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DANIJELA AVRAMOVIĆ[1]

[1]Faculty of Occupational Safety, University of Nis, Serbia

[1]*danijela.avramovic@znrfak.ni.ac.rs*

EVALUATION OF PROTECTED AREA MANAGEMENT EFFECTIVENESS – AN OVERVIEW OF METHODOLOGIES

Abstract: *Literature contains numerous methods for assessing the effectiveness of protected area management, which are classified in seven categories. The methods differ primarily in the manner of data collection and the manner of implementing protection. This paper analyzes three methods (Management Effectiveness Tracking Tool, Rapid Assessment and Prioritization of Protected Area Management, and Protected Areas Benefit Assessment Tool), which we consider to practically applicable in the evaluation and assessment of protected area management in Serbia.*

Key words: evaluation, effectiveness, protected natural area, methods, management.

INTRODUCTION

Protected areas are designated areas that are protected due to their ecological, cultural, or other values. There are numerous protected areas throughout the world, all of which differ according to their category and level of protection, national legislation regulating their protection, rules of international organizations, etc.

Currently, there are over 147,000 protected areas in the world, covering the total area of ca. 19.3 million km^2, which is 13 % of Earth's total land area, or approximately the size of the entire African continent. In contrast, only 0.8 % of the global ocean area constitutes protected marine areas [2].

During the previous decades, evaluation of management effectiveness has become a significant part of *protected area management*. As a result, a number of methods have been created to assess protected area management effectiveness, some of which are based on the rules of international organizations, such as the *International Union for Conservation of Nature* (IUCN), *World Commission on Protected Areas* (WCPA), and others.

The aim of these methods is to enable the most adequate evaluation of protected area management effectiveness using identification, assessment, consideration, indicator measurements, analyses, and utilization of obtained data. This would create conditions for comparison of factual states and an understanding of individual conditions for each protected area, including scheduled monitoring and planning in order to enable adequate implementation of protective measures and, if necessary, improve the management of a specific protected area.

Protected area management encompasses the following elements:

- ✓ Protected area characteristics, including all its values;
- ✓ Hazards that we encounter in protected areas and their instigators;
- ✓ Visions, goals, tools, and strategies for preserving the values and reducing the hazards;
- ✓ Planning for protection of protected areas (management and work plans);
- ✓ Keeping a log of existing resources (staff, finances, and work equipment) for the realization of protected area management according to adopted procedures; and
- ✓ Political surrounding.

Evaluation/assessment can be viewed, analyzed, and interpreted for each individual element through *management plan* (content and planning), *adequacy and suitability* (inputs and processes), and *realization* (outputs and outcomes).

Nowadays, numerous methodologies for assessing protected area management effectiveness have been developed throughout the world. The document entitled *Management effectiveness evaluation in protected areas – a global study* presents and analyzes over 40 different methodologies used in over 100 countries. Most of those methodologies provide adequate evaluation of protected area management effectiveness. The group of authors of this global study classified the methods in seven categories: International methodologies; African methodologies; Asian methodologies; European methodologies; Latin American and the Caribbean methodologies; Oceanian methodologies; and North American methodologies [7].

Methodology

For the purpose of collecting data, internet and desktop research was made, which was then followed by interviews with key informants and experts in protected area management. The interviews were made face-to-face or via telephone. In addition, information collected

from the interviews was compared with both the literature data, as well as the international documents.

Based on years of field and theoretical research of many protected areas between 2000 and 2010, enough data has been provided on the state of protected area management to allow us to select the most suitable methodologies to be used in Serbia: *Management Effectiveness Tracking Tool, Rapid Assessment and Prioritization of Protected Area Management,* and *Protected Areas Benefit Assessment Tool* [2].

Protected Area Management Effectiveness Tracking Tool

Management Effectiveness Tracking Tool (METT) was developed for the purpose of tracking the progress of improving the evaluation of protected area management effectiveness. This method had originally been intended for protected forest areas, but was soon after adapted by the World Bank to be applicable to all forms of land and marine protected areas. World Bank and the Global Environmental Facility mandate the use of METT in all protected area projects that they finance. The method is currently used to provide data on the evaluation of protected area management effectiveness over time [11].

This method: allows tracking the progress of protected area management improvement; harmonizes reports for multiple protected areas; provides useful information to managers of protected areas; allows quick and simple use; is applicable *in situ* with the use of existing knowledge and information; and is simple and easy to understand by persons who are not experts in the field of protected area management.

