# Integrating environmental education in marine protected areas management in Colombia

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## ABSTRACT

Environmental Education (EE) is a key component in any marine protected area management. However, its visibility and action plans are still poorly developed and structured as a clear element in management procedures. The objective of this study is to contribute with a methodological route that integrates EE to the existing model of management planning and strategies, taking the Colombian National Natural Parks System as a case study. The creation of the route is proposed as a participatory research with different stakeholders in order to respond to the specific conservation needs and goals for the National Parks System. The EE national diagnosis has shown that its integration within the parks management structure is a first priority need, being a converging result on the two case studies on National Parks from the Pacific Coast of Colombia. The diagnosis also demonstrates that communication, participation, training and evaluation have to be reinforced, linking the community and stakeholders involved in the park management to the whole EE process. The proposed methodology route has been agreed upon by the National Parks staff and incorporates advice and recommendations from different stakeholders, in order to better include the park users. This step will help us to advance toward sustainable management in marine and coastal protected areas elsewhere, taking into account not only the biological but also the social–cultural prism. The main challenges in the management and conservation of coastal and marine ecosystems today are discussed.

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## 1. Introduction

Coastal areas undergo a heavy anthropogenic pressure on biodiversity, complexity and key species biomass (Abdulla et al., 2008; Dayton et al., 2005; Jackson et al., 2001; Levinton, 2011; Rossi, 2013). The aim of Marine Protected Areas (MPAs) is essentially to relieve vulnerable habitats and species from such pressures. However, frequently, the conservation plans and recommendations do not reach stakeholders, politicians and especially end term users. The vast majority of the conservation work and practice remains obscure in the form of scientific papers, gray literature or technical reports and protocols, creating frustration on both sides: the people who make the rules and the people who have to apply such rules (Bearzi, 2007).

Nowadays, participative Environmental Education (EE) is an approach that is becoming increasingly more popular among conservation specialists and ecosystem managers faced with this information problem (Brewer, 2006; Fien et al., 2001; Hayes, 2009; Kamphuis, 2011; Salm et al., 2000). Recent works state the necessity to determine the goals of conservation, education and management, from an integrative perspective, in order to facilitate the sustainable use and protection of natural habitats, including not only the ecological and biological aspects but also social and cultural elements, with a view to having effective and inclusive management of protected areas (Bearzi, 2007; Hesselink et al., 2007; Pollnac et al., 2010; Sherrow, 2010).

Although considerable progress has been made in the field of community-based management, one of the major difficulties is to move from a passive community participation (e.g. information and consultative processes) to an active community involvement (two way communication, decision making, action for change). In this active involvement people participates in the experimentation and learning process, being the participation seen as one of the main rights of the community and not only a way to achieve project goals

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**Fig. 1.** Scheme of quantitative and qualitative methodology used in the research.

(Cornwall, 2008). The local and external people need something more than laws and policies (top down model), built by institutions (Kearney et al., 2007), but an approach that has to be bottom-up. In fact, it has been demonstrated that local communities have an essential role in this aspect, and a positive effect on the co-management of MPAs (Dahl, 1997; Gutierrez et al., 2011; Kearney et al., 2007; Mills et al., 2011). To achieve better management, the proper transmission of the educational approach has to adapt to the different communities in which they will be developed, and not the other way round; In this context, one of the major difficulties to achieve this active participation and community involvement, is the lack of well-defined objectives, especially in the methodology, systematization and evaluation of the educational programs and their contribution to conservation goals (Kuhar et al., 2010).

The present research seeks a change instead of reaching theoretical conclusions. The problem is closing the gap between pure theory and practice, where such conclusions are focused on applications that would enable reality to be transformed. It also seeks a continuous improvement in quality and must be based on shared criteria and a comparative analysis of different points of view (Benayas et al., 2003).

