

# BARRIERS AND OPPORTUNITIES FOR PUBLIC PARTICIPATION IN SWEDISH BIOSPHERE RESERVES

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**Barriers and Opportunities for Public Participation in  
Swedish Biosphere Reserves**

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## Abstract

This thesis examines what barriers and opportunities exist for public participation in addressing biodiversity loss and adapting to climate change in Swedish biosphere reserves (BRs). This was approached by conducting an instrumental case study of all seven BRs in Sweden, consisting of semi-structured interviews and a case-specific literature review. The results identified that while a significant gap in integrating biodiversity protection with CCA in Swedish BRs exists, the inherent flexibility and local grounding of the BR approach represent a missed opportunity for effectively integrating these issues. Moreover, public participation in Swedish BRs is shaped by a participation design consisting of three key components, namely interest representation, participation opportunities, and degree of influence. These components aim to achieve certain objectives and are enabled or disabled by ambiguous barriers and opportunities. Five such ambiguous barriers and opportunities were identified: awareness and understanding, resource availability, willingness to participate, conflicting interests, and the political context. This paper recommends practitioners to clearly define public participation, its goals for BRs, and enhance collaboration between them and municipalities to better integrate biodiversity conservation with CCA efforts. This thesis not only fills a scholarly gap but also offers a scaffold for enhancing the role and understanding of public participation in the context of Swedish BRs.

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# Summary

Biosphere reserves (BRs) are model regions initiated under the United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and the Biosphere Programme (MAB), which aims to reconcile biodiversity conservation with sustainable development in biodiverse areas with a bottom-up approach (Ferreira et al., 2018). In the context of worsening climate change and biodiversity loss, initiatives like the MAB are highly relevant, as they seek to find innovative and integrated solutions to these interrelated crises. Particularly as public participation is a core component of the program (UNESCO, 2017), BRs present an interesting opportunity to examine questions of participation in the context of sustainable development, and biodiversity loss and climate change adaptation in particular.

Sweden is an interesting country to examine the nexus of these issues, due to its biogeographic profile (the Convention on Biological Diversity [CBD], n.d.) and spirit of local engagement (Arora-Jonsson, 2017), and has seven BRs. Yet, there is a glaring lack of research. This thesis consequently aims to investigate the barriers and opportunities for public participation in addressing biodiversity loss and adapting to climate change Swedish BRs. To achieve this aim, the ways in which BR approach creates opportunities for integrating biodiversity protection and climate change adaptation (CCA) in Sweden were explored, as well as the perceived purpose of BRs, the conceptualization of public participation, and the potential influence of the political context. To answer these questions, a case study on all Swedish BRs was conducted using semi-structured interviews and a case-specific literature. Both members of the public residing in the BR area, and BR employees were interviewed, and their insights were complemented with data sourced from a case-specific literature review. All data was coded in NVivo and analyzed according to an adapted version of Uittenbroek et al.'s (2019) framework on participation in local climate adaptation.

According to the framework, participation is designed along three main factors: interest representation (*who* participates?); participation opportunities (*when* is participation possible?); and the degree of influence (*how* does participation manifest?). These factors affect the barriers and opportunities of the participation process, and consequently disable or enable the achievement of the participation and contextual objectives, which include a normative, substantive, and instrumental rationale (*why* is participation important?).

The data analysis developed five overarching themes: the BR concept, change, conflict, political context, and participation. The data was described along the dimensions of the

theoretical framework and used to inform the discussion of the research aim. The results showed that Swedish BRs encompass a diverse range of participants and interests, including public authorities, inhabitants, associations, and private sector representatives (*who*), which differed in terms of power and the extent of their representation. Nevertheless, the BRs were found to be generally accessible platforms, living up to their role of neutral arenas for exchange, cooperation, and conflict resolution. The BRs provided diverse forms of participation possibilities, such as being a board member, through meetings or dialogue (*how*). These forms take place throughout different stages, from BR establishment to ongoing activities (*when*). The objectives for public participation were primarily normative and instrumental in nature, where participation was repeatedly viewed as an instrument for enhanced democracy as well as a tool to achieve the BR goals (*why*).

Overall, an integration of biodiversity protection and CCA is largely absent from the current practical reality of Swedish BRs, which led to a broadening of the research focus, to understand barriers and opportunities for public participation in general. Nevertheless, the flexibility and local grounding of the BR approach points to a missed opportunity in this endeavour. Moreover, the barriers and opportunities for public participation in Swedish BRs were multifaceted. A shared definition of public participation and its objectives among the relevant stakeholders was lacking, which impedes the effective utilization of participatory processes. Five key factors that, depending on their presence, either hinder or facilitate effective public participation in Swedish BRs were identified: (1) awareness and understanding of the BR concept, (2) available personal resources, (3) willingness to participate, (4) conflicting and competing interests, as well as (5) the political context. The political context was notably influential in this case, having a predominant effect on the design of participation rather than being shaped by it.

Ultimately, this thesis provides a general overview of what public participation in a Swedish BR context looks like, hopes to achieve, as well as its barriers and opportunities. This fills an important gap in the academic discourse and provides a stepping stone for future research that can help improve the understanding and role of public participation in BRs, as well as the reserves' potential for integrating biodiversity conservation and CCA. This research suggests two recommendations for practitioners: (1) Swedish BRs should clearly define how they understand public participation and what they hope to achieve with it, and (2) BRs and their municipalities should enhance collaboration to find ways in which Swedish BRs can contribute to CCA, particularly by integrating it with biodiversity protection efforts.

# Abbreviations

<b>BA</b>	Blekinge Arkipelag Biosphere Reserve
<b>BR</b>	Biosphere Reserve
<b>CCA</b>	Climate Change Adaptation
<b>CBD</b>	Convention on Biological Diversity
<b>KV</b>	Kristianstads Vattenrike Biosphere Reserve
<b>MAB</b>	Man and the Biosphere Programme
<b>SEPA</b>	Swedish Environmental Protection Agency ( <i>Naturvårdsverket</i> )
<b>UNESCO</b>	The United Nations Educational, Scientific and Cultural Organization
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VJ</b>	Vindelälven-Juhttátahkka Biosphere Reserve
<b>VOX</b>	Voxnadalen Biosphere Reserve
<b>VSK</b>	Vänerskärgården med Kinnekulle Biosphere Reserve
<b>ÄND</b>	Älvlandskapet Nedre Dalälven Biosphere Reserve
<b>ÖV</b>	Östra Vätterbranterna Biosphere Reserve

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# 1. Introduction

## 1.1 Background

In their 2023 report, the Intergovernmental Panel on Climate Change (IPCC, 2023) posits that the negative effects of climate change are already broader and more severe than initially predicted. Among many multifaceted challenges, the report points to widespread impacts, losses, and damages to people but also negative impacts to terrestrial, freshwater, and marine ecosystems (IPCC, 2023). Biodiversity loss is a significant global problem, deeply interwoven with climate change, as changes in temperature, precipitation patterns and more intense weather events can alter habitats, shift species distribution or disrupt the timing of biological events like breeding or migration (Habibullah et al., 2022).

These two crises are increasingly being regarded as interdependent issues (Pettorelli et al., 2021). The United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) both highlight the threats which climate change poses for biodiversity, and recognizes adaptation as a critical intervention to lessen the negative implications of these pressures (Watson et al., 2012). This is most recently reflected in the Kunming-Montreal Biodiversity Framework which includes a target that aims to “Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions [...]” (CBD, 2022, p. 10).

In this light, initiatives that aim to both halt biodiversity loss and adapt to climate change are critical to consider. One such promising approach lies in the concept of biosphere reserves (BRs). BRs reflect the implementation of the United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and Biosphere Programme (MAB), with over 700 across the world (UNESCO, 2017). UNESCO promotes BRs as areas for sustainable development which aim to reconcile biodiversity conservation with sustainable resource use (Ferreira et al., 2018).

The overall objective of BRs is to preserve biodiversity and ecosystem functions, manage cultural landscapes in a participatory manner, promote climate protection through land use and adaptation to climate change, and develop the social, economic, and cultural conditions for ecological sustainability (UNESCO, 2017). BRs are viewed as important learning sites in the endeavor to bridge potentially differing conservation objectives and stakeholder

interests, as they attempt to foster more collaborative and adaptive forms of ecosystem management (Plummer et al., 2017). This is reflected most clearly by how they are conceptualized from a bottom-up perspective, and emphasize the importance of local anchorage and of public participation for sustainable development (Stoll-Kleemann et al., 2010). Public participation is considered to contribute to a more inclusive and deliberate approach to environmental governance at large, by centering local stakeholders' knowledge, objectives, and views rather than a technical-rational approach that is driven by bureaucratic control (Few et al., 2007). Public participation is widely associated with more positive BR outcomes yet also cited as an area for improvement (Cuong, Dart, & Hockings, 2017; Ferreira et al., 2018; Few et al., 2007; Schultz et al., 2011; Stoll-Kleemann et al., 2010).

Although BRs are part of a global program, they are put into practice on a national level and adapted to the local level (UNESCO, 2017). An interesting country to examine the nexus of BRs, biodiversity loss, climate change adaptation, and public participation is Sweden. A national assessment of the status of conservation of species and habitats concluded that 20 out of 28 habitats "have unfavorable conservation status in all Swedish biogeographic regions" (CBD, n.d.). The CBD (n.d.) lists several pressures on, and drivers of, change to biodiversity, including the increasing effects of climate change, as well as the growing demand for timber, pulpwood grain and bioenergy, which put significant stresses particularly on freshwater habitats. Challenges also remain particularly in terms of effective management and balancing conservation objectives with other land use demands (Persson et al., 2017; C. Sandström et al., 2011, 2013).

The Swedish Commission on Climate and Vulnerability has recognized the significance of ecosystems and their components in climate change adaptation, stating that "access to biodiversity and robust ecosystems is an important resource for handling and surviving climate-related crises" (SOU 2007, in Wamsler et al., 2016, p. 2), and BRs are considered an important part of Swedish environmental policy. Sweden has seven such reserves that cover 27,000 km<sup>2</sup> of land and are home to a total population of 433,000 inhabitants (Svenska Unescorådet, 2022). Sweden is furthermore known for its high quality democracy (Lemm et al., 2022) and participatory governance tends toward a "safe" and "traditional" approach, rather than being novel, system-challenging, or experimental (Castell, 2016; Monno & Khakee, 2012; Tahvilzadeh, 2015). Moreover, there are no studies on public participation in Swedish BRs, presenting an opportunity to contribute to an enhanced understanding of these issues.

## 1.2 Purpose and Research Questions

Given the exacerbating impacts and risks posed by the interrelated challenges of climate change and biodiversity loss, as well as the lack of research regarding public participation in Swedish BRs, this presents a valuable research gap. This offers a unique opportunity to enhance the understanding of how such participatory mechanisms can support sustainable development, strengthen ecosystem resilience, and foster more inclusive forms of collaborative environmental governance in Sweden.

Subsequently, the aim of this research is to investigate what impedes and enables effective public participation in addressing biodiversity loss and adapting climate change in Swedish BRs. The intention is to create an overview of shared and potentially divergent patterns of barriers on a national level, but particularly which meaningful engagement opportunities exist. To understand this, it is critical to delineate the integration of biodiversity protection and climate change adaptation, understand the perceived purpose of BRs, how public participation is conceptualized and operates, as well as the potential role of the political context in Swedish BRs. Therefore, the main research question and its sub-questions are:

**Main question:** What barriers and opportunities exist for public participation in addressing biodiversity loss and adapting to climate change in Swedish biosphere reserves?

**Sub-question A:** In what ways does the biosphere reserve approach to conservation and sustainable development create opportunities for integrating biodiversity protection and climate change adaptation in Sweden?

**Sub-question B:** What is the perceived purpose of the biosphere reserve approach among the different stakeholders?

**Sub-question C:** In what ways does the political context influence public participation in Swedish biosphere reserves?

**Sub-question D:** What does public participation look like in Swedish biosphere reserves?

## 2. Methodology and Methods

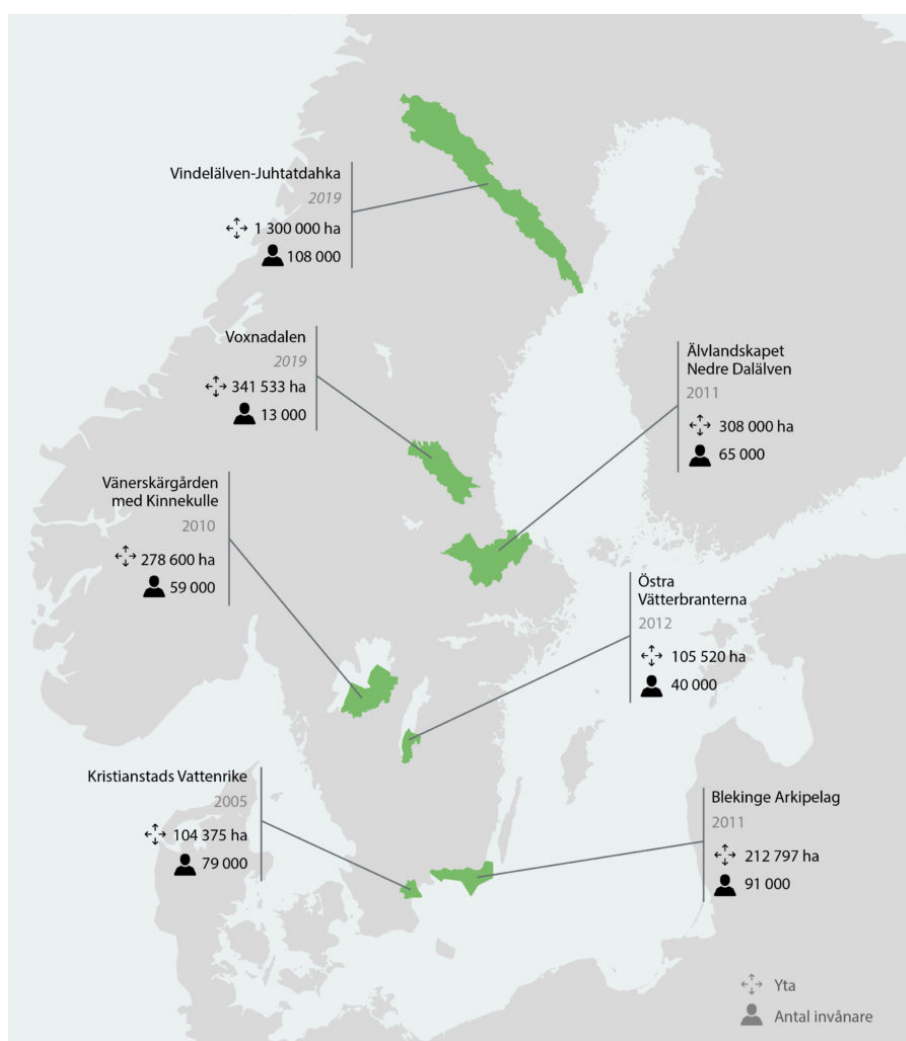
### 2.1 Methodology

This research conducted a qualitative, instrumental case study of Sweden to understand what barriers and opportunities exist for public participation in addressing biodiversity loss and climate change adaptation in BRs. Case study research focuses on investigating a specific case in a real-world setting (Creswell, 2013), and was chosen because it created a detailed, contextual understanding of the research problem.

Sweden has seven established BRs (see Figure 1 and Table 1) that cover 27,000 km<sup>2</sup> of land and are home to around 433,000 inhabitants (Svenska Unescorådet, 2022).

**Figure 1**

*Map of all Seven BRs in Sweden*



*Note.* Figure attributed to Svenska Unescorådet (2022).

**Table 1***Names and established years of all Swedish BRs as of 2022*

<b>Swedish Biosphere Reserves</b>	<b>Established (year)</b>	<b>Size (ha)</b>	<b>Population</b>
Vindelälven-Juhttáahkka	2019	1,300,000	108,000
Voxnadalen	2019	341,533	13,000
Östra Vätterbranterna	2012	105,520	40,000
Blekinge Arkipelag	2011	212,797	91,000
Älvlandskapet Nedre Dalälven	2011	308,000	65,000
Vänerskärgården med Kinnekulle	2010	278,600	59,000
Kristianstads Vattenrike	2005	104,375	79,000

*Note.* Information sourced from Svenska Unescorådet (2022).

A deductive and inductive research strategy was applied. The deductive elements involved first reviewing existing research to identify patterns and characteristics of public participation in addressing biodiversity loss and adapting to climate change in a BR context more broadly and establish a theoretical framework. Primary and secondary data was then collected through semi-structured interviews and a literature review and document analysis on the issue in a Swedish BR context. This entailed a flexible approach with context-specific identification of patterns and characteristics, as well as broad generalizations from emerging themes in the data (Blaikie, 2009; Thomas, 2003), which contributed to a detailed description of the case study free from the constraints of the categories or theories produced by the theoretical framework.

These findings were later integrated into the theoretical framework to connect the case study to the broader state of the art. Mixing the two approaches complemented the rigidity of the deductive approach with the flexibility of the inductive approach and helped create a rich description of public participation for biodiversity protection and CCA in Swedish BRs.

## **2.2 Data Collection Methods and Motivation**

The data was collected using two methods: semi-structured interviews and a literature review. Semi-structured, in-depth interviews are a common data collection approach pursued in case study research (Creswell, 2013). The focus on public participation reflected a clear

value in obtaining first-hand knowledge and experiences, both from inhabitants of the area but also actors working with those inhabitants. This can be best captured through semi-structured interviews, as its flexible approach allows for follow-up questions that are based on the participants' answer, and can therefore reveal more nuance (Kallio et al., 2016).

To supplement the semi-structured interviews, a review and analysis of existing literature on the research problem was conducted. Case study research is grounded on multiple sources of data, as it allows for data triangulation to create a robust evidence base and line of investigation (Baskarada, 2014).

### ***2.2.1 Primary Data: Semi-structured Interviews***

The first step of the semi-structured interviews consisted of choosing suitable participants. Wieringa (2014) describes case-based research sampling to involve a sequential process of analytical induction, whereby the theoretical framework and data population is related cyclically. After the theoretical framework is defined, a participant is selected, which may lead to an update of the framework, and so on, until the framework encapsulates all the data. This allows for flexibility, which fits well with case study research. The overarching sampling approach applied was therefore purposeful sampling, in a combination of maximum variation and snowball sampling. Maximum variation entails delineating criteria that differentiate the participants, then selecting participants that range within that criteria, and snowballing involves using participants to identify additional participants that may be suitable (Creswell, 2013; Knott et al., 2022). In combination, the snowballing sampling was structured within the defined criteria of the maximum variation sampling, providing a relevant participant sample pool.

Contact with potential participants was initiated via email which were public on the BR websites (see Appendix A) and continued through snowballing. The chosen participants were required to be working for a BR organization ("BR Representative") or be inhabitants of a BR and have some knowledge of, or engagement with, a BR ("Public Representative"). Upwards of 100 potential participants were contacted, and 16 semi-structured interviews were completed. The distribution of interview participants according to their role is displayed in Table 2, and a more elaborate description including their code number, the BR they belonged to, as well as the duration of the interview can be found in Appendix B.

**Table 2***The two main participant groups broken down into their role*

	<b>Participant Role</b>	<b>No. Participants</b>
<b>Public Representative</b>	Hostel owner	1
	Citizen / former chair	1
	Member of association	3
	Board member	3
	Municipal worker	1
<b>BR Representative</b>	Biosphere coordinator	5
	National coordinator	1
	Project manager	1
<b>Total</b>		<b>16</b>

Almost all biosphere coordinators in Sweden were interviewed, including the national MAB coordinator, except for those from Blekinge Arkipelag (BA) and Vindelälven-Juhttáhka (VJ). The most common role of the public participants was a member or representative of a non-profit association, or a board member of the BR. Many public participants had several, overlapping roles.

