East Vättern Scarp Landscape – 10 years as a biosphere reserve

Review of the years 2012–2022 as required by UNESCO

FOREWORD

When the East Vättern Scarp Landscape was designated as a biosphere reserve 10 years ago, a trust had been built up over more than a decade prior, a journey from conflict to collaboration. This joint project between agriculture and forestry, businesses, associations, authorities and special-interest organizations has proven to be fertile ground for efforts towards sustainable development in all dimensions. At the heart of it, we have united to learn in-depth about various perspectives. Collaboration and respect for one another's starting points and values are the very foundation of the biosphere association.

The world is changing, and society faces new challenges. Once upon a time, biodiversity was self-evident to everyone. Only the very most informed people had begun to realise that reduced biodiversity could affect everything from the interactions between individual species to global biological balances to nature's ability to meet the needs of humans. The knowledge we gained in BioBlitz 2012, with more than 1,000 species identified, was a sensation.

Today we note with worry the lack of scientific knowledge in the general public while species compositions are changing and global diversity is decreasing at a rapid pace. We want to work for enhanced learning. A good understanding of scientific connections is a necessary foundation for building increasingly sustainable future development. The Eco-Bus, biosphere ambassadors, mini ambassadors, guided tours, forest days, study visits with farmers and businesses, study circles and university courses demonstrate the breadth of our work with learning. We work with the landscape's historical changes and our cultural heritage. We also try to carry on old knowledge and techniques such as pollarding, scything, various methods of forestry and seine fishing, as well as emphasising the contents of the Swedish right of public access. On major, controversial issues, we have tried to hold in-depth dialogues to move further.

When we began working on the East Vättern Scarp Landscape, the climate debate was just beginning. Today we observe concrete signs that climate change is global as well as local, which makes clear the seriousness of the IPCC reports. In these 10 years, we have initiated a change in our attitudes towards nature and our lifestyle on many levels in the biosphere reserve. We see an increased interest in refinement and creative development in the green industries as well as the hospitality industry. Today we see climate measures as an overall umbrella. We adapt our operations and develop concrete measures to contribute to turning the tides. Our work with solar energy and other energy sources are good examples of this.

It is our job to preserve, develop and support so that people can live and work in our area. In our efforts to preserve and develop a living landscape in our beautiful region, collaboration between businesses, landowners and authorities is crucial. In the past few years, conflicts of interest between production and development of arable land, linked to small businesses and increasing small-scale food production, have become a key issue.

Each project and each activity conducted under the association's auspices must be weighed against the goal of being a model area for sustainable development. For each project, collaboration should be the method for success. Many projects have focused on development through the preservation of natural values and improved conditions for outdoor activities and social sustainability, but they have also contained aspects of financial sustainability and profitability for the users. The foundation of the biosphere's activities has been and remains: Collaboration and Knowledge. Cataloguing the circumstances of the East Vättern Scarp Landscape has led to a number of strategic documents, preliminary studies and projects.

At the same time as the grand perspectives are discussed, a large number of users, businesspeople and residents are also living their daily lives. Everyday life in the East Vättern Scarp Landscape differs from other places due to the combination of circumstances here: the rolling landscape, varying and rich biodiversity, small properties (from both a national and regional perspective), the well-developed infrastructure, close proximity to cities and towns and a strong entrepreneurial spirit and a growing hospitality industry.

Small business ownership is important in the area. Combining the unique natural setting with business ownership is often a challenge, but in this 10-year period a number of once-small businesses have evolved and grown as the world has changed, using their knowledge of the uniqueness of the East Vättern Scarp Landscape to contribute to sustainable development through their business. There are many examples of this: farm shops, tourism companies in purely rural environments, REKO-rings, forestry companies, building materials companies and conventional agricultural companies. When companies succeed in growing, they have a great impact on the small-scale, rolling agricultural structure in the East Vättern Scarp Landscape and they contribute to a living agricultural landscape where many choose to stay or to move to instead of moving away. This in turn allows more small businesses to thrive and allows those that do not have large plots of land to stay in operation anyway. In the future, it will be critical to contribute to creating a sustainable, green business climate, which in turn can have a ripple effect. The bigger companies and/or role models that have stabilised the economy are solution-oriented and develop their businesses as times change. They are important for development, as key sources of inspiration and bearers of faith in the future.

It is also an important task to make the East Vättern Scarp Landscape accessible to local residents and tourists alike. Over the years we have created several walking trails, such as the Franciskus and Griabäcken biosphere trails, and we have held several guide training courses. The restrictions in long-distance travelling of the past few years have led to many people taking advantage of this in their staycations.

The refugee situation of 2015 led us to introduce measures such as “learn to speak Swedish” walks for newcomers. After that, we pursued social sustainability and integration in several formats, such as teaching women from other countries to ride bicycles. Now we are likely to face another difficult refugee situation and we plan to help out with what we are best at: gender-equal inclusion, outdoor recreation, understanding Sweden, and culinary experiences. Our previous experiences will serve us well in this.

All these people and the variety of operations and activities in the East Vättern Scarp Landscape are what make the biosphere reserve so unique, where collaboration, knowledge and variation all make the region a key hub. The core organisations of the biosphere association and others contribute to maintaining this foundation, because it is about their members, their stakeholders and their target groups. What makes the East Vättern Scarp Landscape different from other areas is the dedication of landowners, entrepreneurs and their special interest organisations to work together to increase sustainability in a way where use, preservation and development go hand in hand.

The biosphere reserve activities are often made visible through various projects aiming to preserve, develop and support, but the area also boasts a dedication and everyday activity that are so much more than that. People here live and work with, based on and in harmony with nature and modern society.

Our activities are broad and may seem scattered, but from a holistic perspective you can see that everything is interconnected in a content-rich biosphere web, where collaboration is the glue that binds it all together.

A challenge for the biosphere association is maintaining the level of commitment and making all these activities visible, along with everyone who uses, preserves and develops the landscape with its biological values and ecosystem services and makes our region accessible to residents and visitors alike. All with the aim of contributing to sustainable development based on knowledge and collaboration.

The biosphere association wishes to express its gratitude, happiness and pride over the excellent teamwork we share with the founding organisations above all. They have shouldered the role of creating engagement among users, special-interest organisations and authorities with aplomb, which has led to the Biosphere Spirit that defines the East Vättern Scarp Landscape. With great pride and gratitude to everyone who has worked for our collective benefit over the years, we present the story of the past decade of activity.

"We are all a part of the Biosphere" will remain our guiding star, as we continue in the next 10 years to carry out our mission of serving as a model region for sustainable development, weaving together the ecological, financial and social sustainability perspectives and jointly contributing to transforming the climate and extinction disasters into positive development locally and globally.

Inger Ekengard, Chair of the East Vättern Scarp Landscape biosphere association

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Title: East Vättern Scarp Landscape – 10 years as a biosphere reserve, Review of the years 2012–2022 as required by UNESCO

Authors: The review was drawn up on order of the East Vättern Scarp Landscape biosphere association by Ellen Nystedt and Simon Jonegård. In addition, a large number of people contributed material directly or indirectly.

Cover photo: Elin Elderud
Maps: County Administrative Board of Jönköping

PART 1: SUMMARY

a) Name of the biosphere reserve: East Vättern Scarp Landscape Biosphere Reserve

b) Country: Sweden

c) Year of designation: 2012

d) Year(s) of periodic review(s): 2022

e) Previous recommendation(s) made by the International Co-ordinating Council (MAB- ICC), if applicable: Not applicable

f) What follow-up actions are completed and if not completed/initiated, please provide justifications. Not applicable

g) Update on the implementation of measures to achieve the objectives of the biosphere reserve.

- Since designation as a biosphere reserve, an organisation for biosphere operations has been established. The NGO Biosfärområde Östra Vätterbranterna is the principal for the biosphere reserve and embraces both a bottom-up perspective and a certain agency perspective. Authorities and special-interest organisations, user organisations and associations, businesses and private members all have clear roles in the established organisation that works together for their own individual and shared initiatives, measures and communication. Here are the activities the NGO has carried out:

- Hired a coordinator and established a biosphere office.

- Developed a strategic tool, a biosphere programme with six general focus areas and a stated need for continuous collaboration forums and working groups. The six focus areas were developed based on the unique values and local conditions of the area, the Lima Action Plan, Agenda 2030 and various regional plans. The focus areas are: Living Landscape, Energy and climate, Tourism and outdoor recreation, the East Vättern Scarp Landscape Brand and the Biosphere Academy.

- The Biosphere Programme has resulted in targeted efforts to preserve, develop and support with activities and operations in the area related to sustainable development, with the aim of inspiring and spreading knowledge.

- Projects have worked to adapt communication in order to raise interest in and knowledge about what efforts to increase sustainability can entail.

- Improved infrastructure and digital communication has improved availability for sustainable exploration of the East Vättern Scarp Landscape.

- Various players have been engaged and coordinated through defined collaborative groups – focus groups.

h) Briefly describe the process by which the current periodic review has been conducted.

The review process began in the autumn of 2021. The responsible body is the board of the NGO, while the work was conducted by two external consultants with good knowledge of

UNESCO's MAB programme as well as the specific biosphere reserve: Ellen Nystedt from the County Administrative Board of Jönköping and chair of the Living Landscape focus group, and Simon Jonegård, former biosphere coordinator (2012–2014). Throughout the review process, close contact was maintained between the chair, the coordinator and the board. Several meetings and contacts were also made with the national MAB secretariat.

A large number of people were involved and interviewed during the review process. Participants were selected who previously or currently hold key positions or are very active in the biosphere reserve. In addition, people with an interest in the biosphere reserve and sustainable development were given the opportunity to contribute via a survey distributed by social media and a newsletter.

The review was circulated for comments to all the founding organisations, board members and focus groups in April 2022. It was also sent to the other Swedish biosphere reserves and the Swedish Biosphere Reserve Office for information. Comments were received from 10 organisations, board members and focus group participants. All statements were considered and comments on details were addressed with additions and improvements to details and data in the final version of the 10-year review. A joint action meeting was held with the founding organisation Södra Skogsägarna as a result of the review comments. General and structural comments related to the biosphere association's overall structure and organisation were addressed by turning over the documents to the board.

i) Area and spatial configuration:

Area in hectares	Previous report (nomination form 2012)	Proposed changes (if any)
Area (ha) of terrestrial Core Area(s)	970	1,779
Area of terrestrial Buffer Zone(s)	10,300	9,513
Area of terrestrial Transition Area(s)	58,900	57,433
Area of marine/limnic Core Area(s)	1,150	1,032
Area of marine/limnic Buffer Zone(s)	30,700	30,615
Size of marine/limnic Transition Area(s)	2,700	4,109

The core area in the biosphere reserve has increased because the number of nature reserves has increased from 8 to 20 since the biosphere reserve was formed. The number of habitat protections has also increased by an area of just over 10 hectares. The differences in buffer zone areas between 2012 and 2021 is in all likelihood due to the data used to determine the boundary of the limnic/terrestreal area. In 2021 Lantmäteriet's property map Fastighetskartan was used, while a rougher/less precise dataset was used in 2011.

i) Human population of the biosphere reserve

	Previous report (nomination form) 2012-01-01 municipal residents registry	At present (review) 2022-01-01 Municipal residents registry
Core Area(s) (permanent and seasonally)	47	156
Buffer Zone(s) (permanent and seasonally)	6,945	7,501
Transition Area(s) (permanent and seasonally)	32,698	34 364

k) Budget (main sources of funds, special capital funds) and international, regional or national relevant projects/initiatives carried out or planned.

Budget in the nomination form 2011	Budget in 2021
SEK 1,830,000 (EUR 175,145)	SEK 1,813,000 (EUR 166,053)

The budget for 2021 consists of SEK 1,199,000 in national and local funding from the Swedish Environmental Protection Agency and Jönköping Municipality, SEK 31,000 in membership fees and SEK 583,000 in grants from WWF and project grants for three ongoing projects.

l) International, regional, multilateral or bilateral framework of cooperation. Describe, where applicable, the contribution of the biosphere reserve to achieve objectives and developing mechanisms that contribute to the implementation of international or regional bilateral or multilateral agreements, conventions, etc.

International and national:
The Lima Action Plan (LAP) is the global action plan that aims to unite the dedication and initiatives needed to achieve the global Biosphere Programme's vision. The guidance in the Swedish national version describes comprehensive goals and expected effects as well as specific tasks for Swedish biosphere reserves.

