

Recreational opportunities offered in Protected Natural Areas: analysis of the most visited National Parks in Brazil and the United States of America in 2017.

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Abstract

National Parks (NPs) are instruments for nature protection and tourism that demand tools for proper visitation. With the advance of tourism in these areas, NPs assume a double responsibility: to maintain visitor experience quality and to contribute with all their potential to society. In this sense, the Recreation Opportunity Spectrum (ROS) tool categorizes “Visitation Opportunities” classes (Pristine, Primitive, Natural, Rural, and Urban) to identify specific attributes of each environment and each visiting public and, thus, organize tourist use. In this scenario, we aimed to analyze the opportunities offered in 10 National Parks, five in Brazil and five in the United States (US), to understand how different Opportunity Classes can influence tourist visitation. The data were drawn from bibliographic and documentary research. After identifying the tourist potential of each NP, we applied the ROS methodology. The results showed a relationship between the number of opportunities offered and the number of visitors received by the National Parks, confirming the assumption that, both in Brazilian and American parks, different recreational opportunities are related to the largest number of visitors. Thus, the Recreation Opportunity Spectrum (ROS) tool presents itself as an important management tool for tourism visitation. The possibility of creating visitation classes in natural areas must be widely used to guarantee sustainable tourism.

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INTRODUCTION

In the context of Protected Area (PA) establishment policies in Brazil, National Parks (NPs), which are important strategies for nature conservation and tourism development, became the most acknowledged and traditional PA category (DRUMMOND et al., 2010; CUNHA and SPINOLA, 2014; PIRES and RUGINE, 2018). NPs are included in protected area systems all over the world, especially in European and American countries (MENEGUEL and ETCHEBEHERE, 2011; SALVIO and GOMES, 2018).

According to the International Union for the Conservation of Nature (IUCN, 2019), the primary objective of National Parks is to protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, besides promoting environmental education, recreation, and research.

With the advance of tourism in these areas, NPs assume a double responsibility: to maintain visitor experience quality and to contribute with all their potential to society, because they generate both economic and intangible benefits. Economic benefits include those related to tourism and ecosystem services (e.g., maintenance of pure air, clean water, and natural geochemical cycles). Intangible benefits are related to the intrinsic value of nature and the physical well-being associated with the activities conducted in these sites (TERBORGH; SCHAIK, 2002). Thus, if high-quality experiences are provided, visitors themselves lend their support to environmental conservation (MANNING, 2002).

Several studies (BROWN et al., 1978; CLARK and STANKEY, 1979; TAKAHASHI, 2004; BROWN et al., 2005; ICMBIO, 2011b; COELHO, 2015; ICMBIO, 2018a) have discarded the existence of a “typical visitor”, an average tourist that seeks a specific type of activity. In fact, tourists seek a range of varying environments and experiences to fulfill their expectations. Thus, offering different opportunities and environments satisfies various demands from the public. Each visitor is motivated to choose an environment based on their needs and expectations, which are met by the PA activities and might include adventure tourism, ecotourism, geotourism, and others.

In this sense, the Recreation Opportunity Spectrum (ROS) tool improves the

categorization of specific PA zones into different “Classes of Opportunities” (Pristine, Primitive, Natural, Rural, and Urban), from those considered primitive to those that have already undergone some kind of intervention. The relevance of this tool lies in the possibility to reconcile the quality of visitor experience with conservation goals by identifying suitable activities for each area and to each visiting public. Therefore, this tool provides a basis to develop PA management plans and to offer different opportunities to the public (BROWN et al., 1978; CLARK and STANKEY, 1979; ORMSBY et al., 2004; BROWN et al., 2005; ICMBIO, 2011b; ICMBIO, 2018a).

Visitation opportunities emerge from the interrelations between the activities, the environment (biophysical, socio-cultural, and management attributes), the potential experience, and the benefits generated (DRIVER and BROWN, 1978). The combination of these factors (e.g. sceneries and environments suitable for visitation, tourist attractions and activities, access types, lodging and food services, level of infrastructure, institutional presence, among others) varies in each class of the spectrum. The classes are designed based on increasing intensive use, according to natural, social, and management aspects (ROS attributes). Each environment within the PA results from the combination of various experiences for different types of visitors. The spectrum favors this diversity at an adequate level of protection, resource use, and tourist attractions (LEE et al., 2013).

