TRANSATLANTIC MPA NETWORK

TOWARDS A TRANSATLANTIC PARTNERSHIP OF MARINE PROTECTED AREAS

MARINE PROTECTED AREAS RESILIENCE GUIDELINES

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MARINE PROTECTED AREAS: GETTING TO RESILIENCE

INTEGRATING RESILIENCE INTO MPAs MANAGEMENT

GUIDELINES

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"Protected areas not only promote the conservation and provision of ecosystem services but are also key in building coastal communities adaptive capacity and resilience in the face of future scenarios." (Hakna Ferro-Ascona & al. 2019[1]**)**

This document is designed to incorporate and evaluate Resilience as a component of MPA management. We have been working with MPA managers to capture their experience and identify shared approaches that demonstrate MPA effectiveness and that enhance resilience of MPAs and the role they play in increasing resilience of surrounding coastal areas.

These guidelines provide instruction for use of a Resilience Self Assessment tool, which is currently being tested and will be available through an online application when finalized[2].

These guidelines serve as a practical guide for MPA managers to integrate resilience:

When developing or implementing a management plan: Resilience capacity-building objectives and tasks can be integrated into a management plan, whether it is the initial plan for a new MPA, or for plan implementation. The performance and utility of the guidelines can be assessed mid-term or at the end of the implementation period.

When evaluating a management plan that does not initially address resilience: Even if a management plan does not define objectives and activities related to resilience, the criteria and indicators proposed below could be used when evaluating plan implementation. This exercise can inform decisions to integrate new elements in an updated management plan for the next implementation period.

When facing a new or emerging challenge or external threat: New activities or changes within or near the MPA may benefit from use of the guidelines and Resilience tool. For example, development or urbanization in the surrounding area, conflicts with stakeholders, or recovery and restoration efforts following a serious hazard may benefit by incorporating resilient strategies that enable MPA managers to strengthen their capacity to address rapid and impactful changes. Implementing a resilience assessment will facilitate identifying the main weaknesses and the potential management strategies.

The authors are aware that, due to the diversity MPAs and complexity of challenges at MPAs, of such a tool may seem simplistic. However, the tool is intended to be responsive to user priorities and needs. Periodic assessments will be conducted to collect feedback from users to adapt the tool in response toi manager needs, and to develop versions tailored to the specific needs of diverse MPAs.

[1] Hakna Ferro-Azcona & al. 2019. Adaptive capacity and social-ecological resilience of coastal areas: A systematic review. Ocean and Coastal Management 173 (2019) 36–51.

[2] The online application will be released in beta version by the end of November 2019.

1. THE EU TRANSATLANTIC PARTNERSHIP PROJECT ON MPAs

This guidelines and resilience tool has been developed by the **Coastal Resilience Working Group** (CRWG) within the framework of the **Transatlantic Partnership Project on Marine Protected Areas** (Resilience twinning/partnership project), funded by the European Union. A special contribution has been developed by the IUCN CEM[3] Coastal Specialist Group, with the support of the Jacques Cousteau National Estuarine Research Reserve and the Rutgers University (New Jersey, USA). This work also integrates various contributions from project team members developed in advance of this project.

The Transatlantic MPA Partnership Project funded by EU aims to promote broader Transatlantic cooperation, centered on a new comprehensive concept of Atlanticism that underscores the growing importance of Africa and Latin America as actors in the Atlantic region. As a result, the European Parliament requested the Commission to develop a truly North/South Transatlantic dimension in the EU's relationships. Collaboration and partnerships among MPAs has been identified as a means to advance Transatlantic cooperation, while also contributing to EU commitments to halt global biodiversity loss, support adaptation to climate change, and to respond to EU internal policies on the environment, regional cooperation and the maritime dimension. The project has helped to shape a strategic, comprehensive EU approach vis-à-vis the Atlantic Basin, with North-South, East-West and South-South relations.

One of the project achievements was a scoping study that included a Transatlantic basin mapping project which was delivered in March 2018. This collaborative study involved many partners and features:

- A detailed biogeographic overview of the Atlantic Basin at a scale of 1:20 000 000, linked with an eco-marine regional classification, and a brief description of the 30 biogeographic zones identified including coastal profile, hydrodynamics, human pressures, biodiversity, and MPA governance.
- A characterization of Atlantic MPA networks including representativeness, consistency, connectivity, and relationship with fisheries, etc.
- A global presentation and map of MPAs and MPA networks in the Atlantic basin, including their links with international conventions. Selection criteria have been applied to a set of more than 10,000 MPAs to identify candidate MPAs to integrate in each twinning/partnership project.
- A synthesis on MPA governance and management effectiveness in the Atlantic Basin.
- A review of the main conservation challenges faced by MPAs and identification of relevant good management practices and lessons learned from field experiences.
- **A section related to the three twinning/partnership projects implemented during the project, good practices identified in each of the these projects, and the eligible MPAs for each twinning/partnership project. (Unsure what is intended by the last phrase)**

The objectives of the CRWG were to conduct a capitalization process (see below for capitalization definition) to (i) identify those strategies implemented by selected Marine Protected Areas (MPAs) that cope with rapidly changing environments; and (ii) identify those management strategies that contribute effectively to the resilience of surrounding coastal areas beyond the limits of the MPA.

The European Union launched this initiative to foster cooperation between managers of MPAs in countries and territories around the Atlantic Ocean, bringing both sides of the Atlantic together

[3] Commission on Ecosystem Management

through twinning/partnership thematic projects. These partnerships are designed to stimulate the exchange of good practices and strengthen the effective management of MPAs, as well as their contribution to marine conservation.

Thus, to increase the resilience capacity of MPA managers, key project objectives were to:

- **Promote cooperation between managers of Marine Protected Areas (MPAs) in countries and territories around the Atlantic Ocean.**
- **Stimulate exchanges and the sharing of good practices to improve the effective management of MPAs in coastal and offshore areas of the Atlantic.**

The CRWG especially focused on delivering practical tools for MPA managers.

Three main thematic areas were initially identified including an MPA Network of Networks, Marine Mammals, and of course Coastal Resilience. for which pilot MPAs were identified to contribute good practices through twinning/partnership thematic projects.

A lessons learned exercise based on the experience of six primary partners

The resilience CRWG conducted a capitalization process to identify and transfer strategies that address rapidly changing environments. Good resilience practices identified ranged from impacts of climate change, coastal defense structures urban expansion, increasing tourism activities and impacts related to infrastructure for fisheries and maritime transport.

This initiative involved six partners, all of which are experiencing climate impacts and pioneering the development of strategies to address these impacts throughout the Atlantic Basin. These six partners are:

- Jacques Cousteau National Estuarine Research Reserve, New Jersey, USA;
- Cozumel Reserve of Biosphere, Mexico;
- Abrolhos Biosphere Reserve, Brazil;
- Florianopolis Coastal Complex, Brazil;
- Natural Park of the Northern Littoral, Portugal; and
- Emerald Arc Ecological Complex, Gabon.

Capitalization : capturing and sharing the experience

Capitalization can be understood as an integrated building process that that helps improve the design and implementation of development policies and actions, identify the lessons learned from previous interventions, make information accessible, create frames of reference and share experiences. It enables sharing of knowledge and raising awareness among stakeholders. Furthermore, it supports the (re-)use and/or transfer of this capital, ultimately promoting improved performance and delivery. A capitalization process is aimed at consolidating the capital built by initiatives, projects and programmes, with the objectives of: •

- Making the knowledge and results generated more accessible, thus improving transfer of knowledge.
- Obtaining additional results through the benchmarking and detailed content analysis, building on existing knowledge and experience and frames of reference.
- Promoting the re-use and / or transfer of this knowledge and , in order to boost performance and delivery
- Raising awareness and improving communication of results in specific fields of policies.

Five workshops were organized to document success stories and highlight shared elements within the methods developed for each of the good practices (New Jersey, USA, Libreville, Gabon, Florianopolis, Brazil, Cozumel, Mexico and Viana do Castelo, Portugal),. These elements served as the basis for criteria that could to be added to existing MPA management effectiveness frameworks

and for the preparation of MPA management plans. An extensive bibliographic review on resilience and ecosystem restoration was also completed including recent publications[4]. This review was combined with previous work results on resilience from broader and targeted studies.

2. GETTING TO RESILIENCE: A GROWING CONCERN

Coastal zones are affected by rapid and accelerating environmental change

The scoping study illustrated that Atlantic coastal zones are generally facing rapid changes that challenge traditional coastal conservation and sustainable development efforts. **On a global scale, most of the coastal zones in the world are undergoing rapid and accelerating environmental change** that is compounded by a general migration of the world's population toward the coast. This has led to two major impacts: 1) habitat alteration, and infrastructure resulting from urbanization and 2) sea-level rise, increased frequency of extreme weather events, and an increase in ocean surface temperature resulting from climate change. Both of these environmental drivers affect the health of coastal ecosystems and the vitality of coastal-based economies. This situation has also led to an increase in coastal defense infrastructure that may reducnear-term risk but significantly impacts coastal hydrodynamics and natural ecosystems function in the long-term.

Resilience

Understand and monitor the changes

The question of resilience is often viewed by environmentalists in a single way: how can conservation measures enhance the resilience of marine ecosystems. Nevertheless, protected areas are affected by growing environmental and human pressures. This is particularly true for Marine and Coastal Protected Areas (MCPA)[5], considering that coasts globally are experiencing rapid (often unplanned) development and associated risks, including those from climate change. **MCPA managers need to better understand and monitor these changes to develop solutions for strengthening the resilience of their protected area.**

The surrounding environments of MPAs are also experiencing increasing pressures and threats. When conceived as natural solutions for sustainable development and disaster risk reduction, the management models developed by MPAs can also benefit surrounding habitats and communities.

MPAs can also serve as key elements for coastal and marine spatial planning, established to maintain key ecological services and natural infrastructure, and acting as adaptation and disaster risk reduction tools. **The recognition of their utility by coastal stakeholders will contribute to a much stronger resilience capacity of MPAs**[6].

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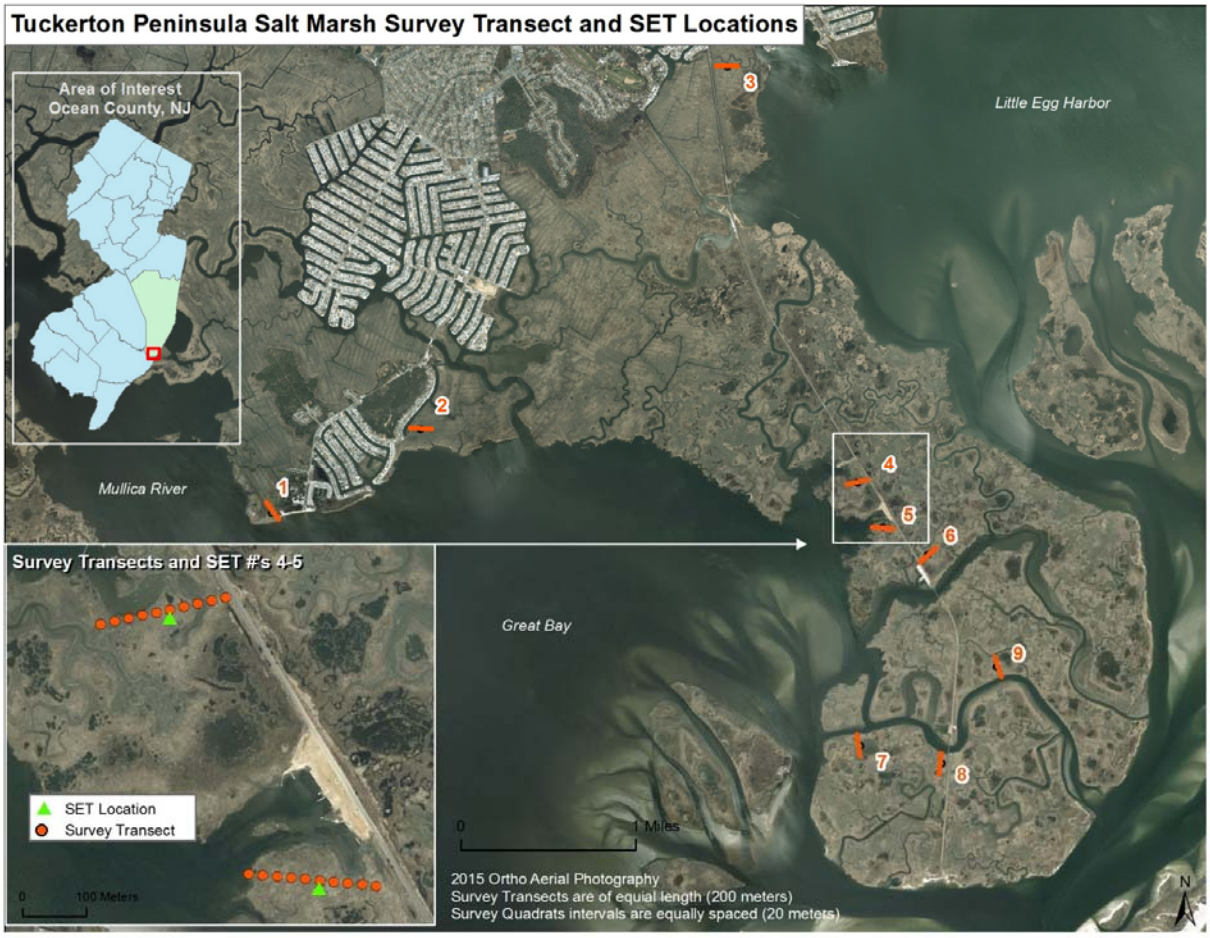
[4] CDB.SBSTTA. 2018. Voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction. CBD/SBSTTA/22/INF/1. 118p.

[5] Acronym adopted by the Convention on Biological Diversity in 2003

[6] Goussard J.J. & M. Ducrocq. 2017. Facing the future: Conservation as a precursor for building coastal territorial cohesion and resilience. Aquatic Conserv: Mar Freshw Ecosyst. 27 (S1):151–161.

Jacques Cousteau national Estuarine Research Reserve (USA, New Jersey) - Sentinel site: detection and monitoring of climate change effects, most notably sea-level rise and inundation.



All national estuarine research reserves monitor key indicators of estuarine function using the consistent, vetted protocols of the System-Wide Monitoring Program, also known as SWMP. The monitoring network is designed to detect short-term variation and long-term trends at a variety of spatial and temporal scales and includes abiotic, biotic, and habitat elements. These data can be applied to a variety of scientific questions or management applications. SWMP is designed to provide long-term environmental monitoring data that can be used to address management issues, rather than for testing specific predetermined hypotheses.

The establishment of the JC NERR sentinel site supports NOAA's long-term goal of assessing coastal vulnerability to climate change and the generation of data useful for forging climate adaptation and mitigation initiatives for coastal communities. Habitat and vertical control data collected at the JC NERR sentinel site will be made available to decision makers across New Jersey and will enable them to determine how the loss of critical salt marsh habitat will affect their coastal communities, their adaptation to future habitat loss, and the development of mitigation plans to address impacts. All of these data will be vital to long-term resiliency in the state, particularly in the aftermath of the sweeping coastal destruction from Hurricane Sandy (2010).

Source: **Andrea Habeck** (JCNERR – USA – New Jersey)

Resilience and risk reduction: back to basics …

The resilience concept remains complex, and many different definitions occur in the literature. Vulnerability is another notion closely linked to resilience[7], that can be better addressed through the risk reduction approach. A systematic review of 174 scholarly articles on disaster resilience measurement from 2005 to 2017[8] shows that most articles (161 out of 174) define resilience, either directly or indirectly, and the authors provide a sample of some ten definitions of resilience from the ten most cited articles.

