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International standards for the effective management of protected areas: An overview

Estándares internacionales aplicables al manejo efectivo de áreas protegidas: Una visión general

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ABSTRACT: Protected areas are a necessary means to ensure the survival of species, maintain healthy ecosystems, and preserve landscapes and seascapes in their natural state. Today, the environmental crisis has accelerated the loss of biodiversity. This has direct repercussions not only on the environment but also on human health and well-being. Hence the importance of protected areas in reversing the loss of biodiversity and ensuring life on this planet. This article is therefore dedicated to analysing the Guidelines for Protected Area Legislation issued by the International Union for Conservation of Nature (IUCN). This article presents important parameters such as the inclusion of environmental principles or best management practices to guide States in the development of regulations. What is essential is that the regulations are clear and can be implemented. Concerning management plans, these must contain achievable objectives and actions to achieve long-term preservation. They must also be logically structured to achieve the expected changes. Ultimately, States need to commit to protecting their biodiversity and use the most innovative technological tools so that the regulatory system that is implemented can reverse biodiversity loss and thus ensure that humans can live in harmony with nature.

KEYWORDS: biodiversity, climate change, nature conservation, international law, endangered species, nature reserve.

RESUMEN: Las áreas protegidas son medios necesarios para asegurar la supervivencia de especies; mantener a los ecosistemas sanos y preservar paisajes marinos y terrestres en su estado natural. En la actualidad, la crisis ambiental ha acelerado la pérdida de biodiversidad. Esto tiene repercusiones directas no solo en el medio ambiente sino en la salud y bienestar del ser humano. De ahí la importancia que adquieren las áreas protegidas para revertir la desaparición de la diversidad biológica y asegurar la vida en este planeta. Por ello, este artículo se dedica a analizar las Directrices para la Legislación relativa a Áreas Protegidas emitida por la Unión Internacional para la Conservación de la Naturaleza (UICN). En este artículo se presenta parámetros importantes como la inclusión de principios ambientales o prácticas óptimas de manejo para orientar a los Estados en el desarrollo de normativa. Lo fundamental es que la normativa sea clara y pueda implementarse. Con respecto a los planes de manejo, estos deben contener objetivos y acciones realizables para lograr la preservación a largo plazo. Igualmente, deben estructurarse de manera lógica para lograr los cambios esperados. En definitiva, es necesario que los Estados se comprometan a proteger su biodiversidad y utilicen las herramientas tecnológicas más innovadoras para que el sistema normativo que se implemente pueda revertir la pérdida de biodiversidad y así lograr que los seres humanos puedan vivir en armonía con la naturaleza.

PALABRAS CLAVES: biodiversidad, cambio climático, conservación de la naturaleza, Derecho Internacional, especie en peligro de extinción, reserva natural.

JEL CODE: F13, Q54.

INTRODUCTION

Some places are home to a unique diversity of animal and plant species. For example, the Galapagos Islands were declared a natural world heritage site in 1978 by the United Nations Educational, Scientific, and Cultural Organisation (National Institute of Cultural Heritage, n.d., para. 1). Their richness includes giant tortoises, frigate birds, iguanas, sea lions, dolphins, red mangroves, cactus, etc. Unfortunately, the islands are threatened by human intervention. Overfishing, pollution of water sources, logging, the introduction of invasive species, and climate change, among others, have accelerated the loss of biodiversity globally.

An effective tool to protect these places is the law. If government regulations, plans, and actions are properly developed, biodiversity conservation can be achieved. It should be emphasised that states cannot achieve this goal alone. The protection of these biodiverse areas requires the commitment of the international community. For example, global environmental conventions are the result of negotiations and agreements between states to avoid environmental crises such as mass extinction of species, loss of ecosystems, global warming, etc.

Environmental problems directly affect human beings. For example, the coronavirus pandemic is caused by the environmental crisis we are currently experiencing. The Ecuadorian newspaper El Comercio (2021) published an interview with David Quammen, a specialist in zoonotic diseases, who mentioned the following:

> The ultimate cause of these spills or overflows that bring new viruses to humans is disruptive human interaction with wildlife, especially in highly diverse ecosystems, where so many animal species exist, all carrying unique

> viruses. When we disturb these ecosystems, to extract resources, we expose ourselves to them. (p. 10)

The lesson from this is that everything is interconnected. Thus, environmental degradation has effects not only on the natural environment but also on human beings. The protection of protected areas becomes relevant in the face of new global challenges such as the coronavirus pandemic. States must prevent crises such as these from taking us by surprise again.

The coronavirus pandemic is having devastating effects. However, restrictions imposed to prevent its spread have reduced human pressure on protected areas. Satellite imagery shows improvements in air quality in all countries that have been affected by the pandemic. However, many of these areas depend on resources generated by tourism (Corlett et al., 2020, p. 2). The coronavirus has caused a breakdown in society in the social, educational, and health fields. The environment has benefited to some extent from the reduction of greenhouse gases. These benefits will not last over time due to the gradual return to normality implied by large-scale industrial production.