Therefore, this study aimed to understand if the most visited NPs in Brazil and the United States (US) are the ones that offer more recreational opportunities.

MATERIAL AND METHODS

Characterization of the National Parks investigated

This research is composed of the analysis of the five most visited NPs in Brazil and the five most visited NPs in the US, both referring to the year 2017. Charts 1 and 2 present the main characteristics of each NP along with information on public use and visitation opportunities.

The Figure 1 shows the location of the National Parks investigated in Brazil and the United States.

Chart 1 - Information on the five Brazilian National Parks investigated

NATIONAL PARK	BRIEF CHARACTERIZATION AND GEOGRAPHIC LOCATION	TOTAL AREA	YEAR OF CREATION	PUBLIC USE AND VISITATION OPPORTUNITIES
Parque Nacional da Tijuca	Located in Downtown Rio de Janeiro, in the Tijuca mountains, south-central Rio de Janeiro state (RJ), between parallels 22° 55' S and 23° 00' S and meridians 43° 11' W and 43° 19' W. It has a wide touristic structure spread across three sectors (<i>Floresta</i> , <i>Serra da Carioca</i> and <i>Pedra Bonita/Pedra da Gávea</i>). The forest patches are interconnected by trails and buildings.	3.95 thousand hectares	1961	The Park has a touristic structure with more than 150 attractions, 128 km of managed trails for public use, and 52 km of internal roads, besides 69 historical monuments and a visitor center. It comprises both conserved and highly intervened areas, with tourist use across the three sectors. The <i>Corcovado</i> is the Park's main attraction, concentrating 62% of the total number of visits, followed by the <i>Estrada da Vista Chinesa</i> (Belvedere) (16%) and the <i>Floresta da Tijuca</i> Sector (8%).
Parque Nacional do Iguaçu	Located in the far west Paraná region, 17 km from downtown Foz do Iguaçu, between parallels 25° 04' S and 25° 41' S and meridians 53° 58' W and 25° 04' W. The Park is situated in the Iguaçu River basin and shares boundaries with 14 municipalities within a 10-km radius.	185.26 thousand hectares	1939	Connected to the Iguazu National Park (Argentina) through the Iguaçu River, the Park integrates the most important biological continuum of central-southern South America. Through joint efforts between Brazil and Argentina, the region ensures the protection and conservation of 600 thousand hectares of protected areas. Its main attraction is the Iguaçu Falls. Its visitation structure is designed for intensive use, with a visitor center and multiple trail options.
Parque Nacional de Jericoacoara	Created after partial recategorization of the <i>Área de Proteção Ambiental de Jericoacoara</i> (Environmental Protection Area), this NP is located in the municipalities of Jijoca de Jericoacoara, Cruz, and Camocim, on the coast of Ceará state, coordinates 2° 47' S and 40° 30' W.	8.85 thousand hectares	2002	The Park has trails, attractions, and sectors dedicated to wind sports. Its main attractions are the beaches, such as <i>Pedra Furada</i> and <i>Serrote</i> , which are largely visited rock formations. Although it lacks a visitor center, the Park provides tours to the mangroves and temporary lagoons. Its headquarters are located in the Jericoacoara village, which is accessed through the municipality of Jijoca de Jericoacoara, through unpaved trails preferably used by four-wheel-drive vehicles and dune buggies.
Parque Nacional Marinho de Fernando de Noronha	Located in the Fernando de Noronha archipelago, 345 km northeast from Cape São Roque, in Rio Grande do Norte state (RN) and 545 km from Recife, Pernambuco state (PE), between coordinates 3°45' 3°56' S and 32°20' W. Comprises 70% of the main island of the Fernando de Noronha archipelago and all other 21 secondary islands, managed in partnership with the <i>Área de Proteção Ambiental de Fernando de Noronha</i> (Environmental Protection Area).	11.27 thousand hectares	1988	The Park has attractions, trails (such as the <i>Baía do Sancho</i> and the <i>Forte de São Joaquim</i> (tourist attractions) a visitor center, and historical sites divided between the terrestrial land the marine parts of the Park. A few islands, such as <i>Rata</i> , <i>Rasa</i> , and <i>Frade</i> , stand out in the archipelago. Each opportunity offers the possibility of activities that include hiking, marine life observation, and rock climbing. In some sections, only boat trips (and no diving) are allowed. Vessels travel at a reduced speed under permanent inspection. The archipelago has a structure for hosting services that cater to different types of audiences.
Parque Nacional de Brasília	Located in the northwest portion of <i>Distrito Federal</i> (Brazil's Federal District), approximately 10 km from downtown Brasília, between coordinates 15° 38' 28" S and 48° 1' 15" W. Its creation is directly related to the construction of the Federal Capital, due to an agreement between the <i>Ministério da Agricultura</i> (Ministry of Agriculture) and the NOVA CAP – <i>Companhia de Desenvolvimento da Nova Capital</i> (Company for the Development of the New Capital) for, among other tasks, “proposing and creating new forest reserves and stations” in the <i>Distrito Federal</i> . The Park comprises the administrative regions of Brasília, Sobradinho and Brazlândia, and the municipality of Padre Bernardo (Goiás State).	42,39 thousand hectares	1961	The Park offers several activities for public use, with emphasis on the “Mineral Water” pools (terminology used by the public to identify the park). The most attractive places for leisure in the Park are the swimming pools, particularly the Old Pool. Other attractions include the Environmental Education Center and walking and cycling trails. The Park has a visitor center.

