



DECISION-MAKING TOOLKIT FOR INCLUSIVE CONSERVATION ON PANORAMA

Deliverable 5.3.



© FerManza

Fotografía: Fernando Román

Index

Abstract.....	3
1. Introduction.....	4
2. Sierra de Guadarrama National Park (SGNP), Spain.....	5
3. Co-creation approach.....	7
4. Results.....	9
4.1 Decision-making toolbox for SGNP inclusive conservation in PANORAMA.....	9
4.2. The potential applicability of the decision-making tools for inclusive conservation within a protected area management setting.....	16
5. Final remarks.....	26
6. Acknowledgements.....	27
7. References.....	27
Appendix A.....	31

Abstract

Researchers from the ENVISION project on inclusive conservation (<https://inclusive-conservation.org>) have developed a toolbox to provide protected areas managers and practitioners with tools for fostering stakeholder inclusion and active participation in conservation decision-making. We applied the tools to the case study of the Sierra de Guadarrama National Park (Spain) as part of a collaborative research approach between scientists and local actors. From the feedback collected throughout our research activities (e.g., interviews, surveys, and workshops), we shaped a set of participatory research tools for inclusive conservation in the National Park. These tools included: i) A set of graphic tools, ‘Streamline’, ii) Participatory mapping, iii) Deliberative processes within a participatory scenario planning exercise, iv) Mental, emotional, and power maps, v) Context-specific boundary object to call for action, and v) Governance arrangements matrix. We worked with National Park decision-makers and stakeholders to evaluate the applicability of these six participatory research tools in management. The toolbox was based on the format for PANORAMA Solutions, a global online platform which aims to inform and guide conservation practitioners in the implementation of successful solutions for protected areas. PANORAMA is a joint initiative of the International Union for the Conservation of Nature (IUCN), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, and other partners. Findings from the evaluation revealed that local decision-makers and experts on protected areas perceive that the participatory research tools can potentially be applied to the management of the National Park; however, they also see major challenges to be addressed before ensuring that these tools can be used as instruments for participatory governance. We discuss lessons learned and propose recommendations for operationalizing and scaling up the applicability of the decision-making toolbox to other protected areas.

1. Introduction

Enhancing stakeholders' inclusiveness in protected areas governance is a well-recognized principle for global biodiversity conservation. This assertion is at the center of the Convention of Biological Diversity (CBD, 1992) and resultant frameworks (e.g., the Post-2020 Global Biodiversity Framework) and regional strategies (e.g., the EU Biodiversity Strategy for 2030). However, putting participatory and inclusive whole-of-society approaches that engage actors in conservation governance into practice still raises many challenges, and scientific cooperation is considered an important support mechanism to provide practical guidance for overcoming them (UNEP-CBD, 2021). Scholars are engaged in debates on how to elicit, integrate, and deal with a wide diversity of knowledge, values systems, and perspectives in conservation governance while dealing with inequalities (e.g., territorial, ethnic, gender and age), power dynamics, and conflicts, and facilitating collective action (Raymond et al., in preparation; Matulis and Moyer, 2017; Tallis and Lubchenco, 2014). Most of these theoretical and practical reflections and lively discussions within the academic world aim to provide the policy community with scientific evidence that helps promote social inclusion in conservation governance.

In this context, the scientific community has become increasingly active in providing a wide diversity of participatory research tools with the potential for confronting the challenges of stakeholders' inclusivity within the conservation management settings (e.g., Ros-Tonen and Willemsen, 2021, Linam et al., 2007). Here, we elaborate on participatory research tools, defined as science-based methods, approaches, processes or techniques that have been developed and tested in face-to-face or online events to facilitate social participation and engagement in conservation governance. Examples of these tools include participatory mapping to represent spatial relationships between different variables, future scenarios focused on collectively envisioning futures as a basis for planning and decision making, spidergrams aimed to represent relationships among variables related to a central question, and Venn diagrams, to visualize social interactions and power dynamics between stakeholders (see Linam et al., 2007). Such a variety of participatory research tools are usually designed and evaluated by researchers who highlight their potential use within the management systems.

While conservation decision-makers might use punctually these participatory research tools, they are rarely fully embedded into management processes for conservation. A large proportion of academic literature posits multiple factors that contribute to maintaining the science-policy gap in conservation governance (e.g., Hering, 2016, Roux et al., 2006, van den Hove, 2007). Among these factors, the traditional, unidirectional model employed by scientists to transfer scientific knowledge might be among the causes of the underutilization of such tools by protected area managers. This model refers to the one-way communication approach mainly used by scientists to communicate scientific evidence through papers, books, thesis, reports, etc. (Roux et al., 2006). It is widely recognized that these scientific documents contain specific terminologies and concepts, which may hinder findings from being easy to understand by non-scientists (Amano et al., 2016). Indeed, a lack of skills to analyze and translate scientific information for conservation governance has been increasingly pointed at by protected areas decision-makers (López-Rodríguez et al., 2017). Additionally, there is an absence of a culture of collaborative work between the scientific and policy communities in protected areas management in many countries. Interactions between scientists and other actors related to the policy processes have been traditionally limited due to the existence of ontological and epistemological differences (e.g.,

the lack of a common language, working philosophies, timeframes, quality criteria, incentive systems, and investment of financial resources and targeted programs to create collaborative workspaces) (Roux et al., 2006; Hegger et al., 2012).

Literature on the science-policy interface for conservation governance increasingly recognizes that successful translation of scientific knowledge into policy-relevant knowledge requires collaborative research approaches with all actors involved in the policy process (van den Hove, 2007). Such collaborative research approaches can help (1) scientists improve their knowledge of the complex decision-making process and gain awareness of the variety of directions in which their research can be used in the policy domain, and (2) decision-makers gain access to the best available scientific evidence and better understand academic discourse. This way, optimal conditions are created for embedding and operationalizing scientific knowledge into management settings. While these collaborative approaches are increasingly adopted in diverse areas of sustainability science (e.g., forest ecosystem management and integrated governance landscape), such approaches are limited in participatory research tools for facilitating social inclusion in conservation governance. Incorporating these tools into management settings continues to present great difficulties (Shantiko et al., 2021). Understanding how the use of participatory research tools can be facilitated in management is a core challenge for supporting the greater inclusivity of stakeholders in conservation governance.

To help alleviate this gap, this report describes the methodological approach to 1) create a toolbox that comprises the diverse participatory research tools for inclusive decision-making designed and applied throughout the ENVISION project (<https://inclusive-conservation.org/>), and 2) explore, through a collaborative approach between researchers and decision-makers, the potential applicability of such tools as management instruments for inclusive conservation governance. The report is focused on the Sierra de Guadarrama National Park (Spain) as the ENVISION case study where the participatory research tools have been applied and evaluated in terms of applicability for the protected area management setting. Our findings provide empirical evidence for reflection on the challenges and opportunities for operationalizing and improving participatory research tools' applicability within protected areas' institutional contexts. The report corresponds to Deliverable 5.3 of the work package (WP) 5 of the ENVISION project.

2. Sierra de Guadarrama National Park (SGNP), Spain

The SGNP is located in the Central Mountain System of the Iberian Peninsula (Fig. 1). It was established in 2013, becoming Spain's newest national park. This National Park covers 34,000 hectares across the regions of Madrid (64% of the territory) and Castile-Leon. It is renowned for its geological features (e.g., glacial cirques, moraines, and singular rock formations such as the granite batholith La Pedriza), alpine lakes, grasslands and pastures, and pine forests that support a notable bird species and high amphibian richness. SGNP has an adjacent “Special Area of Protection”, a “Peripheral Area of Protection”, in addition to two regional parks and two UNESCO Man and Biosphere Reserves that act as buffer zones and contribute to protecting the National Park from significant impacts.