Figure 1. Word cloud derived from the definition of 'resilience'
from 174 articles (from Cai H. & al, 2018)

Another definition is based on the risk equation (risk = **hazard x assets x vulnerability**, where vulnerability is the combination of **exposition x sensitivity x coping capacity**). This plain definition is helpful for developing risk reduction approach, risk reduction being an important component of Resilience Based Management.

A shift to a more integrated and systemic approach

The current integration of the term resilience within the environmental "mainstream" certainly results in some form of "ritualization", where the richness and complexity of the concept fades, and is progressively replaced by an intuitive and sometimes simplistic understanding. Nevertheless, resilience evolution fits with the overall development of coastal management strategies, characterized by a shift to more integrated and systemic vision focusing on a transectoral and

[7] Bevacqua A. 2018. Coastal vulnerability: Evolving concepts in understanding vulnerable people and places. Environmental Science and Policy 82 (2018) 19–29.

[8] Cai & al. 2018. A Synthesis of Disaster Resilience Measurement Methods and Indices. International Journal of Disaster Risk Reduction, https://doi.org/10.1016/j.ijdrr.2018.07.015

transdisciplinary approach, cross-boundary relationships and strategies, system perspective and enlargement of geographical and spatial scales to include both marine and terrestrial environments[9].

If resilience-based management (RBM) can be summed up **as the management of change and transformations**, it relies not only on "retrospective strategies" (conservation, and in some way restoration) but also on **prospective strategies** to accompany the possible continuous shift and transformation, in the near future, of coastal ecosystems, when these changes are unavoidable. Restoration practices can also be helpful to guide and accompany these changes.

Far from these debates, the CRWG identified and analyzed good practices, taking into consideration practical elements that can contribute to reduce the vulnerability of MPAs and enhance their contribution to the resilience of surrounding coastal areas, leading to the identification of the criteria presented below. We have been focusing on MPA strategies for facing rapid changes that can be due to climate change (including climate-driven events and disasters), but also urbanization, tourism, and pressures due to industrial and transport developments.

3. MPA MANAGEMENT EFFECTIVENESS EVALUATION TOOLS: A REVIEW FOCUSING ON RESILIENCE

Given the huge number of MPAs (more than 10.000 MCPAs[10] in the Atlantic basin, under more than 400 different designation types) and the heterogeneity of their management, the CRWG opted to focus on tools designed for the evaluation of MPA management effectiveness. The few that exist are based on relatively similar approaches and standards. Consequently, a first step was to assess how resilience is currently addressed by existing MPA management effectiveness evaluation frameworks (see appendix 1).

During the 1990s, numerous methodologies were established to evaluate the management effectiveness of protected areas, including monitoring the progress made by protected areas towards an effective contribution to biodiversity conservation.[11] The program of work on protected areas of the Convention on Biological Diversity requires that the signatory countries conduct a management effectiveness evaluation for at least 30% of their protected areas by 2010. This approach is now recommended worldwide, up to the point that some donors consider it a requirement for protected areas to be eligible for their funding[12].

Several reviews were conducted to compare and analyze the different approaches and methodologies. A global survey was published in 2008 by a group of conservation organizations[13],

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[99] Birch T. & E. Reyes. 2018. Forty years of coastal zone management (1975–2014): Evolving theory, policy and practice as reflected in scientific research publications. Ocean and Coastal Management 153 (2018) 1–11.

[10] Marine and coastal protected areas – CDB - 2003

11 Hockings, M. 2003. Systems for assessing the effectiveness of management in protected areas. Bioscience. Volume 53, Issue 9, September 2003, Pages 823–832.

12 GEF. 2015 Impact evaluation of GEF support to protected areas and protected areas systems", GEF.

13 Leverington, F. et al. 2008. Management effectiveness evaluation in protected areas: a global study. Overview of approaches and methodology, Supplementary report n°1, University of Queensland, TNC – WWF – IUCN-WCPA,

and updated in 2010 after a synthesis by the "Biodiversity Indicators Partnership"[14]. More than forty different methodologies were identified in this review (see appendix 1). Two major tools, the "How is doing your MPA doing?" toolkit and the World Bank "Score Card", have both been progressively abandoned. Three main tools appear to be the most widely used since the end of the first decade of our century: the RAPPAM[15], designed by the World Wildlife Fund (WWF) for rapid assessment of protected areas and systems of protected areas, the METT[16], used for more detailed individual site evaluation, and the EoH, used for the evaluation of World Heritage Sites.

The multiplication of methodologies, toolkits and guides led the IUCN World Commission on Protected Areas (WCPA[17]) to develop a common framework with common references and standards to avoid the development of a situation where assessments using different tools would be difficult to compare. It proposes a model for the evaluation process, organized by different steps to identify the reference points and understand how the assessment is undertaken. All the main tools refer to this framework for the assessment of management effectiveness (see Figure 1. - from the EoH[18] guidebook). In parallel, the successive methodologies have progressively been aligning to the same approach, the same criteria and, for some of them, the same indicators. The Score Card and the RAPPAM share some identical indicators.

The three most commonly used methodologies present several advantages and are chosen by the managers in terms of site specificity, the level of competencies available and the degree of participation in implementation. While RAPPAM and METT use subjective ratings expressed by numbers, EoH is based on descriptive, qualitative and quantitative scoring[19].

One early tool designed specifically for marine protected areas. "How is your MPA doing?" was developed by WWF, NOAA and IUCN WCPA in 2000 in the framework of the "Management Effectiveness Initiative". Pomeroy (2005) demonstrated the necessity of a tool for MPAs, made obvious by the absence of maritime borders and by the natural connectivity, requiring to conduct on a regular basis a threat analysis within and around the protected site[20]. "How is your MPA doing?" remained a reference among marine conservation practitioners.

Other MPAs management effectiveness evaluation tools were developed, but most of them are not used anymore. The most frequently cited review was produced in 2006 by The Nature Conservancy, under the direction of Mark Stern[21]. It appears that tools with a specific marine and

14 Leverington, F. et al. 2010. **Management effectiveness evaluation in protected areas: a global study.** 2nd edition 2010", University of Queensland (Australia), TNC – WWF – IUCN-WCPA

15 Rapid Assessment and Prioritization of Protected Areas Management

16 Management Effectiveness Traking Tool

17 IUCN Wolrd Commission on Protected Areas

18 Enhancing our Heritage Toolkit – UNESCO World Heritage

19 Stoll-Kleemann, S. 2010. **Evaluation of management effectiveness in protected areas: Methodologies and result**s. Governance of Biodiversity (GoBi) Research Group, Sustainability Science and Applied Geography, Institute of Geography and Geology, University of Greifswald.

20 Pomeroy, R. et al. 2005. **How is your MPA doing? A methodology for evaluating the management effectiveness of marine protected areas**, IUCN. 215p.

21 Stern, M.J. 2006. **Measuring conservation effectiveness in the marine environment : a review of evaluation techniques and recommendations for moving forward**, internal report, TNC

coastal component have been relegated to the backburner. Even for MPAs, RAPPAM and METT are from far the most frequently used tools nowadays.

The BIOPAMA EU program is presently working on the development of a new tool, the Integrated Management Evaluation Tool (IMET), but it is not freely accessible like the three tools listed above and its utilization by a protected area requires a strong level of technical assistance plus appropriate funding. In these conditions, RAPPAM, METT and EoH are likely to remain the preferred tools in the near future.

Guidelines and tools should be made available for MPA managers who face new challenges and seek solutions to cope with rapid changes. A set of user-friendly criteria and indicators should be proposed, easily adapted to different contexts and added to existing management tools.

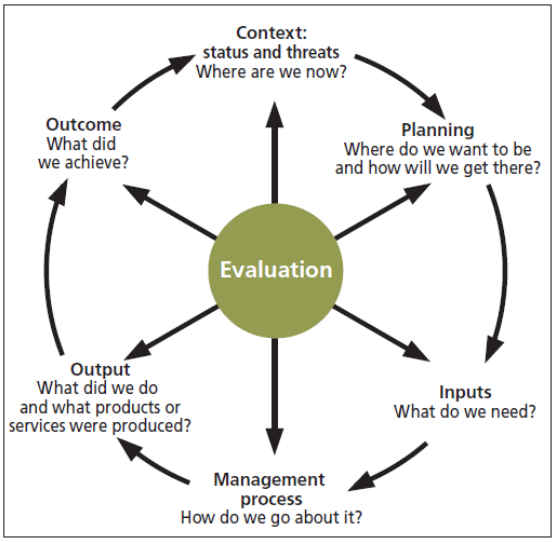


Figure 1: The WCPA Framework for Assessing Management Effectiveness.

Note: For more information on the WCPA framework see: Hockings, M., Stolton, S., Leverington, F., Dudley, N. and Courrau, J. 2006. *Evaluating Effectiveness: A framework for assessing management of protected areas,* (2nd edn) World Commission on Protected Areas, IUCN, Gland, Switzerland. The framework can be downloaded from: http://www.iucn.org/themes/wcpa/pubs/guidelines.htm#effect2

4. RESILIENCE ASSESSMENT: PROPOSED SET OF CRITERIA

The issue of resilience might not seem particularly innovative, but viewed in the context of the pressures on coastal areas around the world, the corresponding challenges for MPA managers and the almost complete absence of consideration given to resilience in classical management effectiveness methodologies, it appeared reasonable to work on developing a dedicated tool. Such a tool can be used for both management plan preparation and management plan evaluation or management effectiveness evaluation.

Two complementary options are envisioned, in order to propose rapid or in-depth assessment tools to MPAs managers, depending on the severity of the situation and the risks encountered by their site. The simple option would consist of a set criteria which evaluation can be established

through straightforward and specific questions. This tool can be presented as an "add-on" device that could be "plugged-in" as a complementary element to existing management effectiveness evaluation tools, such as RAPPAM or METT, building on the ranking system based on predefined answers to the questions. The RAPPAM tool already integrates complementary questions in order to better adapt to a specific context.

This framework can be also used as a separate resilience assessment tool, using parts of existing tools (elements identified as directly or indirectly as important for resilience), and proposing new questions specifically designed for the assessment of ecological, institutional, territorial and social resilience of MPAs.

The criteria are directly based on the experience of MPA managers and can be structured in four main complementary domains:

- Anticipation, awareness, and preparedness
- Territorial integration including spatial and social integration of the MPA
- Political and institutional resilience
- Knowledge management

The MPA Resilience Self Assessment Toolkit (R-SAT) has initially been presented as an Excel spreadsheet. Once fully tested and validated, an online version has been developed and made available as an open online application to provide results and an operational synthesis of the assessment, highlighting the domains for which improvement would be required. The criteria below address different components of the risk equation : hazard and assets/stakes assessement, vulnerability trhough the assessement of sensitivity, exposition and coping capacity.

Ark Emerald ecological complex (three MPAs surrounding the Libreville capital city, Gabon): understanding the dynamic of territorial changes for a better management of urban sprawl.

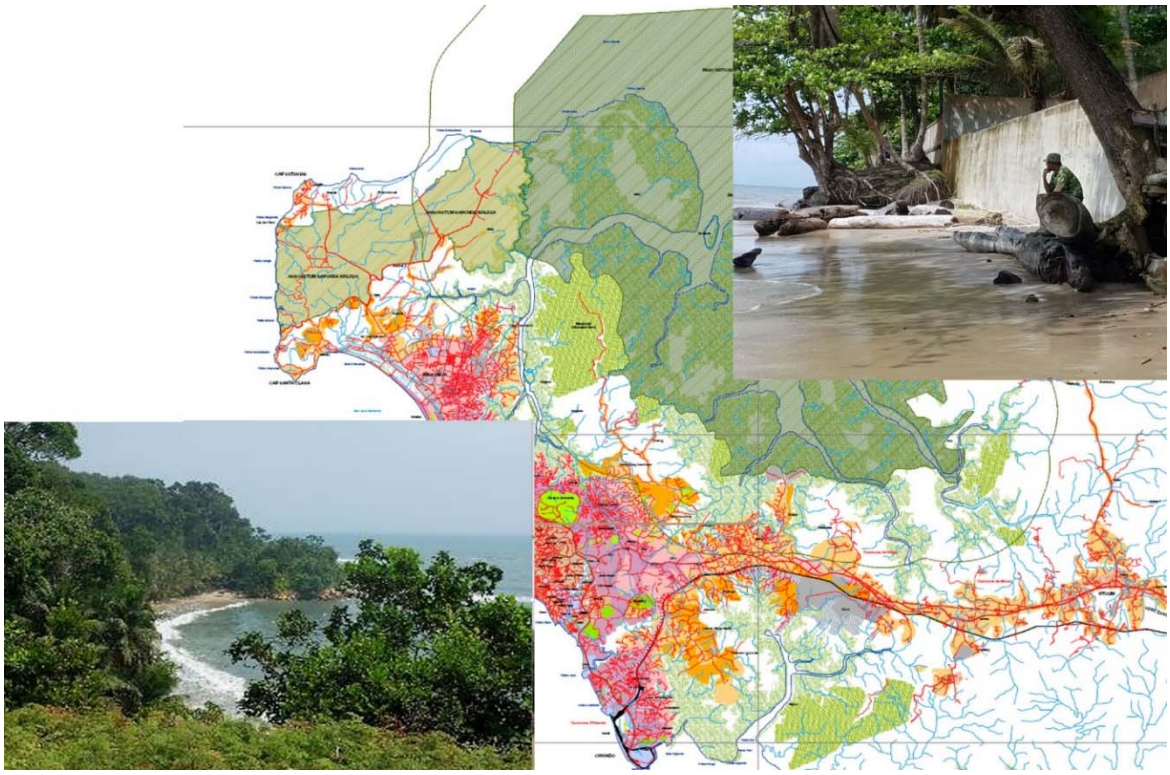
The Emerauld Ark is a complex of three protected areas situated around Libreville, among which two national parks and a protected forest. The unplanned and poorly handled rapid urban growth is provoking important environmental damages, while the coastal habitats preserved by the protected areas should long term contribute to coastal risks reduction. No strategic plan for local development exist, and it is predictable that a continued uncontrolled urban sprawl would lead to major ecological damages and increased risks for human installations and infrastructures.

In order to address this situation, a territorial survey with mapping have been realized and shared with all the actors of the territory in 2015. The study made obvious the main development patterns and trends, environmental damages, situation of present and future risks, and the probable evolution of the situation for the years to come. A dialogue among stakeholders was initiated in 2016, aiming to identify key decisions to build resilience and reduce coastal risks.

The territorial survey and the dialogue were launched by the National Parks Agency, and funded by the French Development Agency in the framework of the Emerald Arc Project. The expertise was mobilized through the Coastal Ecosystems Group of the IUCN Commission on Ecosystems Management.

The main actors involved in the process were the National Urbanism Agency - ANUTTC, the Agency for Spatial Observation – AGEOS, the Agency of Public Works – ANGTI, the General Direction of Environment, the Mayors of Libreville and neighboring cities, the Traditional Chefferies and the National Parks Agency itself (two conservators, department in charge of monitoring and impact studies). The

media and NGOs were invited to attend the presentation of the results of the study and be part of the dialogue.



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One of the keys for success is to engage an institution to lead the process which is not necessarily the main recipient or beneficiary (the National Parks Agency), otherwise it could be perceived as a vision imposed by one institution in line with its own policy and interests. A relative neutral party and a very factual analysis of the situation is key for the findings to be considered reliable by the stakeholder community. In this case, the fact that the National Parks Agency led a study to identify risks certainly had an effect on the interest and commitment of the stakeholders not directly engaged in conservation.