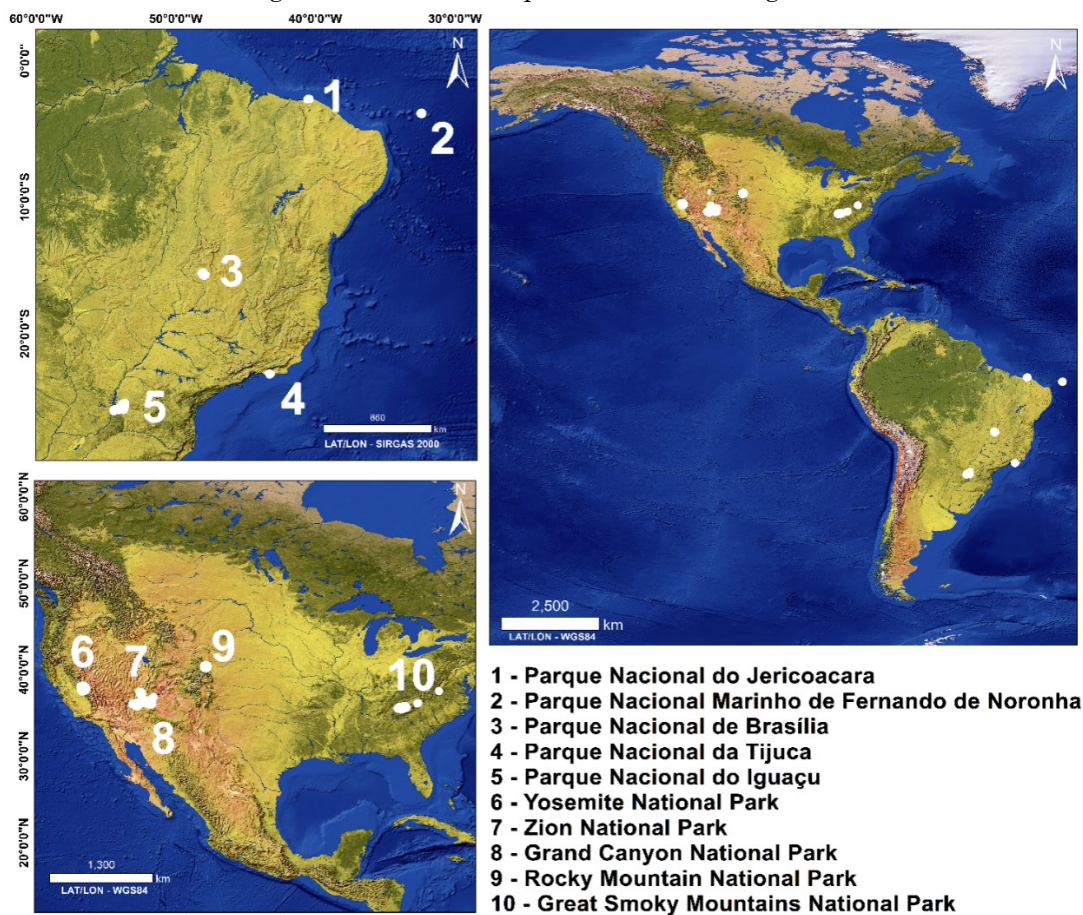
Source: BRASIL (1939); BRASIL (1961); BRASIL (1967); BRASIL (2002); ICMBIO (2017b); ICMBIO (2019a); ICMBIO, (2019b); ICMBIO (2019c); ICMBIO, (2019d); IBAMA; FUNATURA (1990); IBAMA; FUNATURA (1998); ICMBIO; MMA (2008); MEIRELLES et al. (2011).