In order to gain a better understanding of the tools that have to be implemented to pass from a theoretical to a more practical approach in the transfer of information from scientists/managers to users, we accomplished in the present study three different targets: 1) Perform a diagnosis of the EE program not only in our study area but also to the whole National Parks System. 2) Establish the main rules of EE in MPAs with solid participation of Park staff members and stakeholders and 3) Integrate these rules into the Park's management plan with a focus on quality and long term practice alongside prioritized social actors. In order to do this, a first national survey was carried out including 20 National Parks (44% of the National Park's network) with a special focus on Gorgona National Park and Utria National Park, both located in the Eco-region of the Choco Biogeographic area (Mittermeier et al., 1998; Olson and Dinerstein, 1998). They were selected because of their biological value, location, socioeconomic and political situation, similar protected area dimensions, reference point for diverse researches in coastal and marine habitats and time within the National Parks System (UAESPNN, 2008a,b).

It is expected that the EE plan will contribute to integrate those stakeholders with major implications in the protected areas, reducing threats and anthropogenic pressures, and improve the

state of conservation of MPAs, from a perspective of EE as a process and long-term action. The final aim of this paper is to provide clear EE tools, which can be transferred from scientific and technical managers of MPAs to different social groups everywhere, with a view to the methodology being potentially extrapolated to other areas worldwide.

## 2. Material and methods

To carry out the present research, the study was conducted using a quantitative and qualitative methodology (Fig. 1) in order to obtain a general and detailed picture of the complexity of the process studied. The combination of both methodologies allows us to obtain a more solid basis to work at a national and local level during the study, being able to contextualize the research at the different management levels we were working with. For the diagnostic study, we took into account the viability of working together with these two kinds of methodologies, which is acceptable for a diagnostic study (Benayas et al., 2003; Dillon and Wals, 2006; Meyers, 2006; Russell, 2006; Sauvè, 2000).

The quantitative methodology consisted of questionnaires exploring the perceptions of educators related to the EE program of the National Parks System.

The questionnaire was delivered by e-mail to all EE teams in the National Parks System during the second trimester of 2011, with the exception of Gorgona and Utria National Parks, which were delivered in hard copy during the fieldwork.

The structure of the survey included 7 sections divided into the following topics: EE objectives, institutional coordination and support, audiences and activities, communication and participation, priorities in EE, evaluation process, and personal information. The questionnaire was validated at the central office of the Park system, in order to detect failures and adjust the instrument before sending the document to the educators. They were asked to fill in the questionnaire on the basis of available data and their own experience of the management tasks of the park.

The qualitative data was obtained by means of 15 semi-structured interviews with staff members from the central and local offices including Gorgona and Utria National Parks. The interviews also integrated local stakeholders and environmental NGOs that work in the study area and also at a national level. Atlas.ti 6.2.27 supported all qualitative data analysis, allowing us to use the same categories used in the interviews and surveys (For Supplementary material: Refer to : http://doi.pangaea.de/10.1594/PANGAEA.829071?format=htm).

In addition to interviews, two focus groups were carried out with representatives of local, regional and national management offices of the Park's system, being composed of homogenous groups of people. The common characteristics in both groups were their position at the Institution (regional environmental educator coordinator or local environmental educator) that is relevant to the topic of the study (Krueger and King, 1998). In order to evaluate the route for EE local action plans, focus groups give us information about perceptions, feelings, and attitudes of the new proposal and its application viability. The characteristics of a typical smaller focus group project are that the sample can be taken from two to four groups, being the recruitment of participants easily available (i.e. doesn't require a complex analysis or fully transcription, and produces a brief report with conclusions (Morgan and Scannell, 1998)). With this technique, we can be able to see reality from a bottom up point of view, and not from the top down as usual. The use of this technique facilitates the identification of project strengths, weaknesses, and the generation of new ideas and recommendations (Krueger, 1988), regarding the methodological route to guide the educators in the local sphere to construct the local EE action plans.

The first focus group was composed of local staff members from 10 national parks, with a total of 11 participants, five of which belonging to the MPAs. The EE national committee constituted the second panel, with a total of 10 participants from all regions of the Park System is divided.

The questions that guided the focus groups were:

1. What do you think about the actual structure of the proposed methodology?
2. Do you think this methodology is needed and will help through the process of elaboration of local EE action plans?
3. Which changes would you propose in order to make it practical for its use? (You can change boxes order or rephrase them)
4. Would you include or delete any box from this proposal?

At the end of the session, we delivered a participative evaluation to record the group perception about the session during the discussion and the preliminaries results.

