Geotemas, Pau dos Ferros, RN, Brasil
ISSN: 2236-255X, v. 13, 2023.

THE BALANCED SCORECARD METHOD IN PLANNING BRAZILIAN FEDERAL CONSERVATION UNITS: PATHWAYS TOWARDS STRATEGIC MANAGEMENT

O método Balanced Scorecard no planejamento das Unidades de Conservação Federais Brasileiras: caminhos para uma gestão estratégica

El método Balanced Scorecard en la planificación de las Unidades Federales de Conservación Brasileñas: caminos hacia la gestión estratégica

Suiane Benevides Marinho BRASIL – Instituto Chico Mendes de Biodiversidade (ICMBio); *ORCID ID*: https://orcid.org/0000-0001-8630-8249
URL: http://lattes.cnpq.br/5175525632961348
EMAIL: suianebmarinho@gmail.com

Rodrigo Guimarães de CARVALHO – Universidade do Estado do Rio Grande do Norte (UERN); *ORCID ID*: https://orcid.org/0000-0001-9556-3874
URL: http://lattes.cnpq.br/4013877101488981
EMAIL: rodrigocarvalho@uern.br

Article History
Reveived: 15 june, 2023
Accepted: 29 October, 2023
Published:14 december, 2023

ABSTRACT

In Brazil, the National System of Protected Areas (SNUC) has been expanding with the increasing creation of new Federal, State, Municipal, and Private Conservation Units (CUs). The creation of a CU involves the challenge of effective planning, and management, to enable the achievement of specific objectives for each category in the different Brazilian biomes. Regarding the planning and management of these protected spaces, there are several methods for developing plans that have been changing over time, with a strong tendency to simplify planning, resulting in more agility in the development, lower financial costs, and greater objectivity in the practice of CU management. The purpose of this paper is to present, through a survey conducted in a sample of Federal CUs, the attempt to insert strategic planning using the Balanced Scorecard method for the planning and management of these Units. In conclusion, it was found that the Balanced Scorecard method provided a more focused management, with monitoring and better flow of information. However, there are factors that need to be overcome such as the low number of employees, low financial investment for carrying out the actions set out in planning, low number of people trained in the method, and few Conservation Units using it.

Keywords: Environmental planning; Sustainable development; Nature conservation.

RESUMO

No Brasil, o Sistema Nacional de Unidades de Conservação da Natureza (SNUC) vem sendo ampliado com a crescente criação de novas Unidades de Conservação (UC) Federais, Estaduais, Municipais e Particulares. Com a criação de uma Unidade de Conservação, surge o desafio do planejamento e gestão efetivos que possam viabilizar o alcance dos objetivos específicos de cada categoria nos diferentes biomas brasileiros. Sobre o planejamento e a gestão desses espaços protegidos, existem diversos métodos de elaboração de planos que vêm se modificando ao longo do tempo, com forte tendência à simplificação do planejamento, gerando mais agilidade na elaboração, menor custo financeiro e maior objetividade na prática da gestão das UCs. A pesquisa teve como objetivo apresentar, por meio de um levantamento direcionado a uma amostra de UCs Federais, a tentativa de inserção do planejamento estratégico utilizando o método Balanced Scorecard no planejamento e gestão destas Unidades. Como conclusão, verificou-se que o método Balanced Scorecard proporcionou uma gestão mais focada, com monitoramento e melhor fluxo de informações. Contudo, existem fatores que precisam ser superados como o baixo número de funcionários, baixo investimento financeiro para a execução das ações previstas no planejamento, baixo número de pessoas treinadas no método e poucas Unidades de Conservação o utilizando.

Palavras-chave: Planejamento ambiental; Desenvolvimento sustentável; Conservação da natureza.

RESUMEN

En Brasil, el Sistema Nacional de Unidades de Conservación de la Naturaleza (SNUC) se ha ido ampliando con la creación creciente de nuevas Unidades de Conservación (UC) Federales, Estatales, Municipales y Privadas. Con la creación de una Unidad de Conservación, surge el desafío de una planificación y una gestión eficaces que permitan alcanzar los objetivos específicos de cada categoría en los diferentes biomas brasileños. En cuanto a la planificación y gestión de estos espacios protegidos, existen varios métodos de elaboración de planes que han cambiado a lo largo del tiempo, con una fuerte tendencia a simplificar la planificación, generando más agilidad en la elaboración, menor coste financiero y mayor objetividad en la práctica de la gestión de las UCs. El objetivo de la investigación fue presentar, a través de una encuesta dirigida a una muestra de UCs Federales, el intento de insertar la planificación estratégica utilizando el método Balanced Scorecard en la planificación y gestión de estas Unidades. En conclusión, se constató que el método Balanced Scorecard proporcionó una gestión más centrada, con seguimiento y mejor flujo de información Sin embargo, existen factores que necesitan ser superados como el bajo número de empleados, la escasa inversión financiera para la ejecución de las acciones previstas en la planificación, el bajo número de personas capacitadas en el método y las pocas Unidades de Conservación que lo utilizan.

Palabras clave: Planificación ambiental; Desarrollo sostenible; Conservación natural.

1 INTRODUCTION

Balanced Scorecard is a Strategic Planning method for strategy management, developed in the early 1990s by Robert Kaplan and David Norton, professors at Harvard Business School. For measurement in private companies, the method includes decisive

factors for the performance of any organization, the so-called intangible assets: customer relationship, human, organizational and information capital, and internal processes (Kaplan; Norton, 2004).

The first environmental management experience in Brazil with Strategic Planning using the Balanced Scorecard method (SP/BSC) and the Strategic Map (SM) was carried out in the Caparaó National Park/MG, in 2004. At that time, it was possible to adapt the methodology to the public nature and determine the specificities related to conservation and the sustainable use of biodiversity (Cabral, 2012).

Due to the need of improving efficiency in the management of Federal Conservation Units (CUs), the Managing for Results Program (MRP) was created in 2006 using the Balanced Scorecard method to develop and evaluate the Strategic Planning of 11 CUs in Amazonia. The Program aimed to improve performance, provide transparency to society, and achieve the Excellence in Public Management Model (Marques; Cabral; Araujo, 2012). The work was expanded for eight more CUs in 2009, showing that managing institutions were interested in the agenda of improving management and adopting a way of monitoring the performance of CUs (op cit., 2012).

The SP/BSC has not been used in all Units, and the level of Balanced Scorecard implementation is different among them. There are situations in which this SP/BSC has been developed by the CUs to complement or be included in the management plan, and there are CUs with no plan that have used the SP/BSC to guide their management. In the literature, twenty-nine (29) CUs have been identified using the SP/BSC in their management (Araújo; Marques; Cabral, 2009; Cabral, 2012; Marques; Cabral; Araujo, 2012; Pereira, 2013; Brasil, 2015; Guedes, 2015; ICMBio, 2015b; ICMBio, 2015c; Nunes, 2015; D´Amico, 2016), of which only five (5) do not have a management plan (ICMBio, 2019e).

Since its creation in 2007, the administration of the Chico Mendes Institute for Biodiversity Conservation (ICMBio) has adopted the SP/BSC as a management strategy, aiming to implement the Excellence in Public Management Model (ICMBio, 2018a).