Chart 2 - Information on the five American National Parks investigated

NATIONAL PARK	BRIEF CHARACTERIZATION AND GEOGRAPHIC LOCATION	TOTAL AREA	YEAR OF CREATION	PUBLIC USE AND VISITATION OPPORTUNITIES
Great Smoky Mountains National Park	Located in the western US region between the states of Tennessee and North Carolina, coordinates 37°11'02"N and 108°29'19"W. One of the largest PAs in the United States.	203 thousand hectares	1934	The Park has areas that allow a range of activities. It preserves 160 historic buildings and structures and maintains 25 trails spread over 800 km with different characteristics for different publics. It allows activities such as cycling, fishing, hiking, horseback riding, waterfall visits, historic tours, and wildlife observation. It also has an information center, three visitor centers, campgrounds, and several feeding, transport, and accommodation areas.
Grand Canyon National Park	This NP is located in the Grand Canyon region of Arizona, between coordinates 36° 6' 3" N and 112° 5' 26" W. The steep canyon that lends its name to the park was formed by the Colorado River and is 446 km long, 29 km wide, and 1.6 km deep.	492.6 thousand hectares	1919	The Park contains two sectors: the South Rim and the North Rim. The South Rim is open to visitors year-round and provides access to Desert View, Hermits Rest, and Grand Canyon Village, a distinctive complex with attractions, activities, and a transportation service. The North Rim is less accessible and closed to visitors between May and October, during the northern hemisphere winter. The Park's main attraction, the Grand Canyon, attracts millions of visitors. It also has three visitor centers, a museum, an information center, and visitation areas with accommodation and food services.
Zion National Park	Located in southwestern Utah, between coordinates 37° 12' 00.3" N and 112° 59' 12.9" W. On July 31 st , 1909, incumbent president William H. Taft issued a proclamation that reserved 15,200 hectares as the Mukuntuweap National Monument. In 1918, another presidential proclamation expanded the monument to 31,080 hectares. In 1919, the US Congress established the area as a National Park. In 1937, another National Monument called the Kolob Canyons was created. In 1956, the US Congress annexed this monument to the NP.	60.1 thousand hectares	1919	The Park offers trails with different types of access and levels of difficulty and attractions for birdwatching and wildlife observation. It has two visitor centers, a human history museum, campgrounds, and several trail options. In addition, Zion Lodge has tourist accommodation and food services, gift shops, and a post office.
Rocky Mountain National Park	Located in Colorado state. The Park's structure is divided into five regions: Region 1 or West Side; Region 2 or Alpine, with accessible trails and lookouts; Region 3 or North Side; Region 4, the central and most visited area of the park, with easily accessible trails; and Region 5 or South Side, which contains the Estes Park/Longs Peak and multiple waterfalls.	107.55 thousand hectares	1915	The Park offers attractions and recreational activities that include hiking, scenic trails, wildlife observation, fishing, environmental education programs, and horseback riding. It offers over 130 trail options along 482 km; 5 campgrounds; 5 visitor centers; 1 information center, and 1 historical museum. The Park has campgrounds but no hotels or inns.
Yosemite National Park	Located in the Sierra Nevada Mountains, California, USA, in Mariposa and Tuolumne counties.	308.1 thousand hectares	1890	The Park has attractions and activities spread over 2,600 km of watercourses, 560 km of roads, and 1,300 km of trails that are open to visitors. The main tourist attraction of the Park, the "Yosemite Valley", encompasses 18 km ² of the Park's total area.

Source: NPS (2013); NPS (2014); NPS (2016); NPS (2019a); NPS (2019c); NPS (2019e); NPS (2020); SANTANA et al. (2016); USA (1864); YOSEMITE (2019).

Figure 1 - Location map of the NPs investigated.



Elaborated by: The authors (2020).