Table 3 shows the distribution of interview participants per BR. Overall, participants represented six out of seven BRs, with one participant from the national level. The only BR that did not have any representation in the interview process was VJ. Voxnadalen (VOX) was overrepresented compared to the other BRs with a total of six participants, four of which were public representatives and two who were BR representatives. Vänerskärgrården med Kinnekulle (VSK) was also well-represented, with four participants in total, three of which were public representatives and one BR representative. Additionally, Östra Vätterbranterna (ÖV) had no BR representative, and BA had no public representative.



**Table 3**

*The number of participants per participant group for each BR*

Biosphere Reserve	Number of Participants		
	Public	BR Representative	Total
Blekinge Arkipelag	0	1	1
Kristianstads Vattenrike	1	1	2
Vindelälven-Juhttááhka	0	0	0
Voxnadalen	4	2	6
Vänerskärgården med Kinnekulle	3	1	4
Älvlandskapet Nedre Dalälven	0	1	1
Östra Vätterbranterna	1	0	1
National level	/	1	1
<b>Total across BRs</b>	9	7	16

The semi-structured nature of the interviews implied that they were guided by a topic guide rather than strict, inflexible questions. The topic guide provided a pre-written outline with questions for the interview, which allowed for both structure and flexibility to adapt to the content and context of the interaction between the participants and the researchers. Each topic contained a series of questions that served as the foundation for each interview. The topics and their related questions were organized around the following key concepts identified during the initial literature review:

- perceptions of (environmental) change;
- the definition, importance, representation, and examples of participation;
- participation, biodiversity loss, and climate change adaptation;
- different interests, perceptions, and conflict;
- the role of political context; and
- perceived barriers and opportunities for public participation.

The complete interview guide can be found in Appendix B. The original order and some wording of these topics was slightly adapted during the interviews, for clarity and flow. The interviews were held and recorded via Zoom. They each lasted around 24 to 54 minutes and were conducted in February and March 2024 (see Appendix C). The interview process followed the principle of informed consent, whereby participants signed a consent form prior to the interview. This included information about the purpose, aim, confidentiality, and anonymity

measures, in line with the Social Research Association's (2021) guidelines, which align with the EU Data Protection Act of 2018 (see Appendix D). The interviews were done in either Swedish or English, transcribed, and uploaded to NVivo. The data was stored on a local and encrypted hard drive and will remain there until 2032.

### ***2.2.2 Secondary Data: Literature Review***

The secondary data consisted of a case-specific review of existing peer-reviewed as well as gray literature on the role of public participation for CCA and biodiversity protection in Swedish BRs. Gray literature referred to all research material found outside traditional publishing channels (i.e., all material except journal articles) (Rothstein & Hopewell, 2009). This included, but was not limited to, reports, government documents, periodic reviews, operational plans, and other relevant published documents. Gray literature is considered a valuable resource for case study research because it can counter the issue of publication bias, provides a broader evidence base to identify characteristics and patterns in the data, ultimately contributing to a richer description (Haddaway & Bayliss, 2015).

The steps of the review were based on Ferreira et al. (2018) adaptation of Luederitz et al. (2016) work and can be found in Appendix E, with distinct procedures for peer-reviewed and gray literature including the selection and inclusion criteria. The result of this procedure is shown in Table 4, and the final list of literature that was reviewed is outlined in Appendix F.

**Table 4***An Overview of the Results of the Case-specific Literature Review*

<b>Review Steps</b>	<b>Result</b>	
	<b>Peer-reviewed literature</b>	<b>Gray Literature</b>
<b>1. Defining the selection criteria</b>	(TITLE-ABS-KEY (biosphere AND reserve AND sweden) OR TITLE-ABS-KEY (biosfärområde AND sverige) OR TITLE-ABS-KEY (vindelälven-juhttáahkka AND voxnadalen AND östra AND vätterbranterna AND blekinge AND arkipelag AND älvlandskapet AND nedre AND dalälven AND vänerskärgrården AND med AND kinnekulle AND kristianstads AND vattenrike))	8 websites, see appendix A.  The selection criteria consisted of documents that were related to the broader work of the BRs, including, but not limited to, goals, operational plan, nomination forms, reviews.
<b>2. Data gathering</b>	The database search on SCOPUS and DiVA identified a total of 28 unique hits.	The website search identified a total of 54 documents.
<b>3. Data screening</b>	The data screening identified 21 potentially relevant papers.	The data screening identified 41 potentially relevant documents.
<b>4. Data cleaning</b>	The abstract analysis identified 17 papers for the final review.	The brief content review identified 35 documents for the final review.
<b>5. Data scoping</b>	All papers were successfully downloaded.	All documents were successfully downloaded.
<b>6. Full-text review</b>	None of the papers were deemed relevant enough to contribute to the evidence base.	120 codes across the data sources in NVivo, most were similar to the interview codes with few exceptions and contributed to five overarching themes.

*Note.* These steps are adapted from Ferreira et al. (2018) and Luederitz et al. (2016).

As the table shows, the selection criteria for the literature were broadened to capture everything related to the management and work of Swedish BRs, due to the current limited availability of literature on the nexus of public participation and Swedish BRs. The review of peer-reviewed literature identified 17 papers for review. However, the full-text review found that no papers were of value for the research problem. 12 out of 17 papers were more than ten years old, and most of the papers focused on wider management themes. Although some had elements of public participation in their text, none focused specifically on the theme, nor barriers or opportunities for its success. Therefore, the entire data source was excluded for continuity, and emphasis was instead put on the gray literature.

The gray literature review consisted of 35 documents. All seven nomination applications, five periodic reviews from VSK, BA, ÖV, Älvlandskapet Nedre Dalälven (ÄND) and Kristianstads Vattenrike (KV), and five preliminary studies from VOX, VJ, ÖV, VSK, and BA, reviewed. Miscellaneous documents included four reports from the Swedish Environmental Protection Agency (SEPA), goal documents, strategies, action/development plan, a workshop summary, a magazine, as well as annual reviews. There was a deliberate effort to include a representative range of documents, which resulted in a more equal distribution of BR representation as compared to the interviews, see Table 5 and Figure 2.

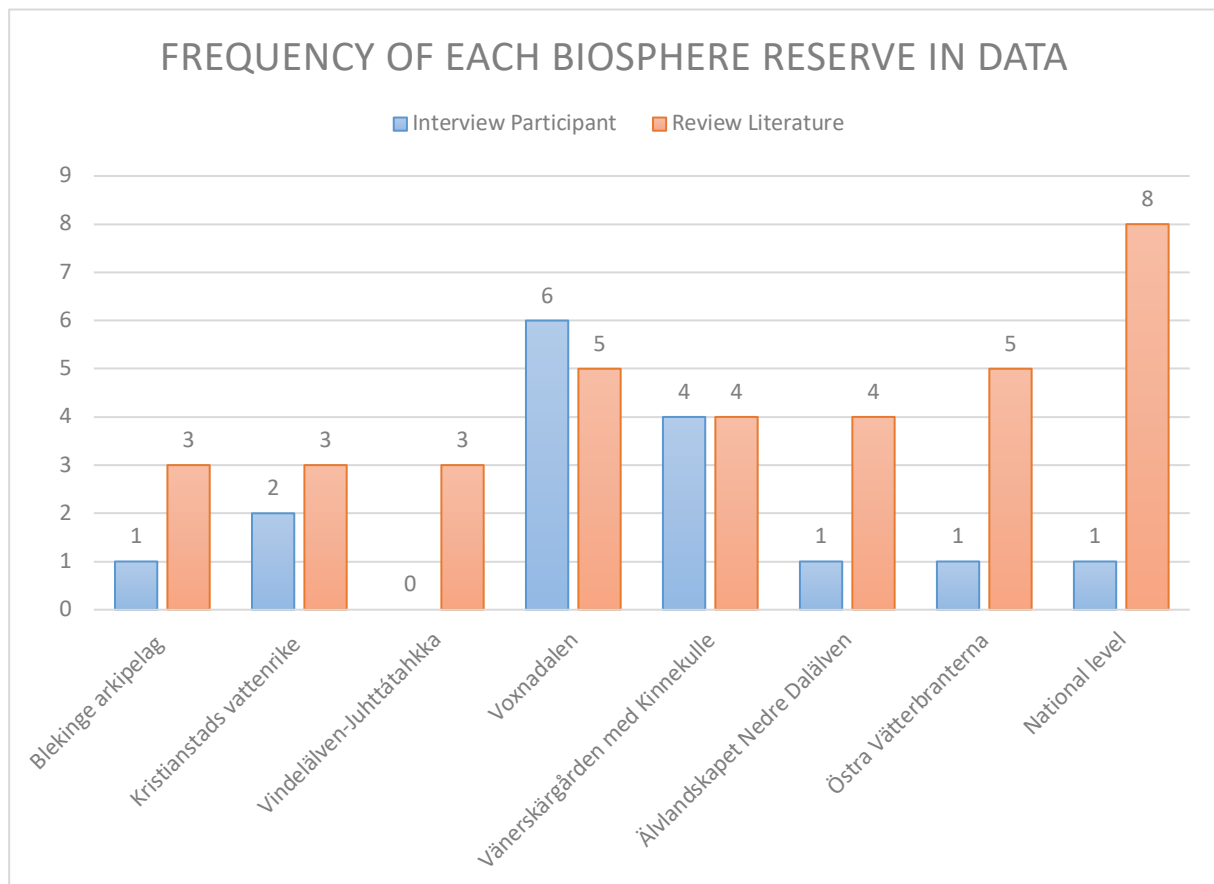
**Table 5**

*Frequency of each biosphere reserve and national level in the gray literature*

<b>Biosphere Reserve</b>	<b>Frequency in Documents</b>
Blekinge Arkipelag	3
Kristianstads Vattenrike	3
Vindelälven-Juhttátahkka	3
Voxnadalen	5
Vänerskärgården med Kinnekulle	4
Älvlandskapet Nedre Dalälven	4
Östra Vätterbranterna	5
National level	8
<b>Total</b>	<b>35</b>

**Figure 2**

*Frequency of Swedish BRs in Interviews and Case-specific Literature Review*



## 2.3 Data Analysis

The analysis of the data collected during the interviews and review was done using an iterative coding process that reflected Creswell's (2013) data analysis spiral. The coding process involved identifying, categorizing, and interpreting patterns and themes within the data. The applied coding scheme followed a deductive–inductive approach, meaning a combination of theory-driven coding (deductive) and data-driven coding (inductive). This iterative process ensured that the analysis remained closely tied to the data, allowing themes relevant to the research questions to develop organically. Through this approach, data could be examined in a flexible manner, allowing themes to emerge naturally from the data (inductive), while also applying existing frameworks to structure and interpret these themes (deductive). This was conducted using the NVivo software analysis tool, which enabled the collection and editing of codes throughout the procedure.

The overarching codes decided prior to the analysis were related to the themes in section 2.2.1, and included: “participation”, “environmental change”, “barriers”,

“opportunities”, and “climate change adaptation”. The coding book and a coding example can be found in Appendix G. The inductive coding process involved generating codes directly from the data itself, making it possible to uncover new insights about public participation in Swedish BRs. As the data was read, recurring ideas, phrases and concepts were noted by each researcher respectively, which then served as the basis for the new codes. To ensure that all relevant insights were captured from the interview transcripts, a dual-track approach was employed. This entailed that both researchers individually analyzed the data set first using the pre-defined codes as well as their respective inductive codes. In a second step, the data sets were merged, combining all developed codes, to find convergence as well as differences which were then used for the remaining data analysis.

The coding of the documents from the literature review had a slightly different approach, as the process could be started with an existing, extensive codebook. The same codes that were used and had emerged during the coding of the interviews were applied, although new codes appeared which were also added. However, due to the sheer amount of text, each document was only analyzed by one author each, as opposed to the dual-track approach employed for analyzing the interviews.

Finally, this coding process resulted in a wide range of codes that were systematically grouped into five overarching themes to identify patterns and discrepancies: the biosphere reserve concept, change, conflict, political context, and participation. These themes were then interpreted against the backdrop of the theoretical framework and to the larger research literature to ultimately answer the overall research question.

## **2.4 Values, Biases, and Limitations**

### ***2.4.1 Values and Biases***

It is critical to transparently reflect on biases that may have influenced the research outcome while recognizing the value-laden character of the obtained information. This highlights the distinction between the researchers’ reality and the participants, underscoring the potential disparities in perspectives and experiences. This research was guided by the values laid out in the RADIX Disaster Studies Manifesto-Accord (Radical Interpretations of Disasters [RADIX], n.d.). Moreover, personal aspects such as self-identifications, experiences, and privileges influenced the research methods. How these factors shaped the researcher’s

framing of the issue, the effect of their backgrounds and experiences on the data interpretation, was acknowledged and continuously reflected on.

The most impactful biases on the research process included availability heuristics, the bandwagon effect, and projection bias, which are elaborated by Johnson and Levin (2009). The availability heuristic refers to the inclination to make predictions that are influenced by recent experiences. In the case of this research, interviews with participants took place within a short period of time, in quick succession. This increased the risk of the availability heuristic biasing the data analysis, as the views and experiences mentioned by interviewees may have disproportionately influenced the researchers' perspective of the subsequent interviews as well as the interpretation of the findings.

This is closely related to the bandwagon effect, which Johnson and Levin (2009) describe as the tendency to adopt the opinions and beliefs of others without questioning them. This issue may have had an impact during the data collection process, when participants brought up personal experiences and opinions that cannot be generalized. Moreover, the projection bias, which describes the assumption that others share similar beliefs as oneself (Johnson & Levin, 2009).

These biases were in part addressed by supplementing the primary data with the systematic review, that contained a broad range of different studies and data. This ensured that the research was informed by a wide array of evidence. Additionally, the use of multiple data sources reduced the reliance on, and hence overestimation of, for example only one single source that was particularly memorable. Moreover, given the researchers' overall awareness of these issues, as well as continuous critical reflection on the research process itself, aided in avoiding these biases to the best extent possible. Lastly, conducting the research as a pair provided an inherent peer-review aspect and allowed for critical reflection and discussion of these issues.

#### ***2.4.2 Methodological Limitations***

Furthermore, there were several methodological limitations that affected the depth and validity of the results. Firstly, a case study approach requires a fine balance of data as it risks being too broad, or too narrow, which can negatively affect the analysis and consequently the broader value of the results (Creswell, 2013). This balance was struck by focusing on all BRs in Sweden, as concentrating on a singular BR would have been too granular and difficult to find adequate data, while looking at all seven was still feasible. However,

attention was paid to the fact that the sub-components of the study, such as each of the BRs' detailed structures and processes, could not be fully examined in rigorous detail, given the time and scope constraint of this research. This also impacted the generalizability of the results (Creswell, 2013).

Secondly, the data collection also had limitations. The semi-structured interviews were limited by breadth, artificiality, and resources. Breadth and artificiality refer to the risk of the sample size being too small and consequently not being representative, and the difficulty of assuring participants are authentic in their answers (Knott et al., 2022). There was a clear uneven representation of participants, as can be observed in Table 3, whereby participants from VOX and VSK were overrepresented. There were also no interviewees from VJ. This was addressed by ensuring that the literature review captured data from all BRs in a more even distribution to create a national overview. Moreover, there was a fair distribution between public and BR representatives, which helped provide equal weight to perspectives of public participation from both the managerial and public point.

This literature review was clearly limited by the lack of relevant peer-reviewed literature, which meant that secondary data was entirely dependent on gray literature. This as much a methodological limitation as it is a finding, pointing to a gap that can be filled by future research. Additionally, there are no accepted standard methods for adequately searching for gray literature (Paez, 2017), and its collection was both limited by language and by time. The selection criteria helped address this, by attempting to include as many documents in English as possible, as well as delineating the scope to only include documents published on the relevant organizations' websites.

Finally, the language barrier was an overarching limitation of the study, as half of the interviews and several documents were only available in Swedish, and only one researcher spoke fluent Swedish. This impeded the researchers' ability to obtain and analyze Swedish texts and interviews to the same extent and depth as English texts and interviews. To mitigate these risks, all interviews were translated, and the coding of both data sources was conducted in English.



## 3. State of the Art

The following section begins by clarifying the key concepts of BRs and public participation in environmental management, followed by a two-part literature review. First literature on the intersection of BRs, biodiversity loss, and CCA are reviewed, and second, literature on the role of public participation in BRs. This creates a comprehensive state of the art from a wider, international perspective, which will help build the basis for theoretical framework that will later anchor the case study in a wider context.

### 3.1 Conceptual Clarifications

#### *3.1.1 Biosphere Reserves*

In 1971, UNESCO launched the MAB, an intergovernmental program with the primary objective to establish a scientific foundation to enhance the relationship between people and their environment (UNESCO, 2017). Overall, it aims to preserve biodiversity and ecosystem functions, manage cultural landscapes in a participatory manner, promote climate protection through land use and adaptation to climate change, and develop the social, economic, and cultural conditions for ecological sustainability (UNESCO, 2008, 2017, 2022).

BRs represent the practical implementation of this program and illustrate a paradigm shift in international conservation efforts, away from restrictive conservation which previously had not accounted for the needs of local communities, towards an approach that recognizes the importance of cultural and social sustainability and their involvement (Ruiz-Mallén, Corbera, Calvo-Boyero, Reyes-García, et al., 2015; UNESCO, 2008, 2017). Accordingly, BRs seek to harmonize biodiversity conservation with the sustainable development of local communities, and hence provide unique opportunities to explore how social-ecological systems can be governed and sustainably managed (Cuong, Dart, & Hockings, 2017; Ferreira et al., 2018).

There are three key functions of BRs: biodiversity conservation, sustainable development as well as a logistic support function for research, training and education (Ferreira et al., 2018). Due to these characteristics, BRs are often regarded as “learning sites” for human-centered approaches to conservation (Baird et al., 2018, p. 410) or “practical arenas” for countries to gain experience in socially and culturally sustainable biodiversity management (Schüttler et al., 2023, p. 484). Moreover, each BR is characterized by a core,

buffer and transition zone which follow different regulations: the core zone is protected by law, the buffer zone allows for human activities compatible with nature conservation, and the transition zone prioritizes economic and social sustainable development (UNESCO, 2022).

As outlined by the technical guidelines (UNESCO, 2022), a BR is formed according to its local prerequisites and defines its own mission, visions, and goals as well as focus on particular areas of development, for which they often establish action groups that work with these issues. They should therefore provide arrangements to promote the participation of a range of stakeholders, including public institutions, local communities, and private actors (Ferreira et al., 2018). Overarchingly, however, local communities should have a central role in the establishment and ongoing work of a BR, and public participation is consequently a core characteristic of its structure (UNESCO, 2022).

### **3.1.2 Public Participation in Environmental Issues**

Participation is a concept with a broad range of meanings and definitions and can refer to nearly anything that involves people (Cornwall, 2008). It is often described as an essential component of environmental management including CCA and BR management (Few et al., 2007; Hügel & Davies, 2020; Reed et al., 2018; Schultz et al., 2011), yet such claims are routinely lacking a clear, shared definition. Nonetheless, Reed et al. (2018, p. 2) define *participation* as a “(...) process where public or stakeholder individuals, groups, and/or organizations are involved in making decisions that affect them, whether passively via consultation or actively via two-way engagement.” This definition highlights how participation in environmental issues largely centers around decision-making, and having the ability to influence decisions which affect oneself or one’s community.

Public participation more specifically carries different meanings in different contexts. Hügel and Davies (2020) argue that “public” is often used synonymously with citizens and community members, and that public participation encompasses the bidirectional or unidirectional interactions between the public and a sponsoring entity, such as an organization or government agency. In this research, the term *public* will be used because it encompasses a wide group of actors that interact with a sponsoring agency and does not limit participation to those with a citizenship status. Overarchingly, the concept of *public participation* will therefore be used to describe the processes and practices which define ways in which the public can engage in decisions that affect them.