The study entitled *Impacts of the coronavirus pandemic on biodiversity conservation* (Corlett et al., 2020) refers to the negative effects of the coronavirus pandemic on biodiversity conservation. For example, research to improve protection strategies has been affected by the closure of universities and research laboratories. Education has been delivered through technological means, but many of the subjects are practical. This has caused several problems for biodiversity specialists. Nevertheless, activities have been resuming because several industrialised countries have already immunised most of the population.

The objective of this research is to analyse the importance of declaring protected areas to safeguard biodiversity

at the global level. This analysis will focus on studying the international standards issued by the world environmental authority (IUCN) to guide States in the development of regulations and public policies for the effective governance of protected areas. These guidelines guide states to fill gaps in their legislation on these issues. With this, governments can have better clarity in the design of environmental policies. Governments must incorporate these management principles, which are based on extensive research, to refine conservation strategies. These parameters have been carefully developed so that they can be incorporated or adapted into any legislation.

One of the central points is that planning for the creation and management of protected areas should be developed with an ecosystem approach. For the development of this guide, professionals from various fields were involved, which is why it has a multidisciplinary character. Not only experts in biology and protected areas where needed. To achieve optimal results, professionals from law and other fields were also involved. In this research, I will also address the challenges of incorporating these guidelines into national regulations and management plans. What is important is that legal drafters and authorities make the protection of natural resources a priority. To achieve this, joint work and good planning are needed.

The establishment of constitutional precepts is key within the regulations. For example, the principles of precaution and intergenerational responsibility are substantial within the supreme law. Thus, infra-constitutional regulations must conform with these precepts. Otherwise, antinomies arise between normative statements. Finally, I will present a case study focused on the Galapagos Islands (the national park and the marine reserve) to assess the actions of the authorities in this area and to determine whether international guidelines for the management of protected areas are incorporated.

For all these reasons, governments must look to the future and use new tools to achieve a real change in their legislation. A change that will allow these biodiverse sites to be effectively protected by law.

1. PROTECTED AREAS: AN OVERVIEW

Biodiverse areas can be declared protected areas through internal regulations. Protected areas are a way of preserving nature in its natural state. An interesting article in *National Geographic magazine* states: "There are approximately 200,000 protected areas in the world that are managed according to their category" (Gibbens, 2018, para. 3). The declaration of protected areas is an important tool in the fight against biodiversity loss, so it is important to have scientific knowledge of the area in question to achieve conservation goals. Likewise, the problems to be eliminated must have been identified beforehand. All this is to design an appropriate management plan.

Given the importance of protected areas, it is important to examine their definition to understand their scope. For this, the Convention on Biological Diversity (hereinafter CBD) and the definition given by the International Union for Conservation of Nature (hereinafter IUCN) are taken as a reference. The CBD (1992) defines a protected area as: "a geographically defined area that has been designated or regulated and managed to achieve specific conservation objectives" (art. 2). Substantial elements of protected areas are found in this conceptualisation. These places have a geographically delimited extension, and their purpose is the conservation of biodiversity. It is also inferred that the protection of biotic beings and ecosystems is in situ.

The International Union for Conservation of Nature (2008) document entitled: Guidelines for the Application of Protected Area Categories provides the following definition:

> A protected area is a clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature and its ecosystem services and associated cultural values. (p. 10)

This conceptualisation is more comprehensive than the one mentioned above. Below is a table highlighting the most important elements that emerge from these definitions.

Table 1: Essential Elements of Protected Areas

Term	Description	Comment
Clearly defined geographical space	The term "space" is three-dimensional: it encompasses airspace, surface, underground and underwater spaces. This space must be defined and agreed	A protected area must have a beginning and an end. Only the designated authorities can decrease or increase its size.
Acknowledged	These protected sites should be implemented in the World Database of Protected Areas for global recognition.	Protected areas must be recognised in some way.

Managed by legal or other means	To exist, a protected area does not necessarily have to be legally recognised.	Protected areas can be recognised by legal means and managed by the state or by communities. In Ecuador, all protected areas are managed by the State through the National System of Protected Areas.
Long-term preservation	It means that the authorities must commit themselves to conserve these biodiverse sites in perpetuity. Actions must be sustained over time.	The fact that governments change does not imply that the rights that have been recognised for protected areas will be undermined or undermined.