Methodological Procedure

The study was conducted using a qualitative approach based on bibliographic and documentary research (official websites and management plans; PRODANOV; FREITAS, 2013) focused on the year 2017. The data were obtained from the official websites of each conservation unit and the organs responsible for their management. In Brazil, this was the *Instituto Chico Mendes de Conservação da Biodiversidade* (ICMBIO) (Conservation Institute) (CATARATAS DO IGUAÇU, 2019; ICMBIO, 2019a; ICMBIO, 2019b; ICMBIO, 2019c; ICMBIO, 2019d; ICMBIO, 2019e; PARQUE NACIONAL DA TIJUCA, 2019; PARQUE NACIONAL MARINHO DE FERNANDO DE NORONHA, 2019; PORTAL JERICOACOARA, 2019) and, in the United States, the National Park Service (NPS) (NPS, 2019a; NPS, 2019b; NPS, 2019c; NPS, 2019d; NPS, 2019e; ROCKY MOUNTAINS NATIONAL PARK, 2019).

Based on the relevant documents, we researched the tourist features, visitation areas, structure, and attractions of Brazilian (IBAMA

and FUNATURA, 1990; IBAMA and FUNATURA, 1998; ICMBIO and MMA, 2008; ICMBIO, 2011a; ICMBIO, 2017b; ICMBIO, 2018b) and American National Parks (NPS, 1976; NPS, 2001; NPS, 2004; NPS, 2007; NPS, 2010; NPS, 2014; NPS, 2016; NPS, 2017a; NPS, 2017b; NPS, 2017c; NPS, 2017d; NPS, 2018a; NPS, 2018b; NPS, 2018c; NPS, 2018d). This approach reveals relevant information on NP visitation and public use and provides perspective on the activities offered by the conservation units and the range of options available to visitors.

We used the ROS methodology for opportunity analysis (BROWN et al., 1978; CLARK; STANKEY, 1979; ORMSBY et al., 2004; BROWN et al., 2005; ICMBIO, 2011b; ICMBIO, 2018a). This approach has been applied in previous qualitative studies (WALLACE, 2002; SOUZA and NORONHA-OLIVEIRA, 2012; BIRKEMOSE, 2015) to identify specific recreational areas offered by the NPs, allowing recreational opportunities to be zoned into different classes (LEE et al., 2013).

We used the five Opportunity Classes matrix, namely: Pristine, Primitive, Natural, Rural, and

Urban. By directly consulting the documentation, we identified and described the opportunities found by their respective classes to assess whether the parks' features fit into any of the ROS categories (SOUZA and NORONHA-OLIVEIRA, 2012). Chart 3 elucidates these classes by showing the direct questions asked throughout the documentary analysis and the

relationship between their attributes and human intervention degree.

We underscore that our intention was not to compare Brazilian and American NPs, but to jointly assess if the most visited NPs in Brazil and the US offer their visitors an opportunity spectrum for public use.

Chart 3 - Visitation Opportunity Classes according to the degree of human intervention and corresponding attributes

Opportunity Class	Documentary analysis	Class attributes
Pristine	Are there zones with a high degree of naturalness; difficult access; no infrastructure or human intervention; little evidence of recreational activities?	<u>Visitation with a Low Degree of Intervention.</u> High naturalness and integrity of the ecological processes; little evidence of human activities and low probability of encountering other people. The access is difficult, the level of challenges and risks taken by visitors is high and the presence of roads or motorized activities is uncommon.
Primitive	Are there visitation zones with a still high degree of naturalness but with the possibility of access by vehicles and a minimum structure for tourist activity?	<u>Visitation with an Intermediate Degree of Intervention.</u> High naturalness and integrity of the ecological processes; little evidence of human activity. Access trails that should be accompanied by guides; many areas without defined trails; little infrastructure; offers visitors with the opportunity to experience <u>autonomy, solitude, and challenges.</u>
Natural	Are there zones with easily accessible tourist activities, defined trails, tourist infrastructure, campgrounds, and visitor centers?	<u>Visitation with a High Degree of Intervention.</u> The environment has natural characteristics and human activities may take place; the landscape has natural and cultural attributes; access may be motorized or on foot through well-defined trails; encounters and interactions with other visitors are frequent; support infrastructure is planned for intensive visitor use, with information boards and signs; self-guided trails are allowed. <u>This class includes visitor centers and camping areas.</u>
Rural	Are there zones with local communities adjacent to the buffer zone, accessible by roads or rural trails that enable experience with the local way of life and interaction between locals and visitors?	<u>Visitation with a High Degree of Intervention.</u> Comprises natural areas and rural settlements adjacent to the conservation unit's buffer zone. Access is via rural roads and trails that connect the properties to the unit's boundaries; may offer services to appreciate the local culture, practices, and way of life in the region. There is the possibility of interaction between the local population and visitors. The infrastructure is usually simple and rustic.
Urban	Are there zones with a developed commercial or administrative structure for tourism; visible interventions with a predominant human presence and food, parking, and lodging facilities?	<u>Visitation with a High Degree of Intervention.</u> The environment is characterized by a mix of commercial and tourist uses; the area offers tourist services that include transportation, hotels, multiple restaurants, hospitals, and frequent encounters with people from different origins.