## 3. Results

The questionnaires were delivered to a total of 45 National Parks that have an EE program running (80% of National Parks) and also to the UAESPNN central office, where a total of 46 surveys were registered. Of the total gathered, 20 surveys (43%) were fully completed, and were used as the sample size for the analysis (Fig. 2). The 26 remaining surveys (56%) were not included in the analysis because answers were not complete or were inconsistent.

### 3.1. Objectives

The results from the survey in Table 1 indicate that the objectives of the EE programs are well defined and follow the SMART categories: specific, measurable, realistic and timely. Nevertheless, the condition attainable presents a major disagreement within the survey, in over 50% of the respondents.

In the qualitative analysis, the results show that the objectives are too generalist and that economic resources are not sufficient in order to attain and achieve the proposed goals.

*…"I think there should be more clarity: a general objective and clearer specific objectives. What I perceive in general is that there are many loose wheels; there is a need for projection, a scheme with a large target or goal with objectives to fulfill. Obviously, if you're not clear you cannot project anything; methods, stakeholders, anything." (NGO director)*

*…"While environmental education in parks is not appreciated in its true dimension and there are not sufficient resources to meet objectives, the results will always be occasional and linked to the individual efforts of the staff members." (Park staff member)*

*…"There are not enough economic resources from my point of view." (Park staff member)*

On the other hand there are some cases in which EE has been working in coordination with the local staff and management plan.

*…"The objectives of EE in our protected area are developed on the basis of the problems encountered by the park annually. In that sense, the park develops a specific required educational action in those communities that demand special environmental actions." (Park staff member)*

*…"EE objectives are consistent and have been developed with team members taking into account the management plan, conservation*
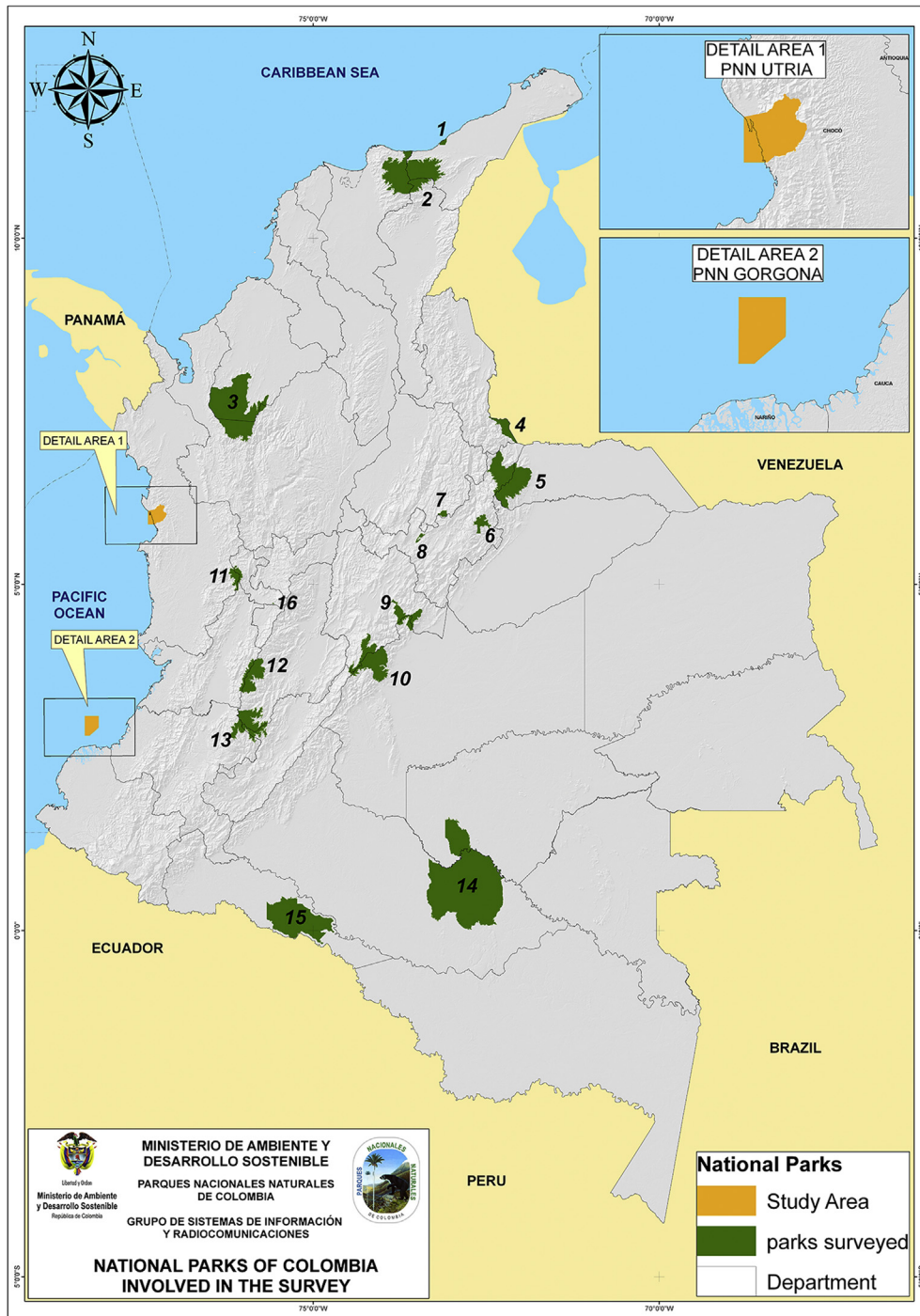
**Fig. 2.** Geographic distribution of the Natural National Parks involved in the survey including the study area. (1) Flamencos, (2) Sierra Nevada de Santa Marta, (3) Paramillo, (4) Tama, (5) Cocuy, (6) Pisba, (7) Guanetá − Alto Fragua, (8) Iguaque, (9) Chingaza, (10) Sumapaz, (11) Tatama, (12) Las Hermosas, (13) Nevado del Huila, (14) Serranía de Chiribiquete, (15) La Paya, (16) Otún − Quimbaya. Detail Area 1 − Utria and Detail Area 2 − Gorgona.