Source: IUCN (2008, pp. 9-12)
Own elaboration

For a site to be considered a protected area it must meet certain requirements such as: having a clearly defined geographical space, being recognised in some way, and having the preservation of biodiversity as its main goal. Biodiversity is a very complex issue and ranges from the simplest to the most

complex elements. Having examined the essential elements of protected areas, it is essential to define biodiversity. To better understand the scope of protection that these areas have. With the establishment of protected areas, States seek to protect not only animal and plant species but all elements of biodiversity. For this purpose, reference is made to the definition found in the Convention on Biological Diversity. In this international instrument, among the terms used, it is mentioned that biodiversity is:

> The variability among living organisms from all sources including, inter alia, terrestrial and marine ecosystems and other aquatic systems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. (Convention on Biological Diversity, 1992, art. 2)

Biodiversity encompasses simple and complex systems such as ecosystems. In these complex systems, biotic and abiotic beings interact. The scope of protection of protected areas is therefore very broad.

The authorities in charge of the management of these protected areas must create environmental policies with a holistic vision to safeguard all components of biodiversity (animal and plant species, organisms, ecosystems, etc.). For example, the causes of mass extinction of species are multiple, but they are connected. Pollution of water sources prevents these species from surviving.

If we add to this the problem of overfishing, we can understand that there are multiple reasons for the disappearance of these species. To tackle these problems, it is not enough to counteract just one of the causes, such as indiscriminate fishing, but comprehensive policies are required. Dissuasive policies

prevent the degradation of ecosystems so that all species can survive.

Continuing with this study, the international categories of protected areas implemented by the IUCN are mentioned. IUCN (2008) established six categories as a reference framework for States in 1994. This classification is contained in the document Guidelines for the Application of Protected Area Management Categories. The objectives of protected areas vary, but the rationale for their creation is the conservation of biodiversity. For example, category I include strict nature reserve and wilderness area. In areas that have been designated in category I, human access is prohibited because they are very fragile areas. The aim is to avoid negative disruptions to the environment, so severe restrictions have been put in place.

If one takes as a reference the global data source on protected areas (Protected Planet), in which several examples can be found, one of these is the Tsaratanana nature reserve which has been designated in the first category. One of these is the Tsaratanana nature reserve, which has been designated in the first category. In this reserve located on Africa's largest island, the vegetation varies according to altitude, and chameleons and endemic species can be found (FAPBM, 2021, para. 1). Because it is an area with fragile ecosystems, the authorities in charge of protected areas on this island determined that the Tsaratanana reserve should be included in category Ia, which corresponds to a strict nature reserve (Protected Planet, 2021). As a result, human access to this reserve is prohibited.

Protected areas are not homogeneous and have been classified according to their particularities. As mentioned above, in category I, access to humans is prohibited due to the vulnerability of their ecosystems. In other categories, such as category II, which corresponds to national parks, less severe restrictions are imposed, thus allowing certain recreational

activities. Ecuador currently has 11 national parks such as Yasuní (Ministry of Environment, Water and Ecological Transition, 2022, para. 1)[1] . The objectives set out in category II are found in this definition taken from the IUCN Guidelines for the Application of Protected Area Management Categories (2008):

> Category II protected areas are large natural or near-natural areas established to protect large-scale ecological processes, together with the complement of species and ecosystems characteristic of the area, which also provide the basis for environmentally and culturally compatible spiritual, scientific, educational, recreational, and visitor opportunities. (p. 19)

Access to humans in national parks is allowed but environmentally damaging activities such as large-scale fishing are prohibited. These examples are intended to demonstrate that thorough research by experts is needed to understand the environment and to identify the problems affecting species and ecosystems in these areas. In the same way, to include them in the category that most closely resembles their objectives. Based on this exemplification, a table summarising the fundamental aspects of the six categories of protected areas according to the IUCN is presented:

1 In the Yasuní National Park, extractive activities have been allowed, which has led to alterations in the ecosystems and loss of biodiversity. As a result, Ecuador has violated international treaties by allowing mining activities in this biodiverse area, thus ignoring the intangibility of protected areas.

Table 2: Classification of protected areas

Category	Description	Fundamental elements	Comment	Examples
Category I: Strict protection	It is classified as a strict nature reserve and wilderness area. Restrictions are strict due to their fragility. The establishment of infrastructure is not allowed in these areas.	The main objective is to maintain ecosystems and species in their natural state, free from human intervention.	Few places receive this protection and are free from human activities.	The White Goat Wilderness Area in Canada is strictly protected to protect its natural richness, which includes waterfalls and alpine meadows.
Category II: National Park	The main objective is to protect functional ecosystems.	Research, recreational, educational, etc. activities are allowed in national parks. These areas are generally large.	Yellowstone National Park was established in 1872 and is the oldest national park in the United States.	In the Galapagos National Park, you can find unique species such as giant tortoises.
Category III: Monument or natural feature	The main goal is to protect a natural monument such as a cave, an ancient grove of trees, etc.	They are usually limited in extent. However, some monuments may require the protection of a large ecosystem to prevent their destruction.	It is difficult for a natural monument to persist without the protection of its surroundings. In the natural environment, everything is connected.	The natural monument La Portada de Chile is made up of volcanic rocks thousands of years old and is protected because of its natural and cultural value.