Source: **Mathieu Ducrocq**

A. ANTICIPATION, AWARENESS AND RESPONSIVENESS

The speed of changes affecting the environment in coastal protected areas is increasing, with cumulative effects due to climate change and rapid development, particularly in developing countries. The lead time required for management decision making and implementation generally lags behind the changes these decisions address. Responses often come late and may be irrelevant due to excessive delays.

This means that a strong anticipatipatory capacity must be developed in order to increase the level of preparedness. It also means that management responsiveness must be increased to shorter feedback loop from lessons learned to enable adaptive management and timely decision making.

The implementation of practical, hands-on processes, such as "planning by doing"[22], based on **iterative collective learning,** can help practitioners develop the capacity to identify weak and early signals of change, and get involved in decision preparation. This approach also requires a multiscale approach in space (from local to broader scales) and time (past to future perspective). In these fields, proactivity of MPA managers is required.

ANTICIPATION

- Capacity of evaluation of the impact of main climate change probable effects on the key compartments of ecosystems and key benefits of MPAs
- Weight of prospective considerations and findings in the conception of the management plan and response strategies
- Existence of priority risks assessment
- Capacity of evaluation of the impact of main climate change probable effects on the key compartments of ecosystems and key benefits of MPAs

[22] Mitchell M. & al. 2014. Applying Resilience Thinking to Natural Resource Management through a "Planning-By-Doing" Framework. Society & Natural Resources: An International Journal, 27:3, 299-314.
Sellberg M.M. & al. 2018. From resilience thinking to Resilience Planning: Lessons from practice. Journal of Environmental Management. 217 (2018) 906e918.

AWARENESS

- Informal information collection procedures and framework
- Specific and participatory monitoring and control of invasive and alien species (Existence of a structured strategy for early identification of the threats, prevention of invasive species (biosecurity protocol) and rapid response, particularly in islands.
- Integration and involvement of local biodiversity users and traditional knowledge in monitoring procedures and protocols
- Existence of early warning system in case of meteorological hazard
- Involvement in local territorial and land use decision-making process

MANAGEMENT RESPONSIVENESS

- Regularity of the evaluation and revision of zoning, limits and management priorities
- Frequency of the update of MPA management plan
- Flexibility of administrative procedures
- Decision autonomy

PREPAREDNESS AND RECOVERY

- Existence of protocols and participatory mechanisms to engage quick management adaptation actions in case of a severe threat being identified
- Existence of disaster response plan or contingency plan
- Existence of contingency financial resources
- Existence of contingency prepositioned equipments
- Availability of financial resources for recovery works
- Resilience considered in MPA infrastructures and equipment (design and conception)
- Insurance coverage and dispositions

Florianopolis mosaic of MPAs (South Brazil): a prospective and territorial approach for reducing the impacts of rapid urban/touristic development:

The Nucleus for Integrated Management of Marine-Coastal Protected Areas[23] (PA) of Santa Catarina is composed of five federal units in the region of Florianopolis, the state capital of Santa Catarina, covering 7% of the Brazilian coast. Located in the south coastal region, that area is one of the most densely populated regions of the State, being an important center of economic activities such as ports, industries, fishing, tourism, among others.

[23] In Brazil Protected Area is denominate “Unidades de Conservação”, Conservation Unit in English.

Due to the importance for the marine and coastal biodiversity of Brazil and in order to guarantee the preservation, conservation and sustainable use of these natural resources, five federal protected areas, known in Brazil as conservation units, had been created in the region: Arvoredo Biological Reserve and Carijós Ecological Station, units of integral protection, where only the indirect use of its protected attributes is allowed, the Environmental Protection Areas of the Right-Whale and Anhatomirim, and the Marine Extrativist Reserve of Pirajubaé, units of sustainable use, which aims to reconcile the conservation of nature with the use of part of its protected natural resources.

The complex of marine-coastal units of conservation of Santa Catarina is inserted in the urban net of the State. Only REBio Arvoredo is totally marine and composed of uninhabited islands. In this way, urban development, either by increasing the number of inhabitants or by installing entreprises close to protected areas, reveals the source of the main environmental impacts of these conservation units.

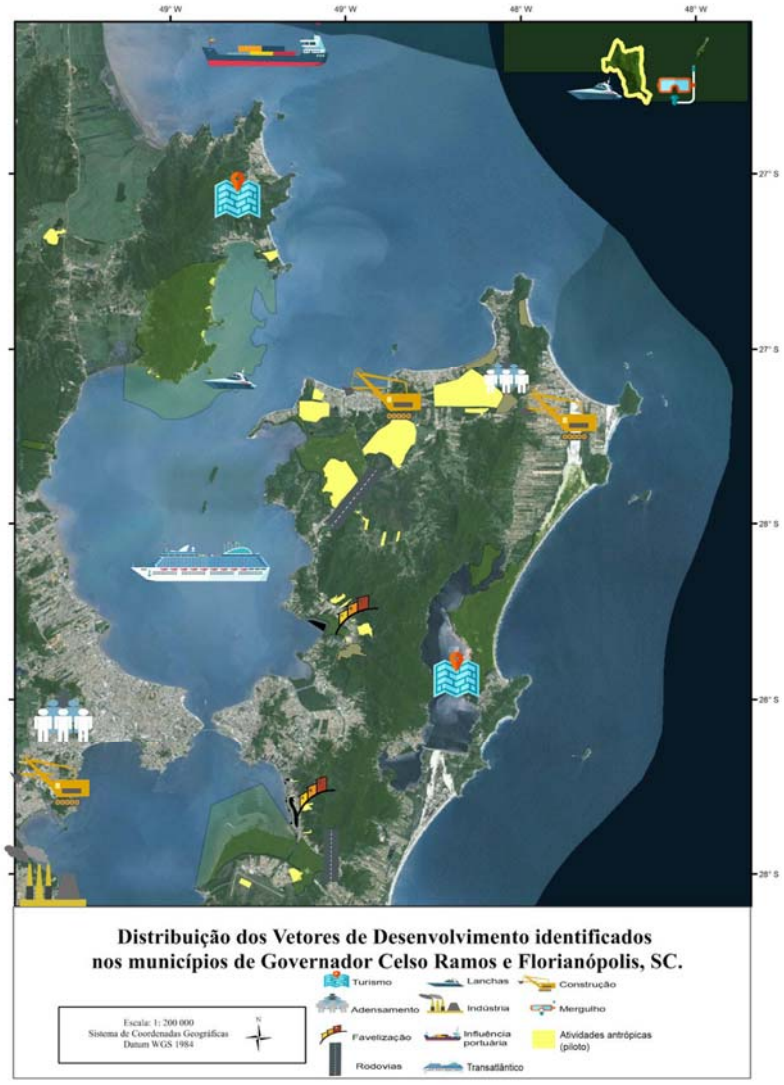


Figure Source: Report of the project "Principles and Guidelines for Incorporation of the Territorial Approach to the Formulation, Development and Review of Management Plans of the NGI SC Member Units", Edital 06/2013 - Atlantic Coast Program.

To cope with such impacts is a challenge to the management of protected areas, considering: the velocity and intensity with the changes in the environment occur; the systemic effects from these different impacts in the same time in a same area; the political distance from the environmental technical area and its management to the decision makers that implement public development policies of the region; and the absence of solid channels of discussion about the development directions of cities.

Source: **Marcia Strapazzon** (ICMBio, Brazil)

B-C. TERRITORIAL INTEGRATION OF MPA

A territorial approach for conservation

The territorial approach for conservation refers to integrated and coordinated multi-sector effort for conservation across a specific portion of territory, guided by a spatial vision of the desirable future and supported by strategic investments in land use and environmental management in order to enhance the sustainability of natural ecosystems, benefits and services they provide to the community. This definition makes no reference to scales (local, regional, national or transnational) and applies equally to any of them (adapted from Romeo L., 2015)[1].

Principles of the territorial Approach for Local Development (TALD) promoted by EU could be applied to the territorial approach of conservation, considering the relevant need to strongly involve strongly local actors in the conservation dynamic. The EU policy note defines TALD as a "*national policy that promotes endogenous, integrated, multi-scalar and incremental local development.*

Endogenous, because local authorities are given the autonomy to reach out to a range of other local actors to make the most of existing political and institutional resources. Integrated, because of the need to coordinate the work of state agencies, civil society and the private sector in a given territory (thus avoiding sectoral fragmentation of development (or conservation) interventions). 'Multi-scalar', meaning there must be mechanisms to allow for cooperation between those implementing national and local policies. And 'incremental', because local authorities do not just improve the national (conservation) development agenda, but also bring to bear additional resources. »[2]

1. Romeo. L.. 2015. What is territorial development? Ecpdm Great Insights. Vol 4. Issue 4. 15-17p.

The territorial integration of MPA include both spatial and social dimensions.

B. Spatial integration

SPATIAL PLANNING AND LANSCAPE / SEASCAPE COHERENCE

- Existence of clear and cohérent land use and marine spatial planning regarding surrounding territory or lands
- Coherence between the internal zoning of the MPA and external assets and land use

INTEGRATION OF THE MPA INTO THE OVERALL TERRITORIAL ORGANIZATION

- Place and importance of the MPA in a wider geographical context and territorial development plan
- Land use around the MPA globally defined to reduce the risks and maximize the benefits
- Integration of the MPA within a national or regional MPAs network

SECURED AND EFFECTIVE LAND TENURE

- Awareness and acceptation regarding MPA existance and limites by local stakeholders
- Long term effective land tenure

Jacques Cousteau National Estuarine Research Reserve (JC NERR - New Jersey, USA) - Getting to Resilience Initiative: A Facilitated Municipal Self-Assessment Process.

In the wake of Superstorm Sandy (October, 2012), there has been an overwhelming interest from all levels of government to increase the resiliency of coastal communities and natural ecosystems. Although sea level rise is a global phenomenon, adapting to its impacts is a local decision-making challenge. Through land use planning, development, and coastal management decisions, local decision-makers play a key role in influencing the resilience of coastal communities to climate-change related sea level rise and storm surge.

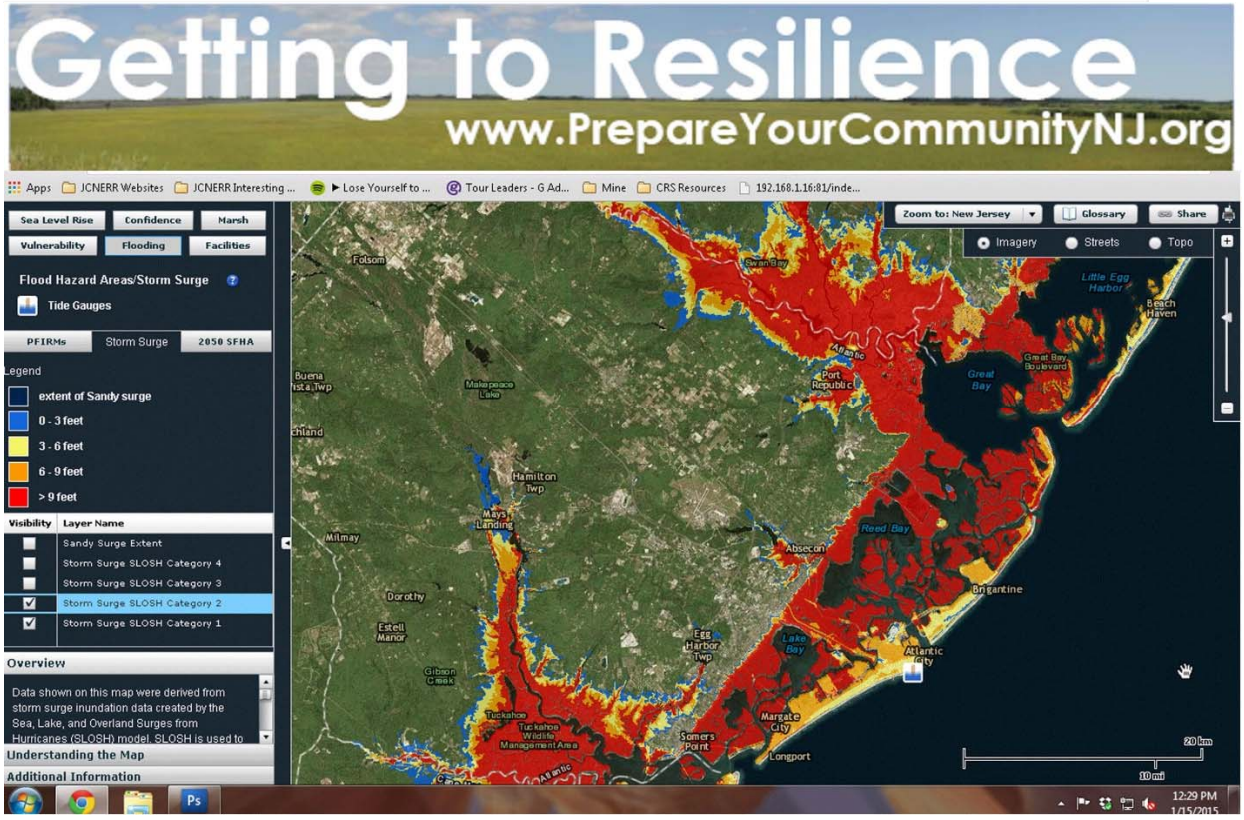
Coastal managers need timely access to site-specific information to inform both strategic and tactical (what's the diff between strategic and tactical?) decision-making. Emergency managers especially need geographic information on where flooding may take place as well as real-time information on the location of critical infrastructure and vulnerable populations. Starting in 2010,the JC NERR teamed up with Rutgers CRSSA (spell out first use) and NOAA's Coastal Services Center to develop NJFloodMapper[24]. Based on the software template originally developed for NOAA's Digital Coast initiative, the NJFloodMapper tool leverages this national-scale effort with enhanced functionality and locally-refined geospatial data and visualization examples that illustrate the location of natural assets, property and infrastructure prone to flooding.

[24] http://www.njfloodmapper.org/

From our experience working with coastal decision-makers, it was clear that additional decision support tools and local-level training were needed to help coastal decision-makers translate place- based information into concrete action plans. The NJFloodMapper tool was integrated with the web-based Getting to Resilience municipal-based planning evaluation tool[25] to provide fuller decision support capability. An important component of this work is a one-on-one facilitated GTR process with New Jersey municipalities to identify current and future hazards and vulnerabilities. As such, JC NERR Community Resilience Specialists work alongside communities to increase their preparedness by linking planning, mitigation, and adaptation. Additionally, this community-based technical assistance involves face-to-face review and discussion of risks as illustrated by FEMA flood maps, the NJFloodMapper, and NJAdapt. Coastal resilience outreach to coastal municipalities remains a priority of the JC NERR. The Reserve has undertaken the GTR municipal planning evaluation process with about 45 NJ coastal municipalities.

The GTR process covers a broad range of topics associated with municipal resilience planning, is a facilitated process and encourages a diverse set of municipal staff and officials to participate (together) in the self-assessment. The process also provides incentives for communities to participate in a resilience self-assessment process by providing recommended actions that can be rewarded (recognized?0 under FEMA's Community Rating System and Hazard Mitigation Planning process. These incentives include financial savings for residents through the Community Rating System, and hazards mitigation grant funding as a result of mitigation planning.