*targets and projects that fall under different strategic lines." (Park staff member)*

### 3.2. Coordination

The results from the survey show that from a local perspective, there is a general consensus regarding knowledge of the park's management plans and its alignment with the EE program, but not regarding conservation targets. The constant claim by the

participants is that financial resources are very scarce to achieve the objectives and the goals proposed.

*"EE in Gorgona National Park is not coordinated with the different institutional management offices: local, regional, central." (Park Staff member)*

*"Now, in Gorgona National Park, whale watching can only be carried out by tourist concession holders, but there is no communication with researchers, and what is happening is there is a leak of resources from both parts." (NGO director)*

**Table 1**
Percentages results from the National Parks' survey completed by the Environmental Education (EE) staff members ($n = 20$) according to objectives, institutional coordination and assessment.

|  | % Agree | % Disagree |
|---|---|---|
| **Objectives** | | |
| Understandable | 100 | 0 |
| Clear and specific | 90 | 10 |
| Realistic | 85 | 15 |
| Time defined | 80 | 20 |
| Consistent | 80 | 20 |
| Measurable | 75 | 25 |
| Written plan | 75 | 25 |
| Attainable (availability of resources and capabilities) | 45 | 55 |
| **Institutional coordination and support** | | |
| Management plan knowledge | 95 | 5 |
| EE alignment with management plan | 90 | 10 |
| EE institutional transversality | 75 | 25 |
| EE transversality in management plans | 70 | 30 |
| Institutional networking | 45 | 55 |
| Human resources | 35 | 65 |
| EE alignment with conservation objectives | 30 | 70 |
| Similar Parks management plan knowledge | 30 | 70 |
| Economic resources | 15 | 85 |
| **Assessment** | | |
| EE improves conservation | 90 | 10 |
| EE achieves its objectives | 70 | 30 |
| Existing EE program | 55 | 45 |
| EE objectives are known by the staff | 55 | 45 |
| EE is systematic and consistent | 55 | 45 |
| Drafting of EE Annual Report | 45 | 55 |
| Reflection process | 45 | 55 |
| Feedback | 40 | 60 |
| Continuous assessment and monitoring | 30 | 70 |
| Existence of indicators | 20 | 80 |

*"When we say that the EE is not coordinated it's because we don't receive any support or alignment from regional or national offices."* (Park staff member)

*"We have resources such as radios, documentation centers, staff exchanges with other parks, which facilitate a better approach to the different works they implement. However, there is a lack of a flow of communication regarding the information and more alignments that hinder us from doing a better job."* (Park staff member)

### 3.3. Assessment

According to the participants, it is evident that the work carried out through EE helps to improve the state of the conservation targets, and the objectives set through the EE program are achieved. Yet, when they are asked about the existence of an established EE program, previous knowledge and awareness of the EE objectives, and activity coherence, almost 50% of participants disagree on these statements.