Agenda 2030 – 17 global goals. In September 2015, the UN General Assembly adopted a global agenda for sustainable development. The agenda has 17 global goals and 169 targets, which are designed to meet the challenges that the planet and humanity face. The document The Global Goals and the East Vättern Scarp Landscape Biosphere Reserve states that the biosphere association's work deals with most of the global goals, and especially the partnership goal, number 17.

Sweden's environmental objectives. The environmental objectives system consists of one generational goal, 16 environmental quality objectives and several milestone targets in the areas of waste, biodiversity, hazardous substances, sustainable cities and towns, air pollution and climate. Sweden's environmental objectives are the national implementation of the ecological dimension of the 17 global sustainability goals. Fourteen of the 16 environmental quality objectives affect the biosphere reserve.

The global strategy of UNESCO's Man and the Biosphere (MAB) Programme and its Lima Action Plan (2016–2025) emphasises the role of the biosphere programme for implementing the global goals. The East Vättern Scarp Landscape Biosphere Reserve's biosphere programme specifies how and which of the global goals the biosphere association aims to contribute to. The projects "Communicating a biosphere reserve", "More outdoor recreation", "Continuity forest", "Growing together" and "The Vättern Scarps Grass-Fed Meat Brand" contribute very clearly to several of the 17 global goals.

The Convention on Biological Diversity (CBD). Sweden signed the convention in 1993 and incorporated it in Sweden's environmental objectives in 2010. The biosphere association embraced the CDB and the importance of contributing to the 17 global goals. The importance of biodiversity and how a model area can work to preserve and restore resilient biodiversity was established through, among other things, an ecological gap and functionality analysis. The purpose of this project was to develop threshold values for a number of species to identify what is necessary for ecologically sustainable landscapes. This method has led to concrete measures and can be further developed for more species and other geographical areas.

The biosphere association's annual operational plan is based on the established biosphere programme, which in turn aims to work towards the goals specified in the Lima Action Plan. The continuous operations of the six focus groups are conducted in various ways. Activities and projects are always established with strong ties to regional, national and international plans, goals and commitments. How this is done and which are the most relevant is briefly described below.

The European Landscape Convention. The biosphere reserve efforts are carried out in accordance with the ambitions of the European Landscape Convention, which aim to enhance awareness, participation and a holistic view of the landscape. The biosphere association strives to:

- enhance awareness of the value and importance of the landscape in the community, in private organisations, among companies and at public authorities
- promote public participation in decisions and processes regarding the landscape locally and regionally
- develop a holistic view of the values of the landscape and how to manage them sustainably.

The UN Convention on the Rights of the Child. Throughout the 10-year period, the biosphere association has held nature excursions for schoolchildren in Jönköping Municipality. A total of 22,000 pupils have been taught and done studies in the biosphere reserve. Since 2020, a pilot study called "mini ambassadors" has been conducted in which pre-school children and pre-school teachers have learned about ecology, the outdoors and sustainability.

Regional and local:

Framework for collaboration in projects and focus groups. As the operations in the East Vättern Scarp Landscape Biosphere Reserve NGO are largely run as projects in collaboration with other special-interest organisations and authorities and through volunteers channelled into focus groups, supporting documents and guidelines have been established for running projects. These are based on the Lima Action Plan and the Global Goals for sustainable development.

The frameworks for collaboration between the biosphere association and each party are clear. All parties in the projects commit to be inclusive, sustainable and ensure gender equality, which allows for multiple parties to contribute with funding and expertise. For example, we can describe a positive collaboration with the World Wildlife Fund (WWF) and the forest landowners' association Södra Skogsägarna, which have funded several educational projects, as well as collaborations with the Federation of Swedish Farmers (LRF), which has contributed funding and expertise and served as project owner of "Lövsuccé 2.0" (Broadleaf Success 2.0) and "Mer svenskt kött på restaurang" (More Swedish meat at restaurants). Two good examples of collaborative knowledge-enhancing projects in which parts of the activities and focus are in the biosphere reserve. Throughout the 10-year period, LRF and Södra Skogsägarna have been active partners and contributed expertise and commitment to projects and activities relevant to the organisation. Among other things, they have participated in steering committees for projects like Levande ekosystem i praktiken (Living Ecosystems in Practice), Lövsuccé 1 (Broadleaf Success 1) and Kontinuitetsskogsbruk (Continuity Forestry) (see more in chapter 4.2).

With the aim of promoting financially, ecologically and socially sustainable development in the countryside, Jönköping Municipality and the County Administrative Board have co-funded the biosphere reserve's work on skills, hours spent working on environmental projects by own employees and financial support for targeted measures. The County Administrative Board has primarily funded measures within the framework of the EU's Rural Development Programme, Green Infrastructure, the Species Action Plan, grants under appropriation direction 1:14 for area protection, terrestrial and limnic management and follow-up of the environmental objectives. The Swedish Forest Agency has contributed funding and expertise to several projects. Additional actors like the County Museum, the Gränna Skogsgrupp, local special-interest groups and interested volunteers have contributed valuable skills and time.

Regional environmental monitoring programmes: The biosphere reserve is covered by the regional environmental monitoring conducted by various players, where the County Administrative Board coordinates the monitoring in seven categories: Landscape: Forest, Agricultural land, Wetlands, Freshwater including groundwater, Health-related environmental monitoring and Environmental toxins. The environmental monitoring programme for Lake Vättern is coordinated by the Water Conservation Association (Vattenvårdsförbundet), and the programme for the tributaries in Southern Vättern is coordinated by SRK (Samordnade Recipient Kontroll – Coordinated Recipient Control). The biosphere association contributes to the dissemination of knowledge and information about monitoring and its results.
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PART II: PERIODIC REVIEW REPORT

1 BIOSPHERE RESERVE:

1.1 Year designated:

2012

1.2 Year of first periodic review and of any following periodic review(s) (when appropriate):

2022

1.3 Follow-up actions taken in response to each recommendation from the previous periodic review(s) (if applicable), and if not completed/initiated, please provide justifications.

Not applicable. No assessment has previously been done for the East Vättern Scarp Landscape Biosphere Reserve.

1.4 Other observations or comments on the above.

No comments on the above.

1.5 Describe in detail the process by which the current periodic review has been conducted:

Once two external parties (Ellen Nystedt for the County Administrative Board and Simon Jonegård as a consultant) were put in charge of the practical implementation of the review in the spring of 2021, several meetings were held between the executive committee and the consultants, who explained that it was important to generate as much participation as possible of the members and the board throughout the evaluation process.

A report called *Landscape in Balance* was compiled in preparation for the review, which summarised much of the ecological knowledge generated in the framework of the biosphere reserve efforts and the results and experiences of some of the most important projects in ecology and green industries that have been carried out in this 10-year period. A new communication strategy was also established in preparation for the review, in which the primary target groups of the biosphere reserve were defined.

In the review process, discussions were held with Jönköping Municipality as well as neighbouring municipalities regarding a possible expansion of the biosphere reserve. There is potential interest in Aneby Municipality to the north, so Jönköping Municipality will investigate a potential future expansion there.

The practical work began with a review of a number of historical documents and archive materials, which were included in the review. Next, extensive outreach work was done to get people involved. In autumn 2021, in-depth interviews were held with 22 people. These included representatives from all seven founding organisations, the two municipalities, the previous and current key people and key organisations for the biosphere association’s operations. Group discussions were held with five of the six focus groups. Two separate

surveys were conducted with two target groups: the board as well as involved parties and members, and the general public. The survey consisted of about 20 questions and was divided into three sections, where parts 1 and 3 were the same for both target groups.

To collect correct, relevant information and statistics, the municipality, the County Administrative Board, the Swedish Forest Agency, the Water Conservation Association (Vattenvårdsförbundet), the forest landowners' association Södra Skogsägarna, the focus groups, several key people who were interviewed in depth, survey recipients and to some degree the board of the biosphere association have all contributed information and knowledge.

In the period from August 2021 to August 2022, the reviewers have participated at monthly board meetings. At each occasion, a brief presentation was held on the current status of the process, followed by the opportunity to ask questions and further discuss the situation.

In 2022, the retrieved information was compiled and expanded, and in April circulated for comments to all the founding organisations and others who requested copies for information.

1.5.1 Which stakeholders were involved?

In addition to the board, with representatives of five of the founding organisations, information was gathered from other organisations and volunteers. Suggestions, comments and thoughts were gathered orally and in writing in several different ways, including through surveys, group discussions with the focus groups and individual in-depth interviews. The interviewees include several of the former key people in the biosphere association who have gone on to other stakeholders with a certain interest in the biosphere reserve; representatives at the regional and local level in the landowner organizations Södra Skogsägarna and the Federation of Swedish Farmers (LRF); the County Museum; volunteer organisations; and active agriculture and forestry players.

One of the two questionnaires was solely for people with a stated involvement in the biosphere association. Below is a graph showing the relationship of the 21 respondents to the biosphere association.

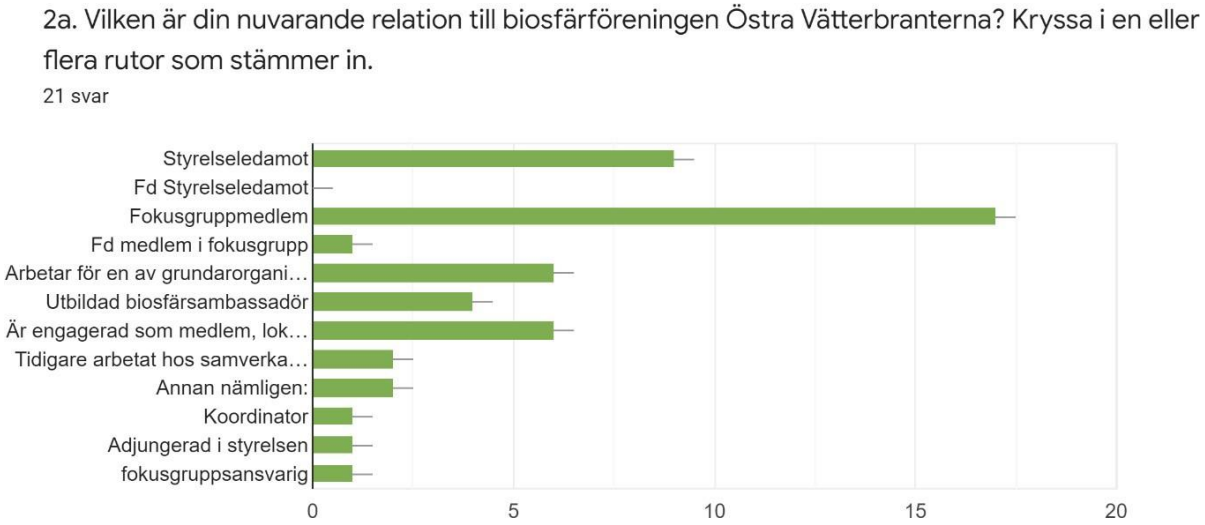

Figure 1. Survey responses to what relationship the respondents have to the biosphere association.

2a. What is your current relationship to the East Vättern Scarp Landscape Biosphere Reserve? Tick all boxes that apply.

21 answers:
Board member, Former board member, Focus group member, Former focus group member
Work for one of the founding organisations, Trained biosphere ambassador
Involved as a member, Previously worked in a collabating organisation, Other, Coordinator, Co-opted to the board, Focus group manager.

1.5.2 What methodology was used to involve stakeholders in the process (e.g., workshops, meetings, consultation with experts).

The following methods were used:

- Group interviews with five focus groups
- Conversations with Tranås Municipality and Jönköping Municipality
- In-depth interviews
- Survey to members/interested people in the general public
- In-depth survey to members of the board and involved people
- Workshop at the biosphere association's members' meeting
- Knowledge acquisition via written information
- Continuous discussions and exchange of information with the executive committee
- Regular attendance of board meetings
- Participation in external activities

1.5.3 How many meetings, workshops, etc. occurred throughout the process of conducting this review?

- 22 people participated in in-depth interviews, including representation from all seven founding organisations, the board and people who previously had key roles through their profession.
- 5 focus group interviews
- Group discussions with the Executive committee and the County Administrative Board
- 46 respondents in the survey for members and the general public – the questionnaire contained about 20 questions, both in-depth and general.
- 21 respondents to the survey intended for board members and involved people
- 1 workshop with 15 participants at the members' meeting on 22 September 2021
- Participation in meetings arranged by other parties with roles in the biosphere reserve
- Participation with information centres and Q&As at all board meetings during the period August 2021 to June 2022.

1.5.4 Were they well attended, with full and balanced representation? (Describe participation and stakeholders).

Participants in in-depth interviews were selected with the aim of obtaining the most valuable and representative experiences from the biosphere efforts. Altogether 22 people participated in interviews, with a 50/50 distribution of men and women. (11 women, 11 men).