In order to analyze the current state of a specific protected area, it is necessary to gather data on the threats, i.e. data pertaining to:

- ✓ Residency and commercial development in the protected area;
- ✓ Agriculture and aquaculture in the protected area;
- ✓ Mining and energy production in the protected area;
- ✓ Transportation network, roads, communication infrastructure, and service network in the protected area;
- ✓ Use of biological resources and resulting damage in the protected area;
- ✓ Impact of humans and disturbance in the protected area;
- ✓ Natural system modifications;
- ✓ Invasive and other problematic species and genes;
- ✓ Pollution reaching the protected area or generated within it;
- ✓ Geological events;
- ✓ Climate change and extreme weather conditions;
- ✓ Specific cultural and social threats.

All existing threats affecting a protected area are identified/marked and appropriately ranked according to the significance of their impact as low, medium, and high threats.

High threats represent the highest level of hazard in terms of degradation of protected area values. *Medium threats* are those that partially influence the degradation of protected area values. *Low threats* are those that are present but with no significant influence on protected area values.

If a specific protected area contains no threats, this should be clearly designated (N/A).

Table 1. *Threats to a protected area* [11, 2]

Threat	Threat level rank			No threat (N/A)
	Low	Medium	High	
Residency and commercial development in the protected area				
Dwelling and human settlements				
Commercial and industrial areas				
Tourism and recreation				
Agriculture and aquaculture in the protected area				
Annual and other crop cultivation				
Animal husbandry				
Aquaculture – fishing, fish farming, and farming of other river organisms				
Mining and energy production in the protected area				
Extraction of coal, oil, and gas				
Exploitation of mineral raw materials				
Energy production, including hydropower stations				
Transportation network, roads, communication infrastructure, and service network in the protected area				
Roads and railroads				
Communication infrastructure and services (e.g. power lines, telephone lines, etc.)				
Numerous canals and locks				
Air traffic				
Roadkill				

Use of biological resources and resulting damage in the protected area				
Hunting, killing, and collection of land animals (includes killing of animals due to conflicts between humans and wild animals)				
Collection of land plant species and related products				
Deforestation and woodsmanship				
Fishing and exploiting aquatic wildlife				
Impact of humans and disturbance in the protected area				
Tourism and recreational activities				
War activities, military exercises, etc.				
Research, educational, and other activities in the protected area				
Activities of the protected area manager (e.g. construction, use of vehicles, artificial dams, etc.)				
Vandalism and other forms of destructive activity affecting the protected area, the managing structure, or the visitors				
Natural system modifications in protected area				
Fires and fire prevention				
Dams, modifications of water surfaces, water management, and water use				
Increased fragmentation within the protected area				
Isolation from other natural habitats (e.g. deforestation, dams without proper passages for aquatic life, etc.)				
Other "borderline" effects on the area's values				
Loss of keystone species (e.g. apex predators, pollinators, etc.)				
Invasive and other problematic species and genera in protected area				
Invasive introduced plant species or their seed				
Invasive introduced animal species				
Pathogenic microorganisms (introduced or native, but causing new problems / increased detrimental effect)				
Introduced genetic material (e.g. genetically modified organisms)				
Pollution reaching the protected area or generated within it				
Household and urban waste water				
Sewage and waste water from buildings in the protected area (e.g. hotels, public restrooms, administrative buildings, etc.)				
Waste water and waste material from industry, mines, and other commercial facilities and buildings (e.g. water from hydropower stations, which can be thermally contaminated, deoxygenated, or contaminated in another way)				
Waste water and other pollutants from agriculture and forestry (e.g. fertilizer and pesticide contamination)				
Municipal solid waste				
Air pollution				
Other types of pollution, such as thermal pollution, light pollution, etc.				
Geological events in protected area				
Volcanic activities				
Earthquakes (tsunami)				
Landslides				
Soil erosion				
Climate change and extreme weather conditions in protected area				
Changes in habitat composition				
Droughts				
Extreme temperatures				
Storms and floods				
Specific cultural and social threats in protected area				
Loss of connection with the tradition and disappearance of traditional knowledge and skills for protected area management				
Natural decay of locations with high cultural value				
Degradation of cultural heritage buildings, special areas, etc.				

Evaluation of protected area management effectiveness is performed by means of an *evaluation form*, which is designed as a table containing *questions*, *criteria*, *evaluations*, *comments/explanations*, and *upcoming activities*.