Taking a look at the evaluation process, the data indicates a gap in the systematization practice, such as the activities of recording information, annual reports and reflections on the educational activity.

This gap increases when we delve further into the evaluation techniques. The surveyors indicated that feedback on the activities monitoring is not frequent in more than 60% of the parks examined. These indicators are the most worrying aspect of evaluation due to their limited use in almost 80% of the parks surveyed. The remaining 20% should be reviewed because most of the indicators are focused on the number of participants/assistants, but are not focused on the educational impact.

### 3.4. Audiences, participation and communication

As shown in Table 2, the most frequent activities registered that fall under all kinds of audiences are communication and dissemination of the National Park's mission and conservation target values, followed by conferences, workshops and inter-institutional work.

One of the most important activities carried out is the participative formulation of projects and also community projects. However, their design and construction hardly reach 25% of the parks surveyed.

Participation and communication are essential in EE and management decision-making. The survey demonstrates that the majority of participants feel that neither internal nor external participation in the park system takes place. As regards the relevance of the individual opinion, the perceptions are divided, indicating that this depends very much on the way in which the park's team functions, and not on the entire sample and the UAESPNN. However, team opinion prevails rather than individual.

### 3.5. Priorities in EE

The main priority identified by the educators is the integration of EE into the management plans and the development of educational programs that are consistent with the local environmental problems (Fig. 3). In addition to this demand, the environmental literacy of educators and participation problems are the other criteria that require more attention in order to work within the subprogram of EE within the UAESPNN. Furthermore, methodology design, identification of stakeholders, planning, positioning and socialization of the park legislation are considered important matters in order to succeed, but not on such a wide scale, and with a more individualized and unique character for each park.

### 3.6. Focus groups

According to the survey, interviews, and workshop results, we identified the key points in order to systematize the EE process and integrate it with the management plan and social actors. To accomplish this target, we developed an EE methodological route to guide the development of EE local action plans in the National Parks in Colombia. This initial proposal was discussed with specialists and EE staff members at the central management office, in

**Table 2**
Percentages from the National Parks survey completed by the Environmental Education (EE) staff members ($n = 20$) according to audiences, activities, and participation and communication criteria.

|  | Always | Frequent | Infrequent | Never |
|---|---|---|---|---|
| **Audiences and activities** | | | | |
| Academic Institutions | 26 | 63 | 11 | 0 |
| Rural communities | 22 | 61 | 11 | 6 |
| Visitors | 26 | 42 | 26 | 5 |
| Institutional actors | 16 | 53 | 32 | 0 |
| Overlapping areas | 11 | 47 | 11 | 32 |
| Indigenous communities | 19 | 6 | 25 | 50 |
| General public | 6 | 22 | 72 | 0 |
| Black communities | 16 | 5 | 21 | 58 |
| Specialized audience | 0 | 17 | 83 | 0 |
| **Participation & communication** | | | | |
| Internal participation | 0 | 35 | 65 | 0 |
| External participation | 0 | 30 | 65 | 5 |
| My opinion matters | 0 | 45 | 50 | 5 |
| My team opinion matters | 30 | 45 | 25 | 0 |
| Communication is key for EE | 75 | 25 | 0 | 0 |
| Training needs | 85 | 5 | 5 | 5 |
| Community participation | 15 | 60 | 25 | 0 |
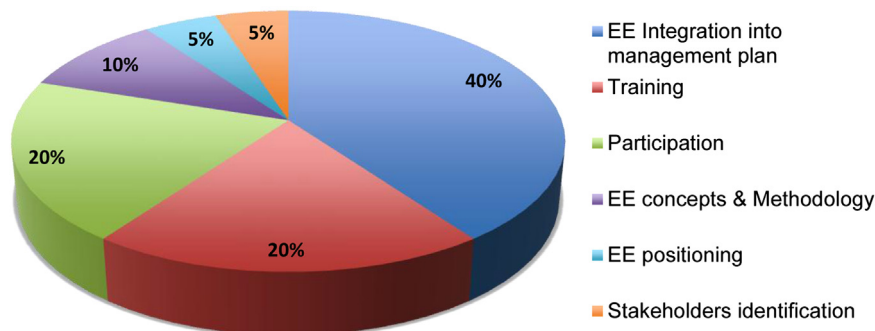
**Fig. 3.** Results of first line Environmental Education (EE) priorities identified in the survey ($n = 20$).