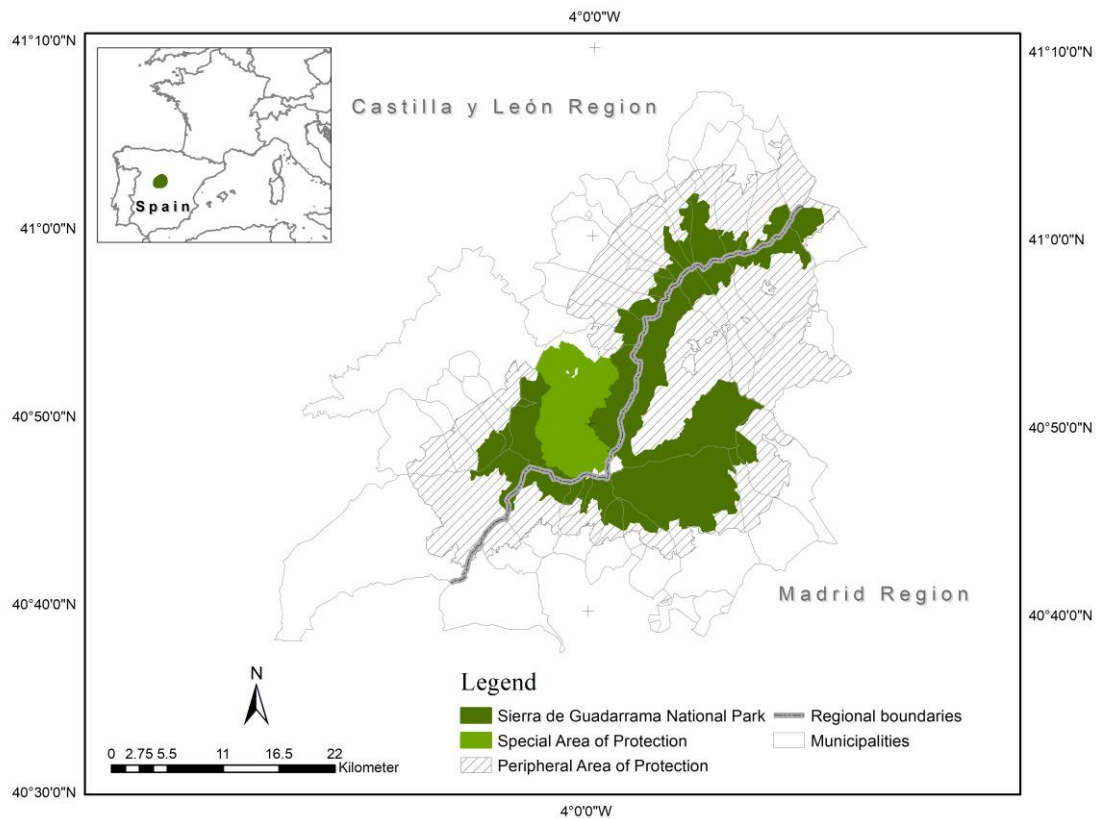


Figure 1. Sierra de Guadarrama National Park, its regional boundaries in the Madrid and Castile-Leon regions, the adjacent areas of protection, and municipalities surrounding the National Park (Adapted from López-Rodríguez et al., 2020).

Traditionally, the predominant land uses in SGNP area included livestock farming and pinewood timber logging. Over the past few decades, this area has changed through a bidirectional process of land intensification and rural abandonment. A key feature of the National Park is its proximity (less than 100km) to Madrid's large metropolitan area (over 6.5 M inhabitants) and the mid-sized city of Segovia (around 50,000 inhabitants) in the Autonomous Community of Castile-Leon, which has made that SGNP has almost 3 million visitors per year. Whereas park visitors are mainly interested in recreation and sports activities, local stakeholders are engaged in diverse activities such as extensive livestock farming, environmental conservation, education and research. In addition to the multiple and competing uses, climate change constitutes a critical challenge in the area, impacting water and snow availability and species range shifts (López-Rodríguez et al., 2021).

From the governance standpoint, SGNP is a government-led protected area managed by two regional state administrations: Madrid and Castile-Leon (BOCYL 2010, BOCM 2010). In their endeavor to achieve conservation targets, these conservation authorities have implemented a variety of mechanisms for promoting the participation and cooperation of state and non-state actors in conservation governance (López-Rodríguez et al., 2020). An example is the Advisory Board, in which local municipalities and relevant stakeholder groups are meant to be represented. SGNP's authorities, when addressing participatory practice, are exposed to a variety of knowledge, values, interests, roles, and power positions from a wide range of state and non-state

actors. SGNP represents an ideal case study to understand what tools can help shape stakeholders' participation in conservation governance and address pluralities and inequalities between stakeholders to move towards better social engagement in conservation decision-making.

3. Co-creation approach

To co-create the toolbox, we developed different research activities in the framework of a science-policy dialogue. Four assumptions underlay the creation of the toolbox in the SGNP:

- 1) facilitating place-based processes that foster inclusive conservation necessitates the collection of local/traditional knowledge, views, and values from multiple stakeholders;
- 2) identifying visions and elaborate future scenarios should be done in a participatory way;
- 3) addressing power dynamics and facilitating collective action is crucial to promote stakeholders' participation and engagement in conservation, and
- 4) strengthening the science-policy interface for socially inclusive governance requires from the promotion of collaborative work among stakeholders.

On this basis, since the beginning of the ENVISION project, we generated a science-policy dialogue to create understanding and collaboration between the research team, local decision-makers, and local actors related to the policy process in the SGNP. The science-policy dialogue entailed different activities such as face-to-face and online meetings to formally introduce the research project to the SGNP's decision-makers and formal invitation to them to be involved in the project research activities while tailoring such activities to their agenda in order to facilitate their participation.

In this science-policy dialogue framework, we reviewed policy documents (e.g., legal norms, participatory processes, management plans), conducted a literature and newspaper library, and carried out nine semi-structured interviews with key informants to achieve a preliminary understanding of how participation is institutionally articulated and map key stakeholders within the SGNP's governance system. This data allowed us to identify gaps and needs in terms of tools to deal with different aspects linked to inclusive conservation: the plurality of visions, diversity of knowledge and values, emotional and relational aspects, power dynamics, and collective action. Based on this, we selected six participatory research tools that we used in ENVISION research and could help to address the mentioned aspects: 'Streamline', 'Participatory mapping', 'Deliberative processes within a participatory scenario planning exercise', 'Mental, emotional, and power maps', 'Context-specific boundary object to call for action', and 'Governance arrangement Matrix'. The three first tools referred to existing methods adapted to the SGNP context; the last three ones were specifically created to be applied in the site.

The selected participatory research tools were developed by testing them through different research activities in the SGNP:

- 38 online and in-person interviews facilitated by the Streamline graphic tool (Lo et al., 2021),

- 161 online and face-to-face surveys using Maptionnaire software as participatory mapping tool (Cebrián-Piqueras et al., 2020),
- A virtual workshop based on deliberative processes for participatory scenario planning with multiple stakeholders, combining traditional scenarios methodologies with innovative tools such as mental, emotional and power maps and a context-specific boundary object (Oteros-Rozas et al., 2020).
- An on-line survey to explore social perception on the tools applied during the virtual workshop for participatory scenario planning.
- 67 semi-structured interviews with representatives of institutions, collectives, and individuals with a stake in the governance of the National Park to collect information about formal and informal mechanisms shaping stakeholders' participation in the site and the stakeholders involved (López-Rodríguez et al., 2020).

Throughout these research activities, local stakeholders could experience the participatory research tools. Further, the results of the research activities were disseminated through 1) research reports and newsletters in the local language before academic article publications to validate the results, and 2) regular meetings and webinars in the local language to inform decision-makers and local actors about the project advances and findings. The continued feedback received from decision-makers and local stakeholders during these science-policy activities allowed us to improve and adapt the tools to better respond to the management needs and challenges of the National Park.

Finally, we conducted a science-policy workshop (1 December 2020) based on a co-learning and knowledge co-production approach (Norström et al., 2020; Rist et al., 2007) to explore the potential applicability of the participatory research tools to be used as instruments within the management setting of this protected area. We adapted the workshop to an online format due to the Spanish government lockdown measures during the COVID-19 pandemic. The virtual workshop involved six people in the facilitation team (3 for facilitation and 3 for note-taking) and 12 decision-makers of the SGNP and other experts on protected areas management (50% from Madrid and 50% from Castile-Leon; 50% female/male). We started the workshop by brainstorming on barriers and opportunities to participatory governance in the SGNP. In doing so, we introduced the key findings identified in previous phases of the research project (see López-Rodríguez et al., 2020). Participants deliberated and enriched their perspectives on barriers and opportunities for participatory governance in the National Park from this initial input.

We then invited workshop participants to complement and refine them and identify specific measures needed to move forward in inclusive and active social engagement in the protected area management. Under this assignment, we encouraged them to identify means that could be provided from the academic world. Using a Google Jamboard handled by the facilitation team, the results were collected and classified into two levels: 1) SGNP's governance system and 2) specific participatory mechanisms in the site. This helped us gain awareness of the variety of directions in which our research can be used within the policy domain, and decision-makers get a better understanding of how it can help them address different challenges associated with participatory processes. Afterward, we presented the six participatory research tools for inclusive conservation applied by the research team in the SGNP. To introduce each tool, we developed a fact sheet including the following items: 1) tool description, 2) scientific goal to be addressed, 3) method of application, 4) results from its application, 5) potential interest for the management

setting from both outcome and process perspectives, and 6) references. We then invited participants to evaluate and reflect collectively on each tool in terms of 1) the management goals that the tool might contribute to addressing, 2) the steps of the management cycle in which the tool might be applied (i.e., planning, implementation, monitoring, and evaluation), 3) its suitability to be used within SGNP management setting, and 4) the resources and needs required for its adoption as a management tool for participatory governance. Participants were divided into three workgroups, each of them evaluating two different tools. In the ensuing plenary, a representative of each workgroup explained the main results for each tool so all participants could collectively deliberate on them. We then invited participants to evaluate the usefulness of the science-policy workshop by using an interactive app to visualize participant responses in real-time and create an interesting and interactive experience (i.e., Mentimeter: <https://www.mentimeter.com/>). Based on these results, we concluded the workshop by inviting participants to expose their final reflections and thoughts. The online workshop was also video and audio-recorded and summarized with the notes taken during the workshop and quotations. We analyzed the summaries through qualitative content analysis (Hsieh and Shannon, 2005). Two months later, we sent a report to participants with the workshop outcomes detailing the goals, challenges, resources, and needs associated with each tool to be applied in the management setting (López-Rodríguez et al. 2021).