The *evaluation form* contains 31 question pertaining to: legal status; legislation; law enforcement; goals of area protection; protected area design; establishment of protected area borders; management plan; scheduled work plan; inventory of available resources; safety

systems; research; information database; resource management; number of staff; staff training; current budget; budget security; budget management; available equipment; equipment maintenance; education and raising awareness; planning of water and land use; communication with government institutions and the private sector surrounding the protected area; local population; treatment of protected area by the local community; economic benefit; monitoring and evaluation; buildings/facilities for visitors; commercial tourism organizations and associations; tickets, fees, penalties; and state of the values.

The answers to the questions posed in the form are ranked on a four-level scale: 0, 1, 2, and 3, the purpose of which is to have the respondents provide a clearest possible opinion of the current state in a specific protected area. A *zero* (0) denotes absence of progress or negligible progress, a *one* (1) denotes some/certain progress, a *two* (2) denotes very good progress with room for further improvement, and a *three* (3) denotes the optimal state.

Each question thus offers four alternative answers to allow the respondents to properly evaluate management effectiveness.

There are also additional three groups of questions, which define in more detail the key topics covered by the previous questions and offer additional information and facts. In case a question is not relevant for a specific protected area, it is left out.

After a completed evaluation of protected area management effectiveness, the points are summed up and the mark is expressed as percentage for: content, planning, inputs, results, and assessments.

Rapid Assessment and Prioritization of Protected Area Management

Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) is classified as a so-called international methodology, as developed by the *World Commission on Protected areas* (WCPA) [5].

The RAPPAM enables: identification of strengths, constraints, and weaknesses of management plans; analysis of scope, severity, prevalence, and distribution of threats and pressures; identification of areas of high ecological and social importance and vulnerability; indication of urgency and conservation priority for individual protected areas; use of prioritized policy interventions to protect protected areas; and implementation of follow-up steps to improve protected area management effectiveness.

Use of this methodology will provide answers to the following questions:

- ✓ What are the threats facing protected areas and how serious are they?
- ✓ How do protected areas compare with one another in terms of infrastructure and management capacity?
- ✓ What are the results of management?
- ✓ What is the urgency for taking actions in a protected area?
- ✓ What are the important weaknesses of management in a protected area?
- ✓ How well do national and local policies support the effective management of protected areas?
- ✓ What is lacking in legislation?
- ✓ What are the most important strategic interventions to improve proteceted area management?

Therefore, this methodology is a relatively quick and simple way to identify trends and problems to be solved in order to improve management effectiveness for a specific protected area.

The RAPPAM is implemented in about 40 countries and in over a thousand protected areas in Europe, Asia, Africa, South America, and the Caribbean.

The methodological framework is based on six main elements of assessment: pressures and threats, planning, inputs, processes, outputs, and outcomes [5, 10].

To assess the effectiveness of *planning*, *inputs*, *processes*, and *outcomes*, the following four-level scale is used: Yes (y); Mostly yes (m/y); Mostly no (m/n); and No (n).

Rapid assessment of protected area management effectiveness is performed thanks to the *rapid assessment questionnaire*, which contains over a hundred questions.

The *rapid assessment questionnaire* includes eight pieces of background information about a specific protected area: name of protected area, date of establishment, size of protected area, name of respondent, date of survey completion, annual budget, specific management objectives, and critical protected area activities.

The most important pressures and threat in a protected area are classified into the following groups: forestry; invasive alien species; fishing and hunting; unsettled property rights or tenure disputes; change of land use purpose; water management; waste water; tourism and recreation; mining; vegetation succession; waterway issue; waste; fire protection issue; and collection of medicinal plants and mushrooms. After a *pressure* has been identified, it undergoes analysis: *extent of an activity* over the past five years (sudden increase, slight increase, no change, slight decrease, and sudden decrease), *scope of impact* over the past five years indicating total severity (severe: occurs throughout in 50 % of its range or greater; high: widespread from 15 to 50 %; moderate: scattered from 5 to 15 %; and mild: localized in less than 5 %), and *permanence* (permanent, over 100 years to recover; long term, between 20 and 100 years to recover; medium term, between 5 and 20 years to recover; and short term, less than 5 years to recover).

What follows is the analysis of *probability* that the threat will occur in the following five years (very high, high, medium, low, and very low).