The aim of this research was to analyze the use of the SP/BSC in the management of Federal CUs from the perspective of managers. The specific objectives were: (i) to evaluate managers' perceptions of the effectiveness of using the Balanced Scorecard in the planning and management of CUs; (ii) to identify the strengths and weaknesses of using the Balanced Scorecard in the management of CUs; and (iii) to evaluate the relationship between the management plan and the use of the Balanced Scorecard in the management of Federal CUs.

This research is socially relevant for discussions on the improvement of the effectiveness in the management of Conservation Units, and for disseminating the current situation of implementing the Balanced Scorecard method, resulting in valuable information for the managing body, as well as for sharing successful management experiences among managers, researchers, and other interested actors.

2 MATERIALS AND METHODS

2.1 Study area

The study was initially aimed at the three hundred and thirty-four (334) Federal CUs in Brazil directly managed by the Federal Government, distributed across the various Brazilian Biomes. The Federal Private Natural Heritage Reserves were not the subject of this research, as they are managed by their owners. When sending the questionnaire to the managers, the universe of three hundred and four (304) CUs was considered, as thirty (30) of them had no manager or were managed by other institutions. In the end, the questionnaire sample had seventy-four (74) responses, corresponding to eighty-one (81) CUs, considering the existence of Integrated Management Centers (IMCs) that manage more than one CU.

2.2 Search design

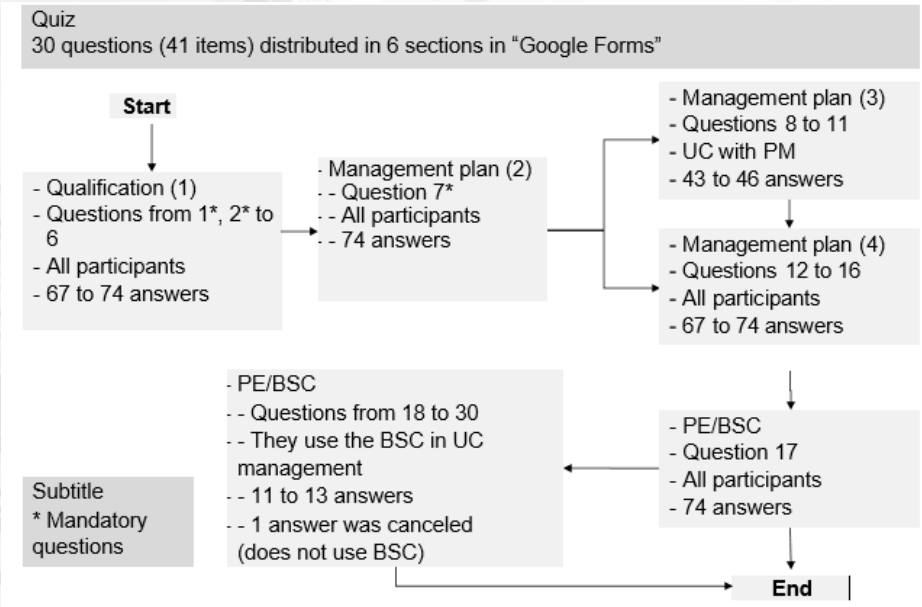
The bibliographic search was carried out on the Google Scholar, Scielo, and Periódicos Capes websites on the Internet, using the following keywords in Portuguese and English: protected area, conservation units, management plan, planning, and management. Scientific publications, management plans, information, and technical books and reports were searched on the ICMBio and the Ministry of the Environment official websites. The search had the advantage of providing the researcher with greater coverage and understanding of the subject of study (Prodanov; Freitas, 2013; Gil, 2008). Data on publications and number of management plans were collected from the Chico Mendes Institute for Biodiversity Conservation website (ICMBio, 2019b; ICMBio, 2019e).

The main planning methodologies used to develop the management plans, including the Strategic Planning using the Balanced Scorecard, were identified in the literature, in the management plans of some of the CUs, and in other technical documents of the Chico Mendes Institute for Biodiversity Conservation (ICMBio) and the Ministry of the Environment

and Climate Change (MMA). The list of UCs that used the SP/BSC was obtained from the bibliographic search and the data collected in the questionnaire.

The questionnaire was structured (Figure 01) to collect information from managers regarding the following specific objectives: to evaluate managers' perceptions of the effectiveness of using the Balanced Scorecard in the planning and management of Conservation Units, and to identify the strengths and weaknesses of using the Balanced Scorecard in the management of Conservation Units.

Figure 01 – Diagram showing the structure of the structured questionnaire and the variation in the number of answers per sections



Source: Developed by the authors.

The bibliographic search and experience in managing CUs were used to develop the structured questionnaire. The questionnaire was formulated using the Google Forms application, with thirty (30) questions, being fourteen (14) open, sixteen (16) closed (simple and multiple choice), in addition to eleven (11) sub-items with open questions. The survey in the CUs was authorized in the Biodiversity Authorization and Information System (SISBIO) nr. 65363 and has a favorable opinion from the Ethics Committee under Certificate of Presentation for Ethical Consideration (CAAE) nr. 03410818.0.0000.5294.

The researcher asked managers to fill out one questionnaire per CU. This questionnaire collected information about the managers' perceptions regarding the management of CUs, such as management plan, effectiveness of Strategic Planning, and the Balanced Scorecard method.

One member per CU (directly managed by the Federal Government) participated in the study. This participant could be the manager, or a servant assigned by the manager, as long as they expressed interest. Thirty (30) CUs were excluded from the questionnaire sending out process because they had no managers or were managed by other institutions.

The target audience for this survey were ICMBio servants or non-servant heads, who may be of higher or middle level, male or female, CU head servant or coordinator, non-servant head or Strategic Planning focal point. The following criteria were used to include participants: being a Conservation Unit manager, being a head or servant assigned to the CU, being a Strategic Planning focal point, agreeing to participate in the survey. For this survey, the gender of the interviewees, as well as their sexual orientation, physical characteristics, color/race and ethnicity, income, classes or social groups were not criteria for selecting the target audience.

In order to achieve greater adherence to the survey, managers were contacted by e-mail, several times over a period of two (2) months, and by phone (when necessary). The right of these managers not to consent or complete all the questions in the questionnaire was guaranteed, which is why the number of answers per question varied.

The Informed Consent Form (ICF) was sent to the heads of CUs. After signing and sending the ICFs back by e-mail to the researcher, the link to the form for answering the questionnaire was sent to the participants by e-mail. The completed ICFs and questionnaires as well as the tabulated data were archived for five years in a file folder in printed form and digital version on CD or pen drive, and were stored in the cabinet with registration number nr. 65136, at the Laboratory of Coastal Studies and Protected Areas (LECAP), at the State University of Rio Grande do Norte.

2.3 Data analysis

Data on publications and the number of management plans were evaluated in terms of frequency, mean, and standard deviation. The questionnaire data were analyzed by the number of answers obtained for each item. Descriptive statistics were used to evaluate the mean value and frequency of answers. The content to create answer categories based on the descriptive responses was used to help in the analysis of the open questions.