order to adjust the application to their structure and needs, before working with focus groups.

In both focus groups, all participants agreed that the proposal fulfill the need of an integrated methodology of EE within the park's management plans and its management model, being the methodology approved in this last evaluation process, except in cases that the management model has another structure because of local issues as happens in the Amazonian region.

The panels also agreed that this tool will facilitate the process of the elaboration of local plans, even though in some cases, they will have to adapt some guidelines to their local situation, and let the general structure serve as a flexible and dynamic guideline but not a fixed one.

From the original proposal, the structure remained the same, but some boxes were rephrased from the original version, new highlights were included and other boxes changed their order within the structure.

As a final result, we found that both focus groups arrived to the same conclusions and modifications of the original proposal, which facilitates the process of the final version of the EE methodology.

A more detailed focus on the regional and local context was suggested, especially in those cases where indigenous and black communities were overlapping in the protected areas.

The monitoring and evaluation section was changed considerably and improved, and all participants supported the incorporation of a dissemination of results section, absent on the management-planning model. All the participants agreed that recommendations should be included in the new version. Initially, the methodological route was being developed to respond to MPAs needs, especially in the study area. However, during the research and because of the active participation of the EE staff, more parks were willing to be included in the initiative in order to establish this method as a national proposal and an essential component to be included in the EE Strategy of the National Parks of Colombia (Fig. 4).

## 4. Discussion

The present results clearly support the establishment of a standardized methodology path to improve EE within the National Parks System. There is a consensus that this target has a first priority interest in order to promote systematization of the process and its inclusion in the management plan and operational structure, not only to MPAs as proposed initially but also to the National Parks System, contributing to conservational targets and management effectiveness (Lundquist and Granek, 2005).

### 4.1. EE objectives and assessment

The survey data indicates that a significant majority of participants found that the objectives were adequately clear, concrete,

and attainable. However, almost 50% admitted that they did not have a written EE local plan, and objectives were more a statement of intent without a logical framework. Defining the objectives is one of the most important steps for managing and planning EE information transfer in MPAs. In this study, EE staff recognized that a minimal training was required in order to develop these tasks and highlighted the scarce communication between different levels of management, leading to unstructured and misaligned EE local action plans with conservation objectives.

One possible explanation for the absence of well-defined EE objectives and measures to evaluate them in the park system lies in the fact that management plans are outdated, and often have wide-ranging objectives that make it difficult to shape EE actions into specific goals, a situation common in other studies (Abdulla et al., 2008; Dahl-Tacconi, 2005).

On the other hand, measures allowing us to explain the achieved results in terms of social impact and a better state of the conservation objectives do not exist, except limited indicators which do not go beyond simple data (number of workshops held, brochures delivered, number of assistants and visitors, etc.). Impact indicators such as change in knowledge, attitude, networking, and participation quality are not found in any of the parks studied, and it is an area that requires further research. This is a crucial field to explore in order to evaluate the effectiveness of the work done, and to support management decisions.

### 4.2. Audiences and activities

We found low consistency in the EE process among the goals proposed, the activities set and the way in which results and impacts are measured. Specialists, stakeholders and Park staff members, see EE as a long-term process that seeks the comprehension and responsible action of the community in order to preserve our natural and cultural heritage within the framework of sustainability (Fien et al., 2001; UNESCO, 1979). However, analyzing our results, the most common actions are short-term events such as conferences, environmental talks, inter-institutional meetings and environmental interpretation. True environmental literacy goes beyond awareness and rote learning but involves critical thinking, integrating principles, and using acquired skills to turn knowledge into action (Bickford et al., 2012).