The board has representatives from different interests in the community and professional fields, with a distribution of 9 women and 18 men. This means a large overrepresentation of men. The board also has an underrepresentation of lower-middle-aged members (under age

35). The board has actively participated in the review efforts and the reviewers perceived participation to be equal between women and men.

At a workshop for members (in September 2021), 15 people participated, with an equal gender distribution, but with an overrepresentation of upper-middle-aged people.

In the focus groups, there is an overall even gender distribution with a female dominance in Tourism and Outdoor Recreation, and a male dominance in Living Landscape and Green Industries. The focus groups have a limited age distribution, with the majority middle aged and upper middle aged.

2 SIGNIFICANT CHANGES IN THE BIOSPHERE RESERVE DURING THE PAST TEN YEARS:

2.1 Brief summary overview: Narrative account of important changes in the local economy, landscapes or habitat use, and other related issues. Note important changes in the institutional arrangements for governance of the biosphere reserve area, and changes (if any) in the coordinating arrangements (including the biosphere reserve organization/coordinator/manager) that provide direction for the biosphere reserve. Identify the role of biosphere reserve organization/coordinator/manager in initiating or responding to these changes.

For the past decade, the biosphere reserve has undergone significant changes primarily related to three major external crises: i) the refugee crisis of 2015, ii) the drought of 2018 and iii) the COVID-19 pandemic of 2020. What the three crises had in common was that while they were each global in origins, they also had considerable local impact.

The large influx of refugees in 2015 resulted in a sharp increase in the number of immigrants in the biosphere reserve within a short period, posing challenges to civil society and public institutions. Here, the biosphere reserve assumed the role of bridge builder, by working with integration in the areas of language, nature and culture (see Chapter 5.9).

The summer of 2018 was marked by extreme weather phenomena, with record high temperatures, months of drought and the severe depletion of water tables. This had a serious adverse impact on agricultural food and feed production, placing immense pressure on the agriculture and forestry industries in particular, and creating drought stress and subsequent spruce-bark beetle infestations that impacted forestry. Biodiversity was not as adversely impacted, as some overgrown lands were regrazed and drought-resistant species gained a competitive advantage over fast-growing grasses. However, some individual species may have suffered.

The COVID-19 pandemic has had a major economic impact, particularly on hospitality and restaurant industries located within the biosphere reserve. The manufacturing industry and other business sectors, as well as public and non-profit organisations, were also impacted to varying degrees, with the forced cancellation or postponement of a range of investments, activities and projects. This was also true for the biosphere reserve, where several projects were impacted, as well as the association’s ongoing work. Prior to the pandemic, the association held some 25 different external events annually, through which it disseminated information about the biosphere reserve. No events could be held during the pandemic, which had a considerable impact on the association, causing, among other things, a sharp decline in membership.

During the period, the question of a potential major mining operation in the northernmost section of the biosphere reserve has been more or less relevant. Due to the substantial international demand for rare-earth metals, the question has global dimensions. However, there is also a risk of serious adverse impact at a local level. Early on in this process, the biosphere reserve seized the initiative to form a dialogue group comprising representatives of various interests, which was expected to help improve the understanding of the question's complexity among key people in the conflict.

Other infrastructure changes have also impacted the biosphere reserve, such as the construction and planning of wind farms and the utilisation of agricultural and forest lands for housing and industry.

Due to declining profitability in milk production, the number of grazing cattle has trended negatively, declining about 5%. This has a direct impact on the area's valuable natural grazing lands. However, during the drought of 2018, more animals than usual were released into more marginal plots of land with encroaching vegetation. The number of small-scale food producers,
farm shops and cafés increased significantly during the period. In addition, the REKO-ring phenomenon has enabled several primary producers to sell some of their products to consumers without intermediaries.

Activity-based tourism, such as cycling, hiking and fishing, has definitely expanded considerably during the period. Similarly, the interest in countryside qualities – visits to homestead cafés, natural areas and all of the lakes in the region – has increased significantly and become a reason to travel in itself. As mentioned above, the industry was hit hard by the COVID-19 pandemic, which reduced the number of foreign travellers, while increasing the number of domestic travellers. During the period, the biosphere reserve invested heavily in making outdoor recreation and tourism more accessible, by establishing various types of trails and providing improved information, particularly about hiking. Within the framework of Leader Vättern, work was undertaken in collaboration with various contributors and stakeholders to strengthen and develop the hospitality industry linked to outdoor recreation and fishing at Lake Vättern.

The coordination of biosphere work was shouldered by four different coordinators during the period. The focus of biosphere work has changed over the years. Initially, activities focused on consolidating the biosphere reserve and creating a local organisation, as well as the development of major international commitments. In the next phase, a stringent focus was placed on launching and managing various types of projects. In recent years, greater emphasis has been placed on administrative order and the predictable long-term implementation of the biosphere programme, as well as UNESCO's established goals for biosphere reserves.

Institutional changes:
The Swedish Forest Agency, which is a national authority, is of the opinion that it has an important role during the establishment phase, but not once a project is transferred to the administration phase – after which the Swedish Forest Agency has a crucial partnership role for specific projects or activities clearly connected to the agency's assignment. This is true for all of the biosphere reserves they have been involved with, which is why, as of 2018, they have no longer been participating as a "founding organisation".

In 2018, the Federation of Swedish Farmers (LRF) announced its withdrawal as a "founding organisation" in the biosphere association. Although LRF has been deeply involved in the

coordination of East Vättern Scarp Landscape for some time, it has had difficulties sustaining its manpower and financial support for the biosphere reserve. Several LRF members remain strongly committed to the biosphere reserve and discussions are under way about how LRF can participate in the association in the future.

Throughout the 10-year period, LRF, the forest landowners' association Södra Skogsägarna and the Swedish Forest Agency have been active partners and participants in practical project-oriented work, such as in the steering committees of the Continuity Forest and Broadleaf Success projects. The follow-up project, Broadleaf Success 2.0, is jointly managed by LRF and other contributors.

The former board-member organisations – the Swedish Forest Agency and LRF – have both, along with the remaining board members, Södra Skogsägarna, Jönköping Municipality and the County Administrative Board, contributed working hours to this review.

2.2 Updated background information about the biosphere reserve.

2.2.1 Updated coordinates (if applicable). If any changes in the biosphere reserve's standard geographical coordinates, please provide them here

(all projected under WGS 84): No changes since the date of application.

Cardinal points:	Latitude	Longitude
Most central point:	64° 30' 00" N	14° 21' 60" O
Northernmost point:	64º 52' 80" N	14º 18' 40" O
Southernmost point:	63º 92' 20" N	14º 08' 90" O
Westernmost point:	63º 95' 50" N	14º 04' 80" O
Easternmost point:	64º 36' 50" N	14º 38' 60" O

2.2.2 If necessary, provide an updated map on a topographic layer of the precise location and delimitation of the three zones of the biosphere reserve Map(s) shall be provided in both paper and electronic copies.

Shape files (also in WGS 84 projection system) used to produce the map must also be attached to the electronic copy of the form.

QR code for the biosphere map in the County Administrative Board's web-based geographic information system indicating the zoning.

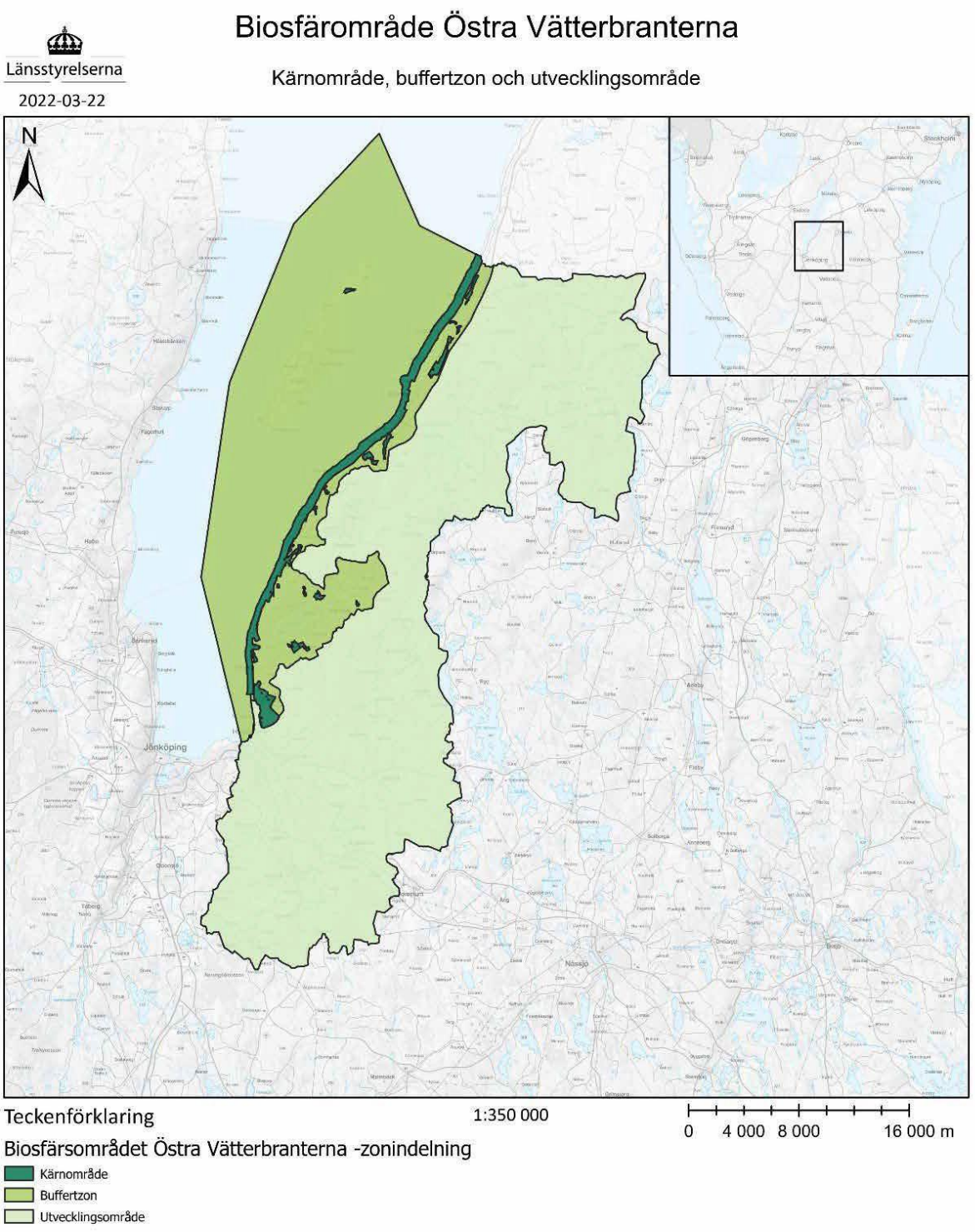

Figure2. Zoning map. Core Area, Buffer Zone and Transition Area.
Source: The County Administrative Board of Jönköping's web-based geographic information system.

Legend; East Vättern Scarp Landscape Biosphere Reserve – zonation:
-Core Area
-Buffer Zone
-Transition area

2.2.3 Changes in the human population of the biosphere reserve.

At the date of application (1 January 2012), the population in the biosphere reserve was 39,690. At the date of the review (1 January 2022), a total of 42,021 people were living in the East Vättern Scarp Landscape. The population has thus increased by about 6% in ten years. The biosphere reserve is mostly located within Jönköping municipality – an expansive municipality with a rapidly increasing population (about 10% during the period).

2.2.4 Update on conservation function, including main changes since last report. *Referf to 4 below*

Conservation and use of agricultural and forest landscapes

Strategic and action-oriented nature conservation work has been undertaken in the past 10 years, involving the formal protection of areas with very high nature values, measures to protect endangered species, increased information and public access. Technical developments have enabled the general public to acquire knowledge by simple means, through the digital reporting of species finds. Over the years, this development has resulted in increased knowledge, opportunities to retain and increase competencies in terms of where elements worthy of preservation are located in the landscape.

The Swedish Forest Agency has established one new habitat protection and the County Administrative Board has established 12 new nature reserves within the biosphere reserve's core area. These areas have very high natural values associated with several different forest types. The County Administrative Board has worked to promote biological diversity in the buffer zone and transition areas, through the Action Plan for Endangered Species (ÅGP), area protection, efforts with Green Infrastructure and special initiatives for bats and pollinating insects (Chapter 4.2). Protected fish and fishing areas have been established within Lake Vättern's water zone, and measures have been taken to strengthen the conservation status of species and habitats indexed under the EU Species and Habitats Directive, within the framework of Vättern as a Natura 2000 site.