The CUs were separated into two large groups: those without and those with Strategic Planning using the Balanced Scorecard method. The first group was analyzed synthetically to be part of the discussion on planning and management of Conservation Units. Then, content analysis was used to create descriptive answer categories based on

the subjective responses of the CUs. The answers to the simple closed questions and multiple-choice questions were analyzed using graphs and tables. Some of the managers' answers were included in the text due to the difficulty in fitting them into the categories created.

To analyze the effectiveness of CU management, BioEstat 5.3 was used to carry out t-tests for two independent samples, and for various treatments according to the sample groups selected. For that, data on Conservation Unit management effectiveness from 2019 were used, included in a spreadsheet available on the SAMGe website. The result was considered non-significant when $p>0.05$.

3 RESULTS AND DISCUSSION

3.1 Characteristics of interviewees

Most of the managers who answered the questionnaire were heads (74.32%, n=55). Servants assigned to CUs (who were not heads) were allowed to answer the questionnaire and they accounted for 25.68% (n=19) of the total answers. Of the respondents, 4.05% (n=3) were not Federal Government servants. Data showed that most CUs were managed by public servants, also in the Amazon biome, which enables ICMBio to invest in ongoing processes to train managers.

The training of managers is essential for improving the performance in CU management. For this reason, ICMBio has provided training in various planning methodologies used in the management of these areas. However, the results of the survey showed that only thirty (30) respondents reported having been trained in SP/BSC, the largest number being assigned to the Atlantic Forest and the second largest to Amazonia.

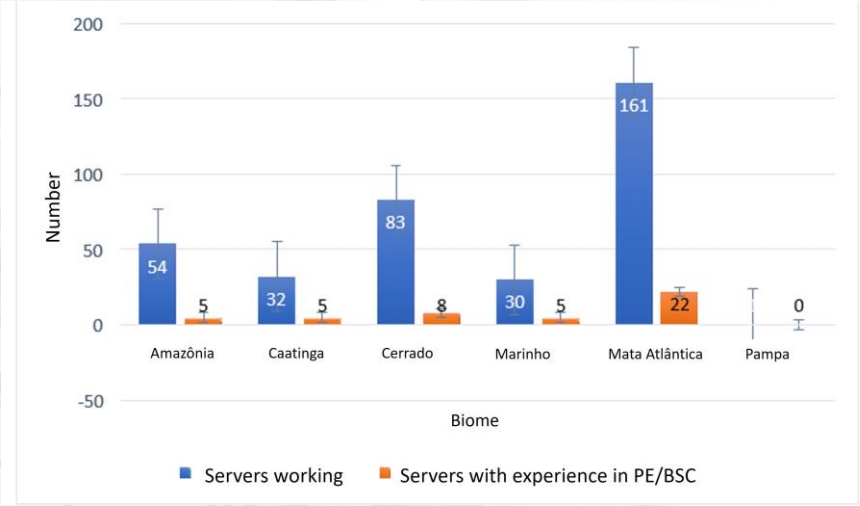
3.2 Strategic Planning using the Balanced Scorecard method

There was no consolidated information available on which CUs had the SP/BSC. In the survey, interviewees mentioned thirty-five (35) CUs that had used the SP/BSC. Bibliographic and documentary search revealed that another twelve (12) CUs had also used the SP/BSC, totaling forty-seven (47) CUs. Most were located in the Amazon biome (n=23), as a reflection of Federal Government policies and the Amazonia Protected Areas Program (ARPA), followed by the Atlantic Forest biome (n=10). Of this list, the minority (21.28%, n=10) of CUs had no management plan. This showed that the SP/BSC is more often implemented in CUs that have a management plan, and may even complement it. Therefore,

in a preliminary analysis, they are not established as competing planning models. Furthermore, thirteen (13) CUs were from the Sustainable Use group, and thirty-four (34) were from the Full Protection group, mainly the National Parks (n=19).

Training managers in Strategic Planning would be important for improving environmental management, but it would also be necessary to have people to carry it out. The participants (n= 74) were therefore asked about the number of servants assigned to the eighty-one (81) CUs. The existence of three hundred and sixty-one (361) servants was reported, of which only 12.47% (n=45) had experience with the Balanced Scorecard method (Figure 02).

Figure 02 – Number of servants assigned to Nature Conservation Units and servants with experience in SP/BSC



Source: Developed by the authors.

More than half of the CUs (60.81%, n=45) had small teams of up to four (4) servants. Furthermore, in 28.38% (n=21) of the CUs there were from five (5) to nine (9) assigned servants, 2.70% (n=2) had between ten (10) and fourteen (14) servants and 6.76% (n=5) had more than fifteen (15) assigned servants. A similar situation was observed in the Central Corridor of the Atlantic Forest, where 56.6% of CUs had up to three (3) servants, and 13.33% had only the manager (Schiavetti; Magro; Santos, 2012).

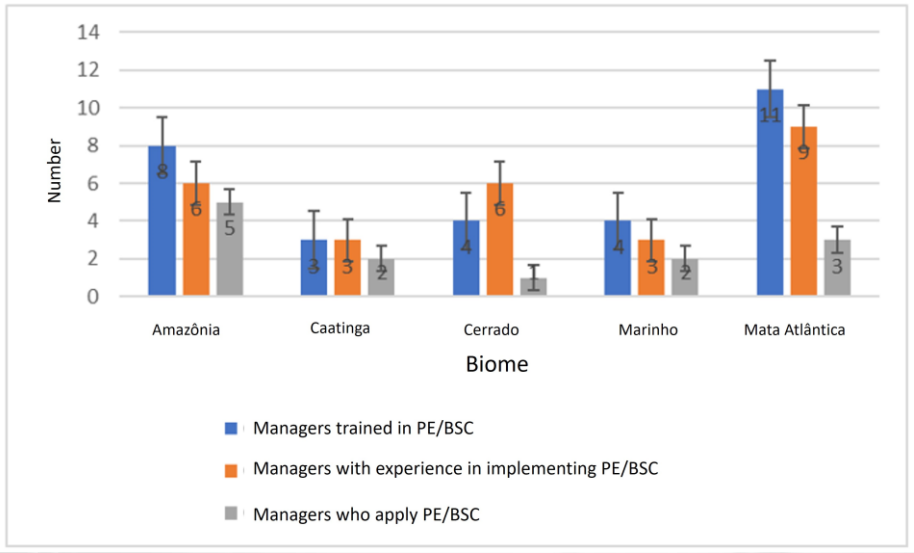
In several studies, this reduced number of people on management teams is one of the difficulties pointed out for the management of CUs (Medeiros; Pereira, 2011; Maganhotto *et al.*, 2014; Teixeira; Venticinque, 2014; Menegassi, 2017). The result confirmed that the teams in CUs remain reduced. The largest number of professionals was found in the Integrated Management Centers (IMCs), which are responsible for managing several CUs.

When the data were distributed across biomes, it was observed that almost half (44.60%) of the servants was assigned to the 25 CUs in the Atlantic Forest biome and had a greater number with experience in Strategic Planning and the Balanced Scorecard method. Only 14.96% of the servants were in the twenty (20) CUs in the Amazon biome and only five (5) servants had experience in SP/BSC. The average number of servants per CU in Amazonia was 2.7 and in the Atlantic Forest it was 6.4 people.