Assessment of *planning* involves the analysis of: *objectives* (maintenance of biodiversity, management plan, consistency of plans with protected area objectives, understanding of protected area objectives and policies, and local community support of objectives); *legal security* (long-term legally binding protection, no unsettled land tenure or use rights disputes, boundary demarcation, resources, resolution of conflict with the local community); and *site design and planning* (protected area siting, protected area configuration, protected area zoning, land use in the surrounding area, and links to other conserved or protected areas).

Assessment of *protected area inputs* involves the analysis of: *staffing* (level of staffing sufficient for effective area management, staff with adequate skills to perform critical management activities, training and development opportunities suited to the needs of the staff, periodical reviews of staff performance and progress of target realization, and sufficient employment conditions to retain high-quality staff); *communication and information* (adequate means of communication between field and office staff, adequacy of existing ecological and socio-economic data for management planning, adequate means of collecting new data, adequate systems for data processing and analysis, and effective communication with local communities); *infrastructure* (adequacy of transportation infrastructure for performing critical management activities, adequacy of field equipment for performing critical management activities, adequacy of staff facilities for performing critical management activities, adequate maintenance and care of equipment to ensure long-term use, and adequate facilities for visitor use); and *finances* (adequate funding in the past five years for performing critical management activities, adequate funding in the next five years for performing critical management activities, financial management practices that enable efficient and effective protected area management, allocation of expenditures suited to protected area priorities and objectives, and stable long-term financial outlook for the protected area).

Assessment of the *management processes* involves the analysis of: *management planning* (comprehensive and relatively recently written management plan, comprehensive inventory of natural and cultural resources, analysis of and strategy for addressing protected area threats and pressures, detailed work plan that identifies specific targets for achieving management objectives, and research and monitoring results that are routinely integrated into planning); *management decision making* (clear internal organization, transparent management decision making, regular collaboration of protected area staff with partners, local communities, and other organizations, participation of local communities in decisions that affect them, and effective communication between all protected area staff and administration levels); and *research, monitoring, and evaluation* (accurate monitoring and recording of the impact of legal and illegal uses of the protected area, research on key ecological issues that is consistent with protected area needs, research on key social issues that is consistent with protected area needs, regular access of protected area staff to latest scientific research and advice, and identification and prioritization of critical research and monitoring needs).

Assessment of *outputs*, which are consistent with the present threats and pressures, set objectives, and the annual work plan is conducted by analysing the effectiveness in the following fields: threat prevention, detection, and law enforcement; site restoration and mitigation efforts; wildlife or habitat management; community outreach and education efforts; visitor and tourist management; infrastructure development; management planning and inventorying; staff monitoring, supervision, and evaluation; staff training and development; and research and monitoring outputs.

Considering the fact that this methodology involves not only indicators of the state of the protected area system as a whole, but also gathering of facts about individual parts of the area, it has been widely used in different regions of the world.

The Protected Areas Benefits Assessment Tool

A group of authors in cooperation with the *World Wildlife Fund* (WWF) have developed *The Protected Areas Benefits Assessment Tool* (PA-BAT) in order to help nature protection agencies, organizations, and institutions to collect and compare information on the overall benefits of protected areas [4].

Assessment of values and benefits of protected areas is conducted for: promotion and raising of awareness of the population; support of protected area decision making and management; analysis of social impact; commitment of funds; reporting purposes; implementation of the Convention on Biological Diversity and its 20 targets; reduction of losses and pressures on biodiversity; preservation of biodiversity; maintenance of benefits provided by biodiversity; and strengthening of protected area capacities.

Implementation of this tool enables collection of information on the overall value of protected areas, not only from an economic and tourism perspective, but also from the social, cultural, and, above all, economic aspect, for services and resources that protected areas can “offer and develop”.

The methodology has the following contents: Glossary; Protected Area Benefit Assessment Tool (PA-BAT) – Overview; How to Use the PA-BAT; Guidance notes on: Background Information Data Sheet; Background Information Data Sheet; Values and their Benefits to Protected Area Stakeholders Data Sheet; and Guide for Instructors.