The content of the toolbox for promoting socially inclusive decision-making in the SGNP was organized based on the format for [PANORAMA Solutions](#), a global online platform which aims to inform and guide conservation practitioners in the implementation of successful solutions for protected areas (Mattsson et al., 2019). PANORAMA is a joint initiative of the International Union for the Conservation of Nature (IUCN), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, and other partners. These solutions are publicly available in different languages. Solutions are documented using a case study template that includes a detailed description of the protected area context in which your solution is applied and further details about the solution (e.g., challenges addresses and beneficiaries). The template also requires describing the solution in “building blocks” (e.g., tools, instruments, approaches, or processes) as key components to facilitate re-application and adaptation of the solutions and transferable to other contexts. Each building block must include goals, challenges, enabling factors, and lessons learned when applying it. Before publication, solutions are peer-reviewed by subject matter experts to ensure that they adhere to defined quality standards and are understandable for a broad audience.

It should be noted that we had planned to conduct another science-policy workshop in the Denali National Park in order to evaluate from a management perspective the participatory research tools applied there. However, this workshop could not be virtually developed due to time restrictions and overlap with other research activities during the COVID-19 pandemic.

4. Results

4.1 Decision-making toolbox for SGNP inclusive conservation in PANORAMA

The “Decision-making toolbox for inclusive conservation in the Sierra de Guadarrama National Park” was published on the PANORAMA website in June 2021. This PANORAMA toolbox describes the set of tools that can potentially support the development of more socially inclusive management actions in SGNP. The full toolbox can be read in the following link:

<https://panorama.solutions/en/solution/decision-making-toolbox-inclusive-conservation-sierra-de-guadarrama-national-park>.

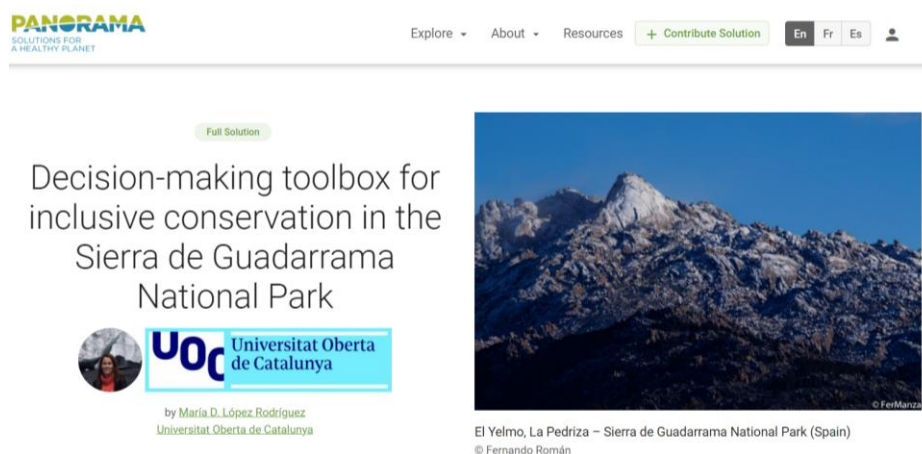


Figure 2. Screenshot of the toolbox for SGNP uploaded into the PANORAMA platform.

Here, we summarize the main sections that comprise the toolbox description in PANORAMA:

Summary of the toolbox:

The Sierra de Guadarrama National Park covers 33,960 ha through the Central Mountain System of the Iberian Peninsula in the Madrid and the Castile-Leon regions. The National Park includes glacial cirques, unique granite rock formations, alpine lakes, grasslands, and pine forests that contain rich biodiversity. The National Park has almost 2.5 million visitors per year and is used for sports and recreation activities. It also encompasses a variety of local stakeholders engaged in diverse activities such as extensive livestock, forestry, biodiversity conservation, education and research. This solution introduces a set of tools to help protected areas managers and practitioners enhance social engagement in conservation decision-making by identifying, navigating and balancing visions, tensions, and power relations between stakeholders. The toolbox has been created in the context of the ENVISION project to support the creation of socially inclusive policies and management actions in protected areas.

Challenges addressed:

The National Park's authorities, in their endeavor to balance conservation goals and human well-being, need to deal with a variety of perspectives, knowledge, and values from a wide range of actors. There are state administrations with intersecting governing competences in the area and stakeholders engage in diverse and often competing activities such as outdoor sports, extensive livestock farming, forestry, conservation, education and research. In turn, many visitors are attracted by the National Park proximity (less than 100km) to Madrid's large metropolitan area (over 6.5 M inhabitants) and the mid-sized city of Segovia (around 50,000 inhabitants). These multiple and competing uses create social tensions around how the park should be governed. Such a context raises the challenge of how different visions and power relations can be considered for conservation governance and balanced in order to guarantee conservation and well-being outcomes.

Beneficiaries:

Protected areas' managers and practitioners can directly benefit from the toolbox when implementing socially inclusive conservation. Local communities may also benefit, since these tools can facilitate their participation in decision-making.

Building blocks:

The toolbox comprises three building blocks with a wide variety of participatory methods and research tools to: facilitate place-based processes that foster inclusive conservation it is necessary to collect local/traditional knowledge, views, and values from multiple stakeholders, identify visions and elaborate future scenarios in a participatory way, address power dynamics promote stakeholders' participation and engagement in conservation, promote collective action between stakeholders. Additionally, the toolbox includes a fourth building block with the diversity of activities that we developed to strengthen the science-policy interface and promote that our scientific evidences could be used by SGNP's decision-makers.

Below we detail the description of the different research tools included in the toolbox classified by goals, the enabling factors to use them and the main lessons learned when they were applied in SGNP:

1) A set of methods to gather local knowledge and values:

1.1. Oral histories and historical datasets review to reconstruct how past visions and drivers of environmental impact have changed over the last 50 years and inform current and future conservation goals.

1.2. Interviews with local stakeholders on 1) how participation works in the protected area and potential barriers/opportunities for more social engagement (López-Rodríguez et al., 2020), and 2) their visions for park management, the values and knowledge that underpin the visions, and their perceptions of landscape changes and the underlying drivers (Lo et al., 2021).

1.3. Face-to-face surveys with residents, including participatory mapping tools (i.e. Maptionnaire) about landscape values and ecological knowledge (Cebrián-Piqueras et al., 2020). Online surveys with local stakeholders to identify changes in their visions, values and perceptions of the landscape after the COVID-19 pandemic.

1.4. Cognitive and emotional maps used to collect collective knowledge of the protected area while capturing intertwined affective relationships. The maps were built through a deliberative processes embedded in a participatory scenario planning exercise (Heras et al., in preparation).

Enabling factors:

- Created an atmosphere of shared understanding, respect and trust with participants to facilitate collaboration along the process;
- Clarified the project's goals and practical outcomes to manage expectations and stimulate participation; and
- Co-designed with participants an outreach plan to better disseminate the generated outcomes while making participants realise about the impact of their engagement and fostering learning from others' experience.

Lessons learned:

- Planning activities with stakeholders carefully to avoid overwhelming them with requests;
- Developing activities according to the timetable, schedule and disruptive events situations (e.g., the COVID-19 pandemic) that work better for most participants;
- Using quantitative research approaches to gather context-based knowledge may result in biased information. A mixed-method approach based on quantitative and qualitative data can help avoid bias and get a more in-depth knowledge of the context;
- Online methods work well and their implementation saves time and money when compared with face-to-face events, but are less effective in achieving good personal interactions;
- Synthesizing and sharing the knowledge is appreciated by the stakeholders. For example, the knowledge gathered from individual stakeholders about landscape changes in the National Park was shared with the stakeholder group at a workshop with the opportunity for short discussions. Stakeholders indicated that they had learned and understood other peoples' points of views on landscape changes and drivers of change.

2) Methodological approaches to elucidate visions and future scenarios for park management:

2.1. Participatory mapping (PGIS), a tool to visualize information in a particular geographical context focusing on a certain issue of interest. This tool was used in surveys to elicit the residents' visions based on perceptions of landscape values and local knowledge.

2.2. Streamline (De Vries & Metzger, 2018), an open-source narrative synthesis tool that integrates graphics in the form of canvases and tiles, facilitating interviews and discussion groups in a creative and stimulating way. Streamline was used with stakeholders' expressing their values and preferences for management actions, and sharing their knowledge of changes in the landscape.

2.3. Participatory scenario planning exercise, a deliberative process that was facilitated about plausible and desired futures through a two-day online workshop (due to the Covid-19 pandemic) with stakeholders. Based on the current socio-ecological conditions and the factors driving change, participants weighed up what could happen in the coming 20 years, discussed implications for biodiversity conservation and the quality of life of those who currently enjoy the ecosystem services it provides, whilst identifying the strategies to address them (Oteros-Rozas et al., 2021).

Enabling factors:

- Inviting and giving voice to stakeholder groups that are often poorly included in social spaces to publicly debate about conservation;
- Creating a collaborative process built upon dissent-based approaches to promote a transparent and horizontal work-space;

- Building workgroups with a balanced representation between stakeholder groups, regions of the residence and gender, helps so that not only majoritarian voices are heard.

Lessons learned:

- Local facilitators and collaborators were essential to approach a big sample of local residents in the surveys and the workshop;
- Online processes require significant efforts and human resources to handle multiple platforms and technical issues simultaneously. Specific expert facilitation skills are required;
- Scenario planning methodologies should more strongly consider different potential disturbances and how drivers of change in the near and far future can be affected by wildcard events such as a pandemic.