The reduced number of people in CUs in the Amazon biome would constitute a contradiction, since according to Brazil (2019), this biome had the largest area defined as CUs. On this subject, there are doubts about what the Federal Government's policy for managing people employed would be to increase the number of servants at the agency and to reduce their evasion, especially in Amazonia. Considering the reduced number of people in most CUs, the effectiveness of the implementation of the activities that are carried out is compromised, such as: inspection, implementation of the Board, management plan, land regularization, biodiversity monitoring, public use, research monitoring, systematization of administrative processes, and authorization.

ICMBio's investment in training participating managers in this methodology (Figure 03) was made over the years and it was observed that its use in the management of the Unit in the five biomes was always lower than the number of trained and experienced managers.

Figure 03 – Relationship between the number of managers trained and experienced in SP/BSC and the use of the method in the management of Conservation Units



Source: Developed by the authors.

CUs in the Amazon biome were those that used the SP/BSC the most in their management. On the contrary, the trained and experienced managers who were in the

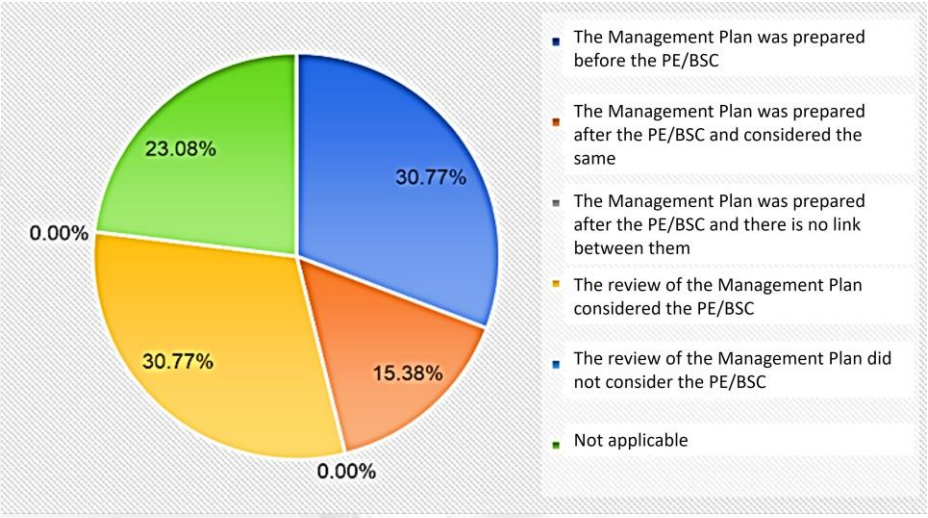
Atlantic Forest biome were those who least used the knowledge acquired in the management of CUs. In Cerrado, the number of trained managers was smaller than the number of experienced managers. In practice, due to discontinuity in training and the lack of application of the SP/BSC, part of this effort to train managers was lost in all biomes.

The SP/BSC has been incorporated into some CU management plans (Marinho Brasil; Carvalho, 2019). In these management plans, the Strategic Map was presented, with the mission, vision for the future, and strategic objectives, as the case of the management plans for the Viruá National Park (ICMBio, 2014), the Maracá Ecological Station (ICMBio, 2015b), the Serra do Pardo National Park (ICMBio, 2015c), and the Planalto Central Environmental Protection Area (ICMBio, 2015a). The Viruá National Park management plan even described the outline of its tactical planning with the indicators and goals defined. In addition, the SP/BSC was part of the revision of the management plan for the Tapajós National Forest, which was published in 2019 (ICMBio, 2019d).

The list of the development and revision of the management plan and the use of the Balanced Scorecard in Strategic Planning (Figure 04) in the management of Conservation Units had thirteen (13) answers. Of these, in 30.77% (n=4) of the CUs, the management plan was developed prior to the use of the SP/BSC, with three of them having former plans dating from 2003, 2008, and 2010. This methodology was used in management from 2006 onwards and has only been used in management plans published since 2014. The use of this Strategic Planning methodology will be discontinued in management plans that follow the ICMBio´s Methodological Roadmap (2018c). However, there was no obstacle to continuing to use it to support the management plan.

The revision of the management plans took the SP/BSC into account in 30.77% (n=4) of the answers, as the case of the revision of the management plans for the Tapajós (ICMBio, 2019d) and Ipanema (ICMBio, 2017b) National Forests. Only in a minority of cases (15.38%, n=2), the management plan was developed after the SP/BSC, considering the protocols already in place in the strategic planning. There are examples, such as the Lago Piratuba Biological Reserve and the Furna Feia National Park, which used this Strategic Planning methodology, but did not have a management plan. It was evident that these managers used the SP/BSC when the Unit did not have a management plan, and there was no obstruction to using this Strategic Planning in the previous phase, during or in the revision of the management plans.

Figure 04 – The relationship between the Management Plan (MP) and the Strategic Planning using the SP/BSC

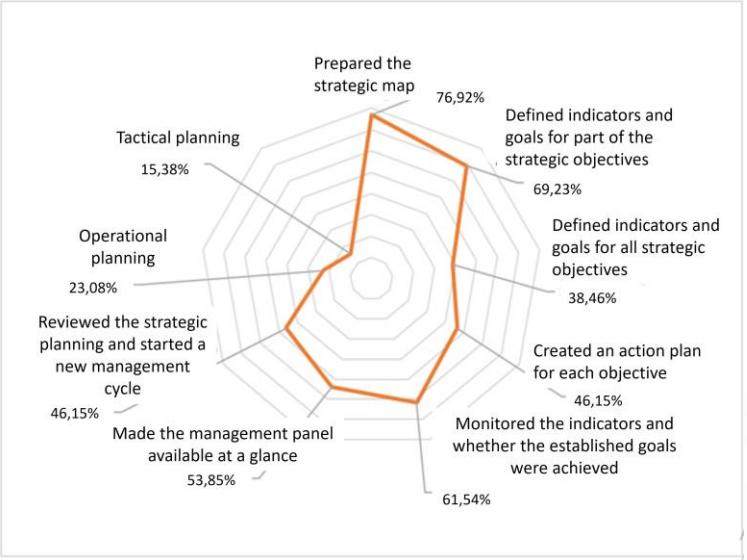


Source: Developed by the authors.

Strategic management, with Strategic Planning and the use of the Balanced Scorecard method, has several stages and tools that could be implemented by Unit managers to achieve Managing for Results. According to thirteen (13) respondents, 76.92% (n=10) of CUs had the Strategic Map (SM), 69.23% (n=9) of managers defined indicators and goals for part of the strategic objectives, and only 38.46% (n=5) of them defined indicators and goals for all strategic objectives. Only 61.54% (n=8) of managers monitored indicators and achievement of goals, and 53.85% (n=7) of them made the results available on the management dashboard for visualization. The Strategic Planning was revised by managers in 46.15% (n=6) of Conservation Units.