[25] http://www.prepareyourcommunitynj.org/



The municipalities that have participated in the GTR process have taken the following steps to improve their resilience:

- Increased communications between staff and elected and appointed officials within muncpalities.
- Increased risk and exposure awareness.
- Increased use of risk and vulnerability mapping in master planning and hazard mitigation planning documents.
- Increased savings in flood insurance payments for residents that pay into the National Flood Insurance Program.
- Increased outreach and education to community members within geographic regions through the establishment of Programs for Public Information.

Based on interviews with municipalities that participated in the GTR process:

- Risk and vulnerability maps are highly effective at increasing the tangibility of coastal hazards—especially at informing policy makers and municipal employees working on topics not directly related to coastal hazards, but also at providing people with experience more information regarding future projections.
- Clearly facilitated meetings and iterative meeting design makes information more understandable and relevant to municipal employees and officials.
- GTR meetings help to facilitate co-learning about the community concerns of different departments and officials.
- The Getting to Resilience Recommendation Report is recognized as being both highly informative and easy to understand.
- Detailing and highlighting potential Community Rating System points already being met as well as ones that could be achieved was frequently recognized as very useful to municipal employees.
- The GTR Recommendations Report aided in applying for outside grants and assistance

- The GTR Recommendations Report is useful in crafting resilience strategies for municipal master plans and other planning documents
- Maps provided through the GTR are utilized to underscore the value of building code requirements to members of the public who complain about them.

Among interviewees that were trying to argue for more proactive approaches to coastal resiliency, the GTR process and Recommendations report is frequently reported as an excellent resource to make the case to elected officials to consider or adopt new policies or programs. These individuals believe that the GTR process has provided more creditability and legitimacy in arguing for policies they see as important.

Source: **Lisa Auermuller, Mike De Luca** (JC NERR, New Jersey, USA)

C. Social integration

"Deliberating climate-resilience in coastal planning and management requires active social reconstruction of environmental issues if a substantive transformatory understanding is to be secured"[26].

C.1. MULTISTAKEHOLDER ENGAGEMENT AND INTERACTION

- Stakeholders mapping existing and used (alive, evolutive and updated)
- Quality of the collaborations with local communities living within and around the MPA
- Quality and functionality of the MPA benefits sharing system and documentation (including rules of access, fees sharing, extractive and valorization activities contractualization, fiscality, accountability, etc.)
- Awareness and education initiatives regarding services provided by the MPA to the communities
- Ability to provide information and awareness to community, especially about the stakes and risks
- Availability of economic arguments on MPA ecosystemic services provided to the community
- Existence of effective conflict resolution approaches
- Efforts and specific ability aiming to solve conflicts with some stakeholders categories

C.2. FORMALIZATION OF STAKEHOLDER ENGAGEMENT

Formalization of stakeholders relationship and contractualization (Charters and code of conduct, labels, certification, programs involving local actors and institutions)

- Initiatives regarding participative approach and representative entities (structuring stakeholders representation)
- Convention, agreements, contracts, MoU with local actors and institutions
- Formal program and initiatives to engage stakeholders and build capacity and awareness (volunteers, stewardship programs)
- Resources (time, funding, equipments, materials...) provided by local actors and institutions as contributions for the MPA management

C.3. CONTRIBUTION AND INVOLVEMENT IN LOCAL DECISION-MAKING MECHANISMS

Northern Littoral Natural Park (Portugal): From Risk Reduction to Marine and Coastal Conservation

In 1987 the Protected Landscape Area of the Littoral of Esposende (APPLE) was created, which predates the creation in 2005 of the Natural Park of the North Littoral (PNLN). In the 1980s, the northern coastline had been subject to various human disturbances, ranging from clandestine settlements to

[26] Lloyd M. G. & al. 2013. Towards a social–ecological resilience framework for coastal planning; Land Use Policy 30 (2013) 925– 933

unplanned development, to the uncontrolled extraction of dune sands and the destruction of biotopes of great importance.

To address this situation, the Municipal Assembly of Esposende proposed the designation of this area as a protected area including the entire coast of the Municipality of Esposende, an extension of 18 km. The effort undertaken was initiated by several local and regional entities, with the primary work conducted by the Municipality of Esposende in conjunction with the National Parks, Reserves and Nature Conservation Service, which led to the creation of APPLE.

Just seaward of the city of Esposende, the Northern Littoral Natural Park protects the natural infrastructure and provides coastal defense for the city.

The creation of this protected area was designed to protect and conserve the coast of Esposende and its natural physical, aesthetic and landscape elements, as well as to mitigate the processes impacting

leading the natural heritage and natural resources of the city, and to promote a sustainable use of the area for recreation.

The creation of APPLE emerged as a defense strategy for this part of the Portuguese coast in the face of urban and environmental change, Very strict rules were developed to governing construction along with creation of a special entity speciifically designed to ensure compliance.

In 2005, the importance of this protected area was confirmed by several scientific studies, and by the existence of natural values in an area adjacent to the one that was designated, which justified the alteration of the boundary and the creation of the Natural Park of the Littoral North.

The management models of this protected area have varied over time, depending on the models defined by Portuguese legislation. Initially APPLE was managed by a Director, later the PNLN was managed by a Board of Directors that included a representative of the City Council of Esposende and from 2006 through a Regional Director which manages all the protected areas of the North region. The PNLN's management has always been conducted in a close partnership with the city council regardless of the degree of formal involvement of the local authority. As a result of this partnership and more than two decades of articulated work, Polis Litoral Norte, S.A., was created at the end of 2008, with a share capital of € 26,100,000. The State has a majority stake in its capital stock and the remaining part is distributed by the municipalities of Caminha, Viana do Castelo and Esposende. The main objective of this company is to requalify and reevaluate risk areas and degraded natural areas located on the coast. This demonstrates the strong commitment that the State and local authorities have made to protect the coastline of the North Littoral. Polis Litoral Norte, S.A, focuses its activities around the following strategic objectives:

a) Protection and defense of the coastal zone in order to reduce risk;
b) Preservation and requalification of natural values;
c) Appreciation and promotion of the unique natural and cultural values of the North Coast;
d) Requalification and revitalization of urban-maritime centers;
e) Vitality and innovation in economic activities.

Financial commitments totaled 9.1 Million Euros,

The coordination of commitments in the North Littoral between public entities with specific capacity and the city councils are a model of articulation that allows a greater sustainability of strategiess to address and mitigate erosion processes that can be replicated elsewhere Portugal or the world with success.

An essential condition for the success of this model of articulation between entities of the Ministry of the Environment and Municipalities is the articulation and implementation of shared objectives.

Source: **Duarte Figueireido** (North Littoral Natural Park, Portugal)

D. POLITICAL AND INSTITUTIONAL RESILIENCE

"The significance of institutional diversity to governance systems parallels that of species diversity to ecosystems, conferring resilience to the overall socio–ecological system"[27].

D.1. POLITICAL AND POLICY SUPPORT

- Quality of poltical support
- Effectivity of political will to maintain and valorise the MPA
- Place of the MPA as part of national / regional showcase
- Clarity of political orientations
- National policies and procedures support MPA objectives and orientations
- Policy alignment and coherence between levels of governance (local – regional – national)

D.2. INSTITUTIONAL RESILIENCE

- Supervisory institutional stability or resilience (continuity of action)
- Quality of internal institutional management dialogue
- Quality of relationship between supervisory authorities and other relevant sectoral and governmental institutions (ability to cross-cutting approach and dialogue)
- Responsiveness of supervisory authority decisions making mechanisms

D.3. INTER-INSTITUTIONAL PARTNERSHIP

- Joint grants and projects with third institutions
- Participation to boards and councils
- Partnership with Universities and research organizations
- Number and diversity of partnerships
- MPA network Membership
- Information, data sharing and exchanges of experience related to MPAs resilience
- Involvement in MPA network governance
- Participation in working groups
- Participation in professional societies and networks

D.4. SUSTAINABILITY

[27] Jones. P.J.S. & al. 2013. Governing marine protected areas: Social–ecological resilience through institutional diversity. Marine Policy 41 (2013) 5–13

Abrohos National Park (Brazil): From Risk Reduction to Marine and Coastal Conservation

The collapse of a tailings dam at an ore mine in Mariana, Minas Gerais, Brazil, is considered the worst environmental disaster in the country's history. On November 5, 2015, the dam collapse led to the deaths of 19 people and released tens of millions of cubic meters of mining waste into Rio *(river)* Doce, thereby affecting its entire 650 km path to the Atlantic Ocean. Thirty municipalities in the Rio Doce basin were affected directly, including traditional human communities and 19 Protected Areas (PAs) of enormous natural and ecological value. In Espírito Santo state at the mouth of the river Rio Doce, pollutants ultimately despoiled globally important leatherback and loggerhead nesting beaches.

Although the existence of marine and coastal MPAs doesn't stop the impacts from the mining waste, MPAs have been proven to be more resilient ecosystems, serving as sanctuaries for local populations of several species that may have disappeared in other locations and show excellent indicator for impact and recovery monitoring. Among the affected coastal and marine PAs were: *Abrolhos National Park*, *Comboios Biological Reserve*, *Costa das Algas Environmental Protection Area* and *Santa Cruz Wildlife Refuge*. These PAs are part of the *Central Atlantic Forest Ecological Corridor*, a region of high endemism where up to 458 tree species have been found in 1 hectare and also part of the *Abrolhos Bank*, **the most important coral ecosystems of the South Atlantic.**

For such a huge environmental disaster, the common regional divisions are not effective: (at least) three states have been affected, with countless human and environmental communities directly or indirectly impacted. Especially in the sea areas, the "Tragedy of the Commons" concept can be applied, as the marine resources are shared by many individuals, communities and states.

MPAs have been essential to the monitoring and evaluation of the disaster's impacts, being places with known boundaries and well established responsibilities for the many Governmental Agencies.

The monitoring of the impacts has been important for defining the impacted communities, providing them with data that can be used for claiming reparation from Samarco, the company responsible for the disaster.

Samarco, the company responsible for the dam spill, signed an agreement for funding the implementation of a new PA covering the mouth of Rio Doce, including marine and land portions to better recover the marine and estuarine ecosystem.

The monitoring of the dam spill had to be started immediately after the dam's failure, requiring quick action from several governmental agencies. With such a huge affected area, Tamar-ICMBio and the PAs have taken the responsibility of ensuring that the marine areas were reasonably well monitored, while most of the media coverage and general attention was directed to the dam's region, 650 km away from the sea

One of the keys for success was the lead of the process by an institution which is not necessarily the main recipient or beneficiary, otherwise it could be understood as a vision imposed by one institution, in line with its own policy and interests. In this case, the MPA played a role of mediator due to its relative neutrality, considering that a true factual analysis of the situation was key to be considered reliable by the community of the stakeholders. In that case, the fact that the National Parks Agency led a study targeting the identification of risks, which somehow constitutes a shift in its prerogatives, certainly had a positive effect on the interest shown by the other institutional actors.

Source: **Fernando Repinaldo, Joca Thome** (ICMBio, Brazil)

E-F. KNOWLEDGE AND KNOW-HOW

E. Knowledge management

Continuous improvement of knowledge is key for reducing uncertainty and improving the relevance of prospective scenarios needed to explore and consider possible futures. It also allows managers to focus on and target conservation actions on key ecosystems and species whose sensitivity can be evaluated. Knowledge also allows a better identification of ecological services provided by MPAs and contributes to building the justification of conservation by demonstrating common and shared benefits for people and coastal societies[28] (territorial and social integration of MPAs). The following are intial thoughts about criteria that would be refined in a Working Group workshop.

E.1. KNOWLEDGE DEVELOPMENT AND DATA MANAGEMENT

- Information on the status and evolution of key species, populations and ecological processes, including interdependencies within and in between ecosystems
- Setting baseline, ecological monitoring and mapping capacities for adaptive management
- Information on main threats likely to affect ecosystems and trends
- Ecosystems and populations monitoring procedures and capacity (key to inform adaptive management)
- Identification of thresholds related to ecosystems and populations dynamics and risks of collapse
- Identification and valuation (including economic) of ecosystems services
- Existence of a structured strategy and protocols for early identification of the threats, prevention of invasive species (biosecurity protocol) and rapid response particularly in islands and isolated ecosystems.
- Accuracy and transparency of data collection methods
- Computing and software ability (GIS, databases, website, etc…)
- Existence of managed databases
- Existence of data sharing procedures and protocols

E.2. CAPITALIZATION AND LESSONS LEARNED

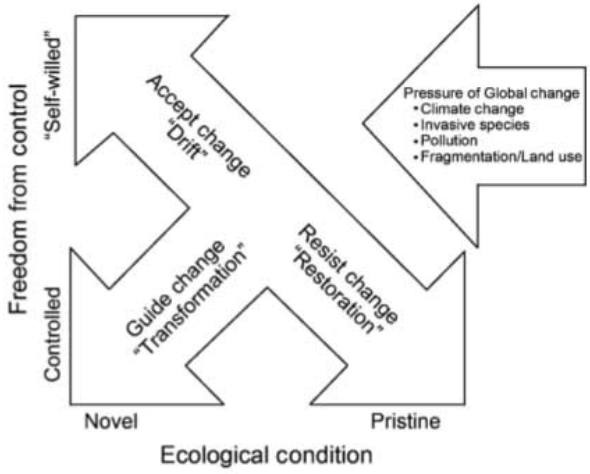
- Records and lessons learned information regarding past disaster events, recovery capacity of ecosystems and results of restoration initiatives.
- Existence of specific procedures and methodologies for capitalization and lessons learned.
- Existence of operational communication supports and channels for the dissemination of the capitalization of experience and lessons learned.
- Capitalization of stakeholders participation and involvement process and memory of the strategies and steps undertaken to strengthen community engagement.
- Involvement of local population to save memory of the risks and traditional coping strategies

F. Restoration Know-How

If resilience-based management is typically the management of shocks, changes and transformation, some restoration actions can also lead to unintended outcomes, as a result of the restoration intervention itself. In fact, restoration may be considered as part of preferable retrospective strategies (restoration of prior ecological conditions) aiming to conserve indigenous or native naturalness. However, in certain cases, threshold effects lead to irreversible changes which then require prospective strategies (facilitation of changes and management of

[28] Arkema, K.K.,& a., 2015. Embedding ecosystem services in coastal planning leads to better outcomes for people and nature. **Proc. Natl. Acad. Sci. U. S. A.** 112, 7390–7395. https://doi.org/10.1073/pnas.1406483112.

transformation processes) that can be more effective[29] for maintaining ecosystem services. The development of restoration approaches aiming to accompagny the changes and build-in anticipatory elements is clearly needed.



Different options facing ecosystem degradation (from Aplet and Cole, 2010[30]).

E.3. RESTORATION CAPACITIES

- Capacity to identify restoration needs taking into consideration driving forces and causes that led to degradation, and ensuring that these causes are controlled.
- Protocols and capacity to ensure that technical solutions implemented are relevant, proved, and can get successful results.
- Decision-making mechanisms and protocols to ensure that restoration initiatives cannot create new negative impacts affecting the surrounding environment.
- Capacity of monitoring and assessing the effect of voluntary assisted restoration processes, in case of large-scale monospecific restoration actions.
- Promotion and test of hybrid restoration and coastal defence solutions.