3) Instruments and techniques to address power dynamics:

3.1. Analytical tool to characterize types of governance arrangements in the protected area delineate participatory processes (López-Rodríguez et al., 2020). Formal and informal governance arrangements were classified in terms of stakeholders' responsibility (shared vs. concentrated) and influence (equal vs. unequal) into four types: prescriptive, informative, consultative, and cooperative. By applying this tool in the National Park we identified challenges for more socially inclusive conservation while enhancing existing participatory mechanisms and delineating new ones.

3.2. Theatre-based facilitation techniques to address power dynamics between stakeholders. By using them in a virtual workshop, participants deliberated on their roles and power relations around conservation governance and how these may be reconciled to improve collaboration.

Enabling factors:

- The analytical tool to characterize governance arrangements requires data collection about the existing decision-making mechanisms behind each arrangement identified, the stakeholders engaged and how they are engaged;
- The art-based approaches and context-specific boundary object require a process based on co-learning and knowledge co-production approaches through which stakeholders deliberate on power dynamics, conservation challenges and define collaborative strategies to address them.

Lessons learned:

- Analyzing both formal and informal-based governance arrangements serves as a means to understand how participation in conservation decision-making is actually shaped within protected areas governance and how to improve stakeholder engagement given the context;
- It is important to consider informal governance mechanisms to understand potential trade-offs because they can lead to both positive and negative outcomes for conservation;

- Stakeholders' responsibility and influence are key analytical axes to delineate participatory mechanisms in order to identify opportunities for more socially inclusive conservation;
- Art-based methods are useful to incorporate power relations aspects into conservation debates;
- Elucidating unequal relations for conservation governance offers opportunities to clarify stakeholders' roles and their responsibilities and facilitate a better understanding of how these may be reconciled to improve collaboration;

4) Tools to promote engagement in collective action:

4.1. A context-specific boundary object to facilitate collective action for conservation governance (López-Rodríguez et al., under review). Using this graphical tool in a workshop, participants assessed their level of willingness to put several strategies into practice. The tool visualized the results graphically as a proxy of the potential willingness to move from theory to practice.

Enabling factors:

- The context-specific boundary object require a process based on co-learning and knowledge co-production approaches through which stakeholders deliberate on conservation challenges and define collaborative strategies to address them.

Lessons learned:

- The assessment of stakeholders' willingness to be involved in putting the strategies into practice is a crucial factor to guide collective action.

The created building block with the activities developed to strength the science-policy interface, the enabling factors and lessons learned are described below:

The elaboration of a plan for creating understanding and collaboration between researchers and decision-makers was a necessary process to promote that scientific knowledge could have impacts on the policy domain. This plan entailed the following actions:

- Face-to-face or online meetings to formally introduce the research project to the protected area decision-makers and managers while using media (e.g., radio and press), and developing seminars to inform local residents and other stakeholders about the project;
- Invitation to decision-makers and managers to be involved in the project activities (e.g. local knowledge alliance, film and meetings);
- Tailoring the research activities to the decision-makers agenda to facilitate their participation;
- Organization of regular meetings, webinars and newsletters in local languages to inform about the project advances and findings;

- Development of workshops with decision-makers to analyze the applicability and usability of resulting tools and other research outcomes within the protected area;
- Dissemination of research reports in local language before academic article publications to validate the results;
- Writing posts in the national park's blog and other related websites to disseminate research findings within the protected area channels.

Enabling factors:

- Conducted key-informant interviews with staff from the Sierra de Guadarrama National Park to identify the interests and needs of decision-makers and align our research activities;
- Involved key staff from the National Park with the capacity to promote institutional changes and decisions to facilitate that our scientific insights might reach impacts on the management setting;
- Organized a workshop with decision-makers to evaluate research tools in terms of applicability in the management cycle in order to facilitate their use by them.

Lessons learned:

- An early exploration of the management and decision-making setting is relevant to plan for and develop solution-oriented research that can be implemented within the management cycle;
- Periodical meetings between researchers and decision-makers help scientists gain awareness of the variety of directions in which their research can impact the policy domain, and decision-makers gain access to the best available evidence to make decisions. This is crucial to align research to the decision-makers' needs and facilitate the use of science in the management setting;
- Producing scientific outcomes that are translatable into real outcomes in the management can motivate decision-makers to participate in the research;
- Writing policy reports to introduce scientific insights into the native language facilitates the use of scientific information by decision-makers;
- Planning the research activities so that overwhelming decision-makers with multiple requests is avoided.

It is worth noting that several participatory research tools (e.g., Streamline, participatory mapping, and deliberative processes) included in the PANORAMA toolbox for the SGNP have also been applied in other ENVISION study areas: Västra Harg Nature Reserve (Sweden), Utrechtse Heuvelrug National Park, and Kromme Rijn region (The Netherlands), Denali National Park and Preserve (Alaska). These tools and other ones are included in the three toolboxes created for the rest of the study areas. Such toolboxes are also accessible via the internet to the public at the PANORAMA platform. Further information concerning these toolboxes is detailed in Appendix A. The relationship between the four toolboxes for the ENVISION sites can also be consulted through the PANORAMA platform (Figure 3).

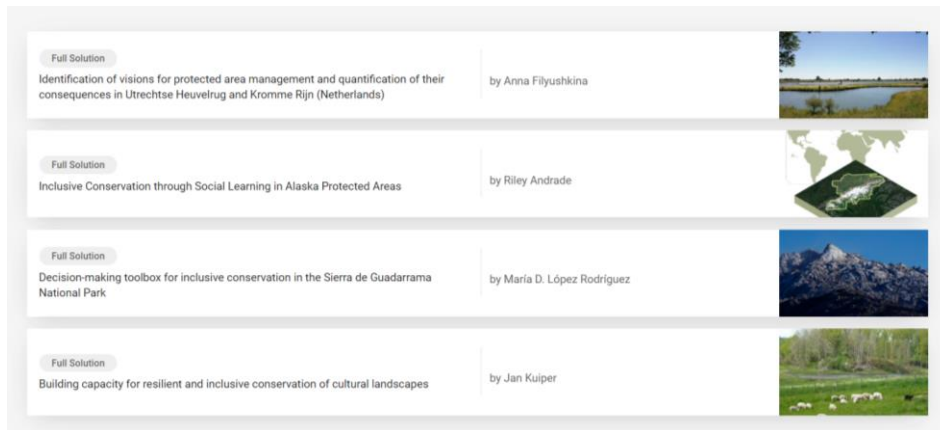


Figure 3. Screenshot of the PANORAMA website showing the PANORAMA toolboxes for each ENVISION study area (<https://panorama.solutions/en/explorer/list?keyword=envision>).

4.2. The potential applicability of the decision-making tools for inclusive conservation within a protected area management setting

The initial brainstorming with SGNP's decision-makers and experts on protected areas management during the virtual workshop allowed identifying 19 barriers and 13 opportunities related to the participation in the National Park and three specific participatory mechanisms of this governance system (i.e., the public participatory process to develop the management plan for SGNP -PRUG-, the Advisory Board -*Patronato*-, and, Experts Workgroups) (Table 1). In addition, they proposed 25 measures that would be needed to advance towards more inclusive conservation in the National Park (Table 1).

Table 1. Barriers and opportunities associated with the participatory governance system of SGNP and three participatory mechanisms of governance (the public participatory process to develop the management plan for SGNP -PRUG, the Advisory Board -*Patronato*- and Expert workgroup), and measures to address them identified by workshop participants.

	Participatory governance system of SGNP	The public participatory process to develop the management plan for SGNP (i.e., PRUG)	The Advisory Board (i.e., Patronato)	Experts workgroups
Barriers	<p>B1. Social requirement for creating social spaces to promote collective reflections and knowledge co-production.</p> <p>B2. Find new ways to involve the National Park's visitors in participation</p> <p>B3. Increase awareness about functioning rules of the National Park for new visitors.</p> <p>B4. Inform and build capacity on participation.</p> <p>B5. Deal with imbalances between the human and financial resources of the two regional state administrations that share the legal authority in the National Park.</p> <p>B6. Identify social networks in the National Park and understand how to involve those who are not involved.</p> <p>B7. Most of the population of Segovia is not satisfied with the National Park because they see it as a limitation for socio-economic development.</p> <p>B8. People involve in participatory processes in the National Park expect that decision-makers with the capacity to make executive decisions are also involved in such processes.</p> <p>B9. Convey to participants that time and efforts invested in participation are important.</p>	<p>B10. In practical terms, it is focused on collecting individual opinions and defending particular interests.</p> <p>B11. Participants usually have little knowledge about the management context.</p> <p>B12. It is a temporal process with time restrictions</p>	<p>B13. Promote social inclusion of well-recognized stakeholder groups and generate feelings of exclusion in minority ones.</p> <p>B14. Stakeholders' representativeness is not balanced.</p> <p>B15. Social perception that the Advisory Board is inefficient in terms of participation.</p> <p>B16. As a consultative board, it is not perceived as truly participative.</p> <p>B17. Low frequency of meetings.</p>	<p>B18 Based on sectoral approaches that generate feelings of exclusion in those people do not involve.</p> <p>B19. Local population with wide heterogeneity hinder the development of informal spaces to participate.</p>
Opportunities	<p>O1. There is an existence of positive stakeholders' willingness towards greater participation in the National Park.</p> <p>O2. There are many visitors in the National Park to disseminate environmental information.</p> <p>O3. It is a recently created National Park that offers opportunities to develop mechanisms to facilitate participation and engagement in conservation.</p> <p>O4. Social action networks are working on the National Park.</p> <p>O5. The reform of the Common Agricultural Policy offers funding opportunities.</p> <p>O6. The Plan for sustainable Education (in preparation) establishes recommendations for enhancing participation</p>	<p>O7. Increasing participation in comparison with the previous process.</p> <p>O8. The thematic workgroups created during the process worked well, especially one of them focused on climate change.</p> <p>O9. The subprogram of participation and volunteering for SGNP is currently developing and provides opportunities to include the outcomes of this workshop.</p> <p>O10. The Strategy of Environmental Education of Castile-Leon contains measures to involve educative centers in the National Park.</p>	<p>O11. It is a needed participatory space.</p> <p>O12. It offers the possibility to work on thematic groups</p>	<p>O13. Generating proximity and mutual understanding among participants.</p>

Table 1. (Continued).