It is critical to be attentive of who is participating, in what activities, how, as well as who is ultimately benefiting from such activities to avoid tokenizing the concept and undermining its potential (Cornwall, 2008). Cornwall (2008) posits that there are many typologies which aim to describe participation that tend to categorize different forms in normative terms and classify them from “good” to “bad”. Classical examples include Arnstein's (1969) ladder of participation and Pretty's (1995) typology of participation in development programs and projects, which ranks different forms of participation hierarchically. Arnstein identifies “non-participation” at the bottom and “citizen control” at the top, and Pretty identifies tokenism and manipulation at the bottom, and interactive participation and self-mobilization at the top. As Cornwall (2008, p. 271) points out, both Arnstein's and Pretty's typologies describe participation as a spectrum defined by the transition of power from authorities to control by the people. In contrast, White's (1996) typology refrains from classifying participatory approaches along an axis of good or bad, and instead aims to highlight contrasting ideas about the reasons for, and ways in which participation is practiced; emphasizing the importance of considering the different interests at stake in widening participation.

In practice, however, these typologies become blurred as much depends on the context in which they are applied (Cornwall, 2008). This reflects Reed et al.'s (2018) “Wheel of Participation” that rejects normative claims which assume that climbing higher up the participation ladder leads to better outcomes, and instead promotes the idea that all types of engagement can lead to positive outcomes if well-adapted to the context in question. Moreover, Bebbington and Farrington (1993), differentiate forms of participation according to depth and breadth. The authors deem a participatory process “deep” when it actively involves participants in each phase, yet this can simultaneously be “narrow” if it only includes certain groups. On the other hand, they regard a process as “wide” when diverse participants are involved, which can be classified as “shallow” if their role is limited to being informed or giving feedback rather than engaging in decision-making. This concept effectively illuminates the dynamics between how inclusively participants are involved and the intensity of their engagement (Lister, 2000).

Consequently, it is pivotal to understand participation as a nuanced concept. Different complex issues can arise for several reasons, like differing perceptions among stakeholders of what participation means, unintended consequences of participating, and the effects of who is actively not participating (Quick & Bryson, 2022). Moreover, “full” participation in the sense

of full breadth and depth, is not only virtually impossible to achieve, but also might not lead to the best outcomes in all cases; not everyone needs to always be involved to bring about good results, highlighting yet again the importance of contextuality, as well as what is realistically feasible (Cornwall, 2008). In conclusion, any process of participation should be clearly defined according to its purpose, the specific activities, who, and who is not, involved, as well as when they are involved.

## **3.2 Literature Review**

### ***3.2.1 Biosphere Reserves, Climate Change Adaptation, and Biodiversity***

#### ***Conservation***

The Madrid Action Plan (UNESCO, 2008) and the Dresden Declaration on Biosphere Reserves and Climate Change (UNESCO, 2011) highlighted a paradigm shift in the BR conceptualization where it became clear that BRs also have a critical role in addressing climate change. For adaptation in particular, both documents underscore how BRs have the potential to be model areas to demonstrate and test measures that aim to adapt to changing socio-ecological systems (UNESCO, 2008, 2011). These sentiments are also echoed by the New Roadmap for 2015-2025 (UNESCO, 2017, p. 19), where one of its four strategic objectives aims to utilize BRs to “support mitigation and adaptation to climate change and other aspects of global environmental change”. Its expected results communicate the role of BRs as priority areas for innovating monitoring, mitigation, and adaptation measures, as well as in effectively integrating activities for biodiversity, sustainable development, climate change mitigation and adaptation. However, although the New Roadmap focuses on examples of mitigation rather than adaptation, in the context of the growing importance of adaptation to climate change risks and biodiversity loss, BRs are clearly interesting and important areas to investigate issues and approaches related to adaptation.

There is limited literature on the nexus of BRs, CCA, and biodiversity conservation. The case studies that exist are primarily contextualized in Latin America, and deal with themes of climate change adaptation for local communities. In a study on the adaptive capacity of a community in the Bolivian Amazon, Ruiz-Mallén et al. (2017) found that households which were located within the Pilón Lajas BR were more likely to be regarded as vulnerable and consequently had the lowest adaptive capacity, due to a lack of involvement in decision making and therefore a constrained agency in developing long-term adaptation strategies.

Conservation policies and regulation is closely linked to communities' land and resource access and consequently their use, which means that they are important to consider when understanding what communities' potential for adaptation is in a BR (Ruiz-Mallén, Corbera, Calvo-Boyero, & Reyes-García, 2015; Ruiz-Mallén et al., 2017). This was echoed by a study on the integration of climate adaptation in a BR in Yucatán, Mexico which exemplified the conflict between strict conservation regulations and local communities' traditional housing practices in the context of climate change risks (Audefroy & Sánchez, 2017).

Moreover, Gámez et al. (2018) analyzed communities' perception of climate change and adaptation measures in relation to conservation in a BR in Mexico, and found that conservation and community welfare can be achieved if natural resources are used responsibly, and highlighted the importance of including dimensions of community vulnerability to understand opportunities to strengthen their adaptive capacity. Critically, Ruiz-Mallén, Corbera, Calvo-Boyero, Reyes-García et al. (2015) argued that adaptations to environmental change were achieved without the BRs enforcement in Bolivia and Mexico, and that the BR was actually the source of stress for all communities involved, rather than an enabling mechanism for development.

Evidently, the existing literature on BRs in the context of climate change adaptation highlights the recurring theme of contestation between conservation measures, local communities' access (or lack thereof) to natural resources which shape their livelihoods, and consequently their adaptive capacity in the context of increasing negative impacts of a changing climate and biodiversity crises. Therefore, stressing the importance of understanding the interactions between the different actors and their interests which shape the way in which BRs operate.

### ***3.2.2 The Role of Public Participation in Biosphere Reserves***

**Intention - International Agreements and Guidelines.** Designed globally, translated into policy nationally and implemented locally, BRs are confronted with expectations from each of these levels, giving rise to different multilevel governance issues (Gustafsson & Schilling-Vacaflor, 2022). Whereas the international perspective may be focused on biodiversity conservation, governments might, for example, prioritize tourism development (Berkes, 2017). However, it is also important to comprehend how biosphere reserves impact the lives of the area's residents, their vulnerability and the potential for adaptation strategies for local livelihoods (Ruiz-Mallén, Corbera, Calvo-Boyero, Reyes-García, et al., 2015). As Stoll-

Kleemann et al. (2010, p. 228) note, the notion of “community participation” is central to the biosphere reserve concept, as it determines whether, under what conditions and to what extent local actors affected by the creation and management of a BR can participate in its management.

Hence, several different international declarations and initiatives highlight the importance of considering and integrating the local perspective and knowledge on BR matters. The notion of inclusive conservation was firstly enshrined in the Seville Strategy, which explicitly emphasized a partnership-based approach in BR management (UNESCO, 1995, 2008). In this strategy, one recommendation on the individual reserve level is that that BRs should attempt to, “survey the interests of the various stakeholders and fully involve them in planning and decision-making regarding the management and use of the reserve” (UNESCO, 1995, p. 6).

The Madrid Action Plan was adopted in 2008, which further outlined specific targets regarding community participation in BRs and declared that “both scientific as well as traditional knowledge from local and indigenous people is needed for adaptation to change and building resilience” (UNESCO, 2008, p. 20). Shortly after, the Dresden Declaration on Biosphere Reserves and Climate Change called on states to “integrate traditional, indigenous and local knowledge and modern scientific findings to strengthen climate change research” (UNESCO, 2011, p. 3). Moreover, in the New Roadmap for 2015-2025, it is highlighted that all procedures regarding the planning, implementation, and management of BRs should be “open and participatory, taking into account local practices and traditions and cultures, and involving all relevant stakeholders” (UNESCO, 2017, p. 21).

Global initiatives and targets such as the International Union for Conservation of Nature Conservation Initiative on Human Rights and the Aichi Targets also emphasize the importance of managing protected areas effectively and fairly, with a focus on respecting the rights and addressing the needs of local and indigenous communities (CBD, 2020; International Institute for Environment and Development, 2013). The Aichi targets specifically address the participatory aspects of biodiversity governance, such as “Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society” and “Goal E: Enhance implementation through participatory planning, knowledge management and capacity building” (CBD, 2020). This reflects the role of governance systems which aim to consider the rights and needs of the local communities (Reed, 2016).

Reed (2016) further highlights that the UNESCO Statutory Framework for Biosphere Reserves promotes the involvement of local and Indigenous populations and their knowledge in both research and management. This approach aligns with a growing consensus in conservation that stresses the need for protected areas to be managed in a way that is both equitable and efficient (Berkes, 2017; Reed, 2016). The strategic plans developed by the signatories of the CBD underscore these principles, demonstrating a commitment to ensuring that BRs not only preserve biodiversity but also support the communities that depend on these ecosystems (CBD, 2010).

**Implementation - Evidence and Gaps from Literature.** Research on BRs which focuses on or involves the dimension of participation largely agrees that community participation and collaboration are a critical component for successful BR management (Coetzer et al., 2014; Huber & Arnberger, 2021; Jaafar et al., 2023; Mitrofanenko et al., 2018; Stoll-Kleemann et al., 2010; Văidianu et al., 2014) particularly in the context of climate change (Gámez et al., 2018; Ivanova Boncheva & Hernández-Morales, 2022). Active stakeholder involvement including public participation in BR management has been argued to lead to positive social and ecological outcomes, benefitting human welfare and biodiversity conservation simultaneously (Barracough et al., 2021; Bouamrane et al., 2017; Ivanova Boncheva & Hernández-Morales, 2022). This is supported by a study on BRs worldwide, in which Schultz et al. (2011) conclude that local participation resulted in increased support for BRs, with little evidence of negative effects of participation for conservation and sustainable development outcomes.

Yet, there is a gap between the intention to integrate local participation in BR management and reality. The integration of BRs into national protected area systems can lead to issues surrounding decision-making and power dynamics, which can result in the enforcement of top-down management rather than leveled cooperation with local communities (Ruiz-Mallén, Corbera, Calvo-Boyero, Reyes-García, et al., 2015). Stoll-Kleemann et al. (2010) found that while BR managers view community participation as an important part of management, local people wish to be more involved in the management and design of BRs, highlighting a discrepancy. Furthermore, despite explicit intentions to encourage local participation, George and Reed (2017) concluded that there were elements of elitism present in Canadian BRs, whereby representation continued to be dominated by professionals over genuine local participation.

The barriers, enabling factors, and opportunities for effective participatory mechanisms in BRs are therefore crucial to assess. BR management is context-dependent and strategies for effective participation should thus be locally adapted (Roldán, 2017). Nevertheless, there are some general themes that can be identified across the literature. On one hand, barriers include lack of capacity, limited resources (for instance mobility, money, time), diverse groups with divergent perspectives, a disabling political environment, lack of information, and unequal representation with respect to socio-economic factors (e.g. education, gender, age) (Huber & Arnberger, 2021; Jaafar et al., 2023; Mitrofanenko et al., 2018). Mohedano Roldán et al. (2019) also highlight challenges such as elite capture, tokenism, information asymmetries, collective action problems, and inherent power imbalances. On the other hand, trust in the local administration, previous experience in participatory processes, an encouraging social environment, positive attitudes towards participation, feelings of ownership, an understanding of potential benefits, place attachment, and a personal invitation to participate are all examples of enabling factors for effective participation (Huber & Arnberger, 2021; Mammadova et al., 2022; Mitrofanenko et al., 2018).

Finally, although general arguments in favor of increased participation in natural resource management and biodiversity conservation include increased efficiency, improved accuracy, and strengthened legitimacy, critics argue that representing conflicting interests can slow down decision making and result in unfavorable and inefficient compromises between people and biodiversity (Mitrofanenko et al., 2018; Schultz et al., 2011). Mohedano Roldán et al. (2019) also surveyed multiple BRs globally and found that deeper forms of participation did not necessarily result in greater legitimacy. The authors identified the strongest effect of participation on lower levels of Arnstein's ladder of participation, thus arguing that the form of participation appropriate for its context matters more than its perceived depth. Participation designs that emphasize intense involvement may lead to a decreased interest to participate, particularly if there is limited commitment and time (Huber & Arnberger, 2021).



## 4. Theoretical Framework

There are several frameworks that aim to capture the complexity of public participation, including the framework for participation in local climate adaptation by Uittenbroek et al. (2019). This framework was deemed appropriate for this research not only because it is designed explicitly for local climate adaptation efforts, but because it touches on all the key components outlined in the conceptual clarification of public participation: who, when, how, and why. It was adapted in Figure 3 to the BR context by integrating the contextual objectives of the MAB as well as the barriers and opportunities for public participation.

This framework begins by outlining the participation design, i.e., the organization of the participatory process, according to three dimensions: (1) who participates (interest representation), (2) when participation is possible (opportunities for participation), and (3) how participation takes shape (degree of influence). Interest representation relates to which actors are present, but it is equally important to consider who is not (Cornwall, 2008; White, 1996). This dimension also addresses the degree of representation, highlighting whether certain actors and expertise has skewed representation, or whether the actors affected by decisions are represented in an equitable way. Second, opportunities for participation refer to when participants can be involved. Participatory processes can take place at different stages of BR management, from design to implementation, to evaluation (Ferreira et al., 2018; Stoll-Kleemann & Welp, 2008). This dimension therefore assesses whether participation takes place during all phases of the decision-making process, multiple phases, or none. Finally, degree of influence describes the degree to which participants, through deliberation, can engage in the issue at hand. Both in terms of the different forms of participation processes, as well as their accessibility in terms of resources, time, location, and understanding of the problem (Cornwall, 2008).

Depending on their context, these different design dimensions aim to ultimately achieve certain objectives. Uittenbroek et al. (2019) integrate the nine objectives for public participation in their framework as outlined by Glucker et al. (2013). These objectives are classified according to normative, substantive, and instrumental rationales. The normative objectives are related to normative ideas and values about democracy and justice, the substantive aim to improve decision output by integrating and evaluating diverse forms of knowledge, and the instrumental ones view participation as a mean to generate legitimacy and resolve conflict (Glucker et al., 2013). Importantly, even though they are regarded as

benefits of public participation, all nine objectives are not necessarily achieved simultaneously, nor are they achieved by all dimensions of the participation design equally (Uittenbroek et al., 2019). Essentially, different types of participatory mechanisms, depending on their design, will achieve the objectives differently.

Moreover, these nine objectives are supplemented with the MAB strategic objectives for 2015-2025, to contextualize the model within contemporary BR management (UNESCO, 2017). This creates a deeper understanding of what, and perhaps if, the type of participatory design pursued in Swedish BRs addresses the MAB-specific objectives, which can ultimately be helpful in generalizing the results. The objectives are described in detail in Table 6.

**Table 6**

*Overview of MAB and participatory objectives*

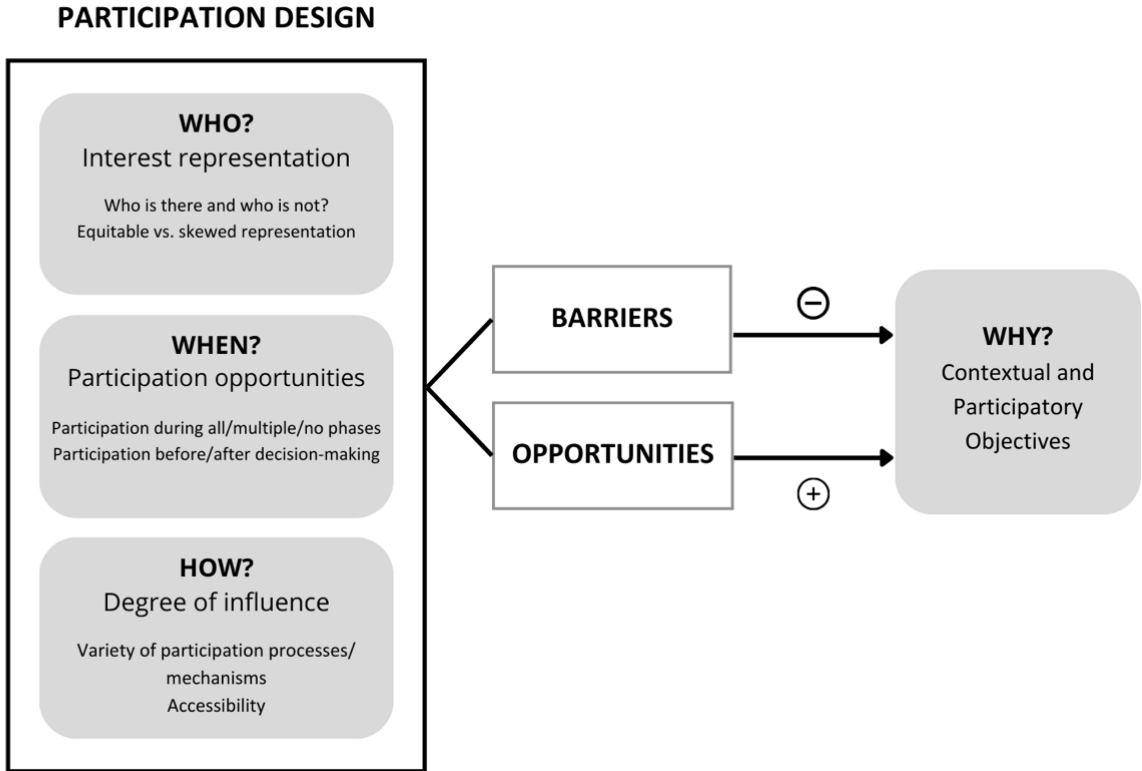
<b>Contextual Objectives: MAB Strategic Objectives (2015-2025)</b>		
<ol style="list-style-type: none"> <li>1. Conserve biodiversity, restore and enhance ecosystem services, and foster the sustainable use of natural resources.</li> <li>2. Contribute to building sustainable, healthy, and equitable societies, economies and thriving human settlements in harmony with the biosphere.</li> <li>3. Facilitate biodiversity and sustainability science, education for sustainable development and capacity building.</li> <li>4. Support mitigation and adaptation to climate change and other aspects of global environmental change.</li> </ol>		
<b>Participatory Objectives</b>		
<i>Normative rationale</i>	<i>Substantive Rationale</i>	<i>Instrumental Rationale</i>
<ol style="list-style-type: none"> <li>1. Influencing decisions</li> <li>2. Enhancing democratic capacity</li> <li>3. Social learning</li> <li>4. Empowering and emancipating marginalized groups and individuals</li> </ol>	<ol style="list-style-type: none"> <li>5. Harnessing local information and knowledge</li> <li>6. Incorporating experimental and value-based knowledge</li> <li>7. Testing the robustness of information from other sources</li> </ol>	<ol style="list-style-type: none"> <li>8. Generating legitimacy</li> <li>9. Resolving conflict</li> </ol>

*Note.* Objectives reference Glucker et al. (2013) and UNESCO, (2017).

The original framework argues that the different dimensions of the participation design have an influence on specific participatory objectives. This thesis on the other hand, simplifies this model by replacing these granular links with “barriers” and “opportunities”. These factors arise because of the participation design, either due to an individual dimensions or several in combination, and influence whether the defined contextual or participatory objectives are achieved or not.

Barriers are understood here as dynamic, socially constructed and contextual “(...) obstacles with tangible effects but which can be overcome with the help of available or accessible resources and capacities” (A. Löf, 2013, p. 331). Based on this definition, opportunities are understood to also be dynamic, socially constructed, and contextual, but rather have an opposite, enabling effect. In other words, barriers obstruct the possibility for participatory processes to achieve its objectives, while opportunities enable it. Figure 3 shows a model of this adapted framework, underscoring the relationships between participation design, barriers and opportunities, and overall objectives.

**Figure 3**  
*Adapted Theoretical Framework on Barriers and Opportunities for Public Participation in BRs*



*Note.* Adapted from Uittenbroek et al. (2019).

## 5. Results

The analysis of the semi-structured interviews and case-specific literature review identified five overarching shared themes: the biosphere reserve concept, change, conflict, political context, and participation.

### 5.1 Biosphere Reserve Concept

Several characteristics emerged in the data that define the BR concept and its approach in a Swedish context. Firstly, in line with their overall purpose, BR Representative 1 and several documents linked broader national and international sustainability goals to local engagement. All nomination forms showed that each BR in Sweden, although guided by the same overarching international guidelines, developed their own context-specific objectives (Alfredsson et al., 2018; Asp et al., 2009; Ericson et al., 2010; Gardeström et al., 2018; Jonegård et al., 2011; MacTaggart et al., 2008; Magnusson et al., 2005). This locality aspect to sustainable development was described by BR Representative 2 a distinguishing factor, as all reserves are formed in a bottom-up manner from local prerequisites, needs, and initiatives. BRs being built on public participation was a dominant theme, as expressed by four BR representatives, one public representative and several documents.