Greater managerial effort was observed in the initial planning and monitoring phase, but commitment in the development of the tactical and operational planning and in the revision of the SP/BSC was low (Figure 05). However, to minimize delays or mistakes in decision-making, as well as to make planning more flexible and adapt it to the management direction when required (whether for legal, ecological, social, or economic reasons), it would be necessary to adequately monitor and evaluate the indicators, the achievement of goals, and the actions carried out. Furthermore, recording this monitoring and evaluations would enable current and future managers to learn how to improve processes, as well as result in institutional learning.

Figure 05 – The implementation of the SP/BSC in Federal Conservation Units. Federais



Source: Developed by the authors.

The periods from 2018 to 2019 and 2014 to 2015 showed the highest number of CUs that had developed their Strategic Planning using the Balanced Scorecard method, with 38.46% (n=5) and 30.77% (n =4) of the answers respectively (Figure 06).

Figure 06 – Number of Federal Conservation Units by period in which they began using the SP/BSC in their management

Source: Developed by the authors.

By highlighting the increase in recent years (2018 and 2019), it was shown that there was still effort by the Federal Government related to the process of training managers to

improve the management of CUs for using the SP/BSC. Less than half (44.44%, n=4) of CUs started using Planning in the periods prior to 2013. Reflecting on the history of the use of SP/BSC in the management of Federal CUs, it was inferred that changes in leadership have, in some cases, led to interruptions in the use of SP/BSC. In the Lago Piratuba Biological Reserve, which has been using the SP/BSC in its management since 2006, it was found that the head remains the same and this permanence is a factor that facilitates its continuous application. Corroborating this perspective, Maganhotto *et al.* (2014) point out that the unpreparedness and turnover of servants in some CUs are detrimental to management.

Most managers (61.54%, n=8) have a positive perception of the managerial effectiveness of Strategic Planning using the Balanced Scorecard method, however, quite different opinions were observed. The positive ones related effectiveness to better management performance, management learning, and the delivery of results. Negative opinions were connected to the structural challenges of public management, which were mainly the lack of people and financial resources, and institutional instability. According to Gerhardinger *et al.* (2011), the difficulties were, in part, a reflection of the Brazilian Environmental Policy.

It is observed that the effectiveness of using the Balanced Scorecard, or any other Strategic Planning methodology, is related to the success of the CU´s diagnosis phase, with the identification of management and socio-environmental challenges. Furthermore, Planning must have indicators and the achievement of the goals monitored to improve management processes. Only in this way can Strategic Planning be adaptive and flexible. When managers are not concerned with these issues, even when developing the management plan, there is frustration in their management performance (Barreto; Drummond, 2017).

The advantages identified by managers when using the SP/BSC were similar to the positive points of effectiveness when using this planning method. On the contrary, the managers' statements about the difficulties highlighted factors other than the lack of personnel and funding, such as low motivation, lack of training, team overload, inadequate use of the method, difficulties in establishing indicators and goals for strategic objectives, unrealistic planning, and lack of institutional support.

CU managers make complex decisions using extensive knowledge about biodiversity to try to preserve it. They must always prioritize information on the occurrence of ecosystems and species and the best management strategies, followed by the

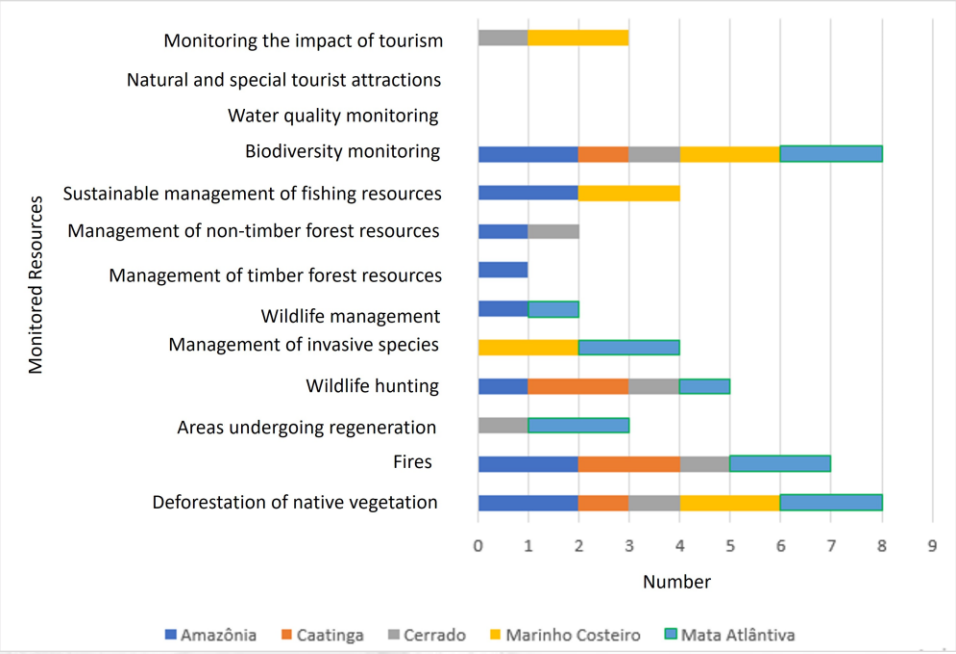
identification of threats (Cook *et al.*, 2012). To facilitate decision-making, they could use information monitored by indicators. These are the measures of compliance with the goals set for the strategic objectives, which should reflect, to a significant extent, the objectives of creating the Conservation Units.

In CUs, indicators measure factors related to management processes, vegetation conservation, management of endangered species, scientific knowledge produced, biodiversity monitoring, and the use of natural resources. The types of indicators set by managers vary by CU category and the scientific knowledge available. Therefore, 46.15% (n=6) believed that by using indicators, it would be possible to evaluate the achievement of the CU objectives, 23.08% (n=3) said no, 15.38% (n=2) considered it could be partially applicable, and another 15.38% (n=2) said it was not applicable. The managers made the following comments: “[...] increased recovered area”; “It is possible to check the achievement of the CU objectives by monitoring indicators”; and “It was not possible to clearly perceive the achievement of the creation objectives. For this, it would be necessary to monitor indicators more related to the conservation of biodiversity and abiotic aspects”.

There are many threats to CUs, such as hunting, grazing, plant extraction, wood extraction, illegal access, fire, and agriculture, being hunting the most constant threat for all, followed by plant extraction (Schiavetti; Magro; Santos, 2012). Managers (11 answers) indicated that the natural resources and threats they faced were monitored by management indicators (Figure 07), with 72.73% (n=8) of them monitoring deforestation of native vegetation and biodiversity.

The managers also indicated that in 63.64% (n=7) and 45.45% (n=5) of CUs, burning and hunting of wildlife were monitored, respectively, except in the Coastal Marine biome. In 36.36% (n=4) of CUs, the management of invasive species (in the Coastal Marine and Atlantic Forest biomes), and the sustainable management of fishing resources (in the Amazon, Coastal Marine, and Atlantic Forest biomes) were monitored. In 27.27% (n=3), managers monitored the area under regeneration and the impact of tourism on CUs. Less frequently, managers monitored indicators on management of fauna (18.18%, n=2), management of timber forest resources (9.09%, n=1), and management of non-timber forest resources (18, 18%, n=2). In 27.27% (n=3) of the answers, it was pointed out that managers monitored other indicators, such as the estimate and density of the buffalo population.