The following terms used in PA-BAT are clearly defined in the Glossary: *benefit* – a resource that is being used to provide direct gains to stakeholders; *co-managed protected area* – sharing management authority and responsibility among governmental and non-governmental actors; *community conserved area* – natural and modified ecosystems including significant biodiversity, ecological services and cultural values voluntarily conserved by indigenous, mobile, and local communities through customary laws or other effective means; *governance* – the form of management that is in place within a protected area; *iconic* – an area recognised by a significant number of people as being of unusually high importance from a cultural, historical, spiritual or scientific perspective; *permitted* – compliant with the law; *poverty* – elements of well-being the denial of which contributes to poverty and the improvement in which should contribute to poverty reduction; *protected area* (2 official definitions); *value* – resources of the protected area that could be exploited to produce a benefit; and *wilderness* – a large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

Background information on a protected area includes the following data: name of protected area; size of protected area (ha); location and borders of protected area; date of establishment; ownership details; governance; primary protected area management objectives; data and number of indigenous or traditional people living there; average annual income of protected area employees and local population; population number in the surrounding areas; migrations; human development index; impact of the protected area on local population's poverty reduction; value of biodiversity; and use of resources.

The PA_BAT requires the identification of [4, 2]:

- ✓ *nine main groups of value*: biodiversity; protected area management; food; water; culture and spirit; health and recreation; knowledge; environmental benefits; and materials; and
- ✓ *24 indicators related to the nine groups*: biodiversity value; job creation; wild game hunting; use of wild food plants; fishing; traditional agriculture; livestock grazing; non-commercial water use: drinking, washing/cooking, and commercial water use: irrigation, hydroelectric power, municipal drinking water source; historical values: archaeology, historic buildings, churches, monasteries, etc.; natural values: waterfalls, groves, etc.; wilderness values; collection of medicinal herbs for local or pharmaceutical use; recreational values; resource for knowledge building; contribution to education; collection of genetic material; climate change mitigation: amelioration of local climate impacts / carbon sequestration; soil stabilisation: prevention of erosion, landslides, and avalanches; coastal protection; flood prevention; water protection; pollination of crops; removal of timber; and extraction of other materials: resin, grass, minerals, etc.

Benefits of a protected area for each value in the protected area are assessed by defining their potential value (minor or major); natural value (minor or major); economic value (minor or major); the period of resource exploitation (seasonally, constantly, tempo-rarily, etc.); and the degree of resource utilisation.

Values of any protected natural resource are classified into three groups: no benefit – **0**; some benefit – **1**, and great benefit – **2**.

CONCLUSION

Throughout the world, there are over 40 different methodologies for evaluating protected area management effectiveness. The purpose of introducing a specific methodology for the evaluation of protected area management effectiveness is to provide insight into the basic threats as well as weaknesses of the system. The methodologies are used for periodical assessment of existing management resources and measures reflected in defined goals and planning documentation, which regulate the protection of a specific area. The results of effectiveness of protective measure implementation, i.e. management effectiveness, are for the benefit of all stakeholders so that they could join forces to improve protected area management. The basis of the analyzed methods in this paper was the determination of pressures and threats for a specific protected area and determination of the degree of impact. Analyses of described methodologies revealed that METT methodology have to be slightly adapted for Serbian circumstances, especially in the segment of threats. These findings would form basics for modification of the existing METT methodology, and would be research challenge for future investigations.

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BIOGRAPHY

Danijela Avramović was born in Aleksinac, Serbia, in 1975. She received the diploma in Environmental Engineering, the Master's (2005) and PhD degree (2014) in Environmental Science from the Faculty of Occupational Safety, University of Niš. Her main areas of research include economics of environmental protection, management of natural resources, ecology and biodiversity, etc. She is currently working at the Faculty of Occupational Safety in Nis, University of Nis.

OCENA EFIKASNOSTI MENADŽMENTA U ZAŠTIĆENIM PODRUČJIMA – METODOLOŠKI OSVRT

Danijela Avramović

Apstrakt: U literaturi je prisutan veliki broj metoda za ocenu efikasnosti menadžmenta u zaštićenim područjima, koje se, najčešće, posmatraju u okviru sedam kategorija. Ove metode se razlikuju, pre svega, po načinu prikupljanja podataka, odnosno načinu sprovođenja mera zaštite. Na osnovu analize relevantnih literaturnih izvora, dokumenata i preporuka međunarodnih organizacija u radu su predstavljene metodologije (*Metodologija za praćenje efikasnosti sprovođenja menadžmenta u zaštićenim područjima, Metodologija brze procene i prioritizacije menadžmenta u zaštićenim područjima* i *Metodologija procene vrednosti i dobrobiti zaštićenih područja*), koje, prema našim nalaženjima, mogu naći praktičnu primenu u oceni efikasnosti menadžmenta zaštićenim područjima Republike Srbije.

Ključne reči: ocena, efikasnost, zaštićeno prirodno područje, metode, menadžment.