Source: adapted from Brown et al (2005); Souza and Noronha-Oliveira (2012); ICMBIO (2018a).

RESULTS AND DISCUSSION

Based on the hypothesis that the most visited NPs are those that offer more recreational opportunities, our study initially highlights that the visitation rates of American NPs are higher than those of Brazilian NPs. In 2017, the total number of visitors in the five American NPs studied was roughly five times higher than the total number of visitors in the five Brazilian NPs (Table 1). It deserves to be mentioned that the two most visited Brazilian NPs, Tijuca and Iguaçu, comprised 78% of the total Brazilian NP

visitors in 2017, whereas the other three NPs in the ranking comprised, together, nearly 22% of the visits.

The parks offer different opportunities distributed among the five opportunity classes (Charts 4 and 5). This scenario indicates a tendency whereby the most visited parks provide more opportunities for visitors and suggest a relationship between the number of recreational opportunities offered and the number of visitors received. This tendency was observed in both Brazilian and American parks (BROWN et al., 2005). Figure 2 shows the opportunity spectrum identified in each country.

Table 1 - Brazilian and American National Parks ranked by number of visits in 2017.

National Parks investigated		Number of visits in 2017
Brazil	<i>Tijuca</i>	3.300.000
	<i>Iguaçu</i>	1.788.922
	<i>Jericoacoara</i>	780.000
	<i>Marinho de Fernando de Noronha</i>	389.744
	<i>Brasília</i>	265.518
	Total	6.524.184
United States	Great Smoky Mountains	11.388.893
	Grand Canyon	6.254.238
	Zion	4.504.812
	Rocky Mountain	4.437.215
	Yosemite	4.336.890
	Total	30.922.048

Source: ICMBIO (2017a); NPS (2020); The authors (2019).

Chart 4 - Recreational opportunities identified in the five Brazilian National Parks according to the five opportunity classes.

NATIONAL PARKS	OPPORTUNITY CLASSES				
	PRISTINE	PRIMITIVE	NATURAL	RURAL	URBAN
TIJUCA	31 visitation areas (50% of the park's total area).	Seven visitation areas (with access trails).	264 visitation areas. A visitor's center; 153 attractions; 128 km of trails.	Three visitation areas (access points to the neighborhoods adjacent to the park).	28 visitation areas (among restaurants, snack bars, picnic areas, parking lots, and gift shops).
IGUAÇU	Three visitation areas (60% of the park's total area).	12 visitation areas (primitive trails).	Nine visitation areas (a visitor's center; four main trails; five attractions).	Four visitation areas (access trails to adjacent municipalities).	Three visitation areas (administration, Porto Canoia station, and food court).
JERICOACOARA	-	Four visitation areas (primitive trails).	26 visitation areas (two sectors for wind sports; 17 attractions; seven trails). Does not have a visitor center.	Eight visitation areas (access trails to villages and settlements adjacent to the park's boundary).	Four visitation areas (guarded entrance gates for access control and visitor registration).
FERNANDO DE NORONHA	Four visitation areas (monitoring and scientific research)	10 visitation areas (boat trip sites).	34 visitation areas (eight trails; 19 attractions; six historic sites; one visitor center).	12 visitation areas (access to surrounding villages and historic sites).	Five visitation areas; 102 accommodation options in the archipelago only.
BRASÍLIA	Four visitation areas (scientific research).	15 visitation areas (surrounding the pristine zone).	Seven visitation areas (a visitor center; trails and attractions).	Two visitation areas (access roads to neighboring municipalities).	Eight visitation areas (restaurants, cafeteria, medical center, bicycle rack, support center, and headquarters).

Source: The authors (2020).