One of the most pronounced roles of a BR as voiced by BR representatives and the literature (Alfredsson et al., 2018; Biosfärområde Vindelälven-Juhttátahkka, n.d.; Biosfärområde Voxnadalen, 2023b; Gardeström et al., 2018; E. Sandström & Sahlström, 2021) was that BRs should act as a neutral platform. By offering a space for communication and collaboration, BRs were portrayed to facilitate the management of diverse, sometimes competing, interests: “One way of expressing the reason why we have biosphere reserves is that we have competing interests, and they should find a way for these competing interests to co-exist if possible.” (BR Representative 3).

Moreover, all nomination forms and periodic reviews (Biosfär Vänerskärgården Kinnekulle, 2020; Biosfärområde Älvsjökvarnen Nedre Dalälven, 2021; Blekinge Arkipelag, 2021; Nystedt & Jonegård, 2022; Wettemark et al., 2015) and other documents emphasized the mission of BRs acting as educators on sustainable development and environmental awareness (M. Löf, 2023; E. Sandström & Sahlström, 2021), often referred to as “model areas” where sustainable development can be successfully exemplified in practice (Heinrup, 2016).

This was repeatedly described in interviews by both participant groups as an important way in which the BRs engaged with the public, particularly youth and children.

Additionally, there was a recognition that a balance must be struck between the different dimensions of sustainable development. For example, VSK highlighted the importance of creating a consensus around (sustainable) development based on natural and cultural values in the area and using the process of becoming and being a BR to find a balance between utility and conservation of the landscape (MacTaggart et al., 2008). As BR Representative 3 pointed out: “If we can find a way where you can have both development and preservation of nature that's success, I think. And important for many places around the world to learn from biosphere reserves.”

This integrated and collaborative approach applied not only to their work within their geographical and administrative boundaries but reached across sectors and different governance levels (Heinrup & Schultz, 2017). This characteristic was recognized as a core trait in most of the nomination forms and periodic reviews, as an essential component driving sustainable development. It was also affirmed by BR Representative 2, who stated that “governmental agencies, they all work within their pipes. But the biospheres, they work across that, and this is why they are a very important tool, not only for the local area, but also for the Swedish Government, actually.”

Yet, despite the clear definition of BRs on paper and the pronounced understanding of the concept among BR representatives, another finding that emerged both in reports (Heinrup & Schultz, 2017; M. Löf, 2023; E. Sandström & Sahlström, 2021) as well as in interviews (especially among BR representatives) was a persistent lack of knowledge and understanding of the concept among the public, as well as difficulties for the BRs in communicating it.

## **5.2 Change**

Change was another theme that was primarily discussed in an environmental form, although non-environmental change was briefly touched upon. In general, the preliminary studies expressed that establishing a BR would be useful in addressing change (Berggren, 2014; Götene Kommun, Lidköping Kommun, & Mariestads Kommun, 2005; Jonegård et al., 2008; Länsstyrelsen i Blekinge et al., 2007; Ovanåker kommun, 2012). The review of the existing 10-year reviews concluded that one key to success for BRs is being adaptive and flexible, and that this is necessary to meet local and international changes (M. Löf, 2023). VOX's nomination form identified global environmental changes like climate change, and

economic and political changes on a local and global level as potential barriers to implementing their development plan (Alfredsson et al., 2018). This was also reflected by ÄND's nomination form, expressing that "modern challenges include the climate issue and adapting development to a globalised world", and that a BR could help create opportunities to serve as a platform for long-term sustainable solutions (Ericson et al., 2010, p. 20).

All interviewees agreed that environmental, climatic, and biodiversity changes are apparent in their areas, and that they affect their daily lives, their work, and the ecosystems they manage. Frequently cited changes were altered precipitation patterns, unpredictable winters with variations in snowfall, and shifts in water levels. These changes were perceived as challenges to both biodiversity and land use, like agriculture and forestry. To combat these problems, one interviewee stated the importance of strengthening biodiversity and developing projects that anticipate future climate scenarios to find adaptive solutions:

"We try to find solutions, where we then strengthen the biodiversity from a climate change perspective where we have in mind that the climate is not the same in 2050 as it is now, and then try to find solutions and adaptations for that [...] Normally, you might have worked more with a management of what already exists from a perspective that it doesn't change, but with climate change, we know that we're going to get a changed flora maybe, and we get an increased pressure from invasive species and things like that." (Public Representative 9)

Nevertheless, this was the only participant that integrated CCA with biodiversity loss and BR work, as climate change was largely discussed from a mitigation perspective in the literature and other interviews, even when participants were specifically asked about CCA measures. Interestingly, several projects could technically be understood as CCA, like the use of ecosystem-based strategies to limit the effects of climate change in VOX's development plan, though they were not explicitly described as such (Biosfärområde Voxnaden, 2023b). In fact, BR Representative 6 expressed: "This is one of our weakest areas in our BR."

Moreover, climate change was mentioned in several documents, but most elaborated on in ÖV and VJ. In their review, ÖV identified climate change and its impact on the ecosystem as one of the three biggest challenges for Lake Vättern (Nystedt & Jonegård, 2022). Climate change was described as a more dire threat in VJ as compared to other BRs, as it was specifically highlighted in conjunction with reindeer husbandry in their documents as a critical

threat to its existence (Berggren, 2014; Gardeström et al., 2018). In contrast, VOX addressed climate change as a potential opportunity for their BR, because it would make their countryside more attractive within 50 years (Ovanåker kommun, 2012). Other environmental changes that were mentioned included pollution, eutrophication, invasive species, land, and water sensitivity to acidification (Länsstyrelsen i Blekinge et al., 2007; Nystedt & Jonegård, 2022).

Finally, non-environmental changes were largely discussed in terms of land-use change and development from a perspective of economic growth. Forestry and agriculture were dominant sectors that were discussed to have wide-ranging impacts in the different BR regions in interviews by both participant groups, particularly from ÖV and VOX.

### **5.3 Conflict**

Although the origin of the establishment of all Swedish BRs varied, the data described how several came to be of the clash of interests that is intrinsic to sustainable development, or the “dichotomy of sustainable development” (E. Sandström & Olsson, 2013, p. 52). This dichotomy was made up of environmental motivations (nature protection and restoration, adaptation, mitigation) on one hand, and economic motivations (economic growth, development) on the other, and represented a red thread across all interviews and gray literature. As expressed by many of the BR representatives and some public representatives, this characteristic of sustainable development gives BRs its purpose as an arena where conflicting interests can meet and come to a shared agreement. Nonetheless, one risk described in half of the interviews was that BRs attract a homogeneous group of actors, and that the employees as well as the most active participants consisted only of people who think and feel the same way about protection and development in the area.

This links to the perceived idea that a BR could get in the way of development. This was described by BR representative 5, with an example of the sensitivity of change for local inhabitants regarding the rewilding of trout in the local river:

“Especially when it came to tearing down dams in water. Because that dam, maybe has been the place for the ones living nearby, who have maybe learned how to swim or you know, it's a history. And now we want to create the living, water and for the fish to spawn and search for a new area. And now we want to tear down that dam [...] tear up maybe someone's history

and childhood and everything. So, they kind of want us instead of taking away the dam, they want us to rebuild it or something. So, some projects take a lot of time.” (BR Representative 5)

This sentiment was reflected by most interviewees which emphasized the importance of understanding and respecting the local connection to the land, the sense of place, and the ways in which the environment, and ultimately the work of the BR, impacts the identity of inhabitants.

Furthermore, land-use and land ownership were major dimensions of these conflicting motivations. Both VSK and ÄND identified widespread worry among landowners and other nature “users” that the designation of a BR would impose new rules and restrictions on land use in their periodic reviews (Biosfär Vänerskärgrården Kinnekulle, 2020; Biosfärområde Älvsjökvarnen Nedre Dalälven, 2021). Multiple interviews in both participant groups echoed this, by pointing out that landowners, commonly foresters and farmers, as well as those who lack interest and understanding for environmental change, were often regarded as actors with interests that complicate the pursuit of the BR objectives.

Specific examples of conflict varied, including clashes between environmental protection and fishing, farming, forestry, and tourism. In VJ, the clash was between specific stakeholders across multiple issues rather than a single issue; between Sámi reindeer herders and other stakeholders in forestry and agriculture, which overarchingly has to do with land-use rights (Gardeström et al., 2018). ÖV exemplified the clearest conflict, as was highlighted by Public Representative 2 and extensively in the gray literature. The establishment of ÖV was the culmination of decades of conflict between forest owners and non-profit nature conservation organizations (Jonegård et al., 2011; Nystedt & Jonegård, 2022). Over time, they built a forum for constructive and open dialogue between different interests through the creation of the ÖV project in 1998, which ultimately resulted in the nomination and establishment of the BR (Jonegård et al., 2008, 2011). Their periodic review identified building trust and investing in conservation as keys to success, but also that new challenges from industries like tourism, wind power and mining, have created new conflicts against in a context with spread-out land ownership (Nystedt & Jonegård, 2022).

From experience, the participant described a power imbalance where political forces took the side of the foresters and attempted to drive the BR organization into a certain



direction to serve their own interests. This created a dramatic wedge, and the toxicity of the conflict was poignantly expressed:

“So it was like a war was starting. It felt like a war. I mean, it was horrible, really horrible. People were actually afraid, like, ‘when I wake up, will there be an axe in my door?’” (Public Representative 2)

They also described how a conflict resolution process followed, and that they received external help to understand what the conflict really was about, to re-build trust. This reiterates how BRs were repeatedly described as neutral arenas that can act as a mediator, helping to bridge interests and resolve conflict. In a national workshop in 2015, BR representatives from all Swedish BRs identified several keys to successful conflict resolution, including transparency, building trust, having a common understanding of the conflict and common goals, as well as including all stakeholders early in the process (Biosfärprogrammet Sverige & Biosfärkandidat Voxnadalen, 2015). Another example was the diverse representation of interests on the board of the reserve during the VJ nomination process, and inviting landowners, relevant associations, and municipalities to a dialogue after a local conflict (Gardeström et al., 2018). This reflected how BRs were described as organizations that could build trust between stakeholders with different interests (M. Löf, 2023) and facilitate dialogue (Asp et al., 2009; Biosfär Vänerskärgården Kinnekulle, 2020; Jonegård et al., 2008, 2011; Nystedt & Jonegård, 2022).

## **5.4 Political Context**

Another key theme was the political context and the ways in which it influences the work of the BRs. The results are described below according to the local (municipal/regional), national and international level.

### ***5.4.1 Local Level***

When asked, several public and BR representatives mentioned that they were not sure about the level of political influence, or that there was little to none. However, those who perceived political influence said that it stems primarily from the municipal level. Municipalities were labeled as important enabling actors in the nomination process and establishment of BRs, often together with the relevant County Administrative Board (Asp et

al., 2009; Götene Kommun et al., 2005; Jonegård et al., 2008; Magnusson et al., 2005; E. Sandström & Olsson, 2013; E. Sandström & Sahlström, 2021). Cooperation with authorities on a local and regional level was described as a key to success for BRs in one Swedish EPA report (M. Löf, 2023). The importance of this partnership was expressed by BR Representatives 1, 3 and 6 as well as by Public Representative 9, who emphasized that local authorities and BRs have different competences and resources that can complement each other. It was mentioned as particularly important in terms of landownership issues, as BRs mostly do not own any land to carry out measures, yet municipalities do (Public Representative 9).

All BRs crosscut several municipalities and had political representatives on their board. As expressed by one interviewee, this influenced the course a BR might take, despite its presumed neutrality:

“So, even if I say that we are apolitical, we have in our board political representatives from the three municipalities who are appointed to sit in a working committee. So, of course, they are supposed to sit there as representatives of their municipalities and they obviously have a political color, that's how it is.” (BR Representative 1)

Some municipalities stood out in the data. In Voxnadalen, Ovanåker Municipality is the legal owner of the BR organization, and the employer of the BR office employees (Alfredsson et al., 2018; Biosfärområde Voxnadalen, 2023b, 2023a). This is similar in BA, where, as described by BR Representative 6, this formal dependency led the BR employees to adopt a “pragmatic” approach: Because the municipality is the formal employer, the BR workers felt that they must find a balance between more sensitive topics regarding development. The interviews showed how, especially in small rural municipalities, politicians often prioritized economic development, like attracting new businesses and building housing, over environmental concerns like biodiversity. This was described to be due to the financial benefits that such developments bring for instance in terms of tax revenue.

Moreover, some gray literature pointed to weaknesses in the relationship between the BR organization and the relevant municipalities. For example, in the periodic review of VSK, one problem is argued to be “an absence, or lack, of actively involved individuals in municipal management bodies” (Biosfär Vänerskärgråden Kinnekulle, 2020, p. 22). This was repeated by BR Representative 2 in relation to the regional authorities, but also by one public representative (anonymous).

### **5.4.2 National Level**

The impact of the national level on the BR work was mainly discussed in terms of funding. Swedish BRs were described to rely on external funding, largely through their respective municipalities and County Administrative Boards, but also SEPA (E. Sandström & Sahlström, 2021). BR Representative 2 highlighted how the funding of the MAB is decided annually, and that they can therefore not be sure how much they will get, underscoring the challenges this poses working on the local level with participation. Another challenge that was mentioned BR Representative 7 was that, although funds are available for certain activities, they often cannot be carried out because the landowners on whose land the activities are to be carried out must be compensated or paid, for which funding is rarely available.

Moreover, a recurrent theme in the gray literature were calls for more robust core funding, particularly from national and international levels, to ensure long-term stability of the BR activities (Alfredsson et al., 2018; Biosfär Vänerskärgrården Kinnekulle, 2020; E. Sandström & Sahlström, 2021). “Lokala Naturvårdssatsningen” [The local nature conservation initiative (LONA)] funds were brought up in some documents (Biosfärområde Älvlandskapet Nedre Dalälven, 2021; Gardeström et al., 2018; Nystedt & Jonegård, 2022) as opportunities to finance projects in the BR areas, and were central to the discussions on funding in the interviews. Several participants across BRs highlighted the drastic funding cuts in nature protection posed by the shift in government in 2022, and its implications:

“It [national funding] has decreased a lot, especially LONA funds [...] That type of money is gone now, at least for these four years of politics. And that LONA money, was very important for us to engage and create engagement between the general public and the municipalities and biosphere reserve. So, of course that will have a negative impact on the general activity level or the possibility to have different activities in the in the biosphere reserve.” (BR Representative 4)

This represented a theme unique to the interviews, as the government shift in Sweden in 2022 took place after most of the reviewed documents were published.

### **5.4.3 International Level**

Lastly, the international level also had an impact on the work of the BRs. Through their designation by UNESCO, BRs implement international concepts locally. On one hand, this was

perceived as something positive by BR Representative 1, as a chance to serve as model areas that contribute to solving global sustainability problems. On the other hand, one public representative pointed to the difficulties of localizing decisions that are made on an international level:

“You can't plan the environment in Stockholm in the same way as you have environmental plans in Barcelona or Munich. But still, decisions are made that are very difficult to localize. [...] But when you at the EU level make overall decisions, that is, set guidelines and laws and thus goals as well as the way forward, then it is easy to forget that the EU consists of very many different countries that have very many different conditions and characteristics to take into account.” (Public Representative 4)

Another challenge highlighted in three interviews was that BRs were perceived to be more successful at gaining international recognition and visibility, compared to the local level where most residents are often unaware that they live in a BR.

## **5.5 Participation**

Participation was a multifaceted, considerable theme that developed along three main sub-themes: (1) the perception and purpose of public participation, (2) stakeholders and representation, and (3) the opportunities and forms of participation.

### ***5.5.1 Perception and Purpose of Participation***

A definition of participation was absent from all documents and literature reviewed despite being a major, recurring theme. Interviewees were asked how they define participation, which garnered varied, albeit often incomplete answers. In general, interviewees mentioned that public participation is about local involvement, discussion, and ultimately active engagement in the planning and execution of activities in BRs. As expressed most clearly, one interviewee defined participation as:

“That you have the opportunity to be involved and influence and have opinions. And also feel that it has a meaning, the views and what you want to change, so that it is not just a chimera or something that does not matter

in the end, but yes, it is simply the foundations of a democracy.” (Public Representative 7)

In general, all interviewees described public participation as very valuable for BRs in Sweden for different reasons. The previous quote reflects one such motivation in both data sources: the opportunity for local inhabitants to reach decisions regarding the surrounding landscape by consensus (Heinrup, 2016), but also for the purpose to increase and promote democracy (Gardeström et al., 2018; Länsstyrelsen i Blekinge et al., 2007). Half of the participants brought up democracy explicitly as a reason when asked why public participation is important in BRs, and that inhabitants should feel included and empowered:

“Everyone that lives here and has their like lives here, they are the biosphere reserve and therefore they should also be included in the in the process and developments. Otherwise, if they don't want or like the direction that we have, and we don't have their support and if they don't like what we do, it's very important to have them with us and that they should feel included and be a part of the of the process. It's very valuable for us.” (BR Representative 4)

This reflected a general notion in the interviews that participation contributed to a sense of place and pride:

“It's not that you go to a meeting and listen, but here it's more that you are an active co-creator of activities perhaps, or in activities that are aimed at others. We want to create a sense of pride among other residents, that you live in a biosphere reserve.” (BR Representative 1)

Where Public Representative 6 expressed that they feel proud to be part of a BR: “I'm proud to be... Yes, live in the area to be a part of what is going on and is happening.”

Moreover, ÖV and BA raised the importance of integrating local knowledge to achieve its goals, and that public participation was critical to do so (Jonegård et al., 2008; Länsstyrelsen i Blekinge et al., 2007). For example, in the BA preliminary study civil dialogue meetings with local individuals, organizations, and associations were employed to spread knowledge and awareness of the BR concept, as well as to capture local knowledge (Länsstyrelsen i Blekinge et al., 2007). Other BRs highlighted similar arguments indirectly, by expressing the ways in

which the public was involved in decision making before and during the nomination process, as well as in the ongoing activities of their BR. This was best exemplified by how inhabitants were included in the planning process in all preliminary studies, but also by emphasizing the importance of including local perspectives in decision making: “for major measures in protected areas, changes need to be carefully established with local stakeholders through information, meetings, etc.” (Biosfärområde Älvlandskapet Nedre Dalälven, 2021, p. 56).

In contrast, the interviews focused more on spreading knowledge to inhabitants and educating them regarding the work of the BR as an important reason for why public participation is valuable. This was linked to other motivations expressed in the data related to achieving the goals and upholding the values of the BRs. For example, the BR academy in ÖV aims to strengthen participation of residents (and other stakeholders) to contribute to the achievement of the BRs vision and values. ÄND also expressed how “local stakeholdership” can improve trust and attitude towards nature conservation and sustainable development, and that collaboration can spread awareness of the BR, biodiversity, and sustainable development (Biosfärområde Älvlandskapet Nedre Dalälven, 2021).

Other tangible examples corroborating this motivation include how VJ posited the BR being a model for local participation and a place to develop dialogue as a strategy to achieve its objectives (Berggren, 2014) and how involving local stakeholders was critical to drive VSK’s processes forward (MacTaggart et al., 2008). This was also apparent in interviews. BR representatives described inhabitants as important actors to help achieve the objectives of the BR, to “get more done” (BR Representative 3), and that the public should be included because it is a pre-requisite of the MAB (BR Representative 4). Multiple public representatives similarly explained that they thought one reason public participation is important is because it can engage the community in protecting and taking care of their surrounding environment.

### ***5.5.2 Stakeholders and Representation***

Different BRs had context-specific stakeholders, although there were clear patterns across the data. Public authorities represented one group of stakeholders, of which the municipality was the most present and engaged (Asp et al., 2009; Jonegård et al., 2008; Magnusson et al., 2005; E. Sandström & Olsson, 2013). The associated County Administrative Board and SEPA were also referred to, although their role was described to be more related to funding (Länsstyrelsen i Blekinge et al., 2007; Magnusson et al., 2005).