Most of the activities are addressed to formal education tools such as school environmental programs (Kuhar et al., 2010; Muñoz-Santos and Benayas, 2012), probably because these comprise an audience that is already established and structured (Lundquist and Granek, 2005; Rice, 2011), where the implementation of actions proves to be less difficult than with other social actors (Zorrilla-Pujana, 2008). Conservation biologist, need to be much more strongly proactive in their approach to communicating, in formal educational settings as well as in other

**1. Lineament with international, national and local guidelines**
What general and specific framework in Environmental Education (EE) should be considered?

- Education and Environment Ministry
- National Parks action plan
- Conservation policy
- EE National Strategy
- Current Park´s management plan
- Local guidelines for conservation education

**2. EE objectives**
What do we want to achieve from the process of EE?

- Develop strategic objectives - long term
- Determine EE objectives in the short, medium term
- Identify common objectives with your park's team, other institutions, communities and stakeholders to establish networking
- Open a space for discussion and approval of the defined

**3. Action Plan Definition**
How are we going to carry out and develop our defined objectives?

- Identify social actors and institutions involved in each of the established EE objectives
- Define goals taking into account threats, pressure and vulnerability of the conservation objectives
- Prioritize social and institutional actors and related to the processes, from local to international scale, if necessary.
- Define activities and a responsible with the social actors involved for each proposed goal
- identify and validate common activities with other parks to foster exchange of experiences, capacity building and networking
- Develop an agreed work schedule
- Develop the budget and identify area resources that can be shared. Take into account contributions from the partners identified.
- Expected results

**4. Indicators definition**
How are we going to measure our EE objectives accomplishment?

- Design indicators of EE according to the objectives and goals. (Base & context)
- Design of process indicators (operation, systematization, articulation)
- Design response indicators (outcome, impact)

**5. Follow up and evaluation**
How do we register and analyze our progress?

- Develop worksheets to systematize the process
- Make annual revision of the action plan and reformulate activities if necessary
- Set EE needs for economic resources allocation
- Collect all materials produced and set a database or file to keep these resources
- General participatory evaluation of the processes

**6. Management decision making**
Which management decisions should we take?

- Identify management objectives that achieved the expected results.
- Generate new proposals for the annual action plans

**7. Results and decisions dissemination**
How are we going to communicate our management decisions?

- Identify and Contact communitarian and local areas for dissemination of results.
- Presentation of the decisions taken on the stages of consultation.
- Socializing and publishing success of EE and a reflection section

**Fig. 4.** Methodological route contents for the elaboration of EE local action plans in the National Parks of Colombia.

venues and via alternative methods to a diversity of audiences (Bickford et al., 2012).

Another limitation found is the deficient condition of the relations between National Parks and local stakeholders, which hinders any EE participative approach with the community, at least in the study area, leaving behind actions with a long-term impact, such as management agreements through communitarian and participative projects with the audiences prioritized by the protected area. In MPAs the role of the community is essential for the approval and monitoring of rules. In a South California MPA, the bottom-up management and EE makes the difference in the increased ratio of fish biomass because of the clear and accepted rules which were correctly transmitted from managers to users from 0.75 tons of fish ha$^{-1}$ to 4.74 tons of fish ha$^{-1}$ in a decade (Aburto-Oropeza et al., 2011).

EE is a crosscutting program in the management process of MPAs and the scarce resources are a common issue that appears in most of the analyzed criteria, but relevant data regarding the benefits of social issues in protected areas are not well covered in local, regional and national accounts (Leverington et al., 2010), which in that case could help to justify an increase in the budget in this multidisciplinary field. A lack of job stability for EE staff and undefined funds generate discontinuity and regression in most of the programmed activities (Zorrilla-Pujana, 2008). Although EE is recognized as a first priority for MPA management and other skills development (Dahl-Tacconi, 2005), reality reveals the contrary: the education program does not present stability in human and economic resources allowing continuity of the established processes (Kullenberg, 2010).