Chart 5 - Recreational opportunities identified in the five American National Parks according to the five opportunity classes.

NATIONAL PARKS	OPPORTUNITY CLASSES				
	PRISTINE	PRIMITIVE	NATURAL	RURAL	URBAN
GRAND CANYON	Nine visitation areas. ("Wild" trails and research areas).	4 visitation areas (primitive trails).	21 visitation areas (three visitor centers; a museum; an information center; 11 trails; Desert View).	Two visitation areas (Desert View Drive and access to the Grand Canyon Village), activities and transportation center.	Seven visitation areas. Information center, restrooms, parking lot, picnic areas, and access to several trails; lodging and restaurants; Grand Canyon Lodge and Grand Canyon Village.
ZION	One visitation area (Zion Wilderness).	Two visitation areas (Zion Wilderness – Backpacking; Timber Creek Overlook Trail).	24 visitation areas (two visitor centers; a museum; three campgrounds; 18 trails).	1 visitation area. South Road – Access to the town of Springdale	4 visitation areas (food and lodging areas). Zion Lodge (opportunity to provide numerous tourist services).
ROCKY MOUNTAINS	Three visitation areas (Specimen Mountain, West Creek, and Paradise Park).	Four visitation areas (Bear Lake, Wild Basin, Longs Peak, Agnes-Vaille).	142 visitation areas (five camping areas; five visitor centers; an information center; a historic museum; 130 trails).	Four visitation areas (trails with a tourist structure that support two roads; they offer access to the surrounding municipalities: Grand Lake and Estes Park).	19 visiting areas. Unlike the other American parks studied, Rocky Mountain does not have hotels or inns, only campgrounds.
YOSEMITE	-	Two visitation areas (Half Dome Trail and John Muir Trail).	22 visitation areas (three visitor centers; Wilderness Center; Museum; Art and Nature Center; Conservation Center; Yosemite's History Center; Hill's Studio; 13 campgrounds).	Four visitation areas (Yosemite Valley; Wawona and Mariposa Grove; Tuolumne Meadows; and Tioga Road). These areas have particular communities that offer tourism practices.	15 visitation areas (lodging sites, food services, picnic areas, and restrooms)

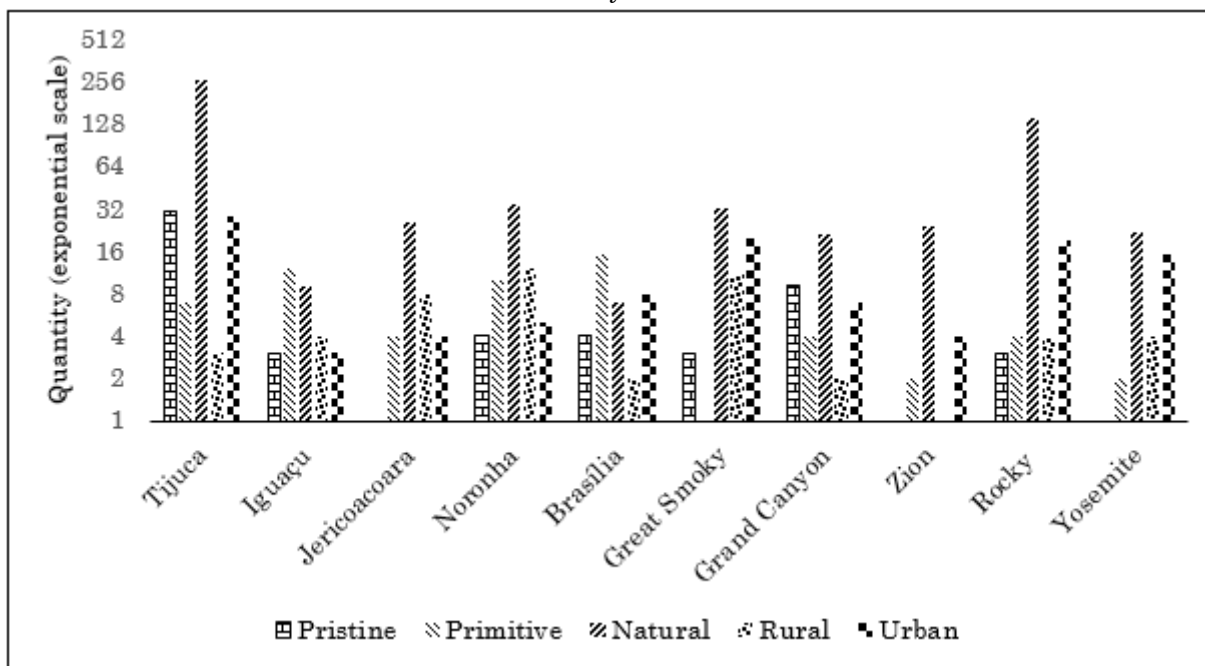
Source: The authors (2020).