Category IV: Habitat/ species	The primary objective is to conserve specific habitats or species.	It seeks to protect or restore species and ecosystems. Species receiving this protection are of international importance.	This category functions to protect species that are in imminent danger of extinction.	The National Wildlife Refuge in Georgia was established to protect endangered bird species such as the American bald eagle.
Category V: Protected Landscape/ seascape	This category is important at the scale of landscape and seascape conservation.	Some category V areas serve as buffer zones.	This category is necessary to restore entire natural systems.	The Clark Lake Preserve is in Alaska. It was created to protect streams and lakes in this natural landscape.
Category VI: Protected area with sustainable use of natural resources	The aim is to protect natural ecosystems and sustainably use natural resources.	The use of natural resources is not on a large scale. This category is intended to facilitate scientific research and environmental monitoring.	It is difficult for natural resources to be used without causing damage to the environment. It is dangerous to allow these activities in areas that have high degrees of diversity.	The Caleta de los Loros Reserve in Argentina receives tourists throughout the year.

Source: IUCN (2008, pp. 16-29)
Own elaboration

Protected areas vary according to their specific conservation objectives. IUCN has developed six categories to help States better plan the actions that can be taken to conserve these areas depending on their characteristics. Having discussed the essential elements of protected areas and their classification, I will now turn to the obligations that arise for states when they declare an area as a protected area. This is important to achieve regulations and policies that ensure their preservation.

The declaration of protected areas creates obligations for states to implement concrete actions to protect their biological diversity. For example, criminal law can be used to punish the illegal trafficking of endangered species. The aim is to reduce the incidence of these crimes and prevent further damage to these natural resources. It is worth taking as a reference the judgment No. 20331-2017-00179 issued by the Specialised Criminal Chamber of the Provincial Court of Guayas in which this crime is configured (2017). The judgment is relevant because, for the first time, those responsible for attacking endangered species in a protected area such as the Galapagos Marine Reserve are being punished.

The events of the above-mentioned case took place on 13 August 2017 in the province of the Galapagos. On that day, the cargo vessel Yuan Yu Leng 999 was detained for being inside the marine reserve of the archipelago. In this inspection, three hundred tons of fish corresponding to species on the red list according to the International Union for the Conservation of Nature (IUCN) for being in danger of extinction were found. Hammerhead and silky sharks were found among the cargo. Hammerhead sharks are sought after in the Asian market for their cartilage-rich dorsal fin.

The magistrates of the Court decided to sentence the twenty Chinese nationals who were apprehended in flagrante delicto to imprisonment for one to three years, depending on

their participation. The crime of illegal transport of protected species of which the crew members of the Chinese boat were accused is typified in the Código Orgánico Integral Penal (2014, art. 247). The legal right protected by the legislation is enshrined in the Constitution of the Republic of Ecuador because the fundamental norm recognises nature as a subject of rights.

It is interesting to examine the Court's arguments for this landmark decision in the defence of nature. The magistrates in this historic ruling pointed out the importance of protecting protected areas due to their natural wealth and the environmental services they provide. They also mentioned that this illegal shark shipment affected the health of ecosystems (Judgment No. 20331-2017-00179). According to the Court and the arguments of experts in the field, the importance of sharks lies in the fact that they are at the top of the food chain and help directly or indirectly to maintain the balance between other species. They also serve as indicators of the state of the oceans. Another essential point for a favourable judgement was the importance of safeguarding and maintaining ecologically balanced ecosystems. As demonstrated, the creation of these protected areas has several benefits such as the restoration of species and entire ecosystems.

2. INTERNATIONAL GUIDELINES FOR EFFECTIVE PROTECTED AREA MANAGEMENT

For the effective management of protected areas, States must develop appropriate regulations and management plans to achieve the proposed conservation goals. Domestic legislation must be brought into line with certain international management principles such as system-wide planning or integrity in perpetuity. Equally, environmental principles must have a binding force. To achieve this, they need to be incorporated into state constitutions. Relevant environmental

principles such as the precautionary principle are recognised in international instruments. International environmental policies and global environmental conventions are key tools for the development of regulations. International environmental instruments such as conventions and general principles create obligations for States. For example, the Convention on Biological Diversity (1992) is:

> The first multilateral treaty to address biodiversity as an issue of global importance, demonstrating concern about its decline and recognising its importance for the viability of life on Earth and human well-being. (National Commission for the Knowledge and Use of Biodiversity, 2022, para. 1).

States that have ratified the CBD must establish measures in their legislation that lead to the protection of all elements of biodiversity. For the law to effectively address all aspects required for the management of these biodiverse areas, States need to be guided by the IUCN Guidelines for Protected Area Legislation (2012). The following is an analysis of the most relevant parameters found in this comprehensive guide.