A second group of actors constituted non-governmental actors and included inhabitants, the biosphere offices, educational institutions, and civil society. Civil society in all BRs was characterized by a diverse and large group of (non-profit) associations, as a medium through which inhabitants were often engaged, including several of the interviewed public participants. These associations represented different interests, and common ones included environmental protection, agriculture, fishing, and tourism (Gardeström et al., 2018; MacTaggart et al., 2008; Magnusson et al., 2005). In addition to (non-)governmental actors were private actors in the form of small and large companies, as well as various types of private landowners, typically foresters and farmers (Biosfärområde Älvlandskapet Nedre Dalälven, 2021; Gardeström et al., 2018; Nystedt & Jonegård, 2022).

In addition, youth and children were identified as distinct stakeholders and efforts to include them, typically through schools, was described in 13 interviews, and particularly in VJ documents, where children were involved in the nomination process to give their opinions and perspective (Berggren, 2014; Gardeström et al., 2018). Nonetheless, youth were not represented on any of the boards, though VOX expressed in their nomination form that this might be a future possibility (Alfredsson et al., 2018).

Finally, VJ is the only BR in Sweden with Indigenous representation. There are seven Sámi villages in VJ that have been represented throughout the preliminary study, nomination form, as well as the ongoing work of the BR (Berggren, 2014; Biosfärområde Vindelälven-Juhttáahkka, n.d.; Gardeström et al., 2018). They were described as key stakeholders, with distinct participation barriers, mostly stemming from their pre-occupation related to reindeer herding, e.g., a lack of time.

### ***5.5.3 Opportunities and Forms of Participation***

The gray literature demonstrated how public participation is integral to Swedish BRs. All analyzed preliminary studies and nomination forms pointed to a bottom-up approach, where local inhabitants or associations initiated the process of investigating the possibility of becoming a BR. The interviews focused more on the ongoing ways in which the public can participate in activities today. Common examples of participation included dialogue, face-to-face meetings, and various outdoor activities like restoration and beach clean-up days, largely centered around spreading knowledge about the surrounding environment. Another tangible participatory form was becoming a board member. As one participant described it as a relatively easy way to achieve direct decision-making power:

“I was very surprised. Like, oh, it was so easy to, like, join this board and now when I have a vote, I have the same vote as a whole organization like [inaudible]. My vote is like the same the same as an authority.” (Public Representative 2)

Another key mechanism was the biosphere ambassador program. This program was mentioned in all periodic reviews, SEPA reports (Heinrup & Schultz, 2017; M. Löf, 2023; E. Sandström & Olsson, 2013; E. Sandström & Sahlström, 2021), and VJ’s nomination form (Gardeström et al., 2018) as a concrete form of participation and was brought up by six interviewees when asked about ways in which citizens can participate. BR Representative 1 gave a thorough description of the program, explaining how participants receive education on environmental concerns, sustainable development, and the unique ecological, social, and economic aspects and obstacles of their area, as well as the overarching MAB. Ambassadors can act as representatives for the BRs at various events, share their knowledge, and initiate sustainable practices in community groups, workplaces, or other organizations (Heinrup & Schultz, 2017). Interviewees talked about it very positively and highlighted the program as a chance for people to become active co-creators of the BRs and disseminators of knowledge.

Moreover, ÖV and VSK also had ambassador programs aimed specifically at children who could become “Mini Ambassadors” (Biosfär Vänerskärårgården Kinnekulle, 2020; Nystedt & Jonegård, 2022), and BR Representative 7 described a summer camp that educates children about the biosphere. Educating youth was described as an important tool to create long-term success and effectiveness of the BR concept. Several interviewees emphasized the opportunity to instill a biosphere mindset at an early age and the opportunity for youth to foster societal change as they could influence their families, ultimately growing into environmentally conscious citizens.

Furthermore, the ways in which people were invited to participate had a pattern. ÖV described in their review how various sectors of society and age are continuously invited by local representatives, posters, websites, and social media (Nystedt & Jonegård, 2022). Several BR representatives emphasized the use of social media as an important way to reach and encourage people to participate, particularly youth. Nonetheless, many of the BR representatives pointed to a challenge in inviting participants and emphasized a low awareness of the BR concept as a potential reason why. The Sandström and Sahlström (2021) SEPA report reflected this, expressed that some BRs struggle with low public awareness, which



could pose a challenge for the legitimacy of the reserves, as broader public understanding is crucial for their sustained support.

Several other documents mirrored this low public awareness challenge because of inadequate communication. The periodic review of BA identified good communication and outreach as an important tool in strengthening the knowledge and awareness of the BR, which was reflected in the VSK, ÄND and ÖV periodic review that all added the value of fostering a sense of shared identity and pride (Biosfär Vänerskärgården Kinnekulle, 2020; Biosfärområde Älvsjökvarnen Nedre Dalälven, 2021; Blekinge Arkipelag, 2021; Nystedt & Jonegård, 2022).

Finally, accessibility to participate was a sub-theme. VJ mentioned in their nomination form that board meetings are held during the daytime, and that they pay daily allowances and travel costs to encourage participation by as many members as possible (Gardeström et al., 2018). Public Representative 4 articulated that it might be difficult for people with disabilities to be part of outdoor activities, but that their BR had a range of activities that were more accessible like indoor, information-sharing meetings. A BR representative brought up accessibility in relation to the willingness to participate among the public:

“People are very busy with their own lives, so they don't really perhaps have so much time or energy to [...] add something more to their daily life or their life schedule. So, that's something that you see can perhaps in different associations that it's hard to recruit new members to the associations and especially the younger ones. It's more like older or retired people that have the possibility.” (BR Representative 4)

This relates to the challenge among BRs to involve the public to the degree that they desired. This was repeatedly described by BR representatives because of a perceived lack of knowledge of the concept and the organizations' work among the public, but also time inaccessibility. Public Representative 4 and 9 also stated that some segments of the population may not want to participate, and that this should also be factored in. In addition, the VJ preliminary study expressed that a lack of willingness, interest, and commitment among local stakeholders to participate could negatively influence the implementation of the planned BR (Berggren, 2014). Lack of commitment was also discussed as barrier in the VSK periodic review, which identified a challenge in terms of finding enough candidates for their board (Biosfär Vänerskärgården Kinnekulle, 2020).

## 6. Discussion

The following discussion firstly addresses sub-question A that aimed to address the ways in which the BR approach in a Swedish context integrates biodiversity protection and CCA. Second, the data is discussed along the dimensions of the public participation design introduced in the theoretical framework. Thereafter, the main research question is addressed from a broader perspective, looking at the barriers and opportunities for public participation in Swedish BRs. Ultimately, the theoretical framework is adapted according to the findings.

### 6.1 Integrating Biodiversity Protection and Climate Change

#### Adaptation

The data suggests a limited explicit integration of biodiversity protection and CCA in Swedish BRs, although it did underscore how valuable the BR approach could be. Biodiversity loss and its subsequent protection and restoration was a clear theme. Climate change was also mentioned across documents and asked about directly in the interviews with mixed responses, although emphasis was on mitigation rather than adaptation. This points to a gap in the understanding of climate change adaptation in Swedish BR contexts, despite its explicit reference in the 2015-2025 strategic MAB objectives (UNESCO, 2017).

This could be attributed to several reasons. Certain projects conducted by the BRs technically fell under the definition of an adaptation strategy, but were not explicitly described as such, affirming the claim that there is a lack of knowledge of the CCA concept. This correlates with a study on implementation barriers for CCA in a Jordanian BR, which identify no explicit CCA measures but rather several implicit activities that address climate-change risks from an adaptation point of view (Jamaliah et al., 2021). Together with much other literature on CCA, a lack of awareness and concern is a common implementation barrier across governance levels and contexts (Biesbroek et al., 2013; Brown, 2013; Jamaliah et al., 2021; Lee et al., 2022). One outcome from a conference on local adaptation in protected areas was the importance of raising public awareness of climate change and its link to biodiversity loss and their combined impact on human well-being (Rannow et al., 2014). Although awareness is not a panacea, it may be a good starting point to take advantage of the opportunities a BR approach can have in integrating the two issues in a Swedish context.

Moreover, the BR approach has the potential to be an effective approach to integrate biodiversity protection and climate change adaptation in Sweden. Firstly, although the BRs are

all guided by the overarching objectives of the MAB, they have a high degree of flexibility in how they approach their work. All the BRs adapted the concept to the local conditions and challenges. This flexible structure allows the BR to take on diverse roles and enables it to adapt to new and changing circumstances. In a review of best practices to integrate adaptation into conservation management, Watson et al. (2012) identify flexibility as a key characteristic because of the impact of changing social, economic and political conditions. The paper also emphasizes that flexibility gives the opportunity for conflict resolution. Since a flexible approach and conflict resolution are core components of the BRs role, this supports the argument that BRs can be helpful in integrating the UNFCCC and CBD agendas.

Secondly, the perception of BRs as model areas for sustainability, driven by bottom-up processes, was clear across the data. While the causes and consequences of biodiversity loss and climate change are global processes, the efforts to protect, restore, and adapt benefit from a local approach (Roldán, 2017; Schüttler et al., 2023). Literature argue in favor of this localized approach, as it allows communities to identify their own priorities and solutions for environmental issues, as well as encourages their involvement in implementation (Rahman et al., 2023; Westoby et al., 2021). Moreover, Schultz et al. (2011) analyzed 146 BRs across 55 countries and found that local participation had a positive impact on sustainable development outcomes.

## **6.2 Public Participation Design in Swedish Biosphere Reserves**

The following section attempts to sketch out the participation design of Swedish BRs along the dimensions presented in the theoretical framework. First, by outlining the objectives which public participation is described to achieve (“Why?”), followed by each component of the participation design (“Who?”, “When?”, and “How?”).

### ***6.2.1 Why: Objectives for Public Participation***

The results indicate that public participation in Swedish BRs is guided by two groups of objectives: many of the participatory objectives from the theoretical framework, as well as the contextual objectives of the MAB. All BRs in Sweden were established with a bottom-up approach, and all BR representatives expressed that public participation is a critical instrument in the work of the BRs. Nevertheless, the lack of a shared understanding of the concept of

public participation made it difficult to disentangle what explicit objectives it has, though some interpretations can be made.

Most of the normative objectives can be identified in the data, but public participation enabling those affected by decisions to influence those decisions and enhancing peoples' democratic capacity were the clearest. Broadly, people having the power to influence decisions that affect them can significantly strengthen the legitimacy and effectiveness of governance processes (Fischer, 2012); when individuals feel that their input matters, they are more likely to engage positively and constructively in democratic processes. Not only was it described in the gray literature, but half of the interview participants brought up democracy as an important reason for why BRs should actively be engaging the public. Literature reflect the importance of democracy for BR functioning, such as Marquez Rosano et al. (2018) who describe environmental democracy as a requirement of BRs, and Roldán (2017) who argue that BRs in democracies are more effective to achieve multidirectional learning than nondemocracies.

The substantive objectives which focused on how public participation can enable an organization to harness and utilize local knowledge for improved decision-making was only highlighted in the gray literature, primarily in the preliminary studies, and did not appear in any of the interviews. This points to a potential gap between the desired wish to utilize local knowledge and the practical reality. Literature on this issue highlights for instance how the ignorance of local academic knowledge negatively impacts participatory BR management (Brenner & Job, 2022), and that, despite a general awareness that local knowledge integration is crucial for BR management, numerous challenges remain (Hockings et al., 2019).

Finally, the instrumental objectives were the most obvious in the results and can be closely linked to achieving the contextual objectives. The recurrent description of BRs as neutral arenas and mediators emphasizes how important conflict resolution is to the perceived role of Swedish BRs. Several documents in the gray literature pointed to early stakeholder involvement and broad representation as important success factors for it, implicitly arguing for the importance of public participation to resolve conflicts. Several studies underpin this finding, as for instance shown by Donevska (2020) who emphasizes the transformative role of diverse stakeholder representation in aligning disparities in decision-making processes related to nature conservation and sustainable development goals. Oliva et al. (2020) further note how building a shared understanding of conflict is crucial for their resolution, and hence emphasize the importance of the presence of all parties involved.

Furthermore, public participation for the purpose of generating legitimacy for the BR organization was explicitly clear in the data. This reflects literature that contend that more engagement with the local community leads to increased levels of legitimacy (Mohedano Roldán et al. 2019), but also affirms the argument that this is one of the most important objectives of public participation (Glucker et al., 2013). It also links closely to how public participation was mainly described to be important for the purpose of achieving the contextual objectives. The data suggesting that public engagement is done because it was a prerequisite of the program, to spread knowledge about local environmental issues, or to get more done, reflects this argumentation, and is supported by literature more broadly (Cuong, Dart, & Hockings, 2017; Jaafar et al., 2023; Martín-López & Montes, 2015; Schultz et al., 2011; Stoll-Kleemann et al., 2010).

Overall, this implies that the data reflected the normative and instrumental objectives most evidently. It also suggests that there should be a greater effort both on the national level as well as on the respective BR level to clearly define what public participation is, but particularly what it hopes to achieve in a Swedish BR context. This could not only help coordinators disentangle and understand the challenges in terms of improving public participation, but it could also help the organizations derive more value from public participation.

### ***6.2.2 Who: Representation of Interests***

The results indicate a diverse representation of interests in Swedish BR, including, but not limited to, fishing, forestry, agriculture, industrial development, tourism, and environmental protection. The various types of actors consist of public authorities and non-governmental actors, and the public.

It was clear through the interviews that the public was not participating as much as the BR representatives would like them to, which points to a gap between the described desire in the gray literature and the practical reality. When the public was integrated, it was typically through associations, as most clearly reflected by the fact that many of the public representatives were affiliated with an association and spoke in that capacity. In Sweden, this is referred to as “föreningslivet” which directly translates to “association life” and more loosely to civil society and is an organized pillar of Swedish democratic society (Arora-Jonsson, 2017).

The theme of conflict that was recurrent in the results highlight diverse representation in Swedish BRs. On one hand, the BRs were consistently described as neutral arenas involving many kinds of stakeholders and hosting the conflicts of their respective interests. Accordingly, the BRs have a strong understanding of their role as conflict mediators. On the other, power imbalances and how related conflicts often played out unevenly in favor of the stronger actor were also clear. Particularly in relation to land tenure issues, as exemplified by the conflict in ÖV. Research shows that this is a common problem in other BRs. Reed et al. (2018) state that the effectiveness of engagement is significantly influenced by power dynamics, and Mitrofanenko et al. (2018) highlight factors including the perception of power inequality and unequal representation of stakeholders as overarching impeding factors for effective BR management.

Another risk described in the interviews was that BRs attract a homogeneous group of actors, and that the employees as well as the most active participants consisted only of people who agree on development in and protection of the area. This could highlight a challenge that is often discussed under the umbrella of “self-selection bias”, referring to the tendency of only a specific, often homogeneous group of individuals (usually those already interested in or aware of environmental issues) choosing to participate in environmental activities (Whitehead, 1991). This can lead to a lack of diversity in perspectives and experiences, which can affect the democratic underpinnings of the BR concept (Marquez Rosano et al., 2018). Moreover, this risk might be exacerbated by the “echo chamber effect”, i.e., when homogeneous groups reinforce their own views without significant input from outside or dissenting perspectives (Levy & Razin, 2019). In the context of the BR work, this implies that only the ideas and priorities of a specific, like-minded group are advanced, potentially overlooking broader community needs. Thus, awareness of these biases and effects is important when attempting to design equitable participation instruments in Swedish BRs.

Moreover, youth were described as key stakeholders that could bring the BR concept into the future, and repeatedly viewed by interviewees as opportunities for increased engagement. This is mirrored in environmental treaties, like the CBD (2012) which includes specific provisions aimed at enhancing the participation of young people. The importance of involving young stakeholders in BRs is also highlighted in key BR documents, such as the Lima Action Plan which explicitly advocates for the inclusion of youth in equitable and participatory planning for sustainable development within biosphere reserves (UNESCO, 2016).

In their research on a BR in Austria, Mitrofanenko et al. (2018) argue youth and elderly women are underrepresented in the decision-making processes and found that intergenerational practice as a strategy to engage these groups helped address participation barriers and enhance management practices. Additionally, Barraclough et al. (2021) conducted a systematic review of how youth perceive and participate in the implementation of sustainability objectives in 74 BRs. They found that young stakeholders possess a deep understanding of both the opportunities and challenges in environmental governance, including resilience and adaptation to global changes. The study also indicates that youth actively participate in diverse activities that support the achievement of conservation and development objectives within their regions. This supports how valuable youth stakeholder knowledge is for BRs, and consequently the need to increase their integration and participation.

### ***6.2.3 When and How: Temporary to Consistent Forms of Public Participation***

There are diverse forms of participation in Swedish BRs, with varying degrees of influence. These forms are closely interlinked with the “when”-dimension of the analytical framework, taking place at distinct points or during longer phases in the BR work. They can be divided into temporary and continuous engagement and distinguished into active and passive forms of participation. Lastly, these different forms also differed in their accessibility, which is characterized by resources, time, location, and understanding and/or knowledge of the issues at hand.

Firstly, BRs pursue a bottom-up approach during their establishment, creating different opportunities for the public to participate. Either the BR was initiated by active citizens, or the public was invited to participate, for example through open meetings. Naturally, these two forms differ in their degree of influence public participants have on the establishment of the BR, as the former is pro-active, long-term, and high-impactful form, whereas the latter is a one-time event requiring less active involvement and commitment, and thus more passive. Stoll-Kleemann and Welp (2008) tested to what extent a participatory management approach, as it is recommended by the statutory documents of the MAB, is implemented in practice. In their case study, the authors distinguish between four types of management styles, which differ in the forms of participation through which people can engage. They find that management styles that encourage active forms are best suited for

BRs, as it correlates as it aligns with their function as learning organizations that encourage participatory and integrated management.

After BR establishment, more forms of participation emerged, yet with differing degrees of influence and durations. Two forms of active, long-term engagement were found across all BRs: being a board member and BR ambassador. The former, however, has a higher degree of influence since board members can directly steer decision-making. Other forms of participation that required active engagement, but no long-term commitment were events such as citizen dialogues or outdoor activities. Participation in informational events organized by the BR, were other examples that were very limited in their duration, but also very passive.

The most impactful opportunity for greater public participation is to build participatory instruments that possess a high degree of influence. Osmani (2008) demonstrates that community-level participatory institutions are more effective and equitable in their policy outputs than traditional management approaches and highlights successful case study examples dealing with diverse development projects. Thus, implementing high-impact participatory instruments not only promotes greater public involvement, but can increase the effectiveness and fairness of management and political decisions.

Finally, accessibility is a critical aspect. Participation in BR management and activities requires some level of resources and investment, but also depends on factors like how well one understands the issue, how much time they can dedicate to it, and their personal willingness to commit (Huber & Arnberger, 2021).

Overall, it can be said that the forms of participation move along a spectrum that is defined by the axes of duration, degree of activity/passivity and accessibility. The level of influence they create accumulates from all three of these aspects, meaning that easily accessible, continuous participation forms requiring active engagement have a higher degree of influence than difficult to access, one-time events with low levels of active engagement.

### **6.3 Barriers and Opportunities for Public Participation in Swedish Biosphere Reserves**

The lack of integration between the issues of biodiversity loss and CCA in Swedish BRs refocused the main research question to address barriers and opportunities from a wider perspective of BR activities instead. This analysis identified several such barriers and



opportunities: awareness and understanding of the BR concept, available personal resources, willingness to participate, conflicting and competing interests, and the political context.