In the water conservation plan for Lake Vättern, the environmental quality objectives are followed up and measures are proposed for achieving targets that are not deemed to have been met. The plan was adopted in 2015 and is used in, for example, permit processes. The management plan from 2017 for fish and fishing consists of a governing document that complements the water conservation plan, with sections pertaining to fish and fishing. As with the water conservation plan, the management plan is designed to provide advice and guidelines in the management of fish and fishing in Lake Vättern. (Chapter 4.2)

Various habitats within the buffer zone have been the focus of several projects aimed at strengthening biodiversity and bio-cultural heritage, adapting the forest to the climate by, for example, increasing the proportion of broadleaf trees, and increasing the interest in and knowledge of new and traditional ways of economically cultivating grasslands, forests and land, while strengthening their ecosystem services and resilience. Chapters 4.2 and 4.3 provide further information about some of the most important projects implemented: LEIF, continuity forest cultivation, Broadleaf Success and efforts to establish demonstration areas for various habitats.

A range of activities, projects and physical measures – such as a feasibility study on hyper-localised tourism, a compilation of socially valuable natural areas and the establishment of new hiking and biking trails, information nodes and demonstration areas – were implemented within the framework of developing a sustainable tourism industry, sustainable product

development and meaningful leisure activities for residents. These activities included the annual Röttle nature and cultural day (Röttle Day), which is jointly arranged by the Grenna Local History Society and other organisations. Röttle Day attracts a large number of visitors and is hosted centrally, within the biosphere reserve's core area.

Hot summers, increasing tourism, the drought of 2018, the pandemic of 2020–2021 and the national Year of Outdoor Sports and Recreation in 2021, have collectively brought the attention of biosphere residents and incoming visitors to the great resources of beautiful nature, soft adventures and access to sandy beaches, located primarily within the core area and buffer zone. The increased demand for passive and active wildlife experiences within the biosphere reserve's core areas has not created any problems. The administration has reported increased localised strain, and a greater need for outdoor facilities and signage to prevent disturbance to sensitive nature, as well as the local residents.

The increasing diversity of small local enterprises that offer accommodation, wildlife experiences, cultural experiences and small-scale agricultural and forestry production items made from local raw materials via farm shops, cafes and restaurants in the vicinity of the core area is resulting in greater demands and opportunities for selling, for example, meat from natural pastures, directly to end consumers.

On the whole, efforts to create a more sustainable hospitality industry, the implementation of the food strategy, municipal initiatives with destination development, heritage interpretation in the core area and buffer zone, and increased national funding for the management of nature reserves, in combination with hot and dry summers, the pandemic and an invigorated focus on local outdoor recreation, have resulted in a higher number of small-scale entrepreneurs operating in various sectors of the green and hospitality industries. For example, the number of farm shops and tourism companies that offer their guests nature and taste experiences or otherwise provide wildlife experiences, such as by enabling independent pack-free cycling or hiking tours.

2.2.5 Update on the development function, including main changes since last report. (Note briefly here and refer to 5 below).

The 2012 application indicated six thematic issues that the East Vättern Scarp Landscape was working on at the time to develop the area sustainably. The biosphere programme that was subsequently drafted and adopted in 2016 differed somewhat, with focus areas only partly maintaining the same course – see below:

2012 – thematic issues	**2016–2022 – focus areas**
East Vättern Scarp Landscape Brand	East Vättern Scarp Landscape Brand
Small-scale wood refinement and set-aside woodland	Living Landscapes (also below)
Tourism	Tourism and outdoor recreation
Locally produced goods	Gastronomic region
Renewable energy	Energy and climate
Landscape history and ecology	Living Landscapes (also above)
–	Biosphere Academy

Under the biosphere programme, focus groups were appointed for each focus area, which has allowed for the development function to be managed in a more structured manner. The primary changes and initiatives within each of the five principal focus areas are briefly stated (the Biosphere Academy is primarily linked to the support function; see the following

chapter). Due to the historical origin and development of the biosphere reserve, the limnic perspective features weakly in the biosphere association's activities in terms of aquatic environments, fishing and the hospitality industry. Measures and activities under the auspices of the biosphere association have been implemented within the scope of the Living Landscape focus group.

The East Vättern Scarp Landscape Brand: Strengthening the East Vättern Scarp Landscape as a brand for sustainable products and experiences has been a goal since its designation as a biosphere reserve and is considered crucial to generating momentum for the development function. In 2021, the biosphere association adopted a communication strategy that, based on various target groups, defines what the East Vättern Scarp Landscape Biosphere Reserve brand stands for and what messages to disseminate (read more in Chapter 2.3.3). The "Vättern Scarps Grass-Fed Meat Brand" project is an example of a brand that was deemed to have considerable potential to impact the development function and the sustainable use of the landscape. Installing signs at the entrances to the biosphere reserve is a crucial component of branding work, but this is yet to be realised.

Tourism and outdoor recreation (Chapter 5.2): Although the hospitality industry has expanded considerably during the period, it has also had challenges with the COVID-19 pandemic. "Sustainable Product Development" (HPU), which was ongoing between the years of 2016 and 2019, was aimed at: "Developing and launching an internationally competitive product range based on the region's unique values in terms of nature, culture and meal experiences, in order to meet the great demand for nature and culture-based experiences". One of three priority areas was the East Vättern Scarp Landscape Biosphere Reserve. The project supported companies in their efforts to thoroughly review their business from a sustainability perspective and from a guest perspective. During the period, considerable investments were made to develop hiking trails and bicycle tourism within and beyond protected areas.

Gastronomic region (Chapter 5.3): The East Vättern Scarp Landscape's agriculture provides the basis for developing the biosphere reserve into a gastronomic region. There has been a noticeable decline in the number of agricultural holdings and grazing animals, which is a major challenge for the biosphere reserve. However, the number of small-scale food producers rose sharply during the period, as well as the number of farm shops and cafés with proprietary production. In addition, the REKO-ring phenomenon has enabled numerous primary producers to sell their products directly to consumers. Various projects and initiatives in the biosphere reserve have been launched to promote this development. However, there are major challenges associated with, for example, maintaining the number of grazing animals in the landscape, which requires an intensified commitment around this focus area.

Energy and climate (Chapter 4.3): Climate change, which is one of the greatest challenges of our time, requires the commitment of the whole of society to change, and the biosphere reserve could have an important role in this regard. Within the framework of this focus area, various study visits, lectures and meetings were arranged regarding sustainable energy production, sustainable consumerism, sustainable transport, sustainable construction and reduced energy use. It is also worth mentioning that a popular initiative during the period was the expansion of photovoltaic systems in the countryside, including workshops on the benefits of solar energy. The initiative was undertaken in collaboration with the County Administrative Board, photovoltaic-system installation companies and the local energy company, Jönköping Energi.

Living Landscapes (Chapters 5.3 and 5.7): In connection with the UNESCO application, an extensive study was conducted, in which the area's particularly important terrestrial

environments were highlighted and subjected to an ecological gap and functionality analysis. The data is unique in that it indicates where there are sufficient acreages and substrates for preserving the ecosystem concerned in the long term, as well as where and how much needs to be recreated to ensure landscapes are ecologically sustainable. The analysis has contributed significantly to increasing knowledge about the need to protect pastures in the East Vättern Scarp Landscape. This knowledge was subsequently compiled in *Landscapes in balance,* in order to shed light on how ecologically sustainable terrestrial landscapes in the East Vättern Scarp Landscape can provide the basis for sustainable production and diverse enterprise. The report provides examples of various collaborative projects, measures and environmental initiatives that could contribute to positive economic development. The clearest examples of where progress has been made but work remains in the East Vättern Scarp Landscape include the hospitality industry, fruit growing, grass-fed meat, varied forestry and investments in wetlands. In the course of their work with Lake Vättern and its unique values, other stakeholders and authorities have created knowledge bases and implemented measures for the sustainable use of Lake Vättern. In 2022, the focus group initiated certain activities through a work group tasked with reviewing how Lake Vättern and other lakes, as well as fish and fishing, can be better integrated, invigorated and developed within the framework of future biosphere work. Lake Vättern is unique in that it has particularly important environments and is of nation-wide interest for outdoor recreation, and that the entire area is part of the EU Natura 2000 network. There is also small-scale commercial fishing and a growing hospitality industry related to fishing tourism and other outdoor recreation.

2.2.6 Update on logistic support function, including main changes since last report. (Note briefly here and refer to 6 below).

The Biosphere Academy (Chapter 6.4) is one of the focus areas in the biosphere programme adopted in 2016 (see preceding chapter). The Biosphere Academy is an arena for learning about the transition to a more sustainable society in a manner that unites the perspectives of various stakeholders, and integrates the knowledge and experiences of earlier generations with new knowledge and sustainability visions. Close national and international collaboration with educators and educational programmes at Jönköping University and other university networks in the field of sustainability has contributed to implementing the UNESCO Global Action Programme on Education for Sustainable Development (GAP/ESD) in the biosphere reserve. The programme was completed in 2019 and replaced with a new similar programme that provides the basis for the Biosphere Academy's activities.

The Biosphere Academy's main activities have included:

- **integrating and problematising** various perspectives on sustainability issues, primarily through courses, seminars, conferences, etc.
- **collaborating** with various stakeholders that have educational functions: schools and childcare, universities and other institutes of higher learning, public education organisations, museums, volunteer organisations, companies, authorities, biosphere reserves and other international stakeholders.
- **initiating** research projects that meet the needs of the biosphere reserve.
- **structuring** aggregated information. In acting as a link between different perspectives, it is important to create structures that coordinate various aspects of learning. To allow for recipients to have the most neutral impression possible and to form their own opinions based on the data, they receive all the available information so that they can, to the extent possible, proceed from a scientific basis without being influenced by the content of the information provided. Consequently, neutrality is critical in the biosphere reserve's role as a link between various perspectives.
- **documenting** and disseminating knowledge and experiences. This includes traditional

knowledge in the field, as well as the development of new knowledge and sustainability strategies.
- **implementing** documented sustainability strategies and models, and arranging workshops, conferences, etc. in collaboration with various stakeholders.
- **disseminating** knowledge and experiences in printed or digital formats.

The academy's ultimate goal is to strengthen the participation and commitment of residents and other stakeholders in the area, and to contribute to the realisation of the biosphere reserve's visions based on the association's values. The initiative to train biosphere ambassadors and mini-ambassadors is an important aspect of this work.

During the period, the concept of demonstration areas was developed and signs were installed in collaboration with various organisations to indicate interesting natural areas subject to conservation and land use regulations. The demonstration areas also function as nodes for field training, and for disseminating knowledge about sustainable methods and the sustainable use of natural resources. During the period, a major investment was also made in marking hiking trails, to make it easier for people to explore the biosphere reserve on foot (Chapter 6.7).

Through the biosphere association and all of the focus groups, efforts were made in communicating about the biosphere reserve through websites, social media, films and printed materials. To help communicate what sustainable development entails and what a biosphere reserve is, the focus group, East Vättern Scarp Landscape Brand, has undertaken work that has resulted in a new communication plan (Chapters 2.33 and 6.55).

Research is being conducted in several different subject areas (Chapter 6.2) and the biosphere reserve has been mentioned in international scientific journals. The research on collaborative processes conducted by the Stockholm Resilience Centre has been particularly prominent. The 2012 application described the recently commenced work of performing a comprehensive ecological gap and functionality analysis (BriFunk), as being aimed at investigating the entire landscape's functionality based on its quality and quantity. The analysis has been completed and now provides a valuable scientific foundation for the biosphere reserve's continued work. BriFunk is implemented in the *Living Landscapes* report, which was jointly prepared with Linköping University.

2.2.7 *Update on governance management and coordination, including changes since last report (if any) in hierarchy of administrative divisions, coordination structure. (Note briefly here and refer to 7 below).*

Biosphere work is organised (Chapter 7.2) through a non-profit organisation led by a coordinator, an operations committee and a Board of Directors. The association is based on democratic principles, where each member is of equal value and all Board members have equal influence, in accordance with the biosphere association's articles of association. The Board members represent the public, private and non-profit sectors of society. Although all seven founding organisations still have a seat on the Board, the Swedish Forest Agency and the Federation of Swedish Farmers (LRF) have chosen not to retain their role as a "founding organisation" (Chapter 7.6.3).