2.1. Principles and obligations for the planning and development of internal regulation

Regulatory planning for the management of protected areas must be done with a holistic approach. States must also commit themselves to incorporating international recommendations. Among the principles to be observed is integrity in perpetuity, system-wide planning, management based on conservation objectives, and the use of a range of protected area categories. The principle of integrity in perpetuity implies the long-term conservation of protected areas. The Guidelines for Protected Areas Legislation state the following:

> Legal drafters should include in protected area legislation those decision-making processes, incentives, and management tools that facilitate and promote the long-term legal security of protected area designation. The instruments available may vary depending on the legal status of lands and waters designated as protected areas. (IUCN, 2008, p. 20).

Protected areas should be a national priority. That is, it is up to governments to set goals and ensure a long-term budget for their management. The defined guidelines must be sustainable over time. To ensure conservation commitments, it is essential to designate authorities in charge of the administration of protected areas. The rights and obligations of the entities should be established in the regulations. For example, the Ministry of Environment through the Directorate of the Galapagos National Park is the entity responsible for the management of the Galapagos National Park and the Galapagos Marine Reserve. The obligations of this entity are established in the Organic Law of the Galapagos Special Regime (2015, art. 20).

Another strategy to ensure the conservation of protected areas according to the IUCN is:

> The need to entrust the designation of any type of the protected area to be integrated into the official system to the highest political body of the territory concerned (usually the legislature, the head of state, or, in cases where the rules and legal framework are defined in legislation, the minister in charge of protected areas). (IUCN, 2008, p. 20).

If the objectives of these biodiverse areas are not guaranteed to be met, the regulations must be reformed, but the legal status of the area must not be undermined. The designation of protected areas requires thorough research. They are not

decisions taken lightly by governments of the day. Decisions are taken at the highest level if they show positive results and generally last over time. What ensures long-term conservation is the stability and strength of institutions.

The principle of system-level planning means that protected areas are managed as a whole, as the elements of this system interact and are interrelated. "The most effective way to plan for conservation is to address it at a broad scale (i.e., from ecosystems, bioregional, and ecologically functional landscapes and seascapes as a whole)" (IUCN, 2008, p. 26). To ensure the comprehensive protection of protected areas, states must implement actions that are consistent with their environmental policy. To establish conservation objectives, it is necessary to consider the significant environmental problems to be counteracted. In this way, it is possible to act preventively and protect biodiversity on a large scale. For example, to protect marine areas, it is important to recognise buffer zones. The official website of the Fundación Ambiental Acción Verde de la República Dominicana (2017) states the following:

> Buffer areas are protected areas that are established around other protected areas with a higher level of importance. They are created to buffer, control potential impacts, and/or avoid physical damage that threatens the integrity of the natural resources that have been selected for legal protection. (p. 1)

Buffer zones act as a protective barrier for animal and plant species outside the protected area to survive. At the system level, it is not enough to implement regulations with an individual approach. Regulations must have the potential to solve macro-level problems.

The principle of managing conservation objectives means that protected areas should be managed through a

management plan that guides the management of the area in question. As mentioned above, protected areas are classified according to specific conservation objectives and the designation does not reflect the effectiveness or otherwise of management. In these IUCN Guidelines (2008) it is mentioned that: "Management plans are formally recognised in international law and policy as a necessary tool for a protected area management" (p. 34). Management plans contain measures and actions to be implemented by the authorities to prevent or mitigate environmental problems in the areas concerned. They are extensive documents detailing how these actions should be implemented according to their characteristics. In parallel, this guidance decrees that certain key elements should be incorporated into the management plan:

> A legal description of the area, management authorities, description of the resources that justify its designation, the objectives to be achieved, the main threats, activities prohibited and permitted in the area, monitoring plan, duration of the plan, and its review and updating cycle. (IUCN, 2008, p. 35).

If management plans do not meet the proposed expectations, it is because they were poorly designed and do not reflect the priorities of the area. If properly planned, the resources earmarked for their protection can be better managed. In addition, you can increase your capacity to respond to problems and undertake innovative initiatives using the latest technology.

For each protected area, a management plan must be created. The Guidelines state that "it is important to define the legal status of such a plan once it has been approved. Such a plan should have the necessary legal force" (IUCN, 2008, p. 36). Management plans should be enforceable so that States assume the obligation to put in place measures to ensure compliance.

For example, the Management Plan for Protected Areas of the Galapagos Islands for Good Living was approved by the ministerial agreement (Ministerial Agreement 162, 2014). This plan has the necessary legal force and is binding, which ensures its observance. It is advisable to form a common inter-institutional front to strengthen the regulations, as well as to strengthen institutions and management plans to achieve long-term conservation goals.