[29] Aplet G.H. & P.S McKinley. 2017. A portfolio approach to managing ecological risks of global change. **Ecosystem Health and Sustainability.** 3(2):e01261. 10.1002/ehs2.1261

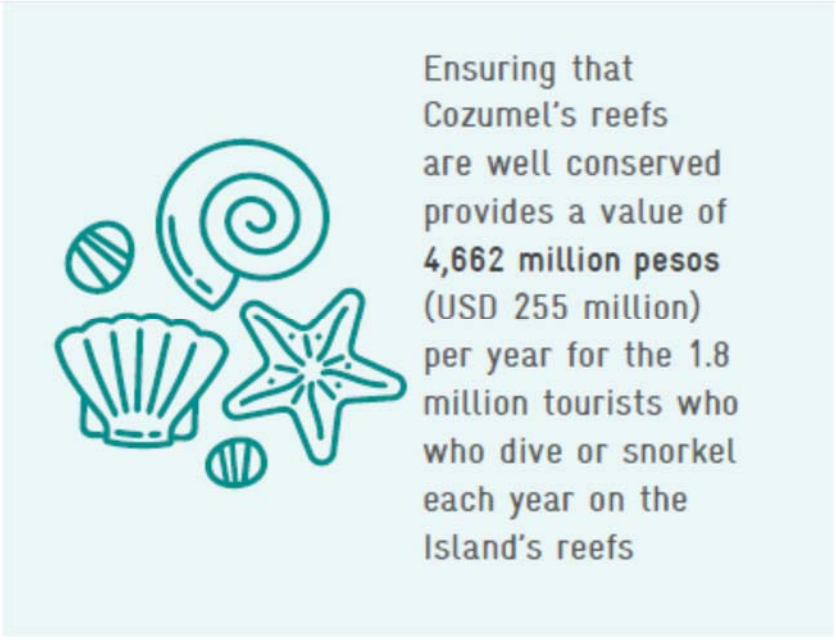
[30] Aplet, G. H., and D. N. Cole. 2010. The trouble with naturalness: rethinking park and wilderness goals. Pages 12–29 in D. N. Cole and L. Yung, editors. **Beyond naturalness: rethinking park and wilderness stewardship in an era of rapid change**. Island Press, Covelo, California, USA.

Cozumel Biosphere Reserve (Mexico): Multistakeholder Partnership and Partnership-based Approach: Mitigating Tourism Impacts.

With almost 500 km^2, Cozumel is the largest island in the Mexican Caribbean. It is an oceanic island of reef origin, located 18 km northwest of the Yucatan Peninsula; separated from the mainland by a channel that reaches 400 m deep (Muckelbauer 1990). In its marine portion there are marine grasslands and coral reefs; which are part of the Mesoamerican Reef, the largest in the western Atlantic (Cuaron 2009). Furthermore, in the north eastern region of the island, there are reef formations formed almost exclusively by coralline algae; these formations, known as "micro-atolls", are unique for the Caribbean (Boyd *et al.* 1963, Steneck *et al.* 2003).

The main economic activity of Cozumel is tourism and is world known because of its coral reefs. Cozumel is one of the main cruise ship destinations in the world, with the island receiving more than 7 million visitors per year, 70% of which engage in nature-based or aquatic activities (for example diving, snorkeling and sunbathing and beachgoing) and which is the main source of the island's economy (SECTUR 2013). However, these activities place major pressures on the environment leading to rapid development of tourism infrastructure (hotels, restaurants, landing stages), increase in invasive species, and a rapid increase in recreational services and nautical activities and fishing pressure. Directly or indirectly, all these pressures are seriously affecting the ecosystems of the island (CONANP-GIZ. 2017).

Federal, state, local government and the wider community, aware of the biological significance of Cozumel, have worked to enhance conservation through the creation of five Protected Areas (two of federal administration and three of state administration, table 1). In addition, the United Nations Organization for Education, Science and Culture (UNESCO) recently recognized the entire Cozumel Island as Biosphere Reserve, being the first site of this type in Mexico that includes a city.



Studies on valuation ecosystems services are supporting advocacy efforts.

Addressing these anthropogenic threats is vital to enhance the resilience of ecosystems, especially considering natural hazards such as hurricanes. This is even more important considering that the Caribbean is a region strongly influenced by hurricanes. (Walker *et al.,* 1991). In order to increase resilience by improving management of these pressures, a conservation strategy has been based,on the following actions:

- Active enbgagement in local land-use planning processes to anticipate threats, such as: (i) Integral System of Sustainable Urban Mobility plan, (ii) Ecological Land Ordinance Program (POEL), (iii) Urban Development Program (PDU), (iv) Municipal Climate Action Plan for mitigation and adaptation to climate change, (v) Master Plan for Port Development 2014–2018.

- Development of an integrated strategy for ecosystem conservation, attending the main pressures for the MPA, with the involvement of different economic and government sectors.

- Control of invasive species (lion fish and feral pigs): This approach features outreach to the public to encourage the consumption of lion fish, handicrafts made with lion fish materials marketed to the tourists and mobilization of dive operators, fishermen, restaurants, consumers, and government.

- Promoting good practices among the dive and snorkeling communities: Diversified partnerships have been built with private tourist operators, especially diving operators, pooling the capacity of the community tro disseminate and implement regulations on diving, the main activity occurring on the Reserve. Nearly 2,000 dive masters, trainers, guides, captains and boat crew have been trained for this objective. A video was created to promote good practices, based on the main threats to the reef as identified by the diving operators[31].

- Mangrove restoration. For 9 years we have worked with members of a sports fishing cooperative to restore the health of the mangrove area where they fish.

The positive results obtained were only possible with the active participation of the community.

[31] http://bit.ly/RulesPNAC

Currently, CONANP has only 14 people to administer the Biosphere Reserve. This small staff alone would limit the capacity to implement and enforce conservation actions. However, participation in territorial organizations and working together with other sectors has made it possible to increase the scope of conservation efforts. In addition, from the moment the community is integrated into conservation actions, this increases ownership, respect and engagement in stewardship of the resources. Some indicators of the impact of the actions carried out are:

- Land use plans include criteria related to the MPA.
- Citizen participation in environmental impact procedures
- The number of tour operators trained in good practices
- Impacts to the reef during dives are reduced

Source: **Cristopher Gonzales Baca & Brenda Hernandez** (CONANP - Mexico)

5. IMPLEMENTING THE RESILIENCE ASSESSMENT: SOME FAQs[32]…

Many MPAs around the world have not evaluated their management effectiveness or are just starting now to implement the process. Questions of resilience might then be understood as secondary or too complex by managers. Nevertheless, the Coastal Specialist Group of the IUCN Commission on Ecosystem Management highly recommended taking resilience into consideration when evaluating management effectiveness, as well as when elaborating or updating the management plans of marine and coastal protected areas. As resilience is a relatively new area for protected area managers, they may not receive much guidance from other territorial stakeholders on this question and thus should adopt a very proactive and innovativeapproach. This is likely to increase the visibility of the MPA, its contribution to public awareness and education, and also strengthen its position in multi-stakeholder and inter-institutional processes. This section provides guidance to MPA managers through simple recommendations.

WHY AND WHEN SHOULD MPA MANAGING TEAMS LAUNCH A RESILIENCE EVALUATION PROCESS ?

Any moment is good, it is never too early and generally never too late to address resilience through evaluation. Considering that coastal protected areas face both terrestrial and marine threats, their main threats will arise from outside the protected area resulting in direct and indirect effects. It is therefore necessary for MPA managers to better understand and to get ready to address emerging threats, and change from external stressors.. This exercise will lead to a more open, proactive and collaborative process, considering that the necessary data will be partly provided by other institutions and stakeholders, and that the results will be of interest to a wide range of potential partners.

When developing or implementing the management plan: Resilience capacity-building objectives and tasks can be integrated into a management plan, whether the first one for a new MPA, or when implementing a plan. Effectiveness and implementation can be assessed either mid-term or at the end of the management plan period.

When evaluating a management plan that does not consider resilience: even if a management plan does not define objectives and activities related to resilience, the criteria and indicators proposed above could be used when evaluating its implementation. This exercise can lead to decisions to integrate new elements in an updated management plan for the next period.

When facing a new situation or new threats arising from the outside: in the case of new activities or noteworthy developments in the surrounding area, conflicts with stakeholders, or after facing a serious

[32] Some other FAQs (JCNERR): http://www.prepareyourcommunitynj.org/faq/

hazard, the managing team might consider strengthening their capacity to face rapid changes. Implementing a resilience assessment will help to identify the main weaknesses and the potential management strategies to be implemented.

WHAT ABOUT BEING "PROACTIVE" ?

Several good practices have been documented in different contexts by the Transatlantic MPA CRWG. Each case study clearly demonstrates the capacity of MPAs, in the case of hazards and increasing pressures or conflicts, to act as data providers, mediators and initiators of common solutions.

This ability is linked to several specific characteristics of MPAs: i) MPAs produce public information and work with data and science producers to monitor ecological and social changes, which is valued by many stakeholders; ii) MPAs are established permanently, focus on long-term objectives and are able to orient stakeholders acting on the basis of temporary mandates; iii) MPAs are equipped with materials which can be used for various tasks on the field and can serve for education matters or in case of emergency; iv) MPAs demonstrate good results when reducing the impacts of direct and indirect pressures, which requires developing collaborations with multiple stakeholders. They are proven more efficient when co-managed with the local communities and partners; and v) the benefits produced by MPAs are generally shared by numerous diverse stakeholders.

Therefore, by recommending a proactive approach, we recommend that MPA managers should invest time and energy on connecting to local communities and other stakeholders, developing and strengthening partnerships, gathering information about the development of surrounding territories, producing reference data and monitoring environmental change and human activity.

IS A RESILIENCE EVALUATION PROCESS COMPLICATED TO UNDERTAKE AND TIME WASTING ?

The project team recognized that an in-depth resilience assessment might be an exigent and time-consuming process that requires a lot of information, much of which is neither produced nor stored by the MPA manager. Undertaking a formalized prospective study is a project in and of itself. Although desirable in the long term, it might not be a priority for MPAs with limited staff or resources. However, it is possible for all MPAs to undertake a partial and/or synthetis assessment in order to identify main weaknesses and the priority elements that should be integrated by the MPA managers in their dashboard and possibly in the management plan.

Assessing capacity for building resilience is finally a continuous process linked with MPA manager proactivity.

GETTING TO RESILIENCE ?

Building resilience is a progressive and continuous process and can't be achieved at once. The importance of the process is to progressively anticipate and identify the threats, raise awareness, help establish partnerships, and define possible pathways to reduce the risks, strengthen resilience, enhance recovery, recognize the value of new strategiess, and explore driving forces of the changes. **Getting to resilience entails adopting an institutional approach as much as implementing a plan of work**. The more the MPA manager is collaborative, connected, transparent, open to information sharing, ready for shared governance, the more success there will be in strengthening the resilience of his or her site. It requires both patience and the ability to move quickly when the circumstances allow.

HOW DO I START IF I HAVE NO DATA ?

The whole process will necessarily be open and collaborative. Once the manager defines the type of data that will be needed to document the process and answer the main evaluative questions, it will be helpful to

set up collaborations with potential partners. The type of studies and data mining may be of interest to a wide range of disciplines which provides an opportunity to engage universities, researchers, students and stakeholders. This might be an effective and low-cost data gathering and production pathway and an opportunity for broader exchanges. The managing team must be encouraged to partner with institutions and stakeholders that produce and store information, and seek access with an open attitude and clear communication about the objectives of data collection; it must be clear also that the results of the studies will be shared with and accessible to the stakeholders.

HOW DO I DO TO GET OTHER STAKEHOLDERS ENGAGED IN THE PROCESS ?

In a fast changing situation, MPAs won't be the only entities to be interested in better understanding their position, weaknesses and strengths, the risks they face and the opportunities they have to build stronger resilience. MPA managers need to remain open and transparent when presenting their interest in conducting a study about local/regional changes and the implications for the MPA and for partnering institutions and stakeholders. As MPAs may have a limited mandate to make decisions outside their borders, MPA managing teams can **play a role of facilitator or moderator of the process**, knowing that the outputs of the exercise might be taken over by other stakeholders. MPA managers can also share scientific or technical resources about the MPA with external stakeholders or institutions.

HOW TO START WHEN FACING CONFLICTING RELATIONSHIPS WITH ONE OR PART OF THE STAKEHOLDERS?

Successful MPA management involves many parties. It will be useful to establish a map of the stakeholders, documenting their respective interests, sphere of influence, capacity and support for the MPA. The MPA manager will need to establish alliances with the stakeholders who recognize the value of the MPA, its benefits, and those who share common or coherent long-term objectives. These alliances should ideally be multiple and concern actors of different categories (research institutions, academic community, socio-professional and civil society organizations, local communities, locally elected fellows, opinion leaders, private sector, media, etc.).

Depending on the type and degree of the conflicts, it could be productive to develop an early agreement on roles and responsibilities, with shared activities preferred. Other stakeholders may be effective spokespeople or facilitators with certain parties or sectors, based on their existing relationships. The process should not be completed without trying to bridge the gaps and reduce the conflicts with stakeholders which have different visions, interests or positions of negotiation. One of the utilities of the prospective study is that it brings the actors to think at a time scale allowing to put aside immediate conflicts of use or access and rebuild common objectives at a broader geographic scale. In the same spirit, it is important to consider all stakeholders, just like in a participatory process, as it will be important not to let any group of interest which could, if not engaged, reject the conclusions of the process.

6. APPENDIX 1. EXISTING MANAGEMENT EFFECTIVENESS EVALUATION TOOLS: ADDRESSING RESILIENCE?

This section first takes a look athow the notion of resilience is taken into account by MPA specialists. It will go through the main existing tools and identify the criteria and indicators that contribute directly or indirectly to measure resilience.

WHAT DO WE MEAN BY RESILIENCE ?

The notion of resilience has generally been applied to marine ecosystems. When speaking about resilience in the context of MPAs,it is used to enlarge the perspectives of marine conservation and to promote MPAs as powerful tools for climate change adaptation as well as sustainable use of marine resources[33].

It is also raised in the context of MPA networks. The "Making it happen" document points out various questions linked to institutional arrangements, surrounding environments evolution, scale and timeframe as being key to the resilience of MPAs networks[34].

The term of resilience also occurs when discussing of the social benefits of MPAs, which are presented as solutions to help secure local economies and systems of life[35].

Although threats analysis is a largely promoted step in all management effectiveness, they typically address the integrity of MPAs, marine ecosystems and the ecosystem services they provide. The question of the institutional survival of MPAs in changing environments and growing pressures is not directly addressed.

The institutional resilience of MPAs only appeared during the second decade of the century, in a set of papers produced from the Marine Protected Areas Governance Project, insisting on the necessity to build multiple partnerships to strengthen MPAs and base the resilience of MPAs on institutional diversity[36].

It is generally recommended that threats analysis consider pressures and threats occurring inside and around the considered site. On the other hand, the benefit of MPAs for their surrounding environment generally focuson the spillover effect and the positive contribution to the reconstitution of fish stocks. MPAs as tool to strengthen the resilience of coastal communities is a recent perspective. The valorization of their positive contributions to adaptation and natural risk reduction strategies is finally quite new in the literature and conservation policies[37].

33 2013 "Designing Marine Protected Area Networks to Achieve Fisheries, Biodiversity and Climate Change Objectives in Tropical Ecosystems: A Practitioner Guide". Coral Triangle Initiative.

34 WCPA - WWF - TNC - NOAA 2008. Establishing Marine Protected Areas resilient networks: Making it happen"

35 Abesamis, N. et al 2006. Social Resilience: a literature review on building resilience into human marine communities in and around MPA networks, MPA Networks Learning Partnership, Global Conservation Program, USAID

36 Jones, P.S. et al. 2013. Governing marine protected areas: Social–ecological resilience through institutional diversity, Marine Policy Volume 41, September 2013, Pages 5-13

37 Marine Protected Areas Federal Advisory Committee, USA, 2017. Harnessing Ecological Spatial Connectivity for Effective Marine Protected Areas and Resilient Marine Ecosystems: Scientific Synthesis and Action Agenda.