### 4.3. Coordination, communication and participation

The need to clarify the mechanism of educational conservation objectives has been demonstrated, but even more important than this is the need to break the current dynamic of environmental information transmission, which is not properly aimed at the different groups, because there is a lack of connection between managers, scientist and users in MPAs (Lundquist and Granek, 2005). Scientist and managers need to be more provocative, proactive, and purposeful in how we communicate to create an environmentally literate society that enacts decisions based on both sound science and the needs of humanity (Bickford et al., 2012).

The results indicate a low perception of institutional coordination between local, regional and national management offices by staff members, stakeholders, and some researchers. This situation is visible at different management levels, and in most cases is the result of wastage in the same institution, loss of knowledge, economical opportunities, and inexistent networking between similar parks, that share biological, social values, programs and projects within the EE strategic line. MPA networks are important not only for the conservation of biodiversity but also as a form of management (Guidetti, 2002). Communication efforts can also help to inspire new ideas for research that inform about management questions and may generate connections with other scientists outside a narrow range of expertise (Grorud-Colvert et al., 2010), but scientists actually make surprisingly few direct contributions to environmental conservation, when there is an evident necessity of a more proactive dialog between conservation scientists and practitioners when devising research priorities (Laurance et al., 2012; Primack, 2006) and the dissemination of those results to the managers and the community involved.

Despite the key role that communication and participation play in the educational process, this is still one of the most difficult tasks within the Park system in which more than 60% of respondents and interviewees perceived that participation in decision-making is infrequent and communication leaks are very common at all management scales. This situation can be explained from different standpoints: 1. The gap between the Park's local and national scope is still hard to bridge. 2. There is a poor contextualization among local realities and national alignments, and 3. The absence of a peer EE at the regional management office disrupts any communication channels in the local and national spheres. Studies demonstrate that MPAs are effective when information is properly transferred and participation of the different users is solid (Pace et al., 2010).

It is not true that local people have a negative reaction toward protected areas. It has been demonstrated that good information and a clear rule statement in which there is direct community participation has a positive effect on final users (Aburto-Oropeza et al., 2011; Triguero-Mas et al., 2009). The lack of effective spaces for communication and participation has led to a negative perception among the team members, stakeholders, researchers and the community who are involved either directly or indirectly with the park's management. Because of this condition, many conservation initiatives are isolated from the park's initiatives, wasting synergies that could be beneficial for the MPA management.

## 5. Conclusions

The present study demonstrates the urgent need to establish a common methodology for the development and implementation of EE local action plans in National Parks. EE is a multidisciplinary component that works with humanity and its relationship to the environment, linking both natural and social sciences, in order to achieve conservation goals (Bickford et al., 2012). There is a need for cooperation at an inter-disciplinary and inter-sectoral level, that requires exchanges between the scientific disciplines as well as a cultural exchange (Kullenberg, 2000). The new proposed methodology hopes that EE will play a catalyst role between the community and MPA management.

It is necessary a more active, open and conciliatory attitude in order to promote stakeholders' participation in and contribution to MPA conservation. For this reason, EE must focus on those audiences that generate the strongest pressure on the area.

EE should establish itself as a crosscutting program integrated in the management process, in order to contribute to improving the state of the protected ecosystem, enhancing a better protection of natural assets and facilitating the connection between various fields and sectors in the community to implement an effective EE (Kobori, 2009). But if EE limits itself to political and theoretical papers, scholar activities, the celebration of environment day and environmental conferences, it will be difficult to achieve long-term conservation objectives.

In order to support and strengthen the EE program within the management of National Parks System, it is essential that the human resources structure is maintained at the local, regional and national level with an EE responsible at all management scales or disruptions and communication flow will occur, interrupting ongoing processes.

After accepting the proposed route for EE local action plans, and validated at the study area, Colombia National Parks approved its inclusion in the National EE strategy and remarked on its consistency and the integrated perspective with the management and conservation objectives, involving the local community and prioritized stakeholders from the start. Utria and Gorgona National Parks are constructing the EE action plan following this method as other parks from the network. We now have a real opportunity to implement ecosystem-based management in MPAs, but the transmission of essential values and roles in MPAs has to be clearer (Rice, 2011). The results determine that it is imperative to work on the

conscious and assertive establishment of objectives for both the MPA management plan and EE programs, as one of the most important steps for the planning, and effectiveness of EE in the park system (Lundquist and Granek, 2005).

## Acknowledgments

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