### ***6.3.1 Awareness and Understanding of the BR Concept***

The primary perceived barrier as reflected by the data was the difficulty for people to understand the BR concept, or simply not being aware of its function. This is far from a unique problem, as a lack of knowledge and or understanding of the BR concept is repeatedly acknowledged in literature as a major barrier BRs face more broadly (Cuong, Dart, & Hockings, 2017; Huber & Arnberger, 2021; Jaafar et al., 2023; Mitrofanenko et al., 2018). Interviewees repeatedly brought up communication and outreach as potential tools as an opportunity improve this issue, like diversifying their communication channels to include printed and digital media. This is also reflected in literature, by, for example Cuong et al. (2018) who argue that limited information and local knowledge of the BR not only impede their success, but that this is attributed to a lack of awareness and weak communication strategies. In fact, high quality outreach and communication are broadly claimed to be major determinants for effective BR work and increased participation (Cuong, Dart, Dudley, et al., 2017; Cuong, Dart, & Hockings, 2017; Jaafar et al., 2023).

Therefore, a lack of awareness and understanding of the BR concept present a barrier to public participation reaching its objectives, whereas employing effective communication strategies present an opportunity. These factors arise from the participation design in several ways, as it pertains to who is reached with which communication strategies, during which point in the participation process, and is particularly tied to the “how”-dimension. As Uittenbroek et al. (2019) note, it is essential for participants to understand both the issue at hand and the decision-making process, as it determines to what extent participants can engage in the discussion about it, which can be best addressed by designing appropriate and diverse forms participation in an accessible manner.

### ***6.3.2 Available Personal Resources***

Consequently, another critical factor was the personal resources of participants. The available time people have outside of their daily life was a particular component of this factor that influenced the degree to which people were able to participate. This is reflected in research, such as Huber and Arnberger (2021) who argue that the availability of personal resources is crucial to become active in BR work.

In addition, as expressed by the BR Representative 4, time availability could be distinguished between age groups whereby retirees had more time to dedicate compared to young people. An opportunity that could be derived here is the mini-ambassador program, which is able to integrate the work of the BR through schools, to create a long-term impact. This corroborates Mitrofanenko et al. (2018) who claim that linking activities to schools can overcome the problem of lack of time for youth in engaging in BR activities.

The same paper emphasizes that a lack of capacity and limited mobility, money and time influence the obstacles to participation in BRs, which links this factor to accessibility in a broader sense. The data pointed to diversifying activities so that as many people with varied needs and ability could attend as an opportunity, and a very tangible example was the compensation for travel and daily allowances to encourage participation in VJ. Nonetheless, accessibility was not a widely considered aspect explicitly, and points to an area for improved consideration.

Therefore, the availability of personal resources becomes a barrier if left unconsidered, but a creative, adapted participation design can navigate such resources and enable opportunities, like integrating BR activities into school activities, instead. This factor is also linked to all components of the participation design, highlighting who is and who is not able to be active, when are they able to be part of the decision-making process, as well as the accessibility of the forms of participation.

### ***6.3.3 Willingness to Participate***

Another important component closely linked to accessibility was people's willingness to participate, or rather the lack thereof, as a perceived barrier for public participation in Swedish BRs. The interviewees attributed a higher degree of willingness to individuals who had an interest in environmental issues in their area but also a strong sense of place, pointing to an opportunity. Targeting people's sense of place and fostering a shared pride in the BR designation by implementing tangible projects was echoed as a measure to encourage public participation by interviewees.

However, whether a strong place attachment specifically results in higher participation rates in environmental issues is debated. Huber and Arnberger (2021) find that place attachment plays a smaller role in people's readiness to participate in an Austrian BR, as compared to other factors such as perceived behavioral control. Contrarily, Buta et al. (2014) discuss how place attachment has been recognized as a positive predictor of environmentally

friendly actions and an overall concern for the environment for local communities in protected areas. Jafaar et al. (2021) conducted a systematic review of community participation in Asian BRs and found that level of education, confidence in the outcomes, time, gender, level of awareness, and residence location among several other factors influence the willingness to participate. Therefore, willingness to participate is arguably a complex predictor, and a factor that should be evaluated more explicitly in Swedish BRs.

Moreover, this echoes the previous reflections on representation in the participatory process. Interviewees emphasized the importance of involving everyone, including those with different beliefs and values, and presented having a homogeneous participant pool as a risk. This is reflected in literature, as communities that are affected by BR management, and protected area management more widely, are heterogeneous, and participation therefore needs to be representative (Ward et al., 2018). Only targeting individuals that are strongly attached to their surroundings, or already hold pro-environmental beliefs, should therefore be avoided in the interest of increasing equitable representation.

Overall, willingness to participate is a complex factor that can be an opportunity for effective public participation if activated, by, for example, stimulating people's sense of place and pride, while an absence of willingness to participate definitely presents a barrier. This factor could also be linked to the participation design as a whole, as it is closely impacted by accessibility, continuous or discontinuous engagement, but particularly the equitable representation of interests.

#### ***6.3.4 Conflicting and Competing Interests***

Conflicts were regarded as both barriers and opportunities for increased public participation in Swedish BRs. The diverse interests in Swedish BRs intersect and create a general divide between pro-environmental and pro-development interests that characterize sustainable development on a larger level (Coetzer et al., 2014). This was not necessarily painted as an obstacle everywhere, but was also described as an inherent, purposive part of the work. This supports the notion that BRs act as neutral arenas, where these diverse interests can meet and make decisions together to protect, restore, and develop the area in a way that is sustainable for everyone (UNESCO, 2017, 2022). Having an adaptive and flexible approach creates many opportunities for increased participation, as it can help respond to plunges in involvement and rebuild trust among local stakeholders (Hahn et al., 2006; Pourcq et al., 2015). Therefore, the most pronounced opportunity to increase participation is to make

use of this role as neutral platform, and facilitate communication, exchange, and collaboration.

Another success factor in this regard is the value in creating spaces. As Baird et al. (2018) note, BRs facilitate action by building common spaces for meaningful stakeholder interactions (e.g., community events, workshops or board meetings). These foster opportunities that build trust and connect actors. It is a powerful way to foster participation because it can be influenced at all stages of the participation design, by attempting to ensure equitable representation through creating common spaces, by being present throughout all phases, and by creating a variety of mechanisms through which influence can be exerted.

Nonetheless, the results also show how when either side of the dichotomy leans too much into their motivations for change and avoids finding common ground, it can become difficult to reach a compromise. This was clearly presented in the ÖV conflict, where those who have disproportionate power, in forms of money, land ownership, and/or political authority, dominate. Mohedano Roldán et al. (2019) mirror this in their finding that conflict was one reported complaint of participation processes in decision-making in a systematic review of BRs in 36 countries. Moreover, a study by Lyon et al. (2017) point to how achieving sustainable development in BRs becomes difficult when power relations are unequal, and there are distinct ideological differences between stakeholders. While in Swedish BRs, those with disproportionate power were rarely inhabitants nor the BR organizations themselves, but rather landowners and municipal actors, other BRs struggle with different power distributions. In a case study of a BR in Mexico for example, the BR organization held unequal power and encroached on the will and needs of the local community by enforcing strict regulations and restrictions on environmental resources (Audefroy & Sánchez, 2017).

Furthermore, VJ having an indigenous population highlights a distinctive conflict that sets it apart from the other BRs in Sweden. Not only does their work center around the clash between economic and environmental interest, but also indigenous rights. This is reflected across Swedish Sápmi, often in the form of land use conflicts, as well as in BRs in other countries with Indigenous peoples (Brännlund & Axelsson, 2011; A. Löf, 2013; M. G. Reed, 2016; Sylvander, 2021; Vasseur, 2019). By embracing the characteristic of being a neutral arena and adequately including Sámi peoples in their decision-making processes, VJ could perhaps act as an example for other, similar conflicts between Sámi peoples' rights and issues of development in Sweden and beyond. Nonetheless, the lack of primary data from this BR makes it difficult to know what the perception and experience of Sámi peoples in VJ are, and

thus inferences made about the value of a BR in managing these conflicts need to be made with great caution.

Overall, sustainable development which shapes the purpose of BRs demands conflicting interests and visions of how environmental, social, and economic interests should converge locally. It is an inherent part of the work and provides the BR with a purpose to be a meeting point or neutral arena where these different interests can meet and negotiate a shared future, thus providing an opportunity for the public to engage through conflict resolution. Nevertheless, it was almost equally described as a potential obstacle to achieve its objectives. Therefore, it is crucial how such conflicts are framed, and that common goals and understandings of the solution are agreed upon. This factor is also linked to the overall participation design, as it pertains to the (un)equal representation of interests, whether conflict is managed throughout the process or arises because of a lack thereof, but also the ways in which conflict is approached through the forms and opportunities of participation.

### ***6.3.5 Political Context***

Overarchingly, the data pointed to a distinguished role of the political context for public participation in Swedish BRs. This claim is reflected in literature, like Méndez-López et al. (2015) who posit that willingness to participate in conservation activities are defined in part by the local political context, and Ishwaran et al. (2008) who argue that common challenges for BR success include inadequate governance and coordination mechanisms to moderate stakeholder interests. UNESCO BRs are globally conceived concepts that are implemented locally, and BR Representative 4 identified higher governance levels assuming similar conditions everywhere, and a lack understanding of context-relevant conditions, as a challenge. As Roldán (2017) highlights, BR management is context-dependent and strategies for effective participation should thus be adapted to the local setting.

Therefore, the political context is argued to have an impact on public participation processes, and the related barriers and opportunities that resulted from the data analysis can be organized around the themes of funding, political will, and land tenure.

**Funding.** The results described municipalities as important partners in implementing projects, though there can be a clash of local political interests and environmental concerns, which make the BRs unable to devote efforts into conservation projects that are considered politically unpalatable. Small rural communities often must contend with limited budgets, which may impact their flexibility in agreeing to certain activities or projects. Often, they prioritize work that drives economic development and generates tax revenue (Lidström & Hertting, 2021). This highlights yet again the inherent “dichotomy of development”, which underscores the tensions and trade-offs that can arise when trying to balance different types of development and the needs of different groups within a society. Thus, it often requires careful consideration and management to ensure that development is inclusive and beneficial on multiple fronts.

These issues are not exclusive to Sweden. Ishwaran et al. (2008) for instance highlight that although BRs globally have both biodiversity conservation and socio-economic development activities in place, it is often difficult to find cases where these different stakeholders come together to improve an existing conservation-development relationship.

A lack of government support in terms of funding links to another worry that was voiced by several participants in relation to a more systemic change that seems to have emerged after the new government took office in Sweden in 2022. The government, in its 2023 budget, significantly cut funding for nature protection and maintenance (Westling, 2023). Most prominently the LONA funds, through which it was possible for the BRs to receive government funding. This was perceived as a major obstacle for engagement in, and the execution of, various activities related to biodiversity and climate change.

This underscores the uncertainties related to funding in this context. Whether it is the fact that funding is decided annually, or the ubiquitous possibility of key financiers withdrawing at any stage, they support calls for more robust core funding for initiatives like BRs. Studies by Stoll-Kleemann et al. (2006) and Cuong, Dart, & Hockings (2017) confirm this finding, expressing that the lack of political backing in BRs is often compounded by insufficient financial resources and inadequate infrastructure to facilitate participatory processes.

Nevertheless, the political structure also holds opportunities in terms of funding. The decentralization of nature management and CCA governance in Sweden anchors the funding of measures such as biodiversity protection at the local level, which gives municipalities more independence for decision-making (Hongslo et al., 2016). Cuong, Dart, Dudley, et al. (2017)

also highlight political decentralization as an enabling factor for effective local BR management, as it provides local authorities with flexibility.

**Political Will.** Political will was another critical component for public participation in Swedish BRs. Several participants pointed to a lack of interest among certain municipal actors, and a lack of understanding of the BR concept and its work. This may translate to a limited political will, which could negatively impact the capability of the BR to operate the projects they wish, and in combination with limited authority over resources (e.g., land), further restricts their desired impact. Research by Barraclough et al. (2021) on 74 UNESCO BRs corroborates this, as the study highlights the significant influence of political will, and a lack of government support in general, as a major impediment to effective BR work.

Another ambiguous aspect related to this is the intention of BRs to be built on public participation, yet they are inherently dependent on state institutions. Be it the municipalities as key enablers during the establishment, as members of the board, or the state as main financier. This could create the image of BRs as being yet another product of public administration, implemented in a top-down manner. On the one hand, this may lead to BRs being perceived as illegitimate, while others could view the connection with public authorities as something positive that provides the biosphere reserves with legitimacy (Sandström and Sahlström, 2021). Yet, research seem to confirm the former claim. A study on BRs in Vietnam for instance shows that top-down, sectoral interests often hinder the effective implementation of the biosphere reserve approach (Cuong, Dart, Dudley, et al., 2017), and research from Japan finds that pre-Seville, top-down implemented BRs struggle with fewer administrative resources and activities (Tanaka & Wakamatsu, 2018).

**Land Tenure.** On the local level, the possibilities of BRs in the implementation of participatory biodiversity and CCA measures are limited in that they lack administrative power. The biosphere offices in Sweden have no formal authority and do not own any land that would be needed to carry out comprehensive measures. Instead, as reflected by the data and literature, actions are supposed to be executed through a continuous dialogue between public services, representatives of the government, landowners, and other relevant stakeholders (Schüttler et al., 2023). Ishwaran et al. (2008) mirror this by noting that common challenges for BR success include the complexity of zoning and land rights.

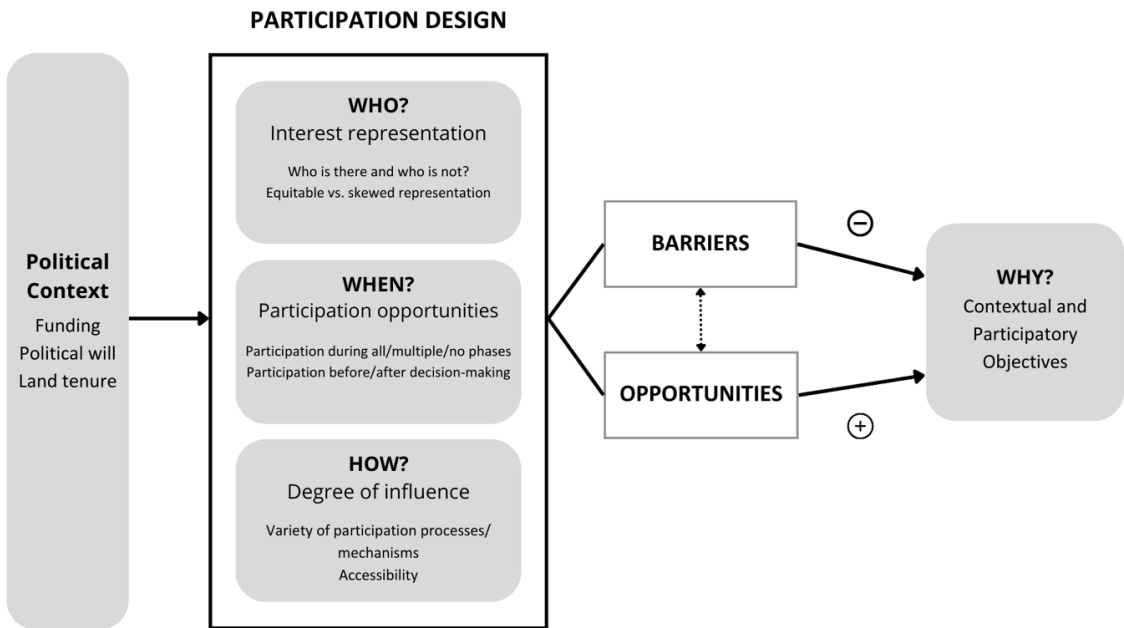
Another barrier is the issue of a lack of funds to compensate the landowners whose lands are to be used for activities. The interviewees raised how, even if funds were available to plan activities, this component was often left unconsidered. This problem is also found in other BRs, as discussed by Wu et al. (2020) who argue why landowners in protected areas in China should be compensated and who should pay for protected areas.

### 6.4 Revised Theoretical Framework

In summarizing the findings, the political context was found to be ubiquitously present throughout the entire participation process and could not be described as a result of the participation design, unlike the other barriers and opportunities. Instead, it is argued to affect the participation design and the framework was revised accordingly (see Figure 4).

This visualizes how the political sphere, particularly the factors of funding, political will, and land tenure in Swedish BRs, influences the overall participation process, which in turn creates barriers and opportunities to achieve the objectives. In addition, many of the barriers were interrelated with opportunities. Meaning that the factors can enable or disable the achievement of the objectives, depending on how the participation design is constructed. Consequently, a dashed double-headed arrow was inserted between the boxes representing this reflexivity.

**Figure 4.**  
*Revised Theoretical Framework*



*Note.* Originally adapted from Uittenbroek et al. (2019).



To conclude, Swedish BRs express a diverse range of participants (*who*), a generally accessible platform (*how*), and active involvement throughout different stages of the BR establishment and activities (*when*). The key barriers and opportunities presented related to awareness and understanding of the BR concept, availability of personal resources, willingness to participate, as well as conflicting and competing interests, and the political context had an overarching influence on the participatory process. The adapted theoretical framework provides a stencil which BR managers can use to create participatory mechanisms that work to support the goals which they hope to achieve, but it will require efforts in not only defining what public participation is, but particularly its objectives.

## 7. Conclusion

In conclusion, the barriers and opportunities for public participation in efforts that aim to address biodiversity loss and adapt to climate change in Swedish BRs are multifaceted. It is critical to be clear that an integration of biodiversity protection and CCA was largely absent from the current practical reality of Swedish BRs. Nevertheless, the flexibility and localized characteristics of the BR approach points to a missed opportunity. Therefore, the barriers and opportunities which were identified in the data apply more broadly and refocused the main question towards public participation activities in general instead.

Firstly, the perceived purpose of BRs as context-driven neutral arenas that emphasize the importance of public participation was clearly expressed among the relevant stakeholders. Yet, a shared definition of public participation is lacking. Consequently, there were only implicit objectives of what the BRs aim to achieve with public participation. These objectives for public participation were primarily normative and instrumental, where participation was repeatedly viewed as an instrument for enhanced democracy as well as a tool to achieve the BR objectives. The lack of a defined process and related objectives presents the first, most structural barrier to utilize the benefits of public participation in a Swedish BR context. To obtain the most value out of participatory processes, Swedish BRs should therefore define what public participation is and what they hope to achieve with it, and the theoretical framework presented in this thesis presents one such opportunity.

Secondly, this research sketched out the perceived, general participation design of Swedish BRs. BRs encompass a wide range of stakeholders, from public authorities to non-public actors including inhabitants, NGOs, associations, and private sector representatives from sectors like forestry, agriculture, and tourism. These interests differed in their representation and power, though it was clear that the BR approach asks for a wide-ranging involvement to fulfill its role as a bridging, mediating, organization. Possibilities to participate existed before and during the establishment of a BR, as well as during its ongoing activities. Participation was presented in diverse forms which all differ in the level of activity they require from the participants as well as in their degree of influence. Prominent examples included board membership, meeting and dialogue, and the BR ambassador programs.

These components of the participation design - *who*, *when* and *how* – were found to contribute to various barriers and opportunities for public participation. This paper identified five such key ambiguous factors: (1) awareness and understanding of the BR concept, (2)

available personal resources, (3) willingness to participate, (4) conflicting and competing interests, as well as (5) the political context. The political context stood out in this regard and was found to have an overarching impact on the participation design, rather than emerge from it. Therefore, adapting the theoretical framework to include the political context as an influencing factor on the participation design. Whereas all the other factors can, to a certain extent, be influenced by adapting the participation design, the political context needs to be navigated when it cannot be changed.

Ultimately, this paper provides a general sketch of what public participation looks like, hopes to achieve, is enabled, and disabled by, in a Swedish BR context. This fills an important gap in the academic discourse and provides a scaffold for future research that can help improve the role and understanding of public participation in BRs, particularly in an era of worsening climate change. To harvest the full range possibilities from these findings, this research recommends that:

- A national and BR-specific definition of public participation as well as what objectives such an instrument hopes to achieve is developed.
- BRs and their municipalities collaborate to find ways in which Swedish BRs can contribute to CCA, particularly by integrating it with biodiversity protection efforts.