WHAT PLACE FOR RESILIENCE IN THE MAIN TOOLS USED FOR THE EVALUATION OF MPAS MANAGEMENT EFFECTIVENESS?

This section analyses how resilience is treated by the main tools designed and/or used to assess the management effectiveness of MPAs. The five tools studied here are the "How is your MPA doing?" toolkit, the World Bank Score Card for site management evaluation, the RAPPAM, the MEET and EoH. Other toolkits could have been detailed but these are the most relevant as they have been designed for MPAs, adapted to MPAs or because they are the presently most used methodologies.

"HOW IS YOUR MPA DOING?" AND RESILIENCE [38]

This tool is quite emblematic as being specifically designed for MPAs. It was launched in 2004 during the Bangkok World Conservation Congress. It includes considerations about marine and coastal ecology and takes in account the specific conditions met by a MPA manager. It is divided into three sets of biophysical, socioeconomic and governance indicators.

The "biophysical indicators" are in fact evaluative criteria more than indicators. They represent valuable elements of characterization of an MPA (from the species to the ecosystem level) and aims to understand whether the ecosystem services are maintained and potentially restored. The evaluators must precisely define for themselves the indicators and a locally adapted methodology. There is no ranking system to measure progress over time. The complexity and the requirements to use properly this tool suppose strong capacity and detailed scientific data. Interesting recommendations and elements of methodology are proposed in the guide. This system was clearly conceived to track the expected effects of the MPA (spillover, increase of fishing yields, etc.) and could be labelled as quite ideological today.

The socioeconomic criteria could exactly deserve the same comment and concentrate on the benefits sharing and positive effects for the local economies and communities. Although it recognizes the necessity of a good social integration of an MPA, it does not deal in this section with questions of resilience.

The governance section considers questions about the status and planning process, and insists on the participatory dimension of governance and management. It does not address the questions of sustainability of the MPA and its resilience, as the evolution of the context does not appear in the studied dimensions.

Conclusion regarding "How is your MPA doing?" and Resilience

The concept of resilience is neither defined in the methodology nor proposed for monitoring and evaluation. This tool was developed during a period when the marine conservation promotors were seeking to gain more supporters and were interested in tools to show how MPAs could be considered as useful tools for fisheries and local economies.

The resilience of MPAs and their contribution to the resilience of coastal communities and societies is not evoked directly, although the questions of participation and benefits sharing were already part of the approach.

This tool has not been widely used as a management effectiveness evaluation tool because it does not define clear and smart indicators. It required an important scientific initial knowledge of the biological context and a strong capacity for data collection and analysis, which is not always possible in developing countries.

38 Pomeroy R.S., Parks J.E., Watson L.M., 2004. How is your MPA doing? A guidebook of natural and social indicators for evaluating marine protected areas management effectiveness , IUCN,

THE WORLD BANK SCORE CARD FOR MPAS AND RESILIENCE[39]

The MPA Score Card was developed by the World Bank in 2004, as an adaptation of the Score Card tool developed by the WB-WWF alliance for terrestrial protected areas. It was designed to monitor the contribution of the World Bank to the millennium goals (2012 objective) and measure the progress in achieving goals. It is more appropriate than "How is My MPA Doing" to understand evolution over time.

The objective of this tool was to turn make information on MPA management and funding more transparent and accountable. Among the expected benefits was the possibility for MPAs to document effective management in order to attract more funds and support from international partners.

This tool is a rapid assessment one, with no need for major data collection like "How is your MPA doing?". It concentrates more on the context of the MPA together with planning and management process. Therefore, this tool is useful to understand how the threats and management issues are addressed.

This tool is organized with a first data sheet and the Score Card itself, constituted of 34 questions plus a rating system.

The data sheet gives a rapid overview of the MPA, by documenting the status, management authority, category, staff and budget and capturing very synthetic data about the main habitats, objectives, threats, activities and stakeholders.

The Score Card then proposes thematic questions and for each four fixed answers with scores from zero to three points. Additional points can be scored in case specific considerations are verified or good practices implemented. The scoring remains subjective and the place for the comments does not replace qualitative appreciation of the management effectiveness.

The first questions address the context, looking at status, regulations, enforcement and demarcation. Only Question 5 is directly relevant to the question of resilience as it seeks to understand if the MPA is part of a wider coastal management plan. The best score is when the MPA is included in a wider coastal plan. Additional points are given for MPAs being part of a MPA network. The analysis of the context also considers resources and stakeholders' awareness.

The following section considers planning. Important elements are taken in consideration which are indirectly linked to the notion of resilience. The long term master planning, capacity of stakeholders to influence the plan, their participation, the respect of cultural matters, regular updating of the management, including by integrating research and evaluation results are considered as good practices that deserve additional points.

The next section concerns the needs for management and isnot linked with resilience (research, staff, budget). It is followed by a set of question about how the management is implemented and several considerations indirectly linked to resilience appear like the communication, awareness of the communities and stakeholders, and their effective participation. An additional point is granted when an emergency response capability exists. This is related to the coping capacity and contributes to the risk reduction capacity.

The following questions consider the outputs, the effectiveness of the implementation of the management principles, including stakeholders' participation. Finally, the last questions address the achievements including the reduction of the threats, the status of the resources, and benefits sharing. The last question is indirectly important for resilience as it considers the level of satisfaction of the stakeholders, and two

39 Staub, F. 2004. Score Card to assess progress in achieving management effectiveness goals for marine protected areas, internal report, World Bank

additional points are granted when the stakeholders feel able to participate to the management and to the decision making process.

Conclusion regarding Score Card and Resilience

The concept of resilience is not part of the level of evaluation proposed by the Score Card. Several relevant evaluative criteria are indirectly linked to resilience, in particular long term planning, threat analysis, stakeholders' participation and satisfaction, and emergency response capability. There are questions that address whether the MPA is part of a wider coastal management plan or an MPA network. This point is certainly one of the most important considering the institutional resilience of an MPA in a changing world, as well as the recognition of its benefits to coastal societies.

The double concept of synthetic evaluation and scoring was an important contribution that influences later commonly used tools. The RAPPAM and METT tools include some of the approach and questions from the Score Card.

RAPPAM AND RESILIENCE[40]

The RAPPAM was also developed by WWF during the same period. This tool aims at a slightly different goal as it is rapid assessment system essentially targeting protected areas networks and their contribution to significantly maintain the world's large ecosystems and related services. Like the Score Card, it is much more directive than the "How is your MPAs doing?" guidebook with questions and four predetermined answers with a ranking system based on yes / no answers. The novelty of this methodology is that it allows for the analysis of management effectiveness of the whole network, of individual sites and also formulating recommendations to managers to address weaknesses.

The first steps aim to define the scope of the assessment, including specific management objectives, and assess the existing information. These two elements can certainly be retained as elements that contribute to the strengthening of the resilience of a MPA. RAPPAM intends to be able to "analyze the scope, severity, prevalence, and distribution of a variety of threats and pressures." It also looks at high vulnerability areas, urgency and conservation priorities. The assessment of the available information includes a threat analysis which will of course constitute an element for a resilience assessment.

The administering of the questionnaire allows for integrating new evaluative questions and developing adapted indicators. This would allow integration of resilience questions in case of need.

The assessment questionnaire itself is constituted of a first background information level, followed by thematic question with the possibility of personalizing the assessment before answering to fixed answers with ranking values. The identification of threats and pressures is let to the evaluators. The characterization of them is directed by the questionnaire, with descriptions concerning the evolution, levels of probability, extent, severity of the impact and permanence.

Following questions assess the biological and socioeconomic importance, including the benefits shared. Then comes the vulnerability of the protected area due to the context, followed by the planning process. These last elements are important for the risk assessment and the definition of the management objectives, indirectly linked to resilience considerations.

40 Ervin, J. 2003. Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology, WWF, Gland, Switzerland

The next box is of very high interest as taking care of the legal security planning. Questions address i) long-term legally binding protection, ii) unsettled disputes regarding land tenure or use rights, and the fact that iii) conflicts with the local community are resolved fairly and effectively. These points might be connected to questions of resilience. The 8th box addresses site design and planning, and includes an interesting question in order to know whether the land use in the surrounding area enables effective PA management.

Following questions concern information input, communication, management inputs (infrastructures, budget; etc.) and process, including a point about the presence of the threat analysis and a threat reduction strategy. Other questions concern the participatory level and capacity to produce information and knowledge to update the management plan.

The next step is concerning the PAs network scope and include elements that concern PA resilience directly or indirectly, such as the existence of an adequate PA policy, political will, restoration target for degraded sites, research on critical PA-related issues and a regular update of the network based on a gap analysis. The policy environment is then analyzed and questions address the fact that national policies promote sustainable land management and land conservation mechanism.

Conclusion regarding RAPPAM and Resilience

This tool addresses resilience better than the previous ones, even though resilience is not expressly defined as evaluative criterion. Some key points relate to resilience when defining the threats and pressures, the long term legal security of the PA, and the design of the site in relation to the surrounding environment. Other points also appear important for resilience matters, such as the stakeholders' effective participation, the updating process of the management plan, the political environment, the gap analysis for PA network design, and regular updating and restoration objectives for degraded sites.

The evaluator can include complementary questions to the proposed methodology, which would allow integrating a section designed for resilience purposes.

METT AND RESILIENCE [41]

The METT is from far the most used tool at the global level nowadays. It has been developed for individual sites with no distinction whether marine and terrestrial. Published in 2007, it is more recent than the previously described tools and capitalizes on the experience developed while implementing the existing tools. It is retaking on several principles from the Score Card. Some questions are exactly the same and the rating system is comparable. The METT process is based on three documents: 1. The identification sheet; 2. The threats analysis sheet; 3. The METT evaluation sheet itself.

Although a threats analysis is conducted as a preliminary step, it is interesting to note that it concerns almost only the threats within the protected area with no mention about the trends and evolutions except for some activities. The only threats noted that originate from outside the PA areindustrial activities and urban pollution. The only activity within the PA for which evolution is considered is agriculture (expansion). The threat analysis does not take into account the evolution of the environment nor the development dynamics around the PA.

The METT evaluation is composed of 30 questions and is operated by a moderator. It is designed to involve top managers, field practitioners and representatives of the communities.

41 Stolton, S. and Dudley, N. 2016. METT Handbook: a guide to using the management effectiveness tracking tool (METT), WWF UK, Woking

The five first questions about the governance (legal status, regulations, law enforcement) as well as conception and management of the PA (objectives and design) appear as indirectly important when evoking questions of resilience but remain of general interest. METT does not ask whether the governance includes adaptive processes in case of shock or rapid change of the context.

The following questions about management (6 to 8) are regardless to resilience matters, but three additional points can be scored when the planning process i) allows adequate opportunity for stakeholders to influence the management plan, ii) includes a periodic review to update the management plan, and iii) regularly integrates new research results. These three items concern adaptive management which is indirectly important to resilience.

The following section (questions 9 to 12) addresses how the key habitats and species are documented, protected, monitored and managed. Good documentation of the state of reference and monitoring system can contribute to resilience capacity but here it is not addressed as a question of resilience. Following questions (13 to 19) concern the management capacities, with staff, equipment and budget and are not related to resilience matters.

The 20th question is about education and awareness but remains very superficial and does not enters in any details concerning the objectives of communication activities.

Question 21 is important concerning resilience as analyzing whether the planning for adjacent land and water areas consider the long term needs of the PA. Three additional points are related to that question and give more details concerning land and water planning for habitat conservation, connectivity, ecosystems services and species conservation.

Following questions (22 to 25) concern collaboration with neighboring actors, indigenous people and local communities, with three additional points in case of good communication with local communities, sharing of the benefits of the PA and support from the communities. These elements certainly contribute to the assessment of the resilience. Question 25 questions specifically the benefits sharing.

Question 26 addresses monitoring and evaluation. The best score is for M&E systems allowing adaptive management.

Questions 27 to 29 are about tourism, services and fees.

The 30th question is about the condition of the values of the PA and their evolution. Three additional points are obtained when the condition of values is assessed, motivates specific management tasks and constitutes a routine for the PA.

An advanced METT version includes four complementary questions designed to better address how the PA may adapt its management to climate change effects, whether the threats to main values are well identified, and the evolution of the status of the key species and habitats.

Conclusion concerning METT and Resilience

Although the METT is building on previous experiences and looked how to make available a simple, user friendly and comprehensive tool that allow comparing the ratings on regular time bases, resilience is still not addressed as a central question.

Some of the evaluative criteria and questions that were found in the Score Card and the RAPPAM are not found in the METT. For example, METT is not considering whether the PA is legally secured on the long term, if there is a risk linked to the development of external threats and pressures, and if the PA is part of a wider land planning process.

EOH AND RESILIENCE [42]

The EoH management effectiveness evaluation tool should naturally take questions of resilience in account, as one of the criteria for the designation of a World Heritage Site is the capacity to maintain it long term in its original state. The regular evaluation of the state of the values and possible downgrading of a World Heritage site should normally integrate points that are relevant to the assessment of the resilience of an MPA.

The EoH methodology first insists on the process for the realization of an evaluation. In the case of a World Heritage site, the State, together with stakeholders, commits to conduct regular assessments of the state of the site and its values. The Government, IUCN and the UNESCO Center for World Heritage collaborate on these assessments. Therefore, the EoH standardized assessment process has been cautiously developed and described, in coherence with the reference framework developed by the WCPA in 2006[43].