2.1.1. Axiological core in environmental matters

To guide states in their decision-making, it is crucial to be guided by certain fundamental principles. The author Jordi Jaria Manzano (2019) in his research entitled: The principles of environmental law: Concretions, inadequacies, and reconstruction, states that in environmental matters there is the possibility of building an axiological core through the incorporation of three principles that should be applied globally: the precautionary principle, *in dubio pro natura* and the principle of responsibility. The purpose is to commit states to care for the environment and to establish timely policies and actions on these issues. The precautionary principle has been recognised in several international instruments because of its relevance. The Rio Declaration on Environment and Development (1992) incorporated this principle. This instrument states the following:

> To protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (Principle 15)

When faced with suspicions of environmental damage, states must take measures to avoid alterations to the environment. In environmental matters, this principle is crucial because it is not possible to be completely certain about the magnitude of the damage caused by certain actions. For this reason, the passivity of states is inadmissible. Professor Jordi Jaria Manzano (2019) states that:

> The precautionary principle aims to prevent those activities whose development represents an unacceptable risk, even if there is no certainty that this risk will materialise, and therefore becomes a conceptual matrix oriented to the channeling of human transformation of the Earth System from the point of view of risk limitation. (p. 420)

The precautionary principle is relevant to prohibit environmentally damaging activities through the establishment of legal precepts. For example, in protected areas, extractive activities are not allowed because these disturbances can have serious repercussions on ecosystems and affect animal and plant species. There is insufficient information on all the problems that these economic activities will bring, but it is known that they will completely change the natural state. In the long term, it will influence climate change.

The precautionary principle sets out guidelines for States to add measures within their legislation to reduce or eliminate risk factors. IUCN (2008) in the above-mentioned Guidelines recommends certain actions for States to include this principle effectively in their legislation:

> Use all available information, including the best available scientific information on hazards, human influences, and risk factors, as well as indigenous and traditional knowledge and practices, to characterise

> hazards, assess options and measures to address them, and assign roles and responsibilities. (p. 39)

Technology is advancing at a rapid pace. This tool helps in the development of new inventions that benefit protected areas. Potential threats in these areas must be reduced or eliminated through actions before irreversible damage such as the disappearance of species occurs. Moreover, technologies can be adapted and used to the benefit of these biodiverse territories.

The principle of *in dubio pro natura* implies, according to Ricardo Russo (2009): "a manifestation of the law by its applicators, orienting it towards the understanding of the most appropriate norm for the preservation of the biophysical basis of social reproduction" (quoted by Manzano, 2019, p. 420). When there are contradictions in environmental regulations, what is most favourable to nature should be applied. In case of possible violations of the natural environment, the most favourable measures must be applied to prevent the damage from materialising. This is how this principle is related to the precautionary principle.

The principle of responsibility, according to Gregorio Mesa (2011):

> It implies the limitation of people's sphere of autonomy, constructed in the context of the liberal constitutional tradition, concerning the forms, mechanism, and methods of use, access, extraction, and appropriation of nature and its elements and components, to maintain equity and ensure sustainability. (Cited by Manzano, 2019, pp. 421-422).

To ensure that the rights of nature are not violated, appropriate conservation regulations and mechanisms need to be designed. For example, in protected areas, people's rights are

limited to achieving the proposed goals. Certain activities such as hunting are not allowed in these areas. When environmental infractions or crimes are committed, the corresponding sanctions are applied. In the event of environmental damage, natural persons, legal entities, or the state as a subject of international law are obliged to take the necessary measures to reverse the damage and to assume all the necessary costs. Responsibility for the protection of the environment belongs to everyone.

These optimization parameters, such as the precautionary principle or the polluter pays principle, if included in constitutional law, will have a positive influence on the entirely legal system. The axiological content is the basis for the correct development of law in all areas.

3. INTERNATIONAL TREATY OBLIGATIONS FOR THE CONSERVATION OF PROTECTED AREAS

States must comply with the obligations set out in global environmental treaties, covenants, and conventions. These are mandatory in nature as they have binding force. In reviewing national legal frameworks governing protected areas, it is necessary to determine whether they are in line with international standards. International treaties are extensive. In this section, I will delve into the rules for protected area conservation found in the Convention on Biological Diversity to determine the obligations that arise for states.

The CBD (1992) covers a range of provisions regarding the establishment of protected areas and the measures to be set out in management plans or programs. Article 8 states: "Each Contracting Party shall, as far as possible and as appropriate: (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity" (Art. 8). This precept obliges states to create systems of

protected areas to safeguard biodiversity. The fundamental axes of this convention are the protection of all components of biodiversity. It also mentions the importance of education and research in these areas. The CBD sets the parameters for the creation and management of these biodiverse areas. The importance of adapting internal regulations to these precepts is highlighted.

To achieve true protection under the law, it is necessary to develop mechanisms to ensure compliance with an obligation. International treaties such as the CBD generate obligations to guarantee the intangibility of protected areas.