The practical work was first organised by work groups that, upon the establishment of a biosphere programme in 2014–2016, were changed to comprise six focus groups. The 2016–2021 biosphere programme is a strategy for sustainable development that describes the association's structure and work. Its focus has been defined, along with proposals for

appropriate measures, activities and projects. The validity of the biosphere programme has been extended to the end of 2022 and this review forms an initial component of the work to develop a revised 2023–2025 biosphere programme (Chapter 7.5.2).

The biosphere association does not exercise any authority and does not conduct political advocacy work. The association pursues its activities in collaboration and close dialogue with authorities, special-interest organisations and other committed individual members.

The biosphere reserve's core areas are primarily managed by the County Administrative Board, and smaller areas by the Swedish Forest Agency and Jönköping Municipality.

2.3 The authority/authorities in charge of coordinating/managing the biosphere reserve. (Comment on the following topics as much as is relevant).

2.3.1 Updates to cooperation/management policy/plan, including vision statement, goals and objectives, either current or for the next 5-10 years

In connection with its designation as a biosphere reserve, the East Vättern Scarp Landscape Biosphere Reserve was formed as a non-profit association. The association adopted the following vision: "We are all part of the biosphere! That is why we work together in the East Vättern Scarp Landscape to preserve, develop and support the local community's vitality and natural and cultural heritage, as well as knowledge and practices – for ourselves and posterity!"

In addition, the association adopted the following concept: "The East Vättern Scarp Landscape Biosphere Reserve shall strive in the long term to consistently develop as a local and international model zone for sustainable development and to be a role model for broad collaborations between various interest groups." The association also has a set of fundamental values that, in short, is based on i) sustainable development, ii) consensus about the area's unique values and iii) collaboration and democracy.

Following the association's formation, a process was undertaken for several years to organise its operations and develop the Biosphere Programme – a strategy for sustainable development. The association devoted special attention to defining the six focus areas that have since provided the basis for the association's annual priorities in action plans. In 2022, a focus area pertaining to water was added. The biosphere programme is based on the Lima Action Plan and defines the biosphere association's values, the specific national and international action programmes that the biosphere association strives to contribute to and how the work is organised through six different focus groups that facilitate compliance with the UN's 17 Sustainable Development Goals (SDGs):

- Biosphere Academy – all 17 SDGs
- Energy and climate – SDGs 2, 7, 11 and 13
- Gastronomic region – SDGs 2, 12, 15 and 17
- Living Landscapes – SDGs 2, 12, 15 and 17
- Tourism and outdoor recreation – SDGs 3, 4, 10, 11, 12, 15 and 17
- The East Vättern Scarp Landscape brand is linked to all 17 SDGs – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17

The biosphere reserve's overall goals are integrated into the biosphere programme's focus areas (see Chapter 2.3.4). In addition, the focus groups are linked via annual activity plans to

strategic, regional and local governing documents, which may vary from year to year, depending on the activities that are pursued.

The objectives of the East Vättern Scarp Landscape's operations and how they are to be implemented are presented in more concrete terms in the annual activity plan, which clearly describes the focus groups' activities (Chapters 2.3.4 and 4.3) and links them to relevant strategic, regional and local governing documents (Chapter 9). The biosphere association and Board of Directors have resolved to extend the current biosphere programme by one year in order to conduct a revision in 2022/2023.

2.3.2 Budget and staff support, including approximate average annual amounts (or range from year-to-year); main sources of funds (including financial partnerships established (private/public), innovative financial schemes); special capital funds (if applicable); number of full and/or part-time staff; in-kind contribution of staff; volunteer contributions of time or other support.

Total budget for the biosphere association between the years of 2012 to 2021 (in SEK thousands):

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
740	1,390	3,115	1,955	1,377	1,371	2,166	1,908	1,464	1,813

Figure 3. Budget comparison between years.

The staff budget consists of the cost for the Coordinator, which Jönköping Municipality finances throughout the 10-year period. The annual budget has fluctuated due to variations in project volumes and sizes. During the 10-year period, the County Administrative Board and WWF contributed the most project funds, followed by Jönköping Municipality and Jönköping County. Other organisations that have financed minor projects or project components include the Federation of Swedish Farmers (LRF), the forest landowners' association Södra Skogsägarna and the Österängen Art Gallery.

The variation between the years of 2012 to 2021 is due to the point in time that different activities and projects were implemented. The year 2014 stands out as a year with a sharp increase in turnover, which is attributable to the biosphere reserve's hosting of the ICC conference, and to the bulk of the biosphere programme's work being undertaken during that year. In addition to the stated budget, Jönköping County Museum, WWF, Gränna Forest Group, Jönköping Municipality, the County Administrative Board of Jönköping and the forest landowners' association Södra Skogsägarna contribute significant resources through co-financing, in the form of human resources. Furthermore, private individuals and regional special-interest organisations contribute significantly with voluntary Board work, participation in focus groups and individual biosphere-related activities in the East Vättern Scarp Landscape.

2.3.3 Communications strategy for the biosphere reserve including different approaches and tools geared towards the community and/or towards soliciting outside support.

Surveys of the general public were conducted on two occasions, two years apart (2019 and 2021). The 2019 survey was conducted prior to the development of a communication strategy. The task was undertaken by a consultant (Placebrander) and the survey had 219 respondents. The 2021 survey was conducted as a component of the 10-year review and had 46 respondents.

In addition, 20 in-depth interviews were conducted in 2021, which contributed information that was more nuanced.

The two polls consistently indicated that personal contact networks are East Vättern Scarp Landscape's most important channel for disseminating messages and information. They also indicated that the website is important, but not as efficient, for disseminating information to the general public and uninvolved biosphere residents and biosphere entrepreneurs. From 2019 to 2021, there was a sharp decrease in the dissemination of information via traditional media. This could be due to several reasons: because fewer activities in the biosphere reserve have received attention, because the number of people who read printed newspapers is in decline and because of the ongoing pandemic during the period. However, the in-depth interviews with the subjects concerned revealed that the website has a vital function as a channel for finding in-depth as well as older information and documentation. Although the website has existed throughout the 10-year period, its function has varied. For the past few years, it has been an important tool for active and committed individuals, as it allowed for the retrieval of up-to-date information, activity reports and the final reports of previously completed projects.

2019 Survey: How did you become aware of the East Vättern Scarp Landscape as a biosphere reserve?

Number of responses: 217, Selected alternatives: 322

	n	Per cent
Friends	40	18.43%
exhibitions and/or market days	33	15.21%
through my job	40	18.43%
the biosphere reserve's website	29	13.36%
biosphere ambassador course	12	5.53%
from people who participate in the biosphere reserve's work	87	40.09%
other:	44	20.28%
I am not familiar with the biosphere association's work	37	17.05%

Figure 4. Survey responses from 2019 on how respondents became aware of the biosphere reserve

2021 survey: How do you receive information about or from the biosphere reserve:

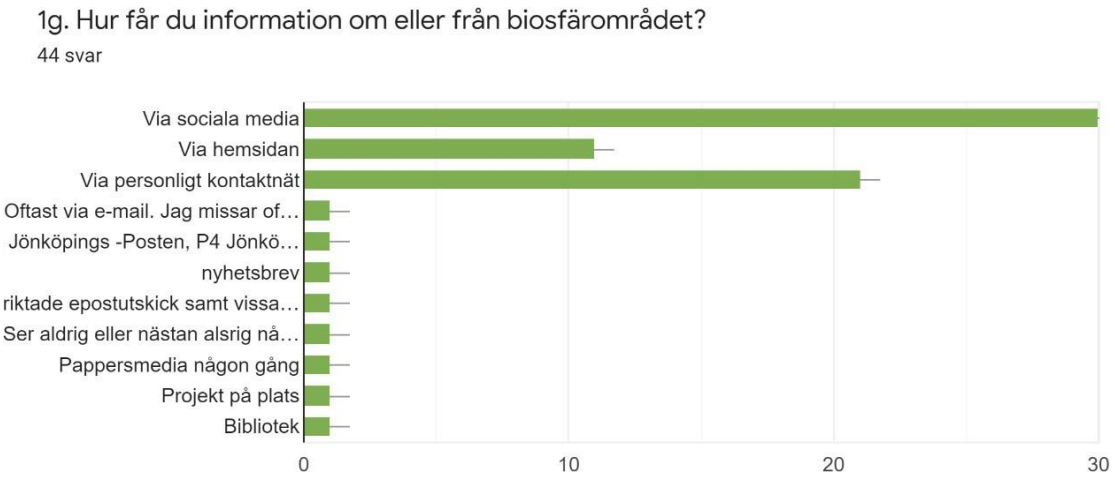

Figure 5. Survey responses from 2021 on how respondents became aware of the biosphere reserve

1.g Work on a communication plan has 1g. How do you receive information about or from the biosphere reserve? 44 answers

Via social media,Via the website, Via my personal contact network, Usually by email. I often miss out the other channels, Local newspaper and radio, Newsletter, Targeted emails, I never or almost never see anything, Print media occasionally, Projects on location, Library

Work on a communicationplan has been ongoing since 2019 and the report, *Communicating a biosphere reserve,* has been presented to all the focus groups. Now that the associated channel strategy has been adopted in December 2021, what remains is to consolidate its content and message in all biosphere- related work, beginning (in 2022) with the development of a new graphic profile and an activity plan.

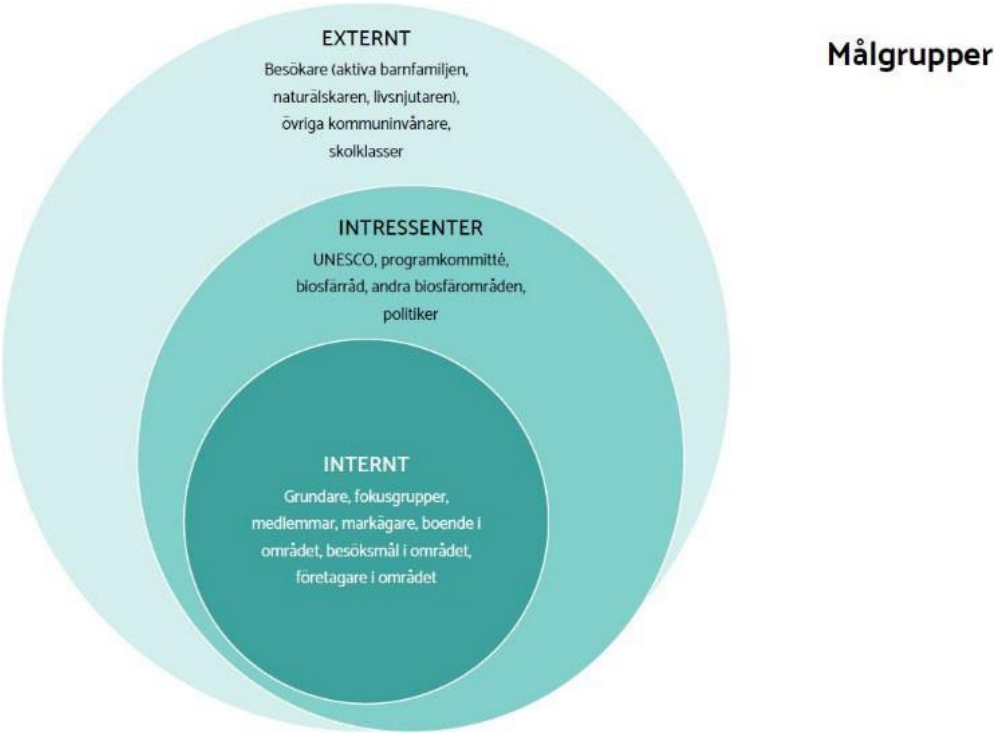

Figure 6. Target groups identified in the communication strategy.
Target groups:
EXTERNAL
Visitors (active family with children, nature lover, bon vivant), other municipal residents, school classes.
STAKEHOLDERS
UNESCO, programme committee, biosphere council, other biosphere reserves, politicians.
INTERNAL
Founders, focus groups, members, landowners, residents of the area, attractions in the area, entrepreneurs in the area.

During 2021–2022, the website will be revamped to better communicate the biosphere reserve's work and values, based on the strategy, *Communicating a biosphere reserve*. The strategy defines three different target groups: external, stakeholders and internal. Within the external target group, three subcategories were defined, which should be the focus of the biosphere reserve's communication: i) Biosphere Resident ii) Biosphere Landowner and iii) Biosphere Visitor – Active Family with Children.