Figure 07 – The natural resources and threats that have been monitored with the use of the SP/BSC in the management of Conservation Units



Source: Developed by the authors.

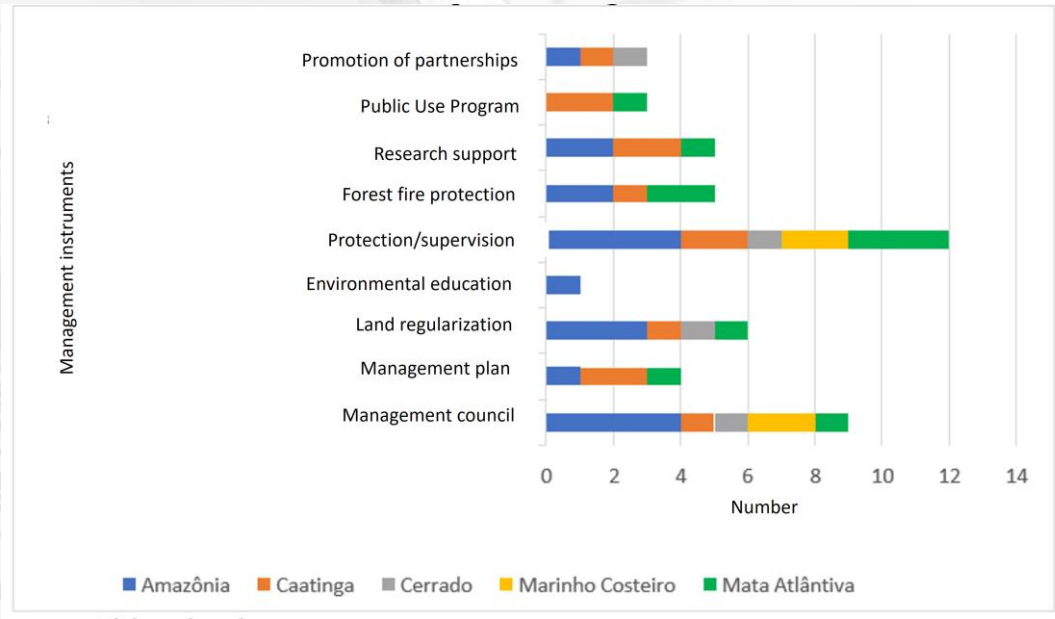
The use of Indicators by managers depended on the CU specificities, such as location, ecosystems, level of implementation, activities that are permitted or prohibited, and natural resources that were under pressure. For example, the management of invasive species was monitored in CUs that are in the Coastal Marine and Atlantic Forest biomes and which have these problems. Deforestation of native vegetation, fires, and biodiversity are the indicators monitored by more than half of CU managers, with the first two, according to ICMBio (2017c), being indicators evaluated by ICMBio in the Integrated Strategic Management System (SIGE) until 2015, and, then, in the institution's performance evaluation processes.

Furthermore, the result showed that managers used several lines of evidence to make decisions and monitor changes in the local context. The same situation was observed in studies analyzing management effectiveness according to Cook *et al.* (2012). Even with planning, there may be uncertainties about conservation problems and the use of natural resources (Haider; Charkhgard; Kwon, 2018).

In addition to natural resources, managers monitored the CUs´ management tools (processes) using performance indicators (Figure 08). All managers who answered (n=12) monitored the indicators related to protection/monitoring. In 75.00% (n=9), managers reported monitoring the management board of the Units in the Amazon, Caatinga, Cerrado,

Coastal Marine, and Atlantic Forest biomes. Half (50.00%, n=6) of the managers monitored the implementation of land regularization, considered a critical process in CUs with pending issues regarding land ownership. Less than half of managers monitored forest fire protection/fighting (41.67%, n=5), and support for scientific research (41.67%, n=5). Interestingly, few managers (33.33%, n=4) monitored the development, implementation, and/or revision of the management plan, which shows that, despite its legal obligation and importance for the management of CUs, this was a neglected process. The minority of managers monitored the program for public use (25.00%, n=3), the fostering of partnerships (25.00%, n=3), and the environmental education and awareness (8.33%, n=1).

Figure 08 – Management tools of Federal Conservation Units distributed by the biomes that were monitored by the performance indicators when using the SP/BSC



Source: Developed by the authors.

Management tools are essential for the effectiveness of CUs. Expanding the consolidation of tools is essential for improving the effectiveness of CUs and overcoming socio-environmental conflicts (Sousa; Serafini, 2018).

It is not possible to measure everything, therefore, measurement is usually focused on the critical factors for achieving the CU´s results. As a result, some of the processes carried out may not have been monitored by managers. However, it was observed that even the critical or strategic processes for implementing CUs were not monitored by most managers, which could lead to inaccuracies in decision-making and management improvement.

The natural resources and management tools that were monitored in CUs were easily identified by managers, but there was little information about the metrics used in Strategic Planning. The definition of management indicators, according to managers, depended on the administrative and scientific data available and, when considering nature conservation, it was very difficult to define indicators that could be monitored with periodic and easily accessible data, which is why simple metrics were set to meet management needs. A manager made the following comment:

> "For the most part, it is difficult to monitor conservation, especially because some of the indicators are difficult to monitor and others require an extended period of time. I think the regeneration and degradation of areas are important. I also think it is important to preserve key species and monitor them if there is expertise for that. Other interesting parameters are the physicochemical ones, such as water quality, which can be monitored with a relatively small volume of resources." (CU Manager).

According to managers, nature conservation in CUs was monitored by indicators considered essential and which were directly and indirectly related to conservation. The managers listed indicators that used measurement units such as numbers, frequency, area, flow, parameters, and density. In this way, general concepts were identified such as the population of fauna and flora species and metrics for minimally evaluating some negative impacts on biodiversity conservation.

The indicators would facilitate better qualification in the evaluation of management effectiveness, which, according to Hockings, Leverington, and Cook (2015), should generally express social, economic, community, and governance aspects. Even when evaluating effectiveness, indicators need to be adjusted, especially those for biodiversity conservation.