	Participatory governance system of SGNP	The public participatory process to develop the management plan for SGNP (i.e., PRUG)	The Advisory Board (i.e., Patronato)	Experts workgroups
Measures	<p>M1. Developing an integral strategy of participation, communication, and environmental education.</p> <p>M2. Building capacity on democratic participation.</p> <p>M3. Mapping social actors.</p> <p>M4. Elaborating a protocol to facilitate participative processes.</p> <p>M5. Participation will be based on a balance of groups and actors and experts on facilitation.</p> <p>M6. Creating the role of “conflict mediator”.</p> <p>M7. Ensuring connection between outcomes from different participative processes.</p> <p>M8. Setting up a Citizen Assembly.</p> <p>M9. Building assemblies with children to understand their vision of the National Park.</p> <p>M10. Enabling information channels with groups connected with local communities.</p> <p>M11. Carrying out meetings in different municipalities to local communities explain what they receive and give to the National Park.</p> <p>M12. Clarifying outcomes from participative processes and establishing a deadline for their implementation.</p> <p>M13. Promoting land stewardship as a tool of participation.</p> <p>M14. Creating permanent mechanisms to participate actively in the National Park.</p> <p>M15. Offering that everyone can express its option on the SGNP’s blog.</p> <p>M16. Designing early warning mechanisms to avoid problems can hardly be addressed or entrenched.</p> <p>M17. Identifying allies and strategic partners.</p> <p>M18 Promoting volunteering programs.</p> <p>M19 Facilitating Citizen Science programs.</p> <p>M20. Implementing an efficient mechanism to communicate outcomes from participative processes.</p>	<p>M21. Generating social processes with spaces to debate and co-create collectively.</p>	<p>M22. Creating thematic groups with a diversity of groups and social actors to work on the documents analyzed by the Advisory Board.</p> <p>M23. Integration with the participatory board of the Biosphere Reserves.</p> <p>M24. Developing a public repository with minutes of the meetings.</p>	<p>M25. Promoting the participation of a greater diversity of groups and actors.</p>

Regarding the participatory research tools introduced during the science-policy workshop, SGNP's decision-makers and experts on protected areas perceived that the six tools could be used within the management setting. However, they also highlighted different resources and needs that should be addressed before ensuring that they can be used as instruments for participatory governance. We hereby report on the description of the tools and the collective reflections by workshop participants on their applicability in the SGNP management setting.

4.2.1. Streamline



Figure 4. Streamline illustrations used to facilitate interviews and discussions groups in the SGNP (Author: Veronica Lo)

Streamline tool fact sheet designed by the research team		
Description	Streamline is an open-source cartoon visualization tool that is flexible, cost-effective, user-friendly, and adaptable to different contexts.	
Scientific goal	To explore local knowledge, views, and values related to different aspects of a protected area to build desired visions for the future.	
Method of application	Online and in-person interview and workshop, facilitated by the 'STREAMLINE' graphic tool.	
Results from the application	Identification of different future visions for the protected areas, including values that support them, factors that generate changes in the territory, preferences for ecosystem services, and management of the sites.	
Interest for the policy domain	<p>From an outcome perspective</p> <p>From a process perspective</p>	<p>Input for comparing and balancing visions for the protected areas management.</p> <p>Facilitating in an interactive and creative way the development of a story to build the desired future for the protected areas.</p>
References	<p>Lo, V.B., López-Rodríguez, M.D., Metzger, M., Oteros-Rozas, E., Cebrián-Piqueras, M. A., Ruiz-Mallén, I., March, H., Raymond, C.M. (<i>in press</i>) 'How stable are visions for protected area management? Stakeholder perspectives before and during a pandemic.' <i>People and Nature</i>.</p> <p>De Vries Lentsch, Aster; Metzger, M. J. (2018). STREAMLINE - a visual interview methodology that makes semi-structured interviews, focus groups and stakeholder workshops more fun and accessible. [dataset]. The University of Edinburgh. Available at: https://datashare.ed.ac.uk/handle/10283/3181/ (Accessed: 28 Oct 2021)</p> <p>https://www.streamline-research.com/</p>	
Social perception of the tool by decision-makers and experts on protected areas		
Management goal that might address	To identify converge or divergence between stakeholders' perspectives and potential conflicts.	
Steps of the management cycle in which it might be applied	Monitoring and Evaluation.	
Suitability to be used within the management setting	It is suitable as a communication tool to collect opinions since it help that all the people can understand the topics addressed.	
Main resources and needs to be used within the management setting	<ul style="list-style-type: none"> - Human resources and professionals' with social skills to apply the tool. - External support to design the tool and build capacity on its use. 	

4.2.2. Participatory mapping

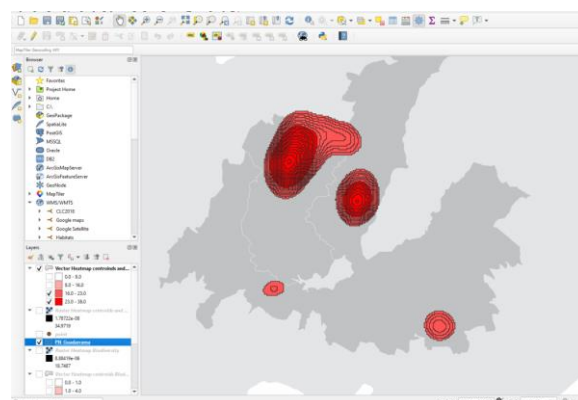


Figure 5. Screenshot of the preliminary results from participatory mapping analysis conducted in the SGNP (Author: M.A. Cebrián-Piqueras)

Participatory mapping tool fact sheet designed by the research team	
Description	Technique to collect, analyze, share or visualize the values, preferences or concerns of citizens and other social actors. Results can be overlaid with other spatial attributes to inform the social acceptability of land-use plans.
Scientific goal	Identify in a spatially explicit way the relationships between different values, preferences and concerns of citizens, among other social actors.
Method of application	Online and face-to-face surveys, facilitated by Maptionnaire software.
Results from the application	Visualizing georeferenced data associated with different types of knowledge, values, and perceptions of ecosystem services, and land-use conflicts.
Interest for the policy domain	<p>From an outcome perspective Obtaining information on local knowledge and potential tensions for protected areas management.</p> <p>From a process perspective Input to develop management strategies considering the plurality of perspectives present in the protected areas and contributing to preventing conflicts and involving the stakeholders and local community.</p>
References	Cebrián-Piqueras, M. A., Filyushkina, A., Johnson, D. N., Lo, V. B., López-Rodríguez, M.D, March, H., Oteros-Rozas, E., Peppler-Lisbach, C., Quintas-Soriano, C., Raymond, C.M., Ruiz-Mallén, van Riper, C.J., Zinngrebe, Y. and Plieninger, T. (2020) ‘Scientific and local ecological knowledge, shaping perceptions towards protected areas and related ecosystem services’. <i>Landscape Ecology</i> , 4. [online] Available from: https://doi.org/10.1007/s10980-020-01107-4
Social perception of the tool by decision-makers and experts on protected areas	
Management goal that might address	<p>To identify opinions from the people around the protected area.</p> <p>To prioritize areas to established management actions (e.g. to plan and create walking routes/trails.</p> <p>To use as a citizen science tool for collective mapping.</p>
Steps of the management cycle in which it might be applied	Planning and Monitoring.
Suitability to be used within the management setting	It is suitable and it could be support the public use and citizen participation program of the National Park.
Main resources and needs to be used within the management setting	<ul style="list-style-type: none"> - External support to embed the technological tool into the management setting. - Internal reorganization to use the tool.