In brief, the goal and significance of the communication strategy is to:

1. Bolster pride and awareness.
2. Increase membership
3. Raise standards
4. Share knowledge
5. Simplify
6. Cooperate
7. Strategies for fostering networks of cooperation in the biosphere reserve that serve as connections ("bridging") among diverse groups in different sectors of the community

2.3.4 *Strategies for fostering networks of cooperation in the biosphere reserve that serve as connections ("bridging") among diverse groups in different sectors of the community (e.g. groups devoted to agricultural issues, local economic development, tourism, conservation of ecosystems, research and monitoring).*

The biosphere programme for the East Vättern Scarp Landscape (developed in 2013 and adopted in 2015) is an overarching governing document that sets the focus for achieving long-term goals. The document links the work of the various focus groups to the comprehensive goals of the Lima Action Plan, with respect to the sustainable use of natural resources and viable communities.

In the course of developing the biosphere programme, thematic issues (Chapter 2.2.5) were abandoned in favour of the six focus areas that, as of 2014, have formed the basis of the association's activities and efforts to build networks and create collaborations. No single focus area is more important than the others and the various areas are intertwined. The purpose and activities of the focus areas are described below.

Biosphere Academy focus area
The East Vättern Scarp Landscape is an area where learning about sustainable development leads to engagement across generational boundaries. The Biosphere Academy is an arena for learning about the transition to a sustainable society that unites the perspectives of various stakeholders and integrates the knowledge and experiences of earlier generations with new knowledge and sustainability visions. **The goal** is for the three explicit priority target groups

– biosphere residents, Swedes with foreign roots and politicians – to continuously integrate different perspectives that lead to sustainable solutions, taking into account all the dimensions inherent to the concept of sustainability. Although the UNESCO Global Action Programme on Education for Sustainable Development (GAP/ESD) which provided the basis for these activities has expired, it serves as a good starting point. **Achievements:** Some 50 biosphere ambassadors trained. Two different university courses are offered regularly ("Nature and culture in the East Vättern Scarp Landscape"; "Nature and culture guide in the East Vättern Scarp Landscape"). The academy has collaborated with the Jönköping County Museum, local museums, schools and preschools, and public-awareness organisations. Several seminars and lectures have also been arranged and the Biosphere Academy has contributed to international conferences.

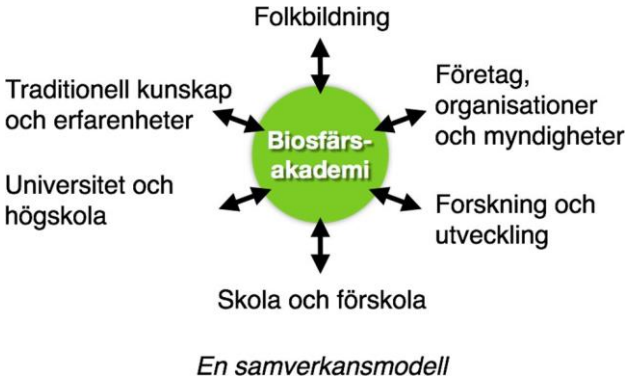

Figure 7. A Collaboration model for the Biosphere Academy focus area.
Clockwise from the top: Public awareness, Businesses, organisations and authorities, Research and development, Schools and preschools, Universities, Traditional knowledge and experiences.
In the middle: Biosphere Academy.

Energy and Climate focus area

Climate change is one of the greatest challenges of our time and one of the highest priority environmental issues. Greenhouse-gas emissions are causing the climate to change and become warmer, with major global consequences. According to the UN Framework Convention on Climate Change, the level of greenhouse gases in the atmosphere must be stabilised at a level that minimises human impact on the climate. However, the fact remains that the climate is changing and the consequences may be that society will be required to actively adapt to a changing climate. **The realistic goal** for this focus group is to create a dialogue between various stakeholders and encourage collaboration and action in the following four areas: sustainable energy production, sustainable consumerism, sustainable transport, sustainable construction and reduced energy consumption. **Achievements:** The focus group is arranging study visits, lectures and interesting meetings on a regular basis to increase knowledge and generate interest in all four areas.

Gastronomic Region focus area

The Gastronomic Region focus area entails the coordination of efforts to develop unique food and beverage experiences in the area and thereby generate further knowledge and bolster pride in its culinary heritage. The aim is to further develop a dynamic, sustainable and vibrant food and beverage industry. This in turn is based on leveraging the knowledge and potential that exists, thanks to the area's natural and cultural values. The three dimensions of sustainability are naturally intertwined in food production and consumption. **The goal** is for the East Vättern Scarp Landscape to be a region where a vibrant countryside, and locally produced food and

experiences improve the value of the area. **Achievements:** the focus group has developed solid collaborations with the region and the county administrative board regarding the regional food strategy, and has had contacts with Visit Småland, which works from the perspective of the hospitality industry. Cooking classes, lectures, inspirational meetings and field trips have been organised.

Living Landscape focus area

The biosphere reserve is characterised by a living landscape that is rich in nature and culture, where humans have an important role. This focus group strives for a landscape where most of the agricultural and forest lands are utilised based on land users' motivations, soil conditions and a range of ecosystem services, while simultaneously protecting and developing demanding species and typical biodiversity, and preserving and highlighting historical values. In a vibrant landscape with collaborating companies and considerable pride and care for the native soil, there are good prospects for functional green infrastructure and rich biodiversity. The ecosystem services that nature provides to humans are delivered and utilised in an ecologically and socially sustainable manner. **Goals:** The biosphere reserve is to contribute in different ways to the sustainable survival and development of the character of small-scale agriculture and forestry, which in turn requires an attractive countryside and profitable rural enterprises. It is crucial that agriculture maintains the areas of natural pastures, as well as for forestry to broaden its focus and develop additional products. **Achievements:** Throughout the 10-year period, work was conducted through research projects, collaborations between authorities-land users and special-interest organisations, as well as practical projects where interested land users were supported by measures and knowledge. Examples of completed projects include: LEIF, Broadleaf Success, Continuity Forest, the mapping of socially important natural areas and more.

Tourism and Outdoor Recreation focus area

Skilled tourism entrepreneurs provide the foundation for tourism in the East Vättern Scarp Landscape area. The amazing nature and cultural values of the scarps are their business assets. Natural and cultural environment on both grand and small scales offer a diversity of experiences. **Goals:** The East Vättern Scarp Landscape is to be a well-known term in tourism and outdoor contexts. The area is to be known for its rich natural and cultural heritage, which are managed sustainably. There are to be numerous reservable and priced experiences. **Achievements:** In 2014, Jönköping Municipality adopted a programme for the development of outdoor recreation. Its vision expresses the goal of becoming Sweden's best municipality for outdoor recreation, for both municipal residents and visitors. Outdoor recreation. The programme touches on what the biosphere association also seeks to develop and in 2021 Jönköping was named Sweden's best outdoor recreation municipality. The biosphere association has actively contributed to the municipality's work to achieve: outdoor educational activities – for preschools and schools, and other organisations for children and young people, to increase knowledge about nature and the environment, and provide greater insight into our cultural environment. **Examples of completed measures include:** the More Outdoor Recreation project, a report on climate-smart experiences, the creation of the bicycle excursion map, the development of two biosphere trails and a pilgrimage route.

East Vättern Scarp Landscape Biosphere Reserve Brand focus area

The East Vättern Scarp Landscape Biosphere Reserve must become a well-known concept – a brand that people associate with the focus areas and projects that the association works with, as well as the East Vättern Scarp Landscape geographical area. The biosphere association's history and work methods are also parts of the story that create an impression of East Vättern Scarp Landscape. **Goals:** The East Vättern Scarp Landscape Biosphere Reserve is to be a term that people associate with the association's operations, the geographical area that constitutes

the biosphere reserve and the activities that take place there. **Achievements:** Signage with QR codes for demonstration areas in the landscape where the association has made contributions, a study of familiarity with the biosphere reserve and a new communication strategy. Efforts that have been the mainstay of all the focus groups have elucidated the importance of communicating the significance of a biosphere reserve in an easy-to-understand and interesting manner, depending on the target group.

2.3.5 Particular vision and approaches adopted for addressing the socio-cultural context and role of the biosphere reserve (e.g. promotion of local heritage resources, history, cultural and cross-cultural learning opportunities; cooperation with local population; reaching out to recent immigrant groups, indigenous people etc.).

The biosphere programme specifies the main goals and visions of the biosphere association's work from the perspective of long-term sustainability, which includes social, ecological and economic aspects, working with new Swedes, local societies, associations, churches, agriculture and forestry entrepreneurs, as well as other entrepreneurial activities, primarily green and hospitality industries.

The six focus groups consolidate the comprehensive visions into practical activities by means of various knowledge exchanges, activities and the joint implementation of projects with several different parties that frequently have both shared and opposing interests with regard to the theme/issue concerned.

Pursuant to the Lima Action Plan's vision and goals for continuous learning and knowledge dissemination, the biosphere association has developed three channels: university collaborations, biosphere ambassador courses, nature school in the biosphere reserve for all children of secondary and upper-secondary school age in Jönköping Municipality.

In order to highlight the biosphere reserve's socio-cultural role, close cooperation has been developed with the Jönköping County Museum and the County Administrative Board's cultural environment unit, and with regularly active participants in projects, public activities and the focus groups' continuous work. Close collaboration with Österängen Art Gallery has resulted in permanent art installations in the biosphere reserve, which stem from the project *Nature takes over.*

The same approach was used in connection with the refugee crisis of 2014–2016, with focus groups pursuing activities and projects to facilitate integration and connections – these efforts have continued through various activities and new projects, such as through language walks and teaching new Swedes to cycle and thus get out into nature

2.3.6 Use of traditional and local knowledge in the management of the biosphere reserve.

A significant portion of the biosphere association's work method involves the collection and compilation of traditional, local and intangible knowledge. Knowledge is acquired through conversations, collaborations, collaborative projects, and educational projects and measures. Much of the knowledge has been compiled over the years in numerous publications that are available at the website, disseminated through various channels, and printed in leaflets and books. An example of a compilation of intangible knowledge acquired through extensive and long-term collaborations spanning across different organisations and interests, is the book *A Wonderful Friday*, which tells the story of a biosphere reserve's origins and creation. Courses, projects and the efforts and skills of individual land users in pollarding were compiled in the publication *Bearers of Tradition,* and old knowledge about fishing in Lake Vättern was

gathered in *Seine Book*. Historical maps were used in several different contexts to connect the present-day landscape with the traditional cultural landscape.

In several projects, various interest groups and authorities have collaborated on advisory services, practical nature conservation efforts and the restoration of utilised landscapes, which has resulted in considerable local interest among land users, significant media interest, and substantial response by national authorities, such as the Swedish Environmental Protection Agency, and regional authorities such as the County Administrative Board and Jönköping Municipality. Projects have frequently included the establishment of demonstration objects and popular excursions and field research. Particularly noteworthy projects include LEIF in practice, the orienteering map *Hitta Ut* with rephotography, Broadleaf Success, More Outdoor Recreation and Continuity Forest.

In conjunction with other work, initiatives were also taken with public education and honing the skills of particularly keen individuals. This was achieved through both theoretical knowledge and study visits, and meetings with local farmers and entrepreneurs. Biosphere ambassadors receive training and advanced training, and field trips and excursions are arranged for interested parties and specific groups, such as scouts, parishes and government-authority administrators.

2.3.7 Community cultural development initiatives. Programmes and actions to promote community language, and, both tangible and intangible cultural heritage. Are spiritual and cultural values and customary practices promoted and transmitted?

Programmes and activities pertaining to sustainability issues have been implemented by several church organisations in the biosphere reserve. Some of these have in different ways been connected to the association without the association assuming the role of organiser – an approach that is used for all religious and political organisations.
Examples of collaborative events with church organisations include bell ringing and intercession in all of the biosphere reserve's churches in conjunction with the inauguration in 2012. The church mass *From the Big Bang to 2017,* by the author and biologist Stefan Edman, was performed in Skärstad Church, after which the association arranged an interview with the author in the Skärstad Parish Home.

On several occasions, representatives of the biosphere reserve were invited by churches to provide information about the reserve and its activities. The association has contributed with inspiration to activities, such as concerts and conversation evenings. When Pilgrims' Walk for Future passed through the biosphere reserve, the pilgrims were received by association representatives, who were also responsible for lectures at Landsjö Church and one of the association's representatives took part in additional activities during the walk through the biosphere reserve to Christina Church in Jönköping.

With respect to other cultural activities, the biosphere association collaborates with local history societies and Österängen Art Gallery.

On several occasions during the period, the biosphere association, in a non-profit capacity, arranged seine fishing, which is a culturally and historically interesting method of fishing from the shore. The activities have attracted highly positive attention and considerable participation. Following the first event, the County Administrative Board contributed a new "Note". The activity was followed up with the compilation and publication of a book about the local history of seine fishing in the East Vättern Scarp Landscape.