4. GUIDELINES FOR ENSURING PUBLIC COMPLIANCE WITH REGULATIONS

The purpose of criminal law is to protect important legal assets such as the environment. Punishable conduct in environmental matters, such as illegal trafficking in protected species, is criminalised in most states' criminal codes. For these rules to be enforced, the offences must contain clear definitions so that they can be understood by all. Penalties must be proportionate to the harm caused. The establishment of penalties is necessary to deter the commission of offences.

Civil penalties in environmental matters are essential to compensate the injured party and where possible to redress the damage caused. The Guidelines for Protected Areas Legislation recommend regulating the following aspects: Cost of environmental remediation. That is, the financial penalty should be set following the damage caused. Community service can be imposed on the offender. In this way, the offender assumes direct responsibility for the effects of his actions. Within the civil sanctions, the revocation of environmental permits or the prohibition to continue carrying out environmentally damaging activities must also be foreseen.

Penalties are necessary, but they are not the only tool available to protect nature. Education is a viable instrument to encourage the protection of biodiversity. The Guidelines recommend the following:

> A good way to achieve this is to develop education programs specifically targeted at schools and municipalities to help local people appreciate the significant benefits of establishing a protected area and imposing certain restrictions on access and use. (IUCN, 2008, p. 219).

Schools and higher education institutions have an important role to play in environmental education. The creation of workshops to raise awareness about the importance of protected areas is recommended to promote environmentally friendly practices.

The value of environmental education is examined in the article entitled: *Environmental Education in Environmental Engineering: Analysis of the Situation in Colombia and Latin America*. This research article it is stressed that: education must be oriented towards sustainable development. It is necessary to provide students with the knowledge, skills and attributes necessary to promote environmental, social, and economic well-being and to avoid compromising the needs of current and future generations (Acosta, et al., 2020). Natural resources are depleted through irrational use. For this reason, it is necessary to encourage care for the natural environment.

One of the most innovative careers for training specialists in environmental damage prevention and reduction is Environmental Engineering. Unfortunately, curricula in Latin America need to be updated to respond to current needs. In Colombia, for example, only 5% of the curricula incorporate courses that teach students strategies to face global environmental

challenges. The subjects taught in this career should be aligned with the sustainable development goals proposed by the UN (Acosta, et al., 2020, pp. 10-11). Environmental education from childhood generates positive effects, but it should be borne in mind that the family environment is also a determining factor in whether nature is cared for.

In the research entitled: *The need for ecocentrism in biodiversity conservation*, it is highlighted that:

> Biodiversity conservation does not have to be based solely on human interests, but it is essential to promote ecocentric values, primarily the conviction that species and ecosystems have value and interests that should be respected regardless of whether they serve human needs and aspirations. (Bron et al., 2020, p. 1089)

Human beings should not be at the center of law. Regulation must be oriented towards care and respect for nature based on its intrinsic value. The rights of people and nature must be safeguarded through public policy. Social and environmental problems must be considered a priority in any legislation.

Positive or negative public perceptions of the creation of protected areas influence their success or failure. Community development is often not considered a central issue in planning. The resources generated for the conservation of these areas should include the whole population. Management plans need to incorporate mechanisms to improve social and educational conditions. Also, access to health should be guaranteed. According to Bennet (2016):

> Community perceptions of the social impacts of protected areas are generally assessed in terms of the conservation projects taking place in the areas concerned. Equity in the distribution of costs

> and benefits among all stakeholders such as local communities, non-governmental organisations, and local governments are determinants in generating positive attitudes and support for conservation projects. (Cited by Abukari and Benedict, 2020, p. 2).

The needs of local communities in protected areas must be taken as priority issues to achieve a balance in these areas. *Local communities' perceptions about the impact of protected areas on livelihoods and community development*, the authors analyzed community perceptions in two protected areas in Tanzania and Ghana to identify which initiatives have succeeded and which are failing. Through surveys, they found that the authorities have not established protection mechanisms to improve the livelihoods of their people. In addition, many respondents felt that the prohibition of activities such as hunting or the sale of protected species affects them because it is their only source of income and livelihood (Abukari and Bededict, 2020). In Africa, extreme poverty has not been solved by the government. Sources of employment must be created to prevent further commercialisation of local flora and fauna. If the authorities do not address social needs, any conservation strategy will fail.

For there to be a commitment on the part of citizens, it is necessary to create norms; promote environmental education; promote ecocentric values; include the local community in the decision-making process of protected areas; take social demands as a priority and promote equity in the distribution of resources. This is the only way to achieve true protection of biodiversity and the local communities that inhabit these territories.