4.2.3. Deliberative processes within a participatory scenario planning exercise

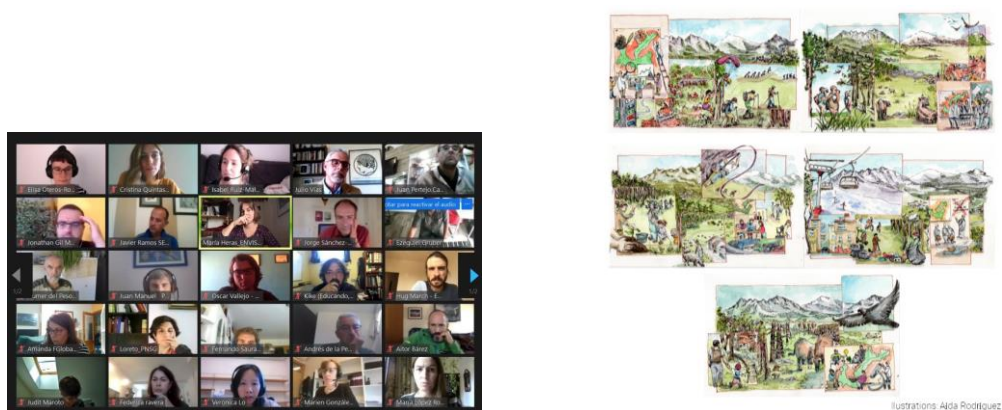


Figure 6. Online workshop for participatory scenario planning in the SGNP (from Oteros-Rozas et al., 2020).

Deliberative processes tool fact sheet designed by the research team		
Description	Social processes to promote collective reflections among diverse stakeholders and guide them in creating visions of desired futures for protected areas management (e.g., participatory scenario planning).	
Scientific goal	To guide stakeholders to think collectively on plausible and hypothetical futures while discussing priorities, actions, and policies with the final aim of guiding conservation governance in the face of perturbances and uncertainties.	
Method of application	Online workshop.	
Results from the application	Co-creation of different future scenarios (plausible and desired ones) for the protected areas and strategies to achieve the desired aspects and address the undesired ones for each scenario.	
Potential interest for the policy domain	<p>From an outcome perspective</p> <p>From a process perspective</p>	<p>Incorporating local concerns, diverse knowledge and values systems in the protected areas management and create collectively strategies to advance towards a more sustainable future.</p> <p>Gaining knowledge about diverse perspectives of the dynamics and uncertainties of human-nature interactions and their consequences for biodiversity conservation and human well-being, and building valuable relationships to increase community capacity for engaging in decision-making.</p>
References	Oteros-Rozas E., M.D. López-Rodríguez, M. Heras, C. Piñeiro, H. March, V. B. Lo and I Ruiz-Mallén. 2020. "Imaginando colectivamente el futuro del Parque Nacional Sierra de Guadarrama y su contexto socio-ecológico". Report. DOI: 10.5281/zenodo.4423119	
Social perception of the tool by decision-makers and experts on protected areas		
Management goal that might address	<p>To collect and incorporate opinions from stakeholders when developing the management plan in the protected area.</p> <p>To prioritize needs/measures in the protected area according to the feedback from stakeholders.</p>	
Steps of the management cycle in which it might be applied	- Planning (it might also has potential applicability in the rest of steps if needed)	
Suitability to be used within the management setting	It is suitable to be applied within the participatory processes in SGNP.	
Main resources and needs to be used within the management setting	<ul style="list-style-type: none"> - Elaboration of a protocol to participate in deliberative processes. - Increasing local participation in the management plan. - Improving the culture of participation in the area. - Human resources to conduct participative processes and monitor the outcomes. 	

4.2.5. Context-specific boundary object to facilitate collective action

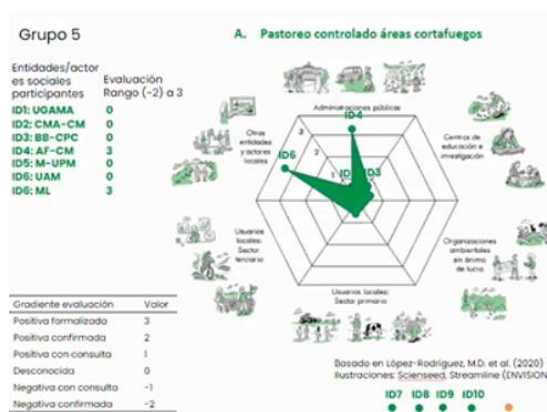


Figure 8. Screenshot of the context-specific boundary object to facilitate for collective action used in a participatory scenario planning process in the SGNP (Author: M.D. López-Rodríguez)

Context-specific Boundary Object Tool fact sheet designed by the research team	
Description	A specifically created boundary object in a graphical tool form that support social processes by framing and guiding strategies for facilitating collective action.
Scientific goal	To facilitate stakeholder organization and identify their willingness to take tangible joint action.
Method of application	Online workshop (as part of a participatory scenario planning process).
Results from the application	Shaping a diversity of collective strategies in terms of stakeholders' diversity and willingness to take action to implement them.
Potential interest for the policy domain	<p>From an outcome perspective</p> <p>Visualizing potential action networks in which the willingness of each stakeholder is a constituent of collective action.</p> <p>From a process perspective</p> <p>Opening up dialogue to foster stakeholder mobilization from theory to joint action for implementing the strategies.</p>
References	López-Rodríguez, M.D., Oteros-Rozas, E., Ruiz-Mallén, I., March, H., Horcea-Milcu, A.I., Heras, M., Cebrián-Piqueras, M.A., Andrade, R., B.P.G. Lo, V. and Piñeiro, C. A boundary object approach to call for collective action in participatory scenario planning. <i>Ecology and Society</i> (Under review)
Social perception of the tool by decision-makers and experts on protected areas	
Management goal that might address	<p>To visualize stakeholders' willingness to participate and engage in management strategies.</p> <p>To identify collaborations with other public administrations.</p>
Steps of the management cycle in which it might be applied	Planning.
Suitability to be used within management setting	Yes, it could be used as tool to support the current development of the National Park's participation and volunteering subprogram.
Resources and needs for its adoption as a management tool for participatory governance	<ul style="list-style-type: none"> - Economic resources and professionals with social skills to develop participative processes using the tool - A stakeholder map to identify potential participants to be involved in the participatory processes - A technical protocol with instructions on how to use the tool - Institutional leadership to embed the tool into administrative procedures

4.2.6. Governance arrangements Matrix

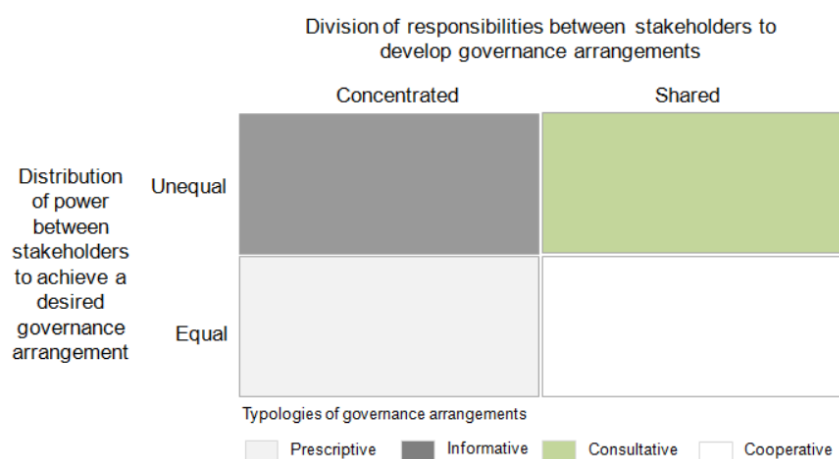


Figure 9. The analytical tool to guide participation assessment of governance arrangements in the SGNP (adapted from López-Rodríguez et al. 2020).

Governance Arrangements Matrix tool fact sheet designed by the research team	
Description	Analytical matrix to characterize governance arrangements in a protected area.
Scientific goal	To understand how (formal and informal) governance arrangements are shaped in terms of stakeholders' responsibility (shared vs concentrated) and influence (equal vs unequal).
Method of application	Face-to-face semi-structured interviews.
Results from the application	Identification of four types of (formal and informal) governance arrangements: cooperative, consultative, informative, and prescriptive.
Potential interest for the policy domain	<p>From an outcome perspective: Guidance to delineate and monitor (formal and informal) participatory mechanisms through which two or more stakeholders interact to adopt governance arrangements.</p> <p>From a process perspective: Input to improve the understanding of participatory mechanisms in order to identify barriers and opportunities that promote institutional reforms for enhancing social participation and engagement in the protected area.</p>
References	López-Rodríguez, M. D., I. Ruiz-Mallén, E. Oteros-Rozas, H. March, R. Keller, V. B. Lo, M. A. Cebrián-Piqueras, and R. Andrade (2020). Delineating participation in conservation governance: Insights from the Sierra de Guadarrama National Park (Spain). <i>Environmental Science and Policy</i> 114(September):486–496. https://doi.org/10.1016/j.envsci.2020.09.019
Social perception of the tool by decision-makers and experts on protected areas	
Management goal that might address	To evaluate the participatory mechanisms and identify measures to enhance participation and collaboration with social actors.
Steps of the management cycle in which it might be applied	Planning, Implementation and Evaluation.
Suitability to be used within the management setting	It is suitable, but first it would be needed clarify in which topics participation could/should be allowed.
Main resources and needs to be used within the management setting	<ul style="list-style-type: none"> - Building capacity and training to apply the tool. - Human resources to analyze participatory mechanisms and apply the tool.

During the final reflection on the science-policy workshop, SGNP's decision-makers highlighted that the outcomes would be helpful to reinforce the development of the participation and volunteering subprogram of the National Park. In addition, they expressed their interest in fostering collaboration with the research team to deal with some of the identified challenges. The possibility of extending the science-policy collaboration was considered by requesting new research projects and institutional agreements for technical consultancies.