According to previous studies (BROWN et al., 1978; CLARK and STANKEY, 1979; TAKAHASHI, 2004; BROWN et al., 2005; ICMBIO, 2011b; COELHO, 2015; ICMBIO, 2018a), for the application of the ROS methodology, there is not a single "typical visitor" profile; rather, the real scenario requires different opportunities and environments to satisfy a range of different audiences. Thus, each environment within a protected area should be able to combine various experiences to satisfy different types of visitors. The spectrum favors this diversity towards a suitable level of protection and use of resources and tourist attractions. All of the NPs studied here offer a range of experiences for potential tourists with

different expectations.

We highlight that the ROS tool can be applied to other management categories, not only in parks. Coelho *et al.* (2015) showed that the establishment of recreation zones in other conservation unit categories contributes to visitation planning and management. For example, defining use norms for each location with clear rules for access and use contributed to the conservation of the *Reserva Particular do Patrimônio Natural (RPPN)* (Private Natural Reserve) *Fazenda Cabeceira do Prata – Jardim* (state of Mato Grosso do Sul, Brazil). The ROS is an essential tool to regulate the unit's public use and management plan.

Figure 2 - Number of recreational opportunities distributed among the five classes in each NP analyzed.



Elaborated by: The authors (2020).

In this perspective, our study showed that the natural, social, and management attributes, all of which are essential for the application of the ROS spectrum, hold significant importance to manage tourist and recreational visitor use. The relevance of the ROS in the organization, planning, and management of tourist recreation contributed to define and classify the opportunity spectrum of each area investigated through the five proposed classes, allowing different objectives and guidelines to be applied to each environment. Thus, the ROS methodology presents itself as an important strategic tool for the management of visitor use.

CONCLUSIONS

Based on the spectrum of opportunity classes proposed by the ROS, all National Parks (NPs) investigated here have attractive recreational classes to attend to various demands. The most visited parks offer different opportunities for different types of tourists, which was observed in both Brazilian and American NPs. According to the literature, the diversity of experiences and opportunities offered in different areas differ significantly according to the number of NP visitors.

Moreover, the visitation rates in American NPs were five times higher than the visitation rates in Brazilian NPs, which face a range of

issues related to the diversity of available attractions, trails and activities, management effectiveness, and human resources and investment. These issues reinforce the need for management tools that enable the maintenance of sustainable tourism and the need for a paradigm shift that involves public policies and behavior related to nature conservation in Brazil.

The management of a conservation unit should be made up by its total set of attributes, including access conditions, activities, structure, and services, aspects that need improvement in Brazilian conservation units. Although each environment within a protected area can offer a range of different experiences, the ROS recommends its list of opportunities to extend beyond the boundaries of the conservation unit, including the opportunities offered in the surroundings and other tourist areas in the region. The planning vision must be broad and the opportunities offered, compatible with the conservation unit category and the pre-established objectives.

The limitations encountered in this study are linked to the fact that the ROS tool does not require interviews with protected area managers or the application of visitor questionnaires. Besides, the management plans and visitation-related documents of the Brazilian NPs investigated here showed an information gap: although the Brazilian law requires the development of a management plan

within five years after the creation of a conservation unit, many of them have used secondary data and remain outdated, with no standardization that could be applied to all Brazilian conservation units. In this sense, the ROS, based on the categorization and zoning of recreational opportunities, can be applied in the development of management plans, allowing public and tourist uses to be organized, planning and management to be strengthened, and suitable rules to be defined in different environments able to receive visitors.

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AUTHORS' CONTRIBUTION

Carolina Ribeiro Gomes conceived the study, analyzed the data and wrote the text. Múcio do Amaral Figueiredo supervised the study, analyzed the data, worked on the writing and revision of the text. Geraldo Majela Moraes Salvio co-supervised the study, analyzed the data, worked on the writing and revision of the text.



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