5. CASE STUDY: THE GALAPAGOS MARINE RESERVE AND NATIONAL PARK

The Galapagos Islands have an incalculable wealth of animal and plant species of worldwide importance. To conserve this area, a special legal regime was established. The Governing Council of the Special Regime of the Galapagos is the most important entity for the administration of the province in all areas. The Galapagos National Park is the body responsible for the management of the two protected areas (LOREG, 2015, art. 20). The positive aspects of the Organic Law on the Special Regime of the Province of Galapagos are as follows: the regulations incorporate fundamental environmental principles such as precaution. These principles have constitutional status. In addition, environmentally damaging activities such as large-scale fishing and extractive activities have been restricted. The only permitted activity is artisanal fishing (LOREG, 2015, art. 58). On the other hand, administrative, civil, and criminal sanctions are foreseen for causing damage in this province. Depending on the seriousness of the offence or infraction this will be known by the competent bodies.

In developing national regulations, the authorities have been guided by some of the IUCN guidelines such as: incorporating environmental principles into the constitution; establishing rights and obligations of the authorities in charge and limiting harmful activities for conservation reasons.

Another important issue is to study the management plans. The Galapagos Protected Areas Management Plan for Good Living is the tool used for the administration of the Galapagos National Park and Marine Reserve. The IUCN recommends a plan for each protected area; however, an effort has been made to incorporate all the parameters issued by this international organisation through the development of an integrated plan. In theory, a logical order is followed: first, a

contextualisation of the province is made, and the purpose of the plan is established. Second, it mentions the threats to the biophysical component. Third, it sets out six objectives and actions to achieve them (Pan de Manejo de Áreas Protegidas de las Galápagos para el Buen Vivir, 2014).

The plan is a comprehensive document and international recommendations have been followed. However, the lack of budget has impeded achieving all the goals proposed in this planning instrument. Another problem is that the technological tools have not been acquired by the authorities. The evaluation of the management of protected areas would have to be stored in Big Data tools to facilitate the elaboration and interpretation of data. Currently, everything is done manually.

Regulations on the islands are strict and the Management Plan for the Protected Areas of the Galapagos Islands for Good Living (2014) was developed under the guidelines issued by the IUCN. Despite this, the incidence of environmental crime has not decreased for various reasons: lack of commitment from the competent authorities, legal loopholes, lack of budget, etc. For example, there is negligence on the part of the Galapagos authorities who have failed to prevent illegal fishing by international vessels on the high seas. In the Ecuadorian newspaper El Universo, the following is mentioned: In 2020 some two hundred and sixty Chinese vessels caught protected marine species near the Galapagos reserve without any kind of control. This is recurrent and the authorities have not defined strategies to achieve international agreements to regulate fishing on the high seas (2021). Greater control of these protected areas is required so that the regulations do not remain mere statements but can be applied.

CONCLUSIONS

The creation of protected areas is a relevant issue due to the alarming decline of biodiversity in all parts of the world. Radical changes in climate, melting of glaciers, the transformation of ecosystems, disappearance of species, etc. are phenomena that are directly related to environmental damage. Man's survival depends on the health of planet earth. The official website of the confederation Ecologistas en Acción de España (2006) stresses the following:

> Biodiversity loss has negative effects on several aspects of human well-being, such as food security, vulnerability to natural disasters, energy security, and access to clean water and raw materials. It also affects human health, social relations, and freedom of choice. (Para. 2)

Biodiversity provides a multiplicity of services to humans. These areas can be protected by law. Environmental precepts are not only aimed at protecting the environment but also human beings. Regulations for the management of protected areas must be developed in strict accordance with the international guidelines of the IUCN if biodiversity conservation is to be viable. The Guidelines for Protected Area Legislation prioritise the inclusion of certain management principles such as system-level planning in any legislation. It also mentions the importance of including environmental principles such as prevention in State constitutions.

Global environmental conventions such as the Convention on Biological Diversity are successful instruments for the conservation of these areas. One of the obligations arising from this Convention is the duty of States to establish protected areas and to establish actions to achieve the proposed goals. To be able to demand compliance with these national and

international regulations, the precepts must be clear, obligatory, and enforceable.

From the case study of the protected areas in the Galapagos, it can be concluded that the regulations have legal gaps, and the integrated management plan has in theory been correctly designed based on the IUCN Guidelines. Unfortunately, in practice, it has been impossible to fully protect these areas. This is because the legal precepts are often unenforceable and do not have the support of society. For this reason, the rules must be clear so that they are respected by all. The objectives included in management plans cannot be utopian or difficult to achieve. Similarly, the authorities have an irreplaceable role to play in generating effective surveillance, control, and monitoring mechanisms for protected areas.

The Guidelines for Protected Areas Legislation helps states create effective regulations and fill legal gaps on these issues. It is an indispensable tool that, although not binding, provides the most recent parameters to optimise States' protected area legislation. IUCN's recommendations are followed by States because it is a relevant institution with professionals who contribute their knowledge to improve nature conservation in all parts of the world.

IUCN guidelines are referred to in international environmental treaties because of their relevance. States, therefore, need to ensure that their protected areas are backed by enforceable policy precepts using the most advanced technological tools to ensure change and prevent further damage to nature. This is the only way to ensure that humans and all species on planet earth can live together in harmony.

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