5. Final remarks

Aiming to create participatory research tools that conservation decision-makers could use, we developed a mutual learning process through science-policy dialogue to create understanding and collaboration between the National Park decision-makers and us as researchers since the beginning of the project. This research approach helped us collect feedback from a diversity of conservation practitioners to redefine the participatory research tools in terms of their potential usability and applicability for decision-making. From these data, we co-created the decision-making toolbox for inclusive conservation in the SGNP by discussing, reflecting, and reframing a set of previously tested participatory research tools to improve their applicability in the site. The adoption of the PANORAMA guidelines (Mattsson et al., 2019) to present the toolbox provides opportunities to its replication and up-scaling in other geographic, social, or sectorial contexts. This can be considered a support mechanism to help the management community craft participatory and management actions in an inclusive manner to achieve global conservation targets (UNEP-CBD, 2021).

The toolbox presented in this report comprised a variety of decision-making tools for inclusive conservation to provide practical guidance to understand, navigate and consider different visions, preferences, responsibilities, and power relations between stakeholders in order to move towards greater inclusivity in conservation decision-making. The evaluation carried out by SGNP's decision-makers and experts on protected areas revealed that the tools of the toolbox have potential applicability within the management cycle of the protected area. However, decision-makers and experts also highlighted that diverse challenges and management needs must be addressed to ensure that these tools will be appropriately embedded within the institutional setting of the protected area. Examples of such challenges include a lack of political leadership, economic and human resources, and skills to apply some of the tools. These findings are in line with previous studies that warn about the complexity of applying participatory research tools into an institutionalized practice outside research settings (Asubonteng et al., 2021). In this last regard, the science-policy workshop provided a useful road map successfully to understand i) how the participatory research tools can be embedded into institutional settings like the one in SGNP and ii) what scientific priorities and management needs can be coupled to develop new actions in partnership (e.g., research projects and agreements for technical consultancies) to address some of the identified challenges. Addressing these aspects emerged as particularly relevant to make progress towards applying the participatory research tools into the management cycle.

The science-policy workshop in SGNP also helped us identify the absence of social sciences perspectives and corresponding professional profiles within protected areas' institutional settings. The whole management team came from natural sciences backgrounds, and urged for the incorporation of new profiles, such as sociologists, anthropologists, physiologists, or

geographers, in the management teams, or set up contracts with research entities that could support them to apply the decision-making tools. Most of the feedback received by SGNP's decision-makers throughout our research activities revealed such insufficient integration of social perspectives into the everyday management practice and planning. This became evident through different limitations associated with participatory governance pointed by them, such as the absence of a culture of participation (inside and outside of protected areas), lack of social skills and resources to conduct participative processes based on social learning, and knowledge co-production in the National Park. Acknowledging that the integration of social considerations in protected areas decision-making achieving better conservation outcomes (Ban et al., 2013), researchers and experts on participatory governance need to support the management community to address this challenge. Collaborative and sustained partnerships that consider evaluations of scientific outputs from a management perspective and help develop solution-oriented research could fill this gap. The research presented in this report provides a useful contextual orientation for scholars and decision-makers interested in conducting collaborative approaches to connect science-based tools with operational aspects of conservation governance worldwide.

6. Acknowledgements

We are very grateful to the participants involved in our research activities, especially to the decision-makers and experts on protected areas governance involved in our science-policy workshop. This research was supported by the ENVISION project, funded through the 2017-2018 Belmont Forum and BiodivERsA joint call for research proposals, under the BiodivScen ERA-Net COFUND programme, and with the support of the following national funders: Grant PCI2018-092958 funded by MCIN/AEI/ 10.13039/501100011033, Swedish Research Council for Sustainable Development (FORMAS), Federal Ministry of Education and Research, Germany, Netherlands Organisation for Scientific Research (NWO), National Science Foundation, United States (NSF), and National Park Service, United States (NPS). IRM acknowledges the support of the grant RYC-2015-17676 funded by MCIN/AEI/ 10.13039/501100011033 and by “ESF Investing in your future”. EOR acknowledges the support of the grant IJCI-2017-34334 funded by MCIN/AEI/ 10.13039/501100011033.

7. References

Ban, N. C., Mills, M., Tam, J., Hicks, C. C., Klain, S., Stoeckl, N., Bottrill, M. C., Levine, J., Pressey, R. L., Satterfield, T., and Chan, K. M. A. (2013). A social-ecological approach to conservation planning: Embedding social considerations, *Front. Ecol. Environ.*, 11, 194–202, <https://doi.org/10.1890/110205>.

BOCYL. 2010. Decreto 4/2010, de 14 de enero, por el que se aprueba el Plan de Ordenación de los Recursos Naturales del Espacio Natural «Sierra de Guadarrama» (Segovia y Ávila). Comunidad de Castilla y León. Pages 3517–3590. Spain.

BOCM. 2010. DECRETO 96/2009, de 18 de noviembre, del Consejo de Gobierno, por el que se aprueba la ordenación de los recursos naturales de la Sierra de Guadarrama en el ámbito territorial de la Comunidad de Madrid. Pages 4–132. Spain.

CBD, 1992. Convention on Biological Diversity. United Nations. Retrieved from <http://www.cbd.int/doc/legal/cbd-en.pdf>.

Cebrián-Piqueras, M. A., Filyushkina, A., Johnson, D. N., Lo, V. B., et al. (2020) 'Scientific and local ecological knowledge, shaping perceptions towards protected areas and related ecosystem services'. *Landscape Ecology*, 4. [online] Available from: <https://doi.org/10.1007/s10980-020-01107-4>.

De Vries Lentsch, Aster; Metzger, M. J. 2018. STREAMLINE - a visual interview methodology that makes semi-structured interviews, focus groups and stakeholder workshops more fun and accessible. [dataset]. The University of Edinburgh. Available at: <https://datashare.ed.ac.uk/handle/10283/3181/> (Accessed: 28 Oct 2021)

Hering, J.G. (2016). Do we need “more research” or better implementation through knowledge brokering?. *Sustain Sci* 11, 363–369. <https://doi.org/10.1007/s11625-015-0314-8>.

Hegger, D., Lamers, M., Van Zeijl-Rozema, A., & Dieperink, C. (2012). Conceptualising joint knowledge production in regional climate change adaptation projects: success conditions and levers for action. *Environmental Science & Policy*, 18, 52–65. <http://doi.org/10.1016/j.envsci.2012.01.002>.

Hsieh, H. F., and S. E. Shannon. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research* 15(9):1277–1288.

Lynam, T., W. De Jong, D. Sheil, T. Kusumanto, and K. Evans. (2007). A review of tools for incorporating community knowledge, preferences, and values into decision making in natural resources management. *Ecology and Society* 12(1): 5. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art5/>.

Lo, V.B., López-Rodríguez, M.D., Metzger, M., Oteros-Rozas, E., Cebrián-Piqueras, M. A., Ruiz-Mallén, I., March, H., Raymond, C.M. (in press) 'How stable are visions for protected area management? Stakeholder perspectives before and during a pandemic.' *People and Nature*.

López-Rodríguez, M.D., Oteros-Rozas, E., March, H, Ruiz-Mallén, I., Lo, V.B.P.G., Cebrián-Piqueras, M.A., Battioni Romanelli, B., & Arroyo Schnell, A. (2021). Fact Sheet ENVISION: Promoting inclusive conservation in protected areas. Zenodo. <https://doi.org/10.5281/zenodo.4693868>.

López-Rodríguez, M.D., Oteros-Rozas, E., Piñeiro, C., March, H. and Ruiz-Mallén, I. (2020). “Co-producción de herramientas para promover gobernanza participativa y conservación inclusiva en espacios naturales protegidos”. Report. DOI: 10.5281/zenodo.4680736.

López-Rodríguez, M. D., Ruiz-Mallén, I., Oteros-Rozas, E., March, H., Keller, R., Lo, V.B., Cebrián-Piqueras, M.A. and Andrade R. (2020). Delineating participation in conservation governance: Insights from the Sierra de Guadarrama National Park (Spain). *Environmental Science and Policy* 114(September):486–496. <https://doi.org/10.1016/j.envsci.2020.09.019>.

López-Rodríguez, M.D., Castro, H., Arenas, M. et al. (2017). Exploring Institutional Mechanisms for Scientific Input into the Management Cycle of the National Protected Area Network of Peru:

Gaps and Opportunities. *Environmental Management* 60, 1022–1041
<https://doi.org/10.1007/s00267-017-0929-x>.

López-Rodríguez, M.D., Oteros-Rozas, E., Ruiz-Mallén, I., March, H., Horcea-Milcu, A.I., Heras, M., Cebrián-Piqueras, M.A., Andrade, R., B.P.G. Lo, V. and Piñeiro, C. A boundary object approach to call for collective action in participatory scenario planning. *Ecology and Society* (Under review).

Matulis, B.S., Moyer, J.R. (2017). Beyond inclusive conservation: the value of pluralism, the need for agonism, and the case for social instrumentalism. *Conserv. Lett.* 10 (3), 279–287. <https://doi.org/10.1111/conl.12281>.

Mattsson, B.J., Fischborn, M., Brunson, M. et al. (2019). Introducing and evaluating a knowledge transfer approach to support problem solving in and around protected areas. *Ambio* 48, 13–24. <https://doi.org/10.1007/s13280-018-1048-5>.