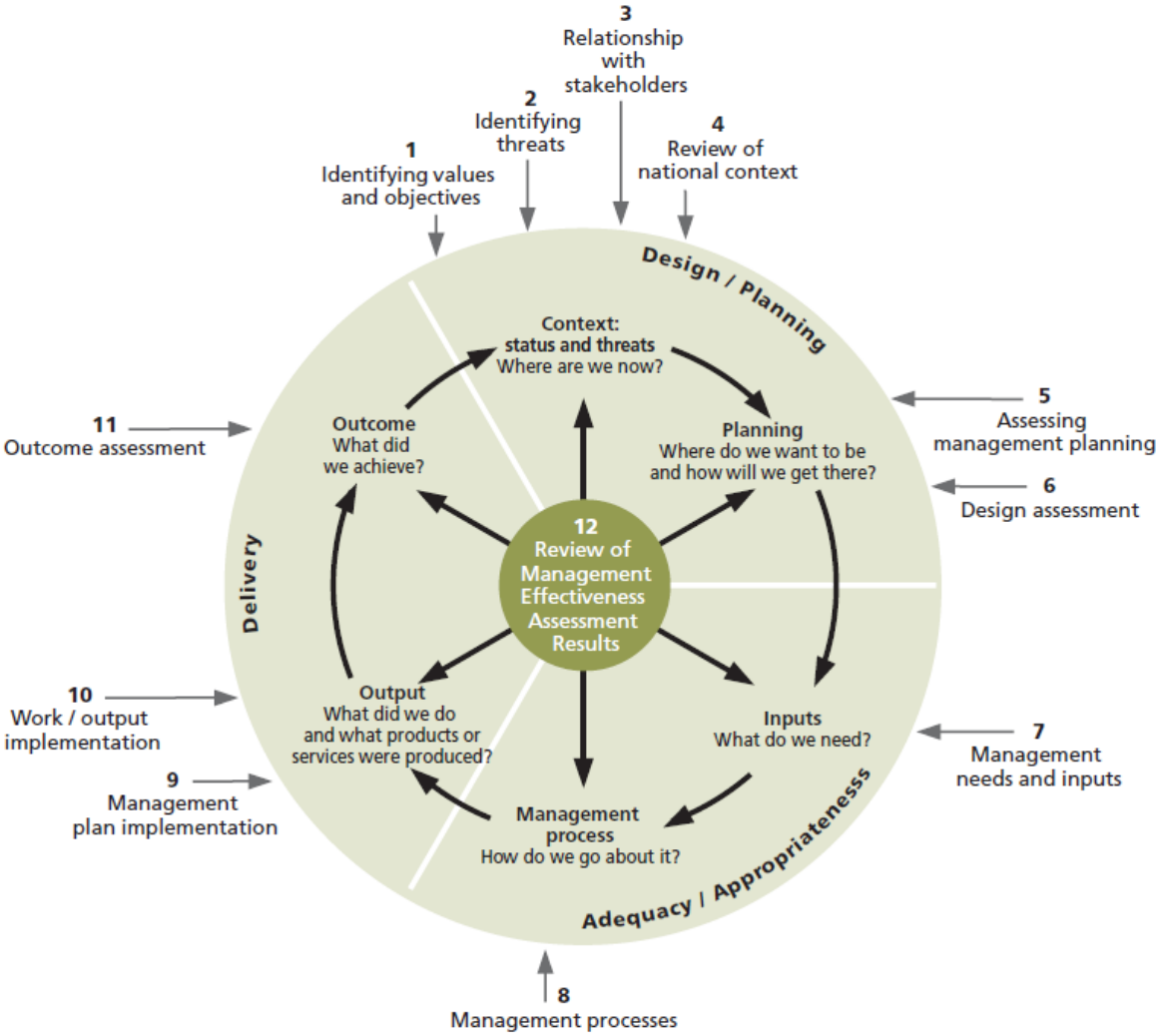
This political dimension of the process and its output is finally becoming one of the focus of the methodology, for it to deliver acceptable evaluations and conclusions for all parts. The other principal focus is about the value and the measurement of them. The assessment is principally concentrated on whether outstanding universal values are maintained or not. Once again, the methodology concentrates more on what is happening within the site than outside. Even the threat analysis does not refer to external threats arising from changes outside the site. Below is an extract of the EoH methodological guidelines, concerning the "Tool n°2 – threat analysis":

- **Threats** are major problems facing a site, such as forest loss or degradation of a coral reef.
- **Causes** of threats are the various reasons why, to follow the examples above, forest is disappearing (e.g. illegal logging and agricultural encroachment) or coral is degrading (e.g. tourist over-use, global warming).
- **Impacts** of threats are knock-on problems that result (e.g. for forests, an impact could be soil erosion or loss of connectivity between forest fragments; for coral reefs, loss of fish species and human well-

Nothing refers to the fact that threats might change, arise suddenly, come from outside, provoke indirect impacts, etc. The question of resilience is missed, maybe even more than in the previously described tools.

42 Hockins M. et al. 2008. **Enhancing our heritage toolkit : Assessing management effectiveness of natural World Heritage Sites**. World Heritage Papers n°23, UNESCO World Heritage Center

43 Hockings, M., Stolton, S., Leverington, F., Dudley, N. and Courrau, J. (2006). Evaluating Effectiveness: A framework for assessing management effectiveness of protected areas. 2nd edition. IUCN, Gland, Switzerland and Cambridge, UK. xiv + 105 pp.



WHAT PLACE FOR RESILIENCE IN THE CEC MPA VULNERABILITY ASSESSMENT TOOL?

Although not being a management effectiveness evaluation tool, the model developed by the North American CEC (Commission on Environmental Cooperation) deserves interest and some analysis. It addresses the question of the vulnerability of resources within MPAs, which of course is a major to be taken in account when considering resilience questions.

This tool is certainly very useful as it intends to create a culture to take in account the evolution of the situation in relation to ongoing changes. This corresponds to one of the key progresses to undertake when trying to build resilience. Nevertheless, when looking at the resilience of protected areas, several limitations of this tool must be mentioned, which are, for part of them, inherent to the objective of the tool, and, for others, linked to methodological aspect.

First, this methodology is specifically looking at the vulnerability to climate change and its implications at the level of the natural assets. Although it considers non-climatic and anthropogenic stressors, it clearly intends to understand how climate change will influence the evolutions, and to predict the probable impacts on the main habitats and biological resources. It does address, for example, questions of institutional vulnerability in a changing socioeconomic context. Therefore, the notion of hazard which is used in the

equation of risk is quite restricted. Although the combination of climate change effects with non-climatic stresses is included in the methodology, the evaluation remains essentially focused on the biological impacts and the modification of initial habitats.

Secondly, the methodology itself can be questioned. Although it proposes a first step to define the scope of the study, one of the first inputs is about habitats. This approach and the list of proposed so-called habitats brings in different issues. The first problem is that the proposed list includes items such as beaches, dunes, rocky reefs as well as estuaries and pelagic areas. This is bringing in, at the level of the entry data, confusion on the scales and between elements of landscapes and habitats. The second problem is that by compartmentalizing the ecosystems in segments, the methodology does not take in account the functional interrelations which are crucial when dealing with recovery after a shock and resilience.

Although the strong interest of the approach developed by CEC should be recognized, it does not give the answer to the question about how resilience should be considered in an MPA evaluation.

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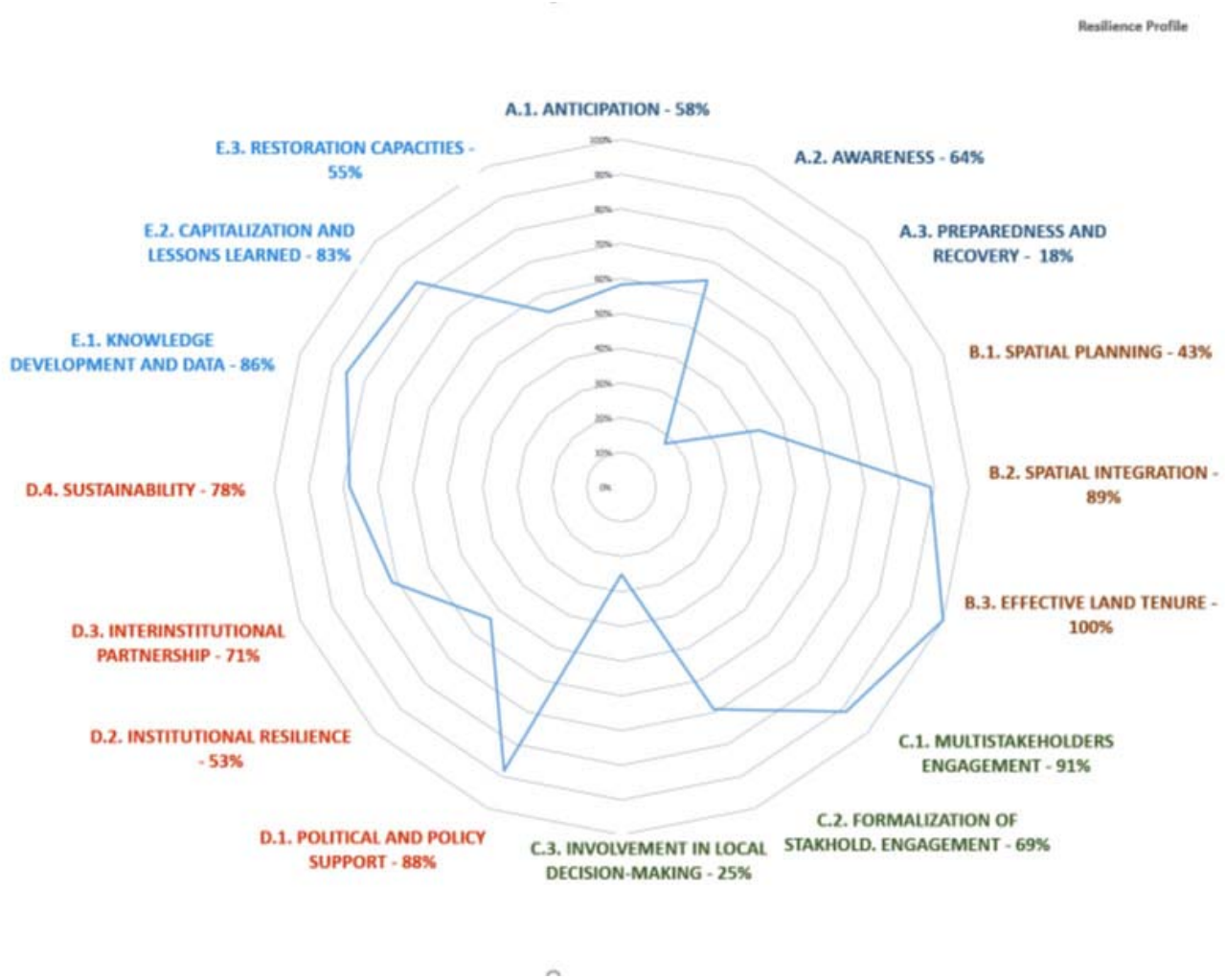
8. APPENDIX 3. MPA RESILIENCE SELF ASSESSMENT TOOLKIT : CRITERIA, OPTIONS AND SCORES

This table is delivered as an Excel file. An online user-friendly version (http://www.coastal-management.online/RSAT/) will be released by the end of November 2019.

At this stage, tool results are expressed through a comprehensive radar graph (see below):



A. ANTICIPATION, AWARENESS AND RESPONSIVENESS A

A.1. ANTICIPATION

Anticipation capacity should be based on prospective scenarios regularly evaluated and updated.

A.1.a. Anticipation capacity should be based on prospective scenarios regularly evaluated and updated.

A. Existence of formalized and updated prospective scenarios and approach (territorial prospective assessments undertaken on a regular base, involving main stakeholders, and considering broader territorial scale, beyond MPAs' limits).	**4**
B. Existence of no formalized prospective scenarios and reflections and capacity for scenario-based decision making as part of the management	**2**
C. Existence of regularly updated vulnerability/risks study and maps as part of the management plan	**2**

A.1.b. Weight of prospective considerations and findings in the conception of the management plan and response strategies

A. Consideration to prospective issues led to specific dispositions in the plan	**3**
B. No clear reference to prospective issues but adaptability of the management plan	**2**
C. No clear reference to prospective issues and Management plan updating procedure don't facilitate adpative management	**1**
D. No management plan	**0**

A.1.c. Existence of priority risks assessment

A. Existence of priority risks assessment regularly updated	**2**
B. Existence of priority risks assessment	**1**
C. No risk assessment	**0**

A.1.d. Capacity of evaluation of the impact of main climate change probable effects on the key compartments of ecosystems and key benefits of

A. Existing modelization capacity	**3**
B. Good knowledge of the impact of main climate change probable effects on the key compartments of ecosystems and key benefits of MPAs (based on empiric	**2**
C. Weak knowledge of the impact of main climate change probable effects on the key compartments of ecosystems and key benefits of MPAs (based on empiric	**1**
D. No consideration given to the impact of main climate change probable effects on the key compartments of ecosystems and key benefits of MPAs (based on empiric experience)	**0**

A.2. AWARENESS

The objective is here the early detection of weak signals of changes/threats, the early access to relevant information on major land use changes or infrastructures project likely to affect the surrounding environment of the protected area:

A.2.a. Informal information collection procedures and framework

A. Informal information collection and management procedure established	**2**
B. No specific dispositions but informal information is taken into consideration for MPA management and cecision making mechanisms	**1**
B. Informal information not rreally taken into consideration for MPA management and decision making mechanisms	**0**

A.2.b. Specific and participatory monitoring and control of invasive and alien species (Existence of a structured strategy for early identification of the threats, prevention of invasive species (biosecurity protocol) and rapid response, particularly in islands.

A. Existence of a structured strategy for early identification of threats related to invasive species and rapid response mobilizing local stakeholders	**4**
B. No specific dispositions for early identification but rapid response mechanisms effective	**2**
C. No specific dispositions, no experience related to the control of invasive species	**0**

A.2.c. Integration and involvement of local biodiversity users and traditional knowledge in monitoring procedures and protocols

A. Local biodiversity users and traditional knowledge systematically integrated in monitoring procedures and protocols	**2**
B. Local biodiversity users and traditional knowledge occasionnaly integrated in monitoring procedures and protocols	**1**
C. No specific importance given to local biodiversity ysers and traditional knowledge	**0**

A.2.d. Existence of early warning system in case of meteorological hazard

A. Regular attention given to meteorological forecast, meteorological records procedure	**2**
B. No regular attention given to meteorological forecast, existing meteorological records procedure	**1**
C. No specific attention given to meteorological forecast, no meteorological records procedure	**0**

A.2.e. Involvement in local territorial and land use decision-making process

A. MPA staff fully involved in local territorial and land-use decision marking processes	**4**
B. MPA staff aware, but only occasionnaly involved in local territorial and land-use decision making mechanisms	**3**
C. MPA staff not involved in local territorial and land-use decision making processes	0

A.3. MANAGEMENT RESPONSIVENESS

A.3.a. Regularity of the evaluation and revision of zoning, limits and management priorities

A. Relevance of current internal zoning and MPA management spatial organization are assessed and discussed on a regular basis, with revisions already proposed	**3**
B. Relevance of current internal zoning and MPA management spatial organization are assessed and discussed on a regular basis and always confirmed	**3**
C. Spatial organization of the MPA is an established fact and considered as intangible even if not convenient	**1**
D. No specific zoning or spatial organization	**0**

A.3.b. Frequency of the update of MPA management plan

A. MPA management plan is not recent (>5 years) and has been evaluated and updated and during the last 3 years	**4**
C. MPA management plan is recent (<5 years) and has never been evaluated	**2**
B. MPA management plan is not recent (>5 years) and has never been evaluated and updated during the last 3 years	**1**
D. No management plan	**0**