## **7.1 Avenues for Future Research**

Finally, this research presents several fruitful avenues for future research. Firstly, as building on the implications of political changes in Sweden on the funding of BRs and other nature protection measures, research could delve into the funding dimension, its relationship to political will, and the related challenges and opportunities. Secondly, the perspectives and experience of VJ was unfortunately a gap in this project, and future work could focus on understanding the experiences and perspectives of the public in the only BR in Sweden with an Indigenous population. Thirdly, communication was a critical factor in influencing local awareness and understanding of the BR concept, often regarded as a barrier to effective participation. Future work could therefore evaluate communication strategies of BRs in Sweden, to highlight what works and what works less. Finally, the role of youth was prevalent in this project, and highlights the potential value in understanding their contribution and challenges to biodiversity and climate-related projects, particularly in BRs.

## 8. References

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# Appendices

## Appendix A

*The websites of Swedish BRs.*

<b>Biosphere Reserve</b>	<b>Website</b>
Vindelälven-Juhttááhka	<a href="https://vindalalvenbiosfar.se/">https://vindalalvenbiosfar.se/</a>
Voxnadalen	<a href="https://www.ovanaker.se/boendeochmiljo/klimatochmiljo/biosfaromradevoxnadalen.947.html">https://www.ovanaker.se/boendeochmiljo/klimatochmiljo/biosfaromradevoxnadalen.947.html</a>
Östra Vätterbranterna	<a href="https://ostravatterbranterna.se/">https://ostravatterbranterna.se/</a>
Blekinge Arkipelag	<a href="https://blekingearkipelag.se/">https://blekingearkipelag.se/</a>
Älvlandskapet Nedre Dalälven	<a href="https://www.nedredalalven.se/">https://www.nedredalalven.se/</a>
Vänerskärgården med Kinnekulle	<a href="https://vanerkulle.org/">https://vanerkulle.org/</a>
Kristianstads Vattenrike	<a href="https://vattenriket.kristianstad.se/">https://vattenriket.kristianstad.se/</a>
National level	<a href="https://biosfarprogrammet.se/">https://biosfarprogrammet.se/</a>

## Appendix B

The interview guides for the semi-structured interviews, for public and BR representatives, in English and in Swedish.

### ***B1. Interview Guide (ENG)***

#### **Introduction**

*Introduce ourselves*

- Nice to meet you, I am Frida / Franziska, and we are masters students at Lund University in DRMCCA, thank you for being part of our master's thesis research.

*Purpose of this research*

- With this research, we want to understand the challenges and opportunities for citizen participation in Swedish biosphere reserves;
- in particular when it comes to activities related to climate change adaptation and biodiversity loss.

*The interview process*

- The interview will last about 45 to 60 minutes and it will be recorded digitally and on our phones as backups.
- We have around 12 questions, divided into three parts, and we might have to interrupt you in case time runs out.
- I will be leading the interview, while my colleague [Frida/Franziska] is taking notes.
- We want to emphasize that this should be a relaxed and low-pressure environment.
- There are no right or wrong answers to the questions, and it is okay not to have or know the answer to a question.
- All input is valuable to us.
- If anything is unclear, please feel free to ask so that we can clear up any confusion.
- If at any time during the interview you feel uncomfortable, please let us know!

#### *Consent, the right to withdraw and data storage*

- So, you have read and signed the consent form, but to refresh:
- You are welcome to stop the interview at any time, for any reason, without having to give an explanation and without consequences.
- Even after the interview, if for any reason you wish to withdraw from the process, let us know and we will delete any information we have obtained from you so far.
- Once your data has been processed, it will be stored on an encrypted and secure local hard drive, disconnected from any cloud services, for seven years and then deleted.
- This is standard practice under international research guidelines.
- Do you have any questions before we start?

#### **Questions (Public Representatives)**

##### **Opening**

*To begin with, we'd like to understand your background, view and connection to the biosphere reserve:*

- 1) Who are you, and what is your role in the biosphere reserve?
- 2) What does the biosphere reserve mean to you, and what goals do you think it hopes to achieve?

##### **Perceptions of change and adaptation**

*Thanks for that introduction. In this second part, we are curious to learn more about your perception of change:*

- 3) What changes to the environment do you see in the area, if any?
- 4) What do you think is the reason for these changes?
- 5) (How) are these changes affecting / influencing you / your life?

##### **Participation**

*Great, we are now moving on to our core theme of participation.*

- 6) Describe what “participation” means to you in the biosphere reserve.
  - a. What should be the goals/objectives of participation?
- 7) Give us some examples of ways you have, or you are able to participate in decision-making in the biosphere reserve.
- 8) Do you want to participate (more)? Why (not)?
- 9) What makes it difficult for you to participate (more)?
- 10) What would make it feel like you and your perspectives were being better included?
- 11) To what extent do you feel invited to participate?
- 12) Are there any decisions/projects/activities you felt strongly about?
  - a. *(Were you able to oppose/challenge them?)*
- 13) Who do you think is important to include?
  - a. *(Do you feel that all of them are represented in decision making processes?)*

### **Environmental change, participation, and your biosphere reserve**

*Thank you so far! We're nearly finished, with just a couple of questions left about the biosphere reserve's approach to climate change and the influence of political and social dynamics on these activities.*

- 14) What do you think the role of your biosphere reserve is in addressing and adapting to climate change?
  - a. *(What kind of activities contribute to this?)*
- 15) Are there any competing visions, interests, conflicts, that make it difficult to do those activities?
  - a. *Alternatively: Are there/have there been any conflicts within the biosphere reserve area?*
- 16) When you think of the political context/environment, for example in terms of policies or institutional structures, is there anything you would say makes it easier or harder for people to be part of these activities?
  - a. *(Are there any recent policy changes or initiatives that have significantly impacted citizen involvement in these areas? Please describe their effects.)*

### **De-brief**

- 17) Is there anything you want to add?

### **Questions (BR Representatives)**

#### **Opening**

*To begin with, we'd like to understand your background, view, and connection to the biosphere reserve:*

- 1) Who are you, and what is your role in the biosphere reserve?
- 2) What are the objectives of your biosphere reserve?



### **Perceptions of change and adaptation**

*Thanks for that introduction. In this second part, we are curious to learn more about your perception of change:*

- 3) What changes to the environment do you see in the area, if any?
- 4) What do you think is the reason for these changes?
- 5) (How) are these changes affecting / influencing your work?

### **Participation**

*Great, we are now moving on to our core theme of participation.*

- 6) Describe what “participation” means to you in the biosphere reserve.
  - a. Do you think it's important/good? Why (not)?
- 7) Give us some examples of ways citizens have or are able to participate in decision-making in the biosphere reserve.
- 8) Do you think they would want to participate (more)?
  - a. Why (not)?
- 9) What makes it difficult for them to participate (more)?
- 10) What would make it easier for them to participate (more)?
- 11) Who do you think is important to include?
  - a. Do you feel that all of them are represented in decision making processes?
  - b. IF APPLICABLE – What are your plans to increase participation?

### **Environmental change, participation, and your biosphere reserve**

- 12) What do you think the role of your biosphere reserve is in addressing and adapting to climate change?
  - a. What kind of activities contribute to this?
- 13) Are there any competing visions, interests, conflicts, that make it difficult to do these activities?
  - a. Alternatively: Are there/have there been any conflicts within the biosphere reserve area?
- 14) When you think of the political context/environment, for example in terms of policies or institutional structures, is there anything you would say makes it easier or harder for people to be part of these activities?
  - a. (Are there any recent policy changes or initiatives that have significantly impacted citizen involvement in these areas? Please describe their effects.)

### **De-brief**

- 15) Is there anything you want to add?

## **B2. Interview Guide (SWE)**

### **Inledning**

*Presentera oss själva*

- Trevligt att träffas, jag heter Frida / Franziska, och vi är masterstudenter vid Lunds universitet i DRMCCA, tack för att du är en del av vår masteruppsats.

### *Syftet med denna forskning*

- Med denna forskning vill vi förstå utmaningarna och möjligheterna för medborgardeltagande i svenska biosfärområden;
- i synnerhet när det gäller aktiviteter relaterade till anpassning till klimatförändringar och förlust av biologisk mångfald.

### *Intervjuprocessen*

- Intervjun kommer att pågå i 45 till 60 minuter och den kommer att spelas in digitalt och på våra telefoner som en backup.
- Jag kommer att leda intervjun, medan min kollega [Franziska] antecknar.
- Vi vill betona att detta ska vara en avslappnad miljö. Det finns inga rätt eller fel svar på frågorna och det är okej att inte ha eller veta svaret på en fråga.
- All input är värdefull för oss.
- Om något är oklart är du välkommen att fråga så att vi kan reda ut eventuella missförstånd.
- Om du någon gång under intervjun känner dig obekvämt, säg till!

### *Samtycke, ångerrätt och datalagring*

- Så, du har läst och undertecknat samtyckesformuläret, men för att uppdatera:
- Du är välkommen att avbryta intervjun när som helst, oavsett anledning, utan att behöva ge en förklaring och utan konsekvenser.
- Även efter intervjun, om du av någon anledning vill dra dig ur processen, meddela oss så raderar vi all information som vi hittills har fått från dig
- När din data har behandlats kommer den att lagras på en krypterad och säker lokal hårddisk, som är bortkopplad från alla molntjänster, i sju år och kommer efter det raderas.
- Detta är standardpraxis enligt internationella forskningsriktlinjer.
- Har du några frågor innan vi börjar?

## **Frågor (Allmänheten)**

### **Inledande frågor**

- 1) Vem är du och vad är din roll i biosfärområdet?
- 2) Vad betyder biosfärområdet för dig och vilka mål tror du att det hoppas kunna uppnå?

### **Uppfattningar om förändring och anpassning**

- 3) Vilka miljöförändringar ser du i området, om några?
- 4) Vad tror du är orsaken till dessa förändringar?
- 5) (Hur) påverkar dessa förändringar dig / ditt liv?

### **Delaktighet**

- 6) Beskriv vad "delaktighet" betyder för dig i biosfärområdet. Vad menas med delaktighet?
  - a. *Tycker du att det är viktigt/bra? Varför (inte)?*
- 7) Ge oss några exempel på hur du har eller kan delta i biosfärområdet.
- 8) Vill du delta (mer)? Varför (inte)?
- 9) Vad gör det svårt för dig att delta (mer)?
- 10) Vad skulle få det att kännas som att du och dina perspektiv inkluderas bättre?
- 11) I vilken utsträckning känner du dig inbjuden att delta?
- 12) Finns det några beslut/projekt/aktiviteter du kände starkt för?
  - a. *Kunde du motsätta dig/utmana dem?*
- 13) Vem tycker du är viktig att inkludera?
  - a. *Känner du att alla är representerade i beslutsprocesser?*

### **Miljöförändring, deltagande och ditt biosfärområde**

- 14) Vilken roll tror ni att ert biosfärområde har när det gäller att hantera och anpassa sig till klimatförändringar?
  - a. *Vilken typ av aktiviteter bidrar till detta?*
- 15) Finns det några konkurrerande visioner, intressen, konflikter i området?
  - a. *Finns det några beslut/projekt/aktiviteter som väcker starka känslor?*
- 16) När du tänker på det politiska sammanhanget/miljön, till exempel i form av politik eller institutionella strukturer, finns det något som du skulle säga gör det lättare eller svårare för människor att delta i dessa aktiviteter?
  - a. *Finns det några nyligen genomförda politiska förändringar eller initiativ som i hög grad har påverkat medborgarnas engagemang på dessa områden? Vänligen beskriv deras effekter.*

### **De-brief**

- 17) Finns det något du vill tillägga?

### **Frågor (BR-representant)**

#### **Inledande frågor**

- 1) Vem är du och vad är din roll i biosfärområdet?
- 2) Vilka är målen för ert biosfärområde?

#### **Uppfattningar om förändring och anpassning**

- 3) Vilka miljöförändringar ser du i området, om några?
- 4) Vad tror du är orsaken till dessa förändringar?
- 5) (Hur) påverkar/påverkas ditt arbete av dessa förändringar?

### **Delaktighet**

- 6) Beskriv vad "allmänhetens deltagande" betyder för dig i biosfärområdet.
  - a. *Tycker du att det är viktigt/bra? Varför (inte)?*

- 7) Ge oss några exempel på hur medborgare har eller kan delta i beslutsfattandet i biosfärområdet.
- 8) Tror du att de skulle vilja delta (mer)?
  - a. *Varför (inte)?*
- 9) Vad gör det svårt för dem att delta (mer)?
- 10) Vad skulle göra det lättare för dem att delta (mer)?
- 11) Vem tycker du är viktig att inkludera i beslutsfattande processer?
  - a. *Känner du att alla är representerade i beslutsfattande processer?*
  - b. *OM TILLÄMPLIGT - Vilka är era planer för att öka deltagandet?*

### **Miljöförändring, deltagande och ditt biosfärområde**

- 12) Vilken roll tror ni att ert biosfärområde har när det gäller att hantera och anpassa sig till klimatförändringar?
  - a. Vilken typ av aktiviteter bidrar till detta?
- 13) Finns det några konkurrerande visioner, intressen, konflikter som gör det svårt att genomföra dessa aktiviteter?
- 14) När du tänker på det politiska sammanhanget/miljön, till exempel i form av politik eller institutionella strukturer, finns det något som du skulle säga gör det lättare eller svårare för människor att delta i dessa aktiviteter?
  - a. *Finns det några nyligen genomförda policyförändringar eller initiativ som har haft en betydande inverkan på medborgarnas engagemang inom dessa områden? Vänligen beskriv deras effekter.*

### **De-brief**

- 15) Finns det något du vill tillägga?

## **Appendix C**

*Date of each interview, participant codes, BR, and interview duration.*

<b>Date of Interview (2024)</b>	<b>Participant Code</b>	<b>Biosphere Reserve</b>	<b>Duration (minutes)</b>
February 28	Public Representative 1	Vänerskärgården med Kinnekulle	46:54
February 29	Public Representative 2	Östra Vätterbranterna	42:58
February 29	BR Representative 1	Vänerskärgården med Kinnekulle	43:24
March 4	BR Representative 2	National MAB Coordinator	33:02
March 4	Public Representative 3	Vänerskärgården med Kinnekulle	36:29
March 5	BR Representative 3	Älvsjökaret Nedre Dalälven	34:07
March 5	Public Representative 4	Voxnadalen	43:27
March 6	BR Representative 4	Voxnadalen	53:57

March 6	BR Representative 5	Voxnadalen	31:09
March 7	Public Representative 5	Voxnadalen	28:24
March 8	BR Representative 6	Blekinge arkipelag	36:49
March 8	Public Representative 6	Voxnadalen	24:32
March 11	Public Representative 7	Kristianstads vattenrike	29:48
March 11	Public Representative 8	Voxnadalen	35:14
March 12	Public Representative 9	Vänerskärgården med Kinnekulle	38:04
March 12	BR Representative 7	Kristianstads Vattenrike	30:36

## Appendix D

Participation was expressed as completely voluntary, participants were able to withdraw their data and any quotes from the study at any time in the writing process, but not after the thesis has been published. Participants were also given the opportunity to anonymize their data to protect their privacy. Some participants with certain roles, such as coordinator of a biosphere reserve, were made aware that disclosing their role was of great value to the results and were therefore limited in their anonymity. This was encapsulated in the consent form below, in English and with a Swedish translation. Participants were consistently reminded of their rights, prior to the interview date, right before recording, and after the interview finished.

The consent form signed by each interview participant is attached below.

## Interview Consent Form

**PURPOSE:** We are interested in understanding the challenges and opportunities which citizens face when engaging in activities that deal with biodiversity loss and climate change adaptation in Swedish biosphere reserves. Through this, we hope to show where opportunities for meaningful participation exist, and in what ways such engagement can improve the processes that impact the local environment and lives of citizens in Swedish biosphere reserves.

**BY PARTICIPATING IN THIS INTERVIEW, I UNDERSTAND THAT:**

- My participation in this study is voluntary.
- I can withdraw from the interview at any time or refuse to answer any question without consequences and without giving a reason.
- Only the researchers will have access to the raw interview material.
- I am free to withdraw from the study at any time after the interview, but not after the thesis has been approved to be published.
- I can contact the researchers at any time to seek clarification or additional information.

**PLEASE CHOOSE ONE BOX PER CONSENT STATEMENT:**

	YES	NO
I agree to the identification of my role and the organization I am currently working for, or have previously worked for, to be disclosed in the study.	<input type="checkbox"/>	<input type="checkbox"/>
I agree to quotes from my interview being cited in the final thesis and potential future publications.	<input type="checkbox"/>	<input type="checkbox"/>
I agree to being referred to and/or mentioned by name in the thesis or in quotes.	<input type="checkbox"/>	<input type="checkbox"/>
I give permission for the interview to be audio-recorded and transcribed.	<input type="checkbox"/>	<input type="checkbox"/>

**DATA SECURITY**

Interview details and consent forms will be stored on a password-protected, local hard drive, disconnected from cloud services for seven years, and then deleted.

<b>PARTICIPANT NAME</b>	
<b>DATE</b>	
<b>SIGNATURE</b>	

**Researchers:** Franziska Fink (fr1085fi-s@student.lu.se)

Frida Nilsson (fr0001ni-s@student.lu.se)

**Supervisor:** Mo Hamza (mo.hamza@risk.lth.se)

Please find a Swedish translation on next page - du hittar en svensk översättning på nästa sida.

## Översättning av samtyckesformulär – signera på sida 1

**SYFTE:** Vi är intresserade av att förstå de utmaningar och möjligheter som medborgare möter när de engagerar sig i aktiviteter som handlar om förlust av biologisk mångfald och anpassning till klimatförändringar i svenska biosfärområden. Genom detta hoppas vi kunna visa var det finns möjligheter till meningsfullt deltagande, och på vilka sätt ett sådant engagemang kan förbättra de processer som påverkar den lokala miljön och livet för medborgarna i svenska biosfärområden.

### **GENOM ATT DELTA I DENNA INTERVJU FÖRSTÅR JAG ATT:**

- Jag ger mitt tillstånd till att intervjun spelas in och transkriberas.
- Jag kan när som helst dra mig ur intervjun eller vägra att svara på någon fråga utan konsekvenser och utan att ange något skäl.
- Endast forskarna kommer att ha tillgång till det obearbetade intervjumaterialet.
- Jag är fri att dra mig ur studien när som helst efter intervjun, men inte efter att avhandlingen har godkänts för publicering.
- Jag kan när som helst kontakta forskarna för att få förtydliganden eller ytterligare information.

### **JA/NEJ PÅSTÅENDEN:**

- Jag samtycker till att min roll och den organisation jag för närvarande arbetar för, eller tidigare har arbetat för, avslöjas i studien. (ja/nej – klicka i rutan på första sidan)
- Jag samtycker till att bli refererad till och/eller omnämnd i uppsatsen med namn eller i citat. (ja/nej – klicka i rutan på första sidan)
- Citat från min intervju kan citeras i den slutliga avhandlingen och potentiella framtida publikationer. (ja/nej – klicka i rutan på första sidan)
- Jag ger mitt tillstånd till att intervjun spelas in och transkriberas (ja/nej – klicka i rutan på första sidan).

### **DATASÄKERHET**

Intervjuuppgifter och samtyckesformulär lagras på en lösenordsskyddad, lokal hårddisk, utan koppling till molntjänster i sju år, och raderas efter det.