Oteros-Rozas E., López-Rodríguez, M.D., Heras, M., Piñeiro, C., March, H., Lo B.V., and Ruiz-Mallén, I. (2020). "Imaginando colectivamente el futuro del Parque Nacional Sierra de Guadarrama y su contexto socio-ecológico". Report. DOI: 10.5281/zenodo.4423119.

Raymond, C. Cebrián-Piqueras, M., Andersson, E., Andrade, R., Arroyo-Schnell, A., Battioni, B., Filyushkina, A., Goodson, D.J., Johnson, D.N., Keller, R., Kuiper, J., Lo V., March, H., Metzger, M., Horcea-Milcu, A., Oteros-Rozas, E., López-Rodríguez, M.D., Salcido E., Stewart W., Ruiz-Mallén, I., Plieninger, T., van Riper, C.J., Verburg, P.H., and Wiedermann, M. Inclusive conservation and the post-2020 biodiversity conservation targets: Tensions and prospects. *One Earth* (Under review).

Ros-Tonen, M.A.F., Willemsen, L. (2021). Editorial: Spatial Tools for Integrated and Inclusive Landscape Governance. *Environmental Management* 68, 605–610. <https://doi.org/10.1007/s00267-021-01548-w>.

Roux, D. J., Rogers, K. H., Biggs, H. C., Ashton, P. J., & Sergeant, A. (2006). Bridging the Science – Management Divide: Moving from Unidirectional Knowledge Transfer to Knowledge Interfacing and Sharing. *Ecology and Society*, 11(1–Art. 4), 1–20.

Shantiko, B., Liswanti, N., Bourgeois, R. et al. (2021). Land-use Decisions in Complex Commons: Engaging Multiple Stakeholders through Foresight and Scenario Building in Indonesia. *Environmental Management* 68, 642–664. <https://doi.org/10.1007/s00267-021-01470-1>.

Tallis, H., and Lubchenco, J. (2014). Working together: A call for inclusive conservation. *Nature* 515, 27–28.

UNEP-CBD, 2021. First Draft of the Post-2020 Global Biodiversity Framework (<https://www.cbd.int/doc/c/abb5/591f/2e46096d3f0330b08ce87a45/wg2020-03-03-en.pdf>)

Van den Hove, S. (2007). A rationale for science–policy interfaces. *Futures*, 39(7), 807–826. <http://doi.org/10.1016/j.futures.2006.12.004>.

Appendix A.

We report the main features and structure of the toolboxes for the other ENVISION sites in the PANORAMA platform:

Utrechtse Heuvelrug National Park and Kromme Rijn region:

- Title of the toolbox: “Identification of visions for protected area management and quantification of their consequences in Utrechtse Heuvelrug and Kromme Rijn (Netherlands)”
- Website link: <https://panorama.solutions/en/solution/identification-visions-protected-area-management-and-quantification-their-consequences>
- Building blocks: This toolbox comprises 3 building blocks with participatory research tools to promote inclusive conservation. The goal of each building block is showed in Figure A1.

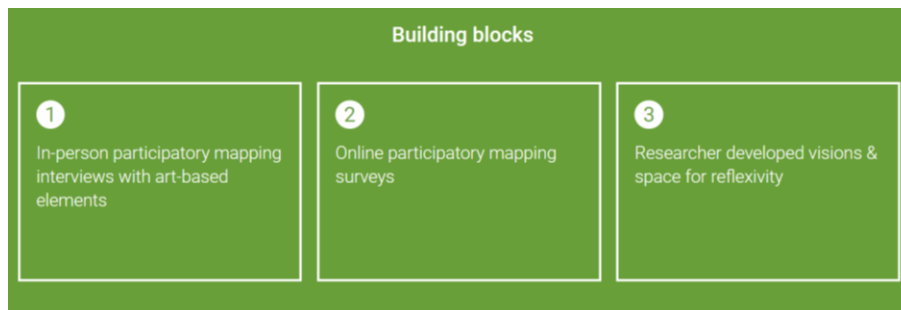


Figure A1. Screenshot of the building blocks that comprises the toolbox for Utrechtse Heuvelrug National Park and Kromme Rijn region.

Denali National Park and Preserve:

- Title of the toolbox: “Inclusive Conservation through Social Learning in Alaska Protected Areas”
- Website link: <https://panorama.solutions/en/solution/inclusive-conservation-through-social-learning-alaska-protected-areas>
- Building blocks: This toolbox comprises 5 building blocks with participatory research tools to promote inclusive conservation. The goal of each building block is showed in Figure A2.

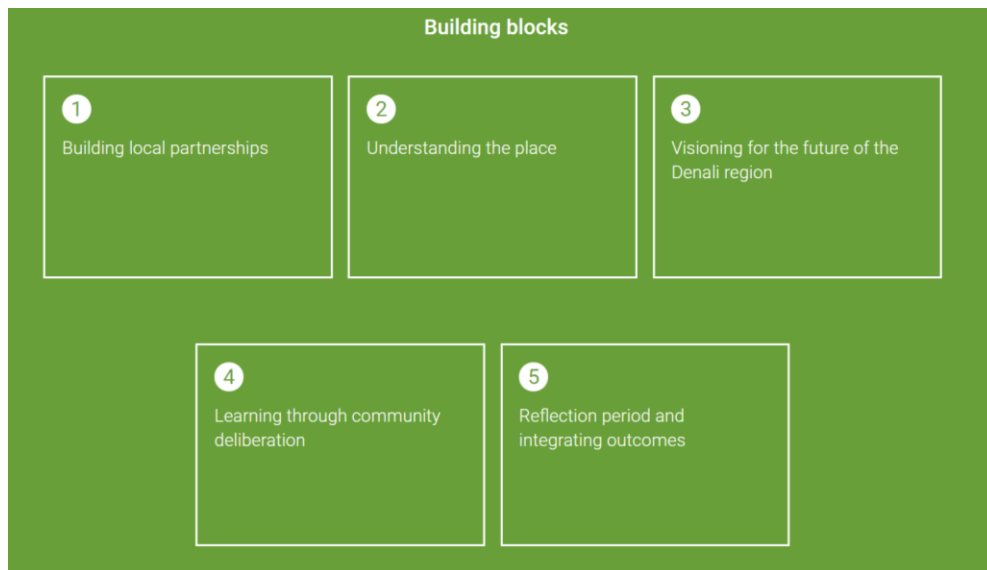


Figure A2. Screenshot of the building blocks that comprises the toolbox for Denali National Park and Preserve.

Västra Harg Nature Reserve:

- Title of the toolbox: “Building capacity for resilient and inclusive conservation of cultural landscapes”
- Website link: <https://panorama.solutions/en/solution/building-capacity-resilient-and-inclusive-conservation-cultural-landscapes>
- Building blocks: This toolbox comprises 5 building blocks with participatory research tools to promote inclusive conservation. The goal of each building block is showed in Figure A3.

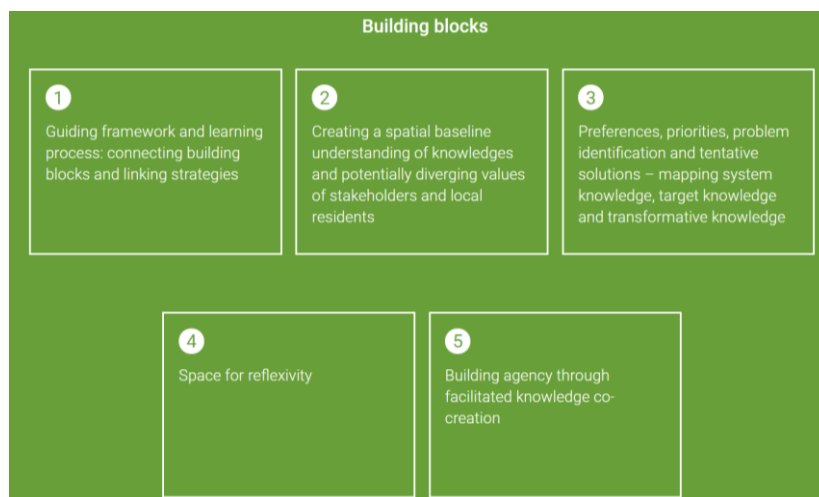


Figure A3. Screenshot of the building blocks that comprises the toolbox for Västra Harg Nature Reserve.



ENVISION is a 3-year research project that develops an inclusive approach to the management of protected areas with the aim of improving biodiversity and human well-being. We engage diverse groups of stakeholders of a protected area, such as recreational users, local residents, local businesses, land owners, agriculture, researchers or local governments and protected area managers.

Authors: López-Rodríguez M.D., Oteros-Rozas E., March H. and Ruiz-Mallén I.

Citation: López-Rodríguez, M.D. et al. (2021) Decision-making toolkit for inclusive conservation on PANORAMA. ENVISION Deliverable D5.3., 32 pages.

DOI: 10.5281/zenodo.5810576

Más información: [inclusive-conservation.org](https://www.inclusive-conservation.org)



ENVISION was funded through the 2017-2018 Belmont Forum and BiodivERSA joint call for research proposals, under the BiodivScen ERA-Net COFUND programme, and with the support of the following national funders.

SPONSORED BY THE