2.3.8 Specify the number of spoken and written languages (including ethnic, minority and endangered languages) in the biosphere reserve. Has there been a change in the number of spoken and written languages? Has there been a revitalization programme for endangered languages?

Swedish is the only official language. Information about hiking trails has been translated into English. Due to increased immigration during the 10-year period in connection with the refugee crisis, biosphere work has also focused its activities and providing information to new Swedes. On these occasions, the activities are communicated and conducted in English or with the help of interpreters for other languages.

2.3.9 Management effectiveness. Obstacles encountered in the management/coordination of the biosphere reserve or challenges to its effective functioning.

Biosphere work is coordinated by a biosphere coordinator employed by Jönköping Municipality. The Coordinator arranges and administers the association's activities, such as the executive committee and board meetings. The Coordinator has an overarching responsibility for coordinating the biosphere reserve's activities, projects, commitments and stakeholders, and for ensuring that relevant information, knowledge and inspiration reach the biosphere reserve's target groups. The Coordinator's involvement in different contexts allows for information to be spread about the association and its activities, and opportunities to link together various stakeholders of projects.

The work of reaching out to target groups is always relevant and requires a dynamic approach that is up to date. Working with members continuously is vital to creating a deeper commitment and improving knowledge. To wit, the association began publishing digital newsletters in 2014 and had up to 160 subscribers that same year. The newsletter is published about four times a year and had 510 subscribers in 2022.

In addition to the founding organisations, the Biosphere Association has five other member organisations and a variable number of private members. The number of private members has increased from 28 people in 2013 to 124 people in 2021. Members are recruited through and primarily involved in activities and an in-person annual meeting.

Traditional media had a major role in reaching the larger general public and biosphere reserve inhabitants until about 2019–2020, when local media reduced their coverage and the readership of such media formats persistently declined. Conversely, creating a relevant and significant presence in social media gained importance. (Chapter 6.5.5)

In connection with the ICC conference of 2014, a Facebook account, "Biosfärområde Östra Vätterbranterna", was created. In February 2015, the Facebook page 244 followers and in February 2022, the page had 1361 followers. About one to two posts are published each week.

A variety of methods for implementing and administering projects in line with the biosphere programme have been discussed. One frequently used method entails the biosphere association encouraging an initiative by parties involved in the biosphere reserve or an external organisation such as WWF. In the project plan, a small amount is set aside to cover the association's administrative costs. During the implementation phase, project managers are supported by a steering committee comprising representatives from relevant authorities and special-interest organisations. This allows for a network to be created, and opportunities for the project to reach a large number of stakeholders within and beyond the target group and

geographical delimitation. All of the founding organisations have participated and contributed their expertise and time through steering committees. The Federation of Swedish Farmers (LRF) and SKS have, following their resignation as founding organisations, participated in projects and steering groups.

An obstacle to long-term efficiency has been the turnover of employed coordinators, as well as variations to the function and design of the operations committee. The work of the focus groups has also been affected by a frequent change of coordinators and the different conditions of individuals who take on the assignments, where some work voluntarily and others work within the framework of a professional position at a member organisation. The focus groups were initially formed as work groups. The activities have varied between being more administrative than operational, between constituting discussion groups or providing support for the implementation of projects. These variations have an impact on opportunities to encourage voluntary participation and commitment.

A survey from 2021 with 46 respondents indicates the extent of familiarity with 16 of the biosphere association's key projects and activities among members and the general public. The orange and red bars indicate the number of people who knew about and considered it to be a good project. The blue bars indicate the proportion of respondents who did not know about each project.

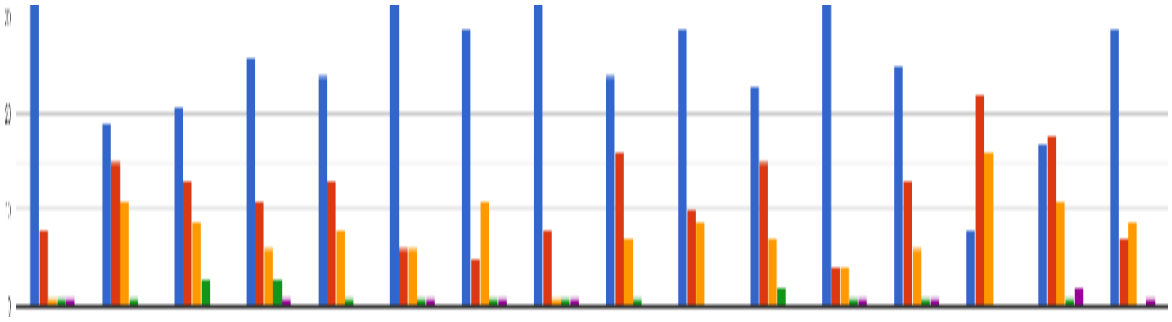

Figure 8. Survey on familiarity with 16 different projects. Blue: unfamiliar with project. Red: good project. Orange: very good project. Green: not so important. Purple: pointless.

The results substantiate the difficulties of reaching those who are not directly or indirectly impacted, as it is evident that at an overall level, awareness of completed projects and activities is quite low. For most of the survey's respondents, 14 out of 16 projects were completely unknown to them.

The in-depth interviews and survey both indicate a perception that the activities pursued by the biosphere association are essentially biased toward ecological and nature-conservation issues. It also emerged that the activities and projects with the greatest distribution among farmers and residents were linkable to the hospitality industry and everyday life in the biosphere reserve, such as new hiking trails, improved accessibility near built-up areas or popular nature and cultural areas, such as "More Outdoor Recreation" and local events that involve small businesses, such as the local-produce gastronomic initiative "Matrundan Gränna". Survey respondents were equally aware and unaware of the work with "biosphere ambassadors" and "mini ambassadors". There was also a noteworthy desire to learn more about or to personally become a biosphere ambassador. Currently, up to 20% of the general public are not ambassadors, but wish to know more.

In the demographic "Board members and committed individuals", the survey showed a clear chronological connection – the more years since an activity was carried out, the less known it was.

2.4 Comment on the following matters of special interest in regard to this biosphere reserve:

(Refer to other sections below where appropriate).

2.4.1 Is the biosphere reserve addressed specifically in any local, regional or/and national development plan? If so, what plan(s)? Briefly describe such plans that have been completed or revised in the past 10 years.

The biosphere reserve is included in the following municipal plans:

- Tranås Municipality's General Plan, which is under development
- Jönköping Municipality's municipal programme
- Jönköping Municipality's programme for rural areas
- Jönköping Municipality's plan for outdoor recreation 2018–2023
- Jönköping Municipality's nature conservation programme
- Jönköping Municipality's programme for sustainable development – the environment 2020–2040
- Aneby Municipality's strategy for the hospitality industry

The biosphere reserve is mentioned in the following regional plans:

- "2006 Regional strategy for formal protection of forest" and "Revised regional strategy for formal protection" and "2018 Revised regional strategy for formal protection" (read more in Chapter 4.1)
- The biological diversity of the agricultural landscape in Jönköping County
- En samlande kraft Landskapsstrategi för biologisk mångfald i Jönköpings län [A unifying force: Province-wide strategy for biodiversity in Jönköping County],
- Strategy for development in and around Vättern – development through Leader during the programme period 2021–2027.
- Action plan for green infrastructure in Jönköping County (see more in Chapters 3.3–3.4)
- Regional strategy for the hospitality industry, 2013–2020
- Regional development strategy for Jönköping County 2020–2035
- Regional food strategy for Jönköping County.

The biosphere reserve is addressed in the municipal planning of both Jönköping and Tranås municipalities. In the new general plan for Tranås Municipality (currently under review), the biosphere reserve is mentioned in the strategic/inter-municipal sections and also relating to a specific development issue for the Adelöv area. The biological dispersal relationships with, among other things, the oak landscape from Lake Vättern to Tranås are addressed in the section on nature conservation. For the Adelöv area, there is also a special LiS report with various development alternatives and a special section on the perspective of children, which forms the basis for conclusions in the general plan.

2.4.2 Outcomes of management/cooperation plans of government agencies and other organizations in the biosphere reserve.

The East Vättern Scarp Landscape consists of numerous small private properties that comprise both wooded and open land. For essentially all forested land, individual management plans and forestry plans have been created in collaboration with special-interest forestry organisations, such as the forest landowners' association Södra Skogsägarna. Authorities and special-interest organisations have been collaborating in the area for a long time and there is a relatively high awareness of natural forest values. In individual management plans, about 8% of the area is voluntarily allocated for nature conservation purposes, compared with the requirement of 5% to qualify for FSC and PEFC certification.

During the 10-year period, 16 new nature reserves were established within the biosphere reserve in accordance with the strategy for the formal protection of forests. The purpose of area protection is to preserve and develop biological diversity, and to promote active outdoor activities, provided that they are not pursued at the expense of designated natural values. For some time now, area protection has partly been based on the proposals of landowners to protect their own land, and could thus result in greater legitimacy for long-term nature conservation efforts.

The County Administrative Board has undertaken pollination assignments at two out of three meadow embankments and in the surrounding habitats of pollinating insects in the biosphere reserve.

The County Administrative Board's action plan for green infrastructure mentions several examples of knowledge acquisition and completed projects within the biosphere reserve (Chapter 3.3).

In conjunction with a revision of the regional strategy for formal protection, an assessment of the scope of biological value regions was updated using knowledge bases and analyses of digital data. The area was previously assessed to be delimited in four separate biological value regions, but is now entirely encompassed by a single larger biological value region comprising four forest habitats.

With respect to fish management, the County Administrative Board's joint communication efforts with Jönköping and Habo municipalities have resulted in the creation of an annual "Char Day and Trout Day" in the biosphere reserve. The day is organised by the County Administrative Board, in collaboration with local stakeholders and other associations. The activities, which include guided tours and practical components, attract hundreds of visitors.

The biosphere association, municipalities and County Administrative Board have established strategies for and worked with wetland restoration within the biosphere reserve. Wetlands have been restored in Adelöv parish.

The Water Conservation Association (Vattenvårdsförbundet) has three governing documents pertaining to the biosphere reserve: *Water conservation plan (environmental objectives), Management plan for fish and fishing* and *Conservation plan Natura 2000.* In line with these documents, measures are taken and follow-ups conducted on environmental quality objectives (Chapters 4.2 and 2.4.3).

2.4.3 Continued involvement of local people in the work of the biosphere reserve. Which communities, groups, etc. How are they involved?

The Biosphere Reserve is a non-profit member organisation with nearly 150 members consisting of private individuals, companies, municipalities and authorities, as well as national, regional and local special-interest organisations (NGOs). With the exception of individual companies, all members are represented on the association's Board of Directors. The Board convenes a minimum of six times a year. All Board members are also participants of at least one focus group. The six focus groups vary in size, with 5 to 15 participants per group. Group participants have long-term commitments and not all representatives of local NGOs and private individuals are Board members.

Much of the biosphere association's operations are channelled through the various focus groups and involve the local population through study visits, activities, lectures and practical measures in the areas of private landowners.

Various sectors of society and age categories are continuously invited to participate in biosphere work through local representatives, posters placed in selected locations, and through the website and social media. The Biosphere Ambassador course for adults and the Mini Ambassador course for preschool children are highly appreciated. A survey in connection with the evaluation indicates that there is considerable interest in participating in the ambassador courses.

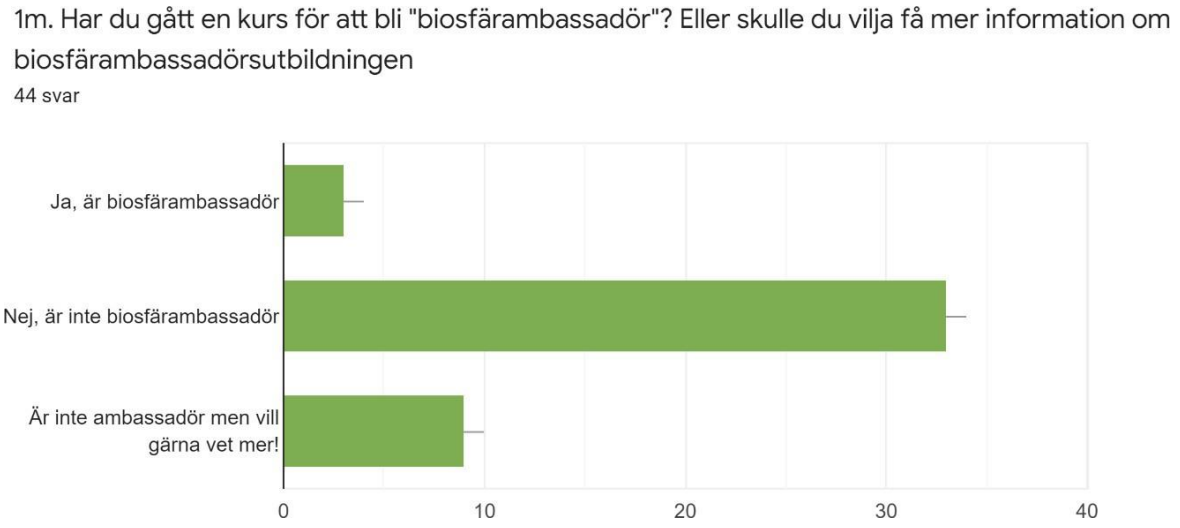

Figure 9. Survey on the interest in participating in ambassador courses.
1m. Have you taken a course to become a "biosphere ambassador"? Or would you like more information about the biosphere ambassador course?