## Appendix E

### *Adapted Systematic Review Steps*

<b>Review Steps</b>	<b>Literature Type</b>	<b>Action</b>	<b>Result</b>
<b>1. Defining the selection criteria</b>	Peer-reviewed literature	Create search strings using key words which define the research focus.	(TITLE-ABS-KEY (biosphere AND reserve AND sweden) OR TITLE-ABS-KEY (biosfärområde AND sverige) OR TITLE-ABS-KEY (vindelälven-juhttátahkka AND voxnadalen AND östra AND vätterbranterna AND blekinge AND arkipelag AND älvlandskapet AND nedre AND dalälven AND vänerskärgården AND med AND kinnekulle AND kristianstads AND vattenrike))
	Gray literature	Define selection criteria and identify websites related to biosphere reserves in Sweden.	See appendix A. The selection criteria consisted of documents that were related to the broader work of BRs, i.e. goals, operational plan, nomination forms, reviews.
<b>2. Data gathering</b>	Peer-reviewed literature	Database search on SCOPUS and DiVA, using the search strings.	The database search identified a total of 28 unique hits.
	Gray literature	Scan the available documents of the identified websites.	The website search identified a total of 54 documents.
<b>3. Data screening</b>	Peer-reviewed literature	Transfer the data including title, year, author(s), and abstract into a table. Screen the	The data screening identified 21 potentially relevant papers.



		data to define the inclusion criteria.	The inclusion criteria for the papers were the following keywords: <ul style="list-style-type: none"> <li>- Environmental governance, management, conservation, ecosystem management, cooperation.</li> </ul>
	Gray literature	Transfer the documents including title, year, author(s), and a brief description into a table. Screen the data to define the inclusion criteria.	The data screening identified 41 potentially relevant documents.  The inclusion criteria were: <ul style="list-style-type: none"> <li>- Documents specific to Sweden.</li> <li>- Comprehensive documents (excluded documents that were summaries of other documents).</li> </ul>
<b>4. Data cleaning</b>	Peer-reviewed literature	Both authors conduct an abstract analysis based on the inclusion criteria and guiding questions: (1) Does the paper focus on a Swedish BR? (2) Does it touch upon the key concepts: <ul style="list-style-type: none"> <li>- perceptions of (environmental) change;</li> <li>- the definition, importance, representation, and examples of participation;</li> </ul>	The abstract analysis identified 17 papers for the final review.

		<ul style="list-style-type: none"> <li>- participation, biodiversity loss, and climate change adaptation;</li> <li>- different interests, perceptions, and conflict;</li> <li>- the role of political context; and</li> <li>- perceived barriers and opportunities for public participation.</li> </ul>	
	Gray literature	<p>Both authors briefly review the contents of each document based on the selection criteria and guiding question:</p> <p>Does it touch upon the key concepts:</p> <ul style="list-style-type: none"> <li>- perceptions of (environmental) change;</li> <li>- the definition, importance, representation, and examples of participation;</li> <li>- participation, biodiversity loss, and climate change adaptation;</li> </ul>	The brief content review identified 34 documents for the final review.

		<ul style="list-style-type: none"> <li>- different interests, perceptions, and conflict;</li> <li>- the role of political context; and perceived barriers and opportunities for public participation.</li> </ul>	
<b>5. Data scoping</b>	Peer-reviewed literature	Download full-text versions of all identified papers.	All 17 papers were successfully downloaded.
	Gray literature		All 34 papers were successfully downloaded.
<b>6. Full-text review</b>	Peer-reviewed literature	Develop a coding scheme in an inductive–deductive approach that is applied to the downloaded papers.	None of the papers were deemed relevant enough to contribute to the evidence base.
	Gray literature		120 codes in NVivo, most were similar to the interview codes with few exceptions and contributed to five overarching themes.

*Note.* Adapted from Ferreira et al. (2018) Luederitz et al. (2016).

## Appendix F

The following two tables consist of the peer-reviewed and gray literature analyzed in the case-specific literature review. The sources which were referenced in the results are also in the reference list.

**Table F1**

*The Peer-reviewed Literature Analyzed in the Case-specific Literature Review.*

Author(s)	Title	Journal, Number, Pages, Citations	Year	DOI
Plummer R., Baird J., Farhad S., Witkowski S.	How do biosphere stewards actively shape trajectories of social-ecological change?	Journal of Environmental Management, 261, art. no. 110139, Cited 14 times.	2020	10.1016/j.jenvman.2020.110139
Baird J., Plummer R., Schultz L., Armitage D., Bodin Ö.	How Does Socio-institutional Diversity Affect Collaborative Governance of Social–Ecological Systems in Practice?	Environmental Management, 63 (2), pp. 200 - 214, Cited 28 times.	2019	10.1007/s00267-018-1123-5
Armitage D., Dzyundzyak A., Baird J., Bodin Ö., Plummer R., Schultz L.	An Approach to Assess Learning Conditions, Effects and Outcomes in Environmental Governance	Environmental Policy and Governance, 28 (1), pp. 3 - 14, Cited 33 times.	2018	10.1002/eet.1781
Baird J., Plummer R., Schultz L., Armitage D., Bodin Ö.	Integrating Conservation and Sustainable Development Through Adaptive Co-management in UNESCO Biosphere Reserves	Conservation and Society, 16 (4), pp. 409 - 419, Cited 12 times.	2018	10.4103/cs.cs_17_58
Schultz L., Folke C., Österblom H., Olsson P.	Adaptive governance, ecosystem management, and natural capital	Proceedings of the National Academy of Sciences of the United States of America, 112 (24), pp. 7369 - 7374, Cited 219 times.	2015	10.1073/pnas.1406493112
Elbakidze M., Hahn T., Mauerhofer V., Angelstam P., Axelsson R.	Legal framework for biosphere reserves as learning sites for sustainable development: A comparative analysis of Ukraine and Sweden	Ambio, 42 (2), pp. 174 - 187, Cited 34 times.	2013	10.1007/s13280-012-0373-3

Börebäck, K.	UNESCO* man and biosphere reserves: The significance of communication processes in the formation of model-areas for sustainability-two case study	International Journal of Environmental Sustainability, 8 (4), pp. 55 - 69, Cited 0 times.	2013	10.18848/2325-1077/cgp/v08i04/55064
Appelstrand M.	Developments in Swedish forest policy and administration - from a "policy of restriction" toward a "policy of cooperation"	Scandinavian Journal of Forest Research, 27 (2), pp. 186 - 199, Cited 57 times.	2012	10.1080/02827581.2011.635069
Tuvendal M., Elmquist T.	Ecosystem services linking social and ecological systems: River brownification and the response of downstream stakeholders	Ecology and Society, 16 (4), Cited 42 times.	2011	10.5751/ES-04456-160421
Hahn, T.	Self-organized governance networks for ecosystem management: Who is accountable?	Ecology and Society, 16 (2), Cited 66 times.	2011	10.5751/ES-04043-160218
Schultz L., Folke C., Olsson P.	Enhancing ecosystem management through social-ecological inventories: Lessons from Kristianstads Vattenrike, Sweden	Environmental Conservation, 34 (2), pp. 140 - 152, Cited 108 times.	2007	10.1017/S0376892907003876
Olsson P., Folke C., Galaz V., Hahn T., Schultz L.	Enhancing the fit through adaptive co-management: Creating and maintaining bridging functions for matching scales in the Kristianstads Vattenrike Biosphere Reserve, Sweden	Ecology and Society, 12 (1), art. no. 28, Cited 352 times.	2007	10.5751/ES-01976-120128
Olsson P., Gunderson L.H., Carpenter S.R., Ryan P., Lebel L., Folke C., Holling C.S.	Shooting the rapids: Navigating transitions to adaptive governance of social-ecological systems	Ecology and Society, 11 (1), art. no. 18, Cited 975 times.	2006	10.5751/ES-01595-110118
Hahn T., Olsson P., Folke C., Johansson K.	Trust-building, knowledge generation and organizational innovations: The role of a bridging organization for adaptive comanagement of a	Human Ecology, 34 (4), pp. 573 - 592, Cited 368 times.	2006	10.1007/s10745-006-9035-z

	wetland landscape around Kristianstad, Sweden			
Gunderson L.H., Carpenter S.R., Folke C., Olsson P., Peterson G.	Water RATs (resilience, adaptability, and transformability) in lake and wetland social-ecological systems	Ecology and Society, 11 (1), art. no. 16, Cited 115 times.	2006	10.5751/ES-01556-110116
Olsson P., Folke C., Hahn T.	Social-ecological transformation for ecosystem management: The development of adaptive co-management of a wetland landscape in southern Sweden	Ecology and Society, 9 (4), Cited 586 times.	2004	10.5751/ES-00683-090402
Magnusson S.-E.	The changing perception of the wetlands in and around Kristianstad, Sweden: From waterlogged areas toward a future water kingdom, Kristianstads vattenrike biosphere reserve	Annals of the New York Academy of Sciences, 1023, pp. 323 - 327, Cited 10 times.	2004	10.1196/annals.1319.018

**Table F2**

*The Gray Literature Analyzed in the Case-specific Literature Review*

Author(s)	Title	Description	Year
Vattenriket	Kristianstads Vattenrike Biosphere Reserve ACTION PLAN 2021-2025	Action Plan	2021
Biosfärområde Älvlandskapet Nedre Dalälven	BIOSFÄROMRÅDE ÄLVLANDSKAPET NEDRE DALÄLVEN Handlingsplan   2023-2025	Action Plan	2022
Biosfärområde Voxnadalen	ÅRSREDOGÖRELSE 2022 Uppföljning av effektmålen i Biosfärområde Voxnadalens utvecklingsplan	Annual Report	2022
Biosfärområde Voxnadalen	UTVECKLINGSPLAN BIOSFÄROMRÅDE VOXNALEN	Development Plan	2023
Biosfärområde Voxnadalen	Det händer i biosfärområde Voxnadalen. INFORMATION OM BIOSFÄROMRÅDE VOXNALEN, 2023	Digital Magazine	2023
Olsson, Per; Moberg, Fredrik	Vägledning för utveckling av biosfärområden och MAB programmet i Sverige	Guidelines	2005
Magnusson, Sven-Erik; Magntorn, Karin; Wallsten,	Kristianstads Vattenrike Biosphere Reserve Nomination form	Nomination Form	2005

Elisabet; Cronert, Hans; Thelaus, Magnus			
MacTaggart, Johanna; Gärdefors, Birgitta; Olsson, Johanna; Crommert, Clas- Göran; Magnusson, Håkan; Magnusson, Bo; Nilsson, Lars-Göran	Biosphere Reserve Lake Vänern Archipelago and Mount Kinnekulle NOMINATION FORM	Nomination Form	2008
Asp, Therese; Bilén, Anna- Karin; Hertzman, Jenny; Johansson, Anette; Johansson, Jonas; Lindberg, Elisabeth; Lindahl, Ulf; Olsson, Lennart; Torebrink, Petra; Wallsten, Elisabet; Olsson Widgren, Ulrika; Widgren, Åke; Axelsson, Lena; Ibertsson, Bernt; Havby, Britt-Marie; Juhel, Birgith; Petersson, Sven-Olof; Berntsson, Emma; Drysén, Per; Sonesson, Anna-Karin; Stranne, Yvonne	BIOSPHERE RESERVE NOMINATION FORM BLEKINGE ARCHIPELAGO	Nomination Form	2009
Ericson, Cristina; Hedin, Kalle; Gyldberg, Bengt	Nedre Dalälven River Landscape Biosphere Reserve Nomination Form	Nomination Form	2010
Jonegård, Simon; Uhr, Johan; Lindell, Måns; Lund, Malin; Wallander, Anders; Jaldemark, Bernard; Magnusson, Marielle; Andersson, Marie; Blank, Henrick; König, Per; Bjurulf, Helen; Tollén, Calle; Hellsten, Claes; Börjesson, Agneta; Fasth, Tomas; Hakeman, Pelle; Vestbö Franzén, Ådel	East Vättern Scarp Landscape- Biosphere reserve nomination form	Nomination Form	2011
Gardeström, Johanna; Grelsson, Gunnel; Andersson, Jon; Norstedt, Gudrun; Svensson, Johan; Nilsson, Christer; Holmberg, Örjan; Sundin, Bo; Westbergh, Stig; Myrén, Annika; Johansson	VINDELÄLVEN-JUHTATDAHKA Biosphere Reserve Application	Nomination Form	2018

Jänkänpää, Hanna; Sténs, Anna; Friborg, Lena; Ackermann, Malin			
Alfredsson, Hanna; Eriksson, Katarina; Berglund, Olle; Hansen, Jens; Johannessen, Fia; Jansson, Daniel; Hägg, Kent; Hedman, Jan	Nomination to UNESCO for Biosphere Reserve status of Voxnadalen Sweden	Nomination Form	2018
Biosfärprogrammet Sverige	Verksamhetsplan och budget 2024 för Biosfärprogrammet Sverige	Operational Plan and Budget	2023
Biosfärområde Älvlandskapet Nedre Dalälven	VERKSAMHETSBERÄTTELSE 2022	Annual Report	2023
Biosfär Vänerskärgården Kinnekulle	Mål för föreningen Biosfärområde Vänerskärgården med Kinnekulle under tidsperioden 2019-2025	Organizational Goals	2021
Wettemark, Carina; Källén, Johanna; Pearce, Åsa; Magntorn, Karin; Dahl, Jonas; Cronert, Hans; Hernborg, Karin; Trolle, Ebba	Kristianstad Vattenrike Biosphere Reserve. Periodic Review 2005-2015	Periodic Review	2015
Biosfär Vänerskärgården Kinnekulle	Lake Vänern Archipelago and Mount Kinnekulle UNESCO Biosphere Reserve, Sweden PERIODIC REVIEW MAN AND BIOSPHERE (MAB) PROGRAMME (YEAR 2010-2020)	Periodic Review	2020
Blekinge Arkipelag	Blekinge Arkipelag 10 years as a biosphere reserve Evaluation according to Unesco of the years 2011-2021	Periodic Review	2021
Biosfärområde Älvlandskapet Nedre Dalälven	NEDRE DALÄLVEN RIVER LANDSCAPE BIOSPHERE RESERVE Periodic Review   2011-2021	Periodic Review	2021
Nystedt, Ellen; Jonegård, Simon	East Vättern Scarp Landscape – 10 years as a biosphere reserve Review of the years 2012–2022 as required by UNESCO	Periodic Review	2022
Götene Kommun; Lidköping Kommun; Mariestads Kommun	Rapport från förstudien om biosfärområde "Vänerskärgården med Kinnekulle"	Preliminary Study	2005
Länsstyrelsen i Blekinge; Karlshamns kommun; Karlskrona kommun; Ronneby kommun	Rapport från förstudien om bildande av biosfärområde "Blekinge skärgård med kust"	Preliminary Study	2007



Jonegård, Simon; Hellsten, Claes; Råsberg, Anders	Rapport från förstudie om "Biosfärområde Östra Vätterbranterna"	Preliminary Study	2008
Ovanåker kommun	Förstudie till att bli utsedd till kandidat utveckla biosfärområdet: "Hälsingebygden i Voxnadalen"	Preliminary Study	2012
Berggren, Kajsa	Rapport från förstudien om Biosfärområde Vindelälven-Juhtatdahka - Vild, vacker och världskänd	Preliminary Study	2014
Biosfärprogrammet Sverige; Biosfärkandidat Voxnadalen	Biosfärområden som konfliktlösande arenor - Rapport från nationell workshop för Biosfärprogrammet Sverige	Report	2015
Sandström, Emil; Olsson, Anna	The process of creating Biosphere Reserves: An evaluation of experiences from implementation processes in five Swedish Biosphere Reserves	SEPA Report	2013
Heinrup, Malena; Schultz, Lisen	Swedish Biosphere Reserves as Arenas for Implementing the 2030 Agenda: Analysis and practice	SEPA Report	2017
Sandström, Emil; Sahlström, Emma	Building Biospheres Reserves through Collaborative Governance: a study of organisational forms and collaborative processes in Sweden's biosphere reserves	SEPA Report	2021
Löf, Marie	Sveriges biosfärområden - en accelerator för hållbar utveckling Femtio år av sammanlagda erfarenheter	SEPA Report	2023
Biosfärprogrammet Sverige	Strategi för Biosfärprogrammet Sverige	Strategy	n,d.
Heinrup, Malena	Biosfärprogram 2016-2021. Strategi för hållbar utveckling inom Östra Vätterbranterna 2016-2021	Strategy	2016
Biosfärområde Vindelälven-Juhtatdahka	Biosfärområde Vindelälven-Juhtatdahka: Vision, Övergripande mål, Verksamhetsidé, och Värdegrund	Vision, Operational Plan and Values	n,d.
Biosfärområde Östra Vattenbranterna	Vision, Verksamhetsidé, och Värdegrund, Östra Vattenbranterna	Vision, Operational Plan and Values	2011

# Appendix G

In the table below is a condensed overview of the codebook that was utilized to navigate and categorize the data. It includes a description of each theme and a definition of the five most critical sub-codes which were applied. A subcode was not necessarily exclusive to one theme but had varied importance depending on the theme. Additionally, an illustrative example of how codes were developed can be found below:

The development of new codes that have emerged during the coding process can be illustrated with the example of the code “new government”, which refers to the government that came into power in Sweden in 2022. One of the interview questions dealt with the influence of the political context, and asked whether the interviewees could think of any policies or political circumstances that affected citizen participation in the BRs. The authors had not explicitly thought about the national government or the former elections having an impact on this, yet respondents frequently mentioned the “new government” and related changes in budget and funding possibilities for their projects. Hence, the code “new government” was added to the code book.

*An overview of the Five Overarching Themes and the most Critical Sub-codes that Helped Define them.*

Code	Description
<b>Theme 1: Biosphere Reserve Concept</b>	Attributes of the respective BR, or the concept on a national / international level. Including role descriptions, management practices, goals, and objectives of the concept.
<b>Examples of sub-codes</b>	
<i>BR platform</i>	Evidence describing the BR organization as a platform, meeting space, etc.
<i>BR role</i>	Descriptions of the role of the BR, what it hopes to achieve with what capacities. Had its own sub-codes such as neutral, model area, etc.

<i>Sustainable development</i>	Notions of sustainable development, emphasizing its integrated approach (i.e. mentioning environmental and developmental objectives in conjunction).
<i>Impact of BR</i>	The effects and outcomes of the BR organization and its work.
<i>Management</i>	Various characteristics of the BR organization in a managerial sense, including structure and governance.
<b>Theme 2: Change</b>	Experienced change in different forms, its causes, and consequences for individuals and for the wider work.
<b>Examples of sub-codes</b>	
<i>Environmental change</i>	Anything from climate change, biodiversity loss, extreme weather events, etc.
<i>Non-environmental change</i>	Change related to development in different capacities, such as industrial, economic, social, and political.
<i>Response to change</i>	The various ways which individuals and organizations respond to change.
<i>Consequences of change</i>	What the implications of different types of change has for individuals or organizations, and the BR organization and its objectives.
<i>Land-use change</i>	Changes related to land tenure, with its own subcodes including forestry and agriculture.
<b>Theme 3: Conflict</b>	Instances, experiences, and evidence of conflicting interests, perspectives, and visions within BR management and work.
<b>Examples of sub-codes</b>	
<i>Actors</i>	The different types of actors active in BRs, made up of several of its own sub-codes such as foresters, farmers, businesses.
<i>Different interests</i>	Describes when there are different / clashing interests representation, motivated by, for example, environmental vs. economic motivations.
<i>Different perspectives</i>	When there are different views or disagreements of a particular issue.
<i>Power</i>	Examples and experiences of power, particularly imbalances.

<i>Conflict resolution</i>	Examples and experiences of how conflict has been solved, or how the BR organization attempts to / can help mediate and solve conflict.
<b>Theme 4: Political Context</b>	Highlights the role of the political context divided across levels, and its impact on the management and activities of BRs.
Examples of sub-codes	
<i>Local level</i>	Related to municipal and regional influences.
<i>National level</i>	Issues relating to the national governance and its influence on the BR management.
<i>International level</i>	Related to the wider forces, such as the MAB, or other international agreements and influences that impact local BR work.
<i>New government</i>	Mentions of the new government (2022).
<i>No effect</i>	When there is an explicit mention that there is no influence of the political context.
<b>Theme 5: Participation</b>	Major theme that encapsulates the participation design, objectives, and barriers and opportunities of public participation in Swedish BRs.
Examples of sub-codes	
<i>Participation definition</i>	The ways in which participation is defined explicitly.
<i>Participants</i>	What stakeholders are described to constitute participants in the context of local public participation.
<i>Forms of participation</i>	Explanations and examples of forms of participation.
<i>Goal of participation</i>	The desired objectives of participation; what it hopes to achieve.
<i>Barrier / opportunity</i>	Enabling and disabling factors for increasing participation or making it achieve the goals it sets forth.