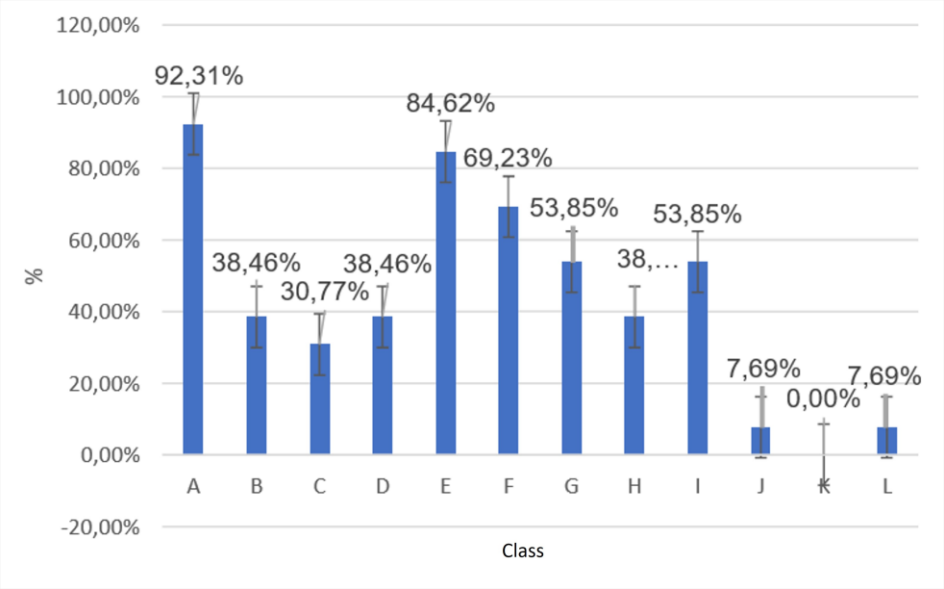
Moreover, no indicator of ecological vulnerability was observed, but according to authors He, Shen, and Zhang (2018), it would be necessary for the management of CUs. In fact, it is a priority to monitor the effects of climate change on biodiversity to adapt decision-making to prevent or mitigate them (Tanner-Mcallister; Rhodes; Hockings, 2017).

In comments from managers, the involvement of servants in Strategic Planning was mentioned as a positive factor. Its effectiveness was related to motivated and committed servers who are aligned with the implementation of the SP/BSC. In this way, the involvement of the team played a key role in the effectiveness of the Conservation Unit management. On this subject, 13 managers indicated that most of their teams (76.92%, n=10) are moderately

involved with the CU's SP/BSC. Only 15.38% (n=2) of the teams were completely involved, and 7.69% (n=1) were quite involved with Planning.

Managers perceived improvements in five management aspects with the application of the Balanced Scorecard in the Conservation Unit (Figure 09), being the guideline the most evident aspect.

Figure 09 – Perception of the 13 managers about the positive aspects of managing Federal Conservation Units using the Balanced Scorecard



Source: Developed by the authors.

Subtitle: (A) Defined a guideline to be followed in the management of the Conservation Unit; (B) It made it possible to identify the beneficiaries of the Conservation Unit; (C) Improved dialogue between the Conservation Unit and society; (D) It made it possible to identify the institutional values of the ICMBio; (E) Provided greater clarity in management processes for the Conservation Unit team; (F) Improved the team's understanding of the management of the Conservation Unit; (G) Enabled greater transparency in the management of the Conservation Unit; (H) Improved communication of the results of the management of the Conservation Unit to society; (I) Improved communication of the results of the management of the Conservation Unit to the ICMBio; (J) There was no improvement in the management of the Conservation Unit; (K) Not applicable; and (L) Others.

Interviewees perceived improvements in management processes related to the team (84.62%, n=11), in the team's understanding of management (69.23%, n=9), in transparency of management for society (53.85%, n=7), and in communicating results to ICMBio (53.85%, n=7). In terms of interaction with society, the local population, in particular, would need to be attracted by conservation, by the ecosystem services provided, by information on the sustainable use, and by restoration of biodiversity to defend CUs against the risks and impacts generated by economic and industrial issues (Dudley *et al.*, 2018).

4 CONCLUSION

Strategic Planning using the Balanced Scorecard method for the management of Federal CUs represents an advance in the attempt to achieve effectiveness in these areas.

Traditional management plans are essential as they provide vast knowledge about the context of the CUs' socio-environmental systems, facilitating decision-making. However, the delay in development and the difficulty in implementing the planned actions are obstacles that have been reducing the perception of the importance of management plans.

In an attempt to speed up and streamline the monitoring process of Managing for Results in Brazilian Federal CUs, the SP/BSC was progressively implemented from 2006 onwards, achieving good results and being considered positive by most interviewees. However, challenges related to the scarce number of human resources, lack of continuity in training, and scarce financial resources affect the possibility of successful planning process.

It was observed that the SP/BSC can be implemented alone or combined with management plans. There must be harmony among the planning tools to adapt the different methodologies with the aim of facilitating the effectiveness of the different categories of CUs in Brazil.

ACKNOWLEDGMENTS

We are grateful for the financial support from the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - CAPES - Brazil.

REFERÊNCIAS

ARAÚJO, M. A. R..; MARQUES, C. P.; CABRAL, R. F. B. **Melhorando a efetividade da gestão de unidades de conservação:** a experiência do programa de gestão para resultados – PGR. Brasília: MMA, 2009. (Série Cadernos ARPA, v. 3).

BARRETO, C. G.; DRUMMOND, J. A. L. Strategic planning in Brazilian protected areas: Uses and adjustments. **Journal of Environmental Management**, London, v. 200, n. 15, p.79-87, set. 2017. Disponível em: http://dx.doi.org/10.1016/j.jenvman.2017.05.064 . Acesso em: 11 jun. 2018.

BRASIL. Ministério do Meio Ambiente. **Lições aprendidas sobre a etapa de planejamento em planos de manejo de UC:** comunidade de ensino e aprendizagem em planejamento de UC. Brasília, 2015. Disponível em:

http://www.mma.gov.br/images/arquivo/80255/LICOES_APRENDIDAS_etapa_planejament o.pdf . Acesso em: 26 jun. 2018.

BRASIL. Ministério do Meio Ambiente. **Cadastro Nacional de Unidades de Conservação do Ministério do Meio Ambiente. Tabela consolidada das Unidades de Conservação**. 2019. Disponível em: https://www.gov.br/mma/pt-br . Acesso em: 27 set. 2019.

BRASIL, S. B. M.; CARVALHO, R. G. **Análise dos métodos de planejamento e gestão de Áreas Protegidas no Brasil**. In: PINHEIRO, L. S.; GORAYEB, A. (org.). Geografia Física e as mudanças globais. Fortaleza: Editora UFC, 2019. E-book.

CABRAL, R. F. B. **As pontes entre a estratégia e a execução das unidades de conservação**. In: Unidades de conservação no Brasil: O caminho da Gestão para Resultados. São Carlos: Rima Editora, 2012.

COOK, C. N. *et al*. Managers consider multiple lines of evidence important for biodiversity management decisions**. Journal of Environmental Management**. London, v.113, p. 341-346. 2012. Disponível em: https://doi.org/10.1016/j.jenvman.2012.09.002 . Acesso em: 20 set. 2018.

D'AMICO, A. R. **Efetividade dos Diagnósticos Ambientais para Subsidiar o Planejamento de Unidades de Conservação Federais no Brasil.** 2016. 59 f. Dissertação (Mestrado em Ecologia) - Universidade Federal de Minas Gerais, Belo Horizonte, 2016. Disponível em: http://hdl.handle.net/1843/BUBD-AAZGAZ . Acesso em: 24 jun. 2018.

DUDLEY, N. *et al*. The essential role of other effective area-based conservation measures in achieving big bold conservation targets. **Global Ecology and Conservation**. v.15 jul. 2018. Disponível em: https://doi.org/10.1016/j.gecco.2018.e00424 . Acesso em: 28 nov. 2019.

GERHARDINGER, L.C. *et al*. Marine Protected Dramas: the flaws of the Brazilian National System of Marine Protected Areas. **Environmental Management**. v. 47, p. 630-643, 2011. Disponível em: https://doi.org/10.1007/s00267-010-9554-7 . Acesso em: 29 maio 2020.