A.3.c. Flexibility of administrative procedures

A. The procedure to update the management plan after an evaluation process is easy and takes less than 6 months	**4**

B. The procedure to update the management plan after an evaluation process presents some difficulties and can take until one year	**2**
C. The procedure to update the management plan after an evaluation process is a real challenge, and its validation can take more than one year	**0**
A.3.c. Decision autonomy	
A. Globally satisfactory	**4**
B. Satisfactory for some aspects, to be improved for other	**2**
C. Needs to be improved	**0**
A.3.d. Management plan	
A. Adopted and updated	**5**
B. Adopted but needs to be updated	**3**
C. Available but not adopted	**2**
D. Under development	**1**
E. None	**0**
A.4. PREPAREDNESS AND RECOVERY	
Ability to reduce exposition of specific ecological assets (mobile coral nurseries or surelevating nesting platform for shore birds for example) and/or restoration works	
A.4.a. Existence of protocols and participatory mechanisms to engage quick management adaptation actions in case of a severe threat being identified	
A. Existing operational protocoles, mechanisms, and agreements for supporting rapid response	**2**
A.4.b. Existence of disaster response plan or contingency plan	
A. Existing disaster response plan or contingency plan	**2**
A.4.c. Existence of contingency financial resources	
A. Existence of an available contingency fund	**3**
B. Pre identification of available resources or sponsors	**1**
C. No specific dispositions	**0**
A.4.d. Existence of contingency pre positioned equipments	
A. Existence of an available contingency equipments	**2**
B. Pre identification of available contingency equiments	**1**
C. No dispositions	**0**
A.4.e. Availability of financial resources for recovery works	
A. Ongoing recovery or restoration works	**3**
B. Availability of funds for recovery works if needed	**2**
C. Pre identification of aganecies or organization able to support recovery works	**1**
D. No specific dispositions	**0**
A.4.f. Resilience considered in MPA infrastructures and equipments (design and conception)	
A.4.f. Resilience systematically considered for the conception of MPA infrastructures and equipments	**2**
B. Resilience considered for the conception of the most exposed MPA infrastructures and equipments	**1**
C. No specific consideration on resilience for the design and conception of MPA infrastructures and equipments	**0**
A.4.g. Insurance coverage and dispositions	
A. Strong insurance coverage (building and equipment) to natural hazards	**3**
B. Partial insurance coverage (building and equipment) to natural hazards	**2**
C. Very partial or weak insurance coverage (building and equipment) to natural hazards	**1**
D. No insurance coverage	0
B. TERRITORIAL INTEGRATION OF MPA	**A**
Secured legal status for the MPA and buffer zone with confirmed long term land tenure dispositions and capacities	
B.1. SPATIAL PLANNING WITHIN AND AROUND THE MPA	
B.1.a. Existence of clear and cohérent land use and marine spatial planning regarding surrounding territory	
A. Existence of coherent coastal land use and marine spatial plans covering MPA area and surrounding territories / lands	**4**
B. Existence of no consistent coastal land use and marine spatial plans	**3**
C. Existence of coastal land use plan, but no marine spatial plan	**2**
D. Existence of some rules for use and access to marine resources but no plan	**1**
E. No coastal land use or marine spatial planning	**0**
B.1.b. Coherence between the internal zoning of the MPA and external assets and territorial vocations	
A. Strong coherence between internal zoning of the MPA and assets/land use in adjacent areas ensuring connectivivity	**3**
B. Partial coherence between internal zoning of the MPA and assets/land use in adjacent areas ensuring connectivity	**2**
C. Relevant discrepancies betwen internal zoning of the MPA and assets/land use in adjacent areas	**1**
D. No consolidated internal zoning of the MPA	**0**
B.2. INTEGRATION OF THE MPA INTO THE OVERALL TERRITORIAL ORGANIZATION	
B.2.a. Place and importance of the MPA in a wider geographical context and territorial development plan	
A. The MPA is considered as a structuring element of local territorial organization and development	**4**
B. Territorial organization and development has been taking partially into account the existence of the MPA	**2**
C. No consideration to the MPA regarding territorial and spatial organization of surrounding territories/lands	**0**
B.2.b. Territorial vocations and land use dispositions around the MPA globally defined to reduce the risks and maximize the benefits	
A. Almost	**3**

B. In some way	**2**
C. Not	**0**
B.2.c. Integration of the MPA within a national or regional MPAs network	
A. The MPA is part of a wider local and regional physical / geographical conservation network	**2**
B. The MPA is part of a wider local physical / geographical conservation network	**1**
C. The MPA is not embedded into a wider physical / geographical conservation network	**0**
B.3. SECURED AND EFFECTIVE LAND TENURE	
B.3.a. Awareness and acceptation regarding MPA existance and limites by local stakeholders	
A. Existence of MPA and limits are almost well known, consensual and secured	**3**
B. Limits of MPAs are not well known and/or locally discussed	**1**
C. Serious claims exist regarding MPA or its limits	**0**
B.3.b. Long term effective land tenure	
A. LLand tenure status is clear, enforced on the field and respected	**3**
B. Land tenure status is clear but still questionned by some stakeholders	**2**
C. Relevant claims and dispute regarding land tenure status	**0**

C. SOCIAL INTEGRATION OF MPA A

"Deliberating climate-resilience in coastal planning and management requires active social reconstruction of environmental issues if a substantive transformatory understanding is to be secured"[1].

C.1. MULTISTAKEHOLDERS ENGAGEMENT AND INTERACTION	
C.1.a. Stakeholders mapping existing and used (alive, evolutive and updated)	
A. Existing and updated	**2**
B. Existing needs updates	**1**
C. Not existing	**0**
C.1.b. Quality of the collaborations with local communities living within and around the MPA	
A. Almost good	**2**
B. Fair with remaining difficulties to be solved	**1**
C. Poor quality or with persistant disagreements	**0**
C.1.c. Quality and functionality of the MPA benefits sharing system and documentation (including rules of access, fees sharing, extractive and valorization activities contractualization, fiscality, accountability, etc.)	
A. Satisfactory, funcional and documented formalized system and agreements for benefit sharing	**4**
B. Benefit sharing formalized system and agreements under development	**3**
C. On going initiatives aiming to qualify the benefits arising from the MPAs with the objective to communicate on them with the users	**2**
D. No MPA benefit sharing systems	**0**
C.1.d. Awareness and education initiatives regarding services provided by the MPA to the communities	
A. Frequent initiatives - structured programme	**4**
B. Regular initiatives	**2**
C. Few initiatives	**0**
C.1.e. Ability to provide information and awareness to community, especially about the stakes and risks	
A. Regular pedagogic communication aiming to inform communities on the stakes and risks arising from new situations	**2**
B. Punctual communication towards the communities in case of rising emergency	**1**
C. No specific communication with the users and communities about risks	**0**
C.1.f. Availability of economic arguments on MPA ecosystemic services provided to the community	
A. Existence of recent economic studies on the value of ecosytem services provided to the community by the MPA	**4**
B. Planning of economic studies on the value of ecosytem services provided to the community by the MPA	**3**
C. Existence of references not directly issed from the MPA	**2**
D. No initiative related to economic valuation of ecosystems services	**0**
C.1.g. Existence of effective conflict resolution approaches	
A. Existing functional conflict resolution framework and dialogue interlocutors	**2**
B. No established conflict resolution framework but conflict resolution is globally satisfactory	**1**
C. No conflict resolution orientations	**0**
C.1.h. Efforts and specific ability aiming to solve conflicts with some stakeholders categories	
A. Conflicts generally solved	**3**
B. Majority of conflicts resolved and proven ability to adress the problems	**2**
C. Many persistent conflicts not resolved	**0**
C.2. FORMALIZATION OF STAKEHOLDERS ENGAGEMENT	
Formalization of stakeholders relationship and contractualization (Charters and code of conduct, labels, certification,	
C.2.a. Initiatives regarding participative approach and representative entities (structuring stakeholders representation)	
A. Existence of an active, funcional and formal organization of MPA stakeholders representatives	**5**
B. Existence of a formal organization of MPA stakeholders representatives to be redynamized	**3**
C. Representativity limited to some groups of stakeholders	**2**
D. Representativity of stakeholders not satisfactory	**0**
C.2.b. Convention, agreements, contracts, MoU with local actors and institutions	

A. Most of the relation with local actors and institutions are formalized through existing Convention,Contracts or agreements. Compliance with these commitments is regularly evaluated.	
B. Some convention or other formal agreement	**1**
C. No convention or other formal agreement	**0**
C.2.c. Formal program and initiatives to engage stakeholders and build capacity and awareness (volunteers, stewardship programs)	
A. Existing programs	**2**
B. No program of this kind	**0**
C.2.d. Resources (time, funding, equipments, materials...) provided by local actors and institutions as contributions for the MPA management	
A. These resources are considered as crucial for the MPA	**3**
B. Important level of resources but not crucial for the MPAs	**3**
C. Some resources	**1**
D. No significant contribution from local actors and institutions	**0**
C.3. CONTRIBUTION AND INVOLVEMENT IN LOCAL DECISION-MAKING MECHANISMS	
A. MPA staff frequently invited to participate in local decision-making mechanisms even when the topic is not directly related to the MPA	**4**
B. MPA staff generally consulted by local decision-makers for decisions related to infrastructures, land use planning or environment	**3**
C. MPA staff sometimes consulted by local decision-makers for decisions related to infrastructures, land use planning or environment	**1**
D. MPA staff not really involved in local decision-making mechanisms	**0**

D. POLITICAL AND INSTITUTIONAL RESILIENCE A

"The significance of institutional diversity to governance systems parallels that of species diversity to ecosystems, conferring resilience to the overall socio– ecological system"[2].

D.1. POLITICAL AND POLICY SUPPORT	
D.1.a. Quality of political support	
A. Almost good	**4**
B. Fair with some difficulties	**2**
C. To be improved	**1**
D.1.b.Effectivity of political will to maintain and valorise the MPA	
A. Almost good	**2**
B. Fair with some difficulties	**1**
C. To be improved	**0**
D.1.c. Place of the MPA as part of national / regional showcase	
A. MPA considered as emblematic and important part of national Conservation Heritage	**3**
B. Relevant MPA between others	**1**
C. Not especially significant	**0**
D.1.d. Clarity of political orientations	
A. Almost good	**2**
B. Fair with some difficulties	**1**
C. To be improved	**0**
D.1.e. National policies and procedures support MPA objectives and orientations	
A. True	**3**
B. Partially true	**1**
C. Not true	**0**
D.1.f. Policy alignment and coherence between levels of governance (local – regional – national)	
A. Almost good	**3**
B. Fair with some difficulties	**1**
C. To be improved	**0**
D.1.g. Financial resources sustainability	
A. Almost good	**3**
B. Fair with some difficulties	**2**
C. To be improved	**1**
D. No sustainability	**0**
D.1.h. Diversity of financial resources	
A. Almost good	**4**
B. Fair with some difficulties	**2**
C. To be improved	**0**
D.1.i. Existence of long term funding mechanism	
A. Yes	**4**
B. Not	**0**
D.2. INSTITUTIONAL RESILIENCE	
D.2.a. Supervisory institutional stability or resilience (continuity of action)	
A. Almost good	**4**
B. Fair with some difficulties	**2**
C. To be improved	**1**

D.2.b. Quality of internal institutional management dialogue	
A. Almost good	**4**
B. Fair with some difficulties	**2**
C. To be improved	**1**
D.2.c. Quality of relationship between supervisory authorities and other relevant sectoral and governmental institutions (ability to cross-cutting approach and dialogue)	
A. Almost good	**3**
B. Fair with some difficulties	**2**
C. To be improved	**0**
D.2.d. Responsiveness of supervisory authority decisions making mechanisms	
A. Almost good	**4**
B. Fair with some difficulties	**2**
C. To be improved	**1**
D.2.e. Quality of governance in respect to the management plan dispositions	
A. Almost good	**3**
B. Fair with some difficulties	**2**
C. To be improved	**1**
D.2.f. Designation status: clarity and sustainability	
A. Positively designated	**4**
B. Ongoing process	**2**
C. Not clearly designated	**0**
D.3. INTERINSTITUTIONAL PARTNERSHIP	
D.3.a. Joint grants and projects with third institutions	
A. Many	**2**
B. Some	**1**
C. None	**0**
D.3.b. Participation to boards and councils	
A. Many	**2**
B. Some	**1**
C. None	**0**
D.3.c.Partnership with Universities and research organizations	
A. Many	**2**
B. Some	**1**
C. None	**0**
D.3.d. Number and diversity of partnerships	
A. Numerous (>10)	**2**
B. Some	**1**
C. None	**0**
D.3.e. MPA network Membership	
A. Yes	**1**
B. no	**0**
D.3.f. Information, data sharing and exchanges of experience related to MPAs resilience	
A. Frequent	**2**
B. Occasional	**1**
C. None	**0**
D.3.g. Involvement in MPA network governance	
A. Yes	**1**
B. No	**0**
D.3.h. Participation in working groups	
A. Yes	**1**
B. No	**0**
D.3.i. Participation in professional societies and networks	
A. Yes	**1**
B. No	**0**

E. KNOWLEDGE AND KNOW-HOW A

E.1. KNOWLEDGE DEVELOPMENT AND DATA MANAGEMENT	
E.1.a. Information on the status and evolution of key species, populations and ecological processes, including interdependencies within and in between ecosystems	
A. Almost good	**3**
B. Fair	**2**
C. To be improved	**1**

D. Very few information	0
E.1.b. Setting baseline, ecological monitoring and mapping capacities for adaptive management	
A. Almost good	3
B. Fair	2
C. To be improved	1
E.1.c. Information on main threats likely to affect ecosystems and trends	
A. Almost good	3
B. Fair	2
C. To be improved	1
D. Very few information	0
E.1.d. Ecosystems and populations monitoring procedures and capacity (key to inform adaptive management)	
A. Almost good	3
B. Fair	2
C. To be improved	1
D. Very few information	0
E.1.e. Identification of thresholds related to ecosystems and populations dynamics and risks of collapse	
A. Some reliable information	3
B. Some interesting hypothesis	2
C. To be explored	1
D. New question	0
E.1.f. Identification and valuation (including economic) of ecosystems services	
A. Already addressed	3
B. Ongoing	2
C. Planned	1
D. No initiative	0
E.1.g. Existence of a structured strategy and protocols for early identification of the threats, prevention of invasive species (biosecurity protocol) and rapid response particularly in islands and isolated ecosystems.	
A. Yes	2
B. Under development	1
C. New question	0
E.1.h. Accuracy and transparency of data collection methods	
A. Almost good	2
B. Fair	1
C. To be improved	0
E.1.i. Computing and software ability (GIS, databases, website, etc…)	
A. Almost good	2
B. Fair	1
C. To be improved	0
E.1.j. Existence of managed databases	
A. Yes	2
B. Not	0
E.1.k. Existence of data sharing procedures and protocols	
A. Yes	2
B. Not	0
E.2. CAPITALIZATION AND LESSONS LEARNED	
E.2.a. Records and lessons learned information regarding past disaster events, recovery capacity of ecosystems and results of restoration	
A. Existing accurate and reliable data and information	3
B. Some data and information	2
C. Very few data and information	1
D. No data and information	0
E.2.b. Existence of specific procedures and methodologies for capitalization and lessons learned.	
A. Yes	3
B. No	0
E.2.c. Existence of operational communication supports and channels for the dissemination of the capitalization of experience and lessons	
A. Yes	2
B. No	0
E.2.d. Capitalization of stakeholders participation and involvement process and memory of the strategies and steps undertaken to strengthen community engagement.	
A. Stakeholders engagement process records available	2
A. Some information not systematized on stakeholders engagement process	1
C. New question	0
E.2.e. Involvement of local population to save memory of the risks and traditional coping strategies	
A. Communities systematically consulted and traditional coping capacities valorized for resilience strengtehning	2

B. Communities consulted in case of problems about their representations and proposed solutions	**1**
C. Communities not consulted concerning risks	**0**
E.3.a. Capacity to identify restoration needs taking into consideration driving forces and causes that led to degradation, and ensuring that these causes are controlled.	
A. Almost good	**3**
B. Fair	**2**
C. To be improved	**1**
D. Weak	**0**
E.3.b. Protocols and capacity to ensure that technical solutions implemented are relevant, proved, and can get successful results.	
A. Existing protocols and capacities	**2**
B. Some restoration capacities under development to be strengthened and formalized through management plans	**1**
C. To be developed	**0**
E.3.c. Decision-making mechanisms and protocols to ensure that restoration initiatives cannot create new negative impacts affecting the surrounding environment.	
A. Existing mechanims and procedures designated to apply ecological safeguards before launching restoration activities	**2**
B. Mechanism and procedures under development or applied punctually	**1**
C. To be developed	**0**
E.3.d. Capacity of monitoring and assessing the effect of voluntary assisted restoration processes, in particular in case of large-scale monospecific restoration actions.	
A. Almost good	**3**
B. Fair	**2**
C. To be improved	**1**
D. New question	**0**
E.3.e. Promotion and test of hybrid restoration and coastal defence solutions	
A. Yes	**1**
B. New question	**0**