44 answers:
Yes, I am a biosphere ambassador
No, I am not a biosphere ambassador
I am not an ambassador, but I would like to know more!

During the 10-year period, rural entrepreneurs, landowners and interested individuals from the general public have been involved in the biosphere reserve's work to increase sustainability by addressing issues and challenges pertaining to social, economic and ecological factors. This included arranging, participating and leasing their property for activities, gatherings and practical measures, such as the restoration of forest pastures and the setup of demonstration areas. The work has also included integration activities such as language walks, bicycle-riding courses for new Swedish women, as well as urban cultural activities such as the art exhibition, *Nature takes over*.

A number of different member activities, lectures, excursions and membership meetings catering to various fields of interest are held every year, for various sections of society comprising a range of age groups, ethnic backgrounds, and urban and rural residents.

For further information about the different projects and activities, please refer to Chapter 4.

2.4.4 Women's roles. Do women participate in community organizations and decision-making processes? Are their interests and needs given equal consideration within the biosphere reserve? What incentives or programmes are in place to encourage their representation and participation? (e.g. was a "gender impact assessment" carried out?) Are there any studies that examine a) whether men and women have different access to and control over sources of income and b) which sources of income do women control? If so, provide reference of these studies and/or a paper copy in an annex.

All of the biosphere association's activities incorporate gender-equality issues and gender perspectives appropriately to each activity. Some projects have a special emphasis on female participation, such as Broadleaf Success 2.0, and are subsequently followed up through project reporting. The role of women of was specially emphasised in the Growing Together project, through which newly arrived refugees and new Swedish women learned to ride bicycles to increase their opportunities for getting around in the community.

Sweden is considered to be one of the world's most equal countries and according to Swedish legislation, all forms of gender discrimination are prohibited. The norm in society is for the rights, needs and interests of women to be equally important to those of men. Municipalities and authorities have policies and resolutions in place stipulating that everyone should be provided with the same opportunities to participate in democratic processes. In employment, consideration is primarily given to competence and experience, while gender and ethnic diversity are promoted. Women within government authorities and public organisations are involved in decision-making and work processes. At the date of evaluation, the biosphere association's Chairman and Coordinator positions were held by women.

2.4.5 Are there any changes in the main protection regime of the core area(s) and of the buffer zone(s)?

No core area has been lost since the application and 13 new core areas (12 nature reserves, one habitat protection) have been added to the buffer zone. The protection for the core areas is intact because they consist of protected nature areas, where such protection is supported by Swedish legislation.

Changing the classification of an area from a buffer zone to a core area thus entails increased protection of the nature area. In addition, four new nature reserves were added beyond the buffer zone, which is why they are not included as core areas. However, they are also strongly protected against exploitation under the law. (For further information about acreages, see Chapter 1.i).

The buffer zones consist of other types of protected nature: national interests in nature conservation and cultural-heritage preservation, shoreline protection areas, nature-conservation agreements on forest land and animal-protection areas. Here, the protection remains unchanged due to Swedish legislation and a functioning state and municipal administration. The management and supervision of nature areas has not changed.

Management and supervision in the value clusters. The County Administrative Board and, to some extent, the Swedish Forest Agency and Jönköping Municipality, are jointly responsible for ensuring that there is appropriate management. Supervision is conducted by the County Administrative Board and the municipality.

Management and supervision in the buffer areas. The Swedish National Heritage Board is responsible for the national interest in cultural environments, the Swedish Environmental Protection Agency is responsible for the national interest in nature conservation, the County Administrative Board is responsible for nature reserves and Natura 2000 areas, and the Swedish Forest Agency is responsible for habitat protection. Transition areas are managed and supervised under the auspices of the municipalities, the County Administrative Board and the Swedish Forest Agency.

2.4.6 What research and monitoring activities have been undertaken in the biosphere reserve by local universities, government agencies, stakeholders and/or linked with national and international programs?

Research has been conducted in the biosphere reserve by several institutions pertaining to a variety of fields. An initial activity in the biosphere reserve was the BioBlitz, which at one point contributed considerable data about endangered species in the biosphere reserve. Read more in Chapter 4.2.

An explicit focus on research includes collaborative processes, and these have primarily involved the Stockholm Resilience Centre and the Swedish University of Agricultural Sciences, SLU. Another important area of research includes landscape processes and ecological gap/functionality analyses aimed at scientifically establishing concrete and measurable goals for ecological sustainability. Such biological research has mainly been conducted by ProNatura and Linköping University, with the support of the World Wildlife Fund (WWF) and the Swedish Environmental Protection Agency.

Environmental monitoring in the biosphere reserve is managed by several stakeholders at different levels. The most important aspects of biosphere reserve monitoring is compiled below.

Stakeholder	Operations	Focus/programme	Geography
Swedish Meteorological and Hygrological Institute (SMHI)	Research and monitoring	Weather measurements Water-flow measurements Measurement of carbon emissions	National
Swedish Agency for Marine and Water Management	Research and monitoring in marine and aquatic environments in Sweden	Coordination. National responsibility for administration. Provide funding for and order research	National
The Swedish Environmental Protection Agency and the Swedish Forest Agency.	Research and forest monitoring	Coordination. Provide funding for and order research	National

County Administrative Board of Jönköping	Environmental monitoring, supervision	Biotic and abiotic monitoring – Regional environmental monitoring programme for the County of Jönköping, 2021–2026. County programme for the follow-up of regional environmental goals.	Regional
Swedish Forest Agency	Environmental monitoring, supervision	Forest	Regional
Water Conservation Association (Vattenvårdsförbundet)	Research and environmental monitoring	Fish and water chemistry. Biotic and abiotic monitoring in Lake Vättern in accordance with Coordinated national environmental monitoring	Regional
Tranås Municipality	Monitoring	Regional follow-up, local environmental goals	Local
Jönköping Municipality	Monitoring	Regional follow-up, local environmental goals	Local
Fishery conservation associations	Supervision and environmental monitoring	Test fishing	Local
SRK Södra Vättern's tributaries	Environmental monitoring	Recipient control, control of flows and levels	Local
Southern Lake Vättern region's bird club and other ornithological associations)	Environmental monitoring	Bird inventories	Local
County Museum	Research and monitoring	Archaeology, cultural environments	Regional
Citizen Research/ Terrestrial and limnic nature monitoring	Environmental monitoring	Flora monitoring, nature monitoring	Local

Smålands Botaniska förening (The province of Småland's Botanical Society) and other non-profit associations, such as the Gränna Skogsgrupp forest conservation association, the Swedish Society for Nature Conservation, the Botanical Society, the southern Lake Vättern mushroom club and more	Environmental monitoring	Flora inventories, fungal inventories, insect inventories	Regional

2.4.7 How have collective capacities for the overall governance of the biosphere reserve (e.g. organization of new networks of cooperation, partnerships) been strengthened?

The biosphere reserve's management and development capacity was strengthened by the emergence of collaborative formats through the biosphere association's activities and locally implemented projects. The particular organisations and individuals who participate in such collaborations change dynamically whenever new initiatives are taken, when new social challenges or crises arise, or when the surrounding world is organised differently. Below are some of the new collaborations or collaborations that have changed in nature during the period.

An indicator of how the biosphere work is capturing the commitment of residents and companies is the 2020 Christmas gift from the Husqvarna Group to the employees whose voluntary services were, at their own request, divided between the East Vättern Scarp Landscape Biosphere Reserve and the global sustainability organisation WaterAid.

Collaborations with other biosphere reserves. There are ongoing exchanges with other biosphere reserves in Sweden through the national biosphere council. Inspiration from the Lake Vänern Archipelago and Mount Kinnekulle biosphere reserve has, for example, resulted in the creation of mini-ambassador courses. During the period, members of the biosphere Association have actively participated in a range of international biosphere conferences, such as the NordMAB and EuroMAB conferences. These conferences provide excellent platforms for such exchanges and the opportunity to network with representatives from other biosphere reserves who may share the same challenges.

Experience exchanges regarding partnership processes, conflict resolution and network building have been crucial to the East Vättern Scarp Landscape's international cooperation during the period and will hopefully continue into the future.

The East Vättern Scarp Landscape Biosphere Reserve has been helpful at a national level in the formation of the Vindelälven-Juhttátahkka Biosphere Reserve. It has exchanged experiences through ambassador courses and study visits to other biosphere reserves.

Some new collaborations have emerged, but failed due to a change in the conditions for working with development and projects within LEADER – Local development. A Leader area is a geographical area wherein residents utilise a three-party partnership to collaborate on a shared development strategy. The conditions for collaborating within the framework of Leader were changed during the programme period due to a change in the scope of the areas. A new opportunity through Leader Västra Småland, which covers nearly the entire biosphere reserve, could provide a solid basis for collaboration and a potential source of project funding.

Some welcome initiatives include the joint project with the Water Conservation Association and the County Administrative Board, as well as increased collaboration on water and fisheries matters. The Water Conservation Association conducts active work on these issues in Lake Vättern. Land within fishery conservation areas is important to the management of fishing and measures were taken to improve the water quality and fish conservation in the area. However, there is a lack of coordinated efforts with water under the auspices of East Vättern Scarp Landscape. It is important to sustain the work group's activities, in order to clarify how the East Vättern Scarp Landscape should most appropriately fulfil its function.

Sustainable Product Development (HPU) was a government initiative for tourism organisations in all of the regions. The biosphere reserve initially contributed to this initiative, after which Smålands Turism worked for three years, with a stringent focus on developing new export-ready products within nature and cultural tourism. Several products were developed in the biosphere reserve, new hospitality-industry companies launched and solid long-term collaborations initiated, such as around Smålandsgården in Bunn.

2.4.8 Please provide some additional information about the interaction between the three zones.

Zoning is a form of spatial planning that is important for ecological, economic and social development. The core areas have high biological values and thereby function as a source of species for the buffer zone, as well as the transition area. The landscape comprises well connected core areas, which generates a functioning biological infrastructure for certain specific environments. However, there are also high biological values in the buffer zone and transition area, which are primarily linked to the cultivated landscape, such as natural grazing lands.

In the core areas, economic activities are limited by various regulations and conservation plans. Consequently, social and economic development occurs primarily in the buffer and transition areas. However, the core areas also have a function here, in that they can constitute attractions for the tourism industry, and serve as recreational areas for local residents.

All of the core areas have formal protection under Swedish legislation, which also applies to several subdivisions within what are classified as buffer zones and transition zones. (See Chapter 2.4.5) The zoning of the buffer and transition areas has not changed in the past 10 years. A large number of new core areas were added within the buffer zone. New nature reserves and a habitat protection were also established within the transition zone, which do

not belong to the core areas but are part of biosphere work towards sustainable development. Nature reserves are valuable areas for biodiversity, outdoor life, recreation and the hospitality industry, regardless of whether they are within the buffer zone or the transition zone.

One third of Lake Vättern's area is encompassed by the biosphere reserve and forms a significant part of the buffer zone. Nearly all of Lake Vättern's area is designated as a Natura 2000 site. Its waters are also designated as particularly valuable to Sweden's fishing and nature, and the entire lake is a water protection area. The conservation plan assesses the conservation status of the habitats and species protected by the directive, as well as typical species associated with these habitats. It also describes any potential impact on the protection values and proposes remedial measures.

2.4.9 Participation of young people. How were young people involved in the organizations and community decision-making processes? How were their interests and needs considered within the biosphere reserve? What are the incentives or programs in place to encourage their participation?

The Mini Ambassadors pilot project is about long-term initiatives that help preschool children to acquire knowledge early in