GIL, A. C. Como Elaborar Projetos de Pesquisa. 6. ed. São Paulo: Atlas, 2008.

GUEDES, F. B. **Planejamento Estratégico da Área de Proteção Ambiental de Guaraqueçaba: etapa de elaboração das diretrizes e mapa estratégico**. 2015. 31f. Trabalho de Conclusão de Curso (Formação em Gestão para Resultados) - Instituto Chico Mendes de Conservação da Biodiversidade, Antonina, 2015. Disponível em: http://ava.icmbio.gov.br/mod/data/view.php?d=17&rid=2337 . Acesso em: 26 jun. 2019.

HAIDER, Z.; CHARKHGARD, H.; KWON, C. A robust optimization approach for solving problems in conservation planning. **Ecological Modelling**. v.368, p. 288-297. jan. 2018. Disponível em: https://doi.org/10.1016/j.ecolmodel.2017.12.006 . Acesso em: 20 set. 2018.

HE, L.; SHEN, J.; ZHANG, Y. Ecological vulnerability assessment for ecological conservation and environmental management. **Journal of Environmental Management**. London, v. 206, p. 1115-1125, jan. 2018. Disponível em: https://doi.org/10.1016/j.jenvman.2017.11.059 . Acesso em: 12 dez. 2019.

HOCKINGS, M.; LEVERINGTON, F.; COOK, C. **Protected area management effectiveness.** In: Protected Area Governance and Management. Canberra: ANU Press, 2015.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de Manejo do Parque Nacional do Viruá**. Brasília, 2014.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de Manejo da Área de Proteção Ambiental do Planalto Central**. Brasília, 2015a.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de Manejo da Estação Ecológica de Maracá**. Brasília, 2015b.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de Manejo do Parque Nacional da Serra do Pardo**. Brasília, 2015c.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de manejo da Floresta Nacional de Ipanema revisão**. Brasílias, 2017b. (v.1 - Diagnóstico).

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE. **Relatório de Gestão 2017**. Brasília/DF, 2017c. Disponível em: http://www.icmbio.gov.br/acessoainformacao/images/stories/relatorio_gestao/Relatorio_de_G estao-2017.pdf . Acesso em: 9 out. 2019.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE. **Gestão Estratégica**. Disponível em: http://www.icmbio.gov.br/portal/gestaoestrategica . Acessado em: 1 jun. 2018a.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de Manejo da Área de Proteção Ambiental de Cairuçu**. Paraty, 2018c.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE. **Painel Dinâmico de Informações:** Gestão da Unidade de Conservação. Disponível em: https://www.gov.br/icmbio/pt-br/centrais-de-conteudo/paineis-dinamicos-do-icmbio . Acesso em: 11 set. 2019b.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE-ICMBio. **Plano de Manejo da Floresta Nacional do Tapajós**. Brasília, 2019d. v. 3.

ICMBIO - INSTITUTO CHICO MENDES DE CONSERVAÇÃO DA BIODIVERSIDADE. **Plano de Manejo**. Disponível em: http://www.icmbio.gov.br/portal/planosmanejo . Acesso em: 16 nov. 2019e.

KAPLAN, R. S.; NORTON, D. P. **Mapas Estratégicos - Balanced Scorecard: Convertendo ativos intangíveis em resultados tangíveis**. 7. ed. Rio de Janeiro: Elsevier, 2004.

MAGANHOTTO, R. F. *et al*. Unidades de Conservação: limitações e contribuições para a conservação da natureza. **Sustentabilidade em Debate**. Brasília, v. 5, n. 3, p. 203-221, set./dez. 2014. Disponível em: https://periodicos.unb.br/index.php/sust/article/download/15661/13984/ . Acesso em: 29 maio 2019.

MARQUES, C. P.; CABRAL, R. F. B.; ARAUJO, M. A. R. Programa de Gestão para Resultados (PGR): Uma estratégia de educação continuada para a implementação da gestão de excelência em unidades de conservação participantes do programa de áreas protegidas da Amazônia (Arpa). In: **Unidades de conservação no Brasil**: O caminho da Gestão para Resultados. São Carlos: Rima Editora, 2012.

MEDEIROS, R.; PEREIRA, G. S. Evolução e Implementação dos Planos de Manejo em Parques Nacionais no Estado do Rio de Janeiro. **Revista Árvore**, Viçosa/MG, v. 35, n. 2, p. 279-288, abr. 2011. Disponível em: https://www.scielo.br/j/rarv/a/tq97hvXxR99DY9BcKnSQRFH/?lang=pt. Acesso em: 20 set. 2018.

MENEGASSI, D. **É hora de repensar o Plano de Manejo**. Eco Jornalismo Ambiental. São Paulo, 18 abr. 2017. Disponível em: https://www.oeco.org.br/reportagens/e-hora-de-repensar-o-plano-de-manejo/ . Acesso em: 1 jun. 2018.

NUNES, L. B. M. **Planejamento estratégico do Parque Nacional da Furna Feia:** diretrizes e mapa estratégico. 2015. 31f. Trabalho de Conclusão de Curso (Formação em Gestão para Resultados) - Instituto Chico Mendes de Conservação da Biodiversidade, Mossoró, 2015. Disponível em: http://ava.icmbio.gov.br/mod/data/view.php?d=17&rid=2346 . Acesso em: 28 fev. 2020.

PRODANOV, C. C.; FREITAS, E. C. **Metodologia do trabalho científico:** métodos e técnicas da pesquisa e do trabalho acadêmico. 2. ed. Novo Hamburgo: Feevale, 2013. E-book.

SCHIAVETTI, A.; MAGRO, T. C.; SANTOS, M. S. Implementação das unidades de conservação do corredor central da Mata Atlântica no estado da Bahia: desafios e limites. **Revista Árvore**, Viçosa-MG, v. 36, n. 4, p. 611-623, 2012. Disponível em: http://dx.doi.org/10.1590/S0100-67622012000400004 . Acesso em: 28 maio 2019.

SOUSA, E. E.; SERAFINI, T. Z. Panorama das Unidades de Conservação na zona costeira e marinha do estado de São Paulo. **Desenvolvimento Meio Ambiente**, v. 44, p. 360-377, 2018. Disponível em: https://revistas.ufpr.br/made/article/view/55115 . Acesso em: 29 maio 2020.

TANNER-MCALLISTER, S. L.; RHODES, J.; HOCKINGS, M. Managing for climate change on protected areas: an adaptive management decision making framework. **Journal of Environmental Management**, London, v. 204, p. 510-518, 2017. Disponível em: http://dx.doi.org/10.1016/j.jenvman.2017.09.038 . Acesso em: 12 dez. 2019.

TEIXEIRA, M. G.; VENTICINQUE, E. M. Fortalezas e fragilidades do Sistema de Unidades de Conservação Potiguar. **Desenvolvimento e Meio Ambiente**, v. 29, p. 113-126, 2014. Disponível em: https://revistas.ufpr.br/made/article/view/32843 . Acesso em: 12 mar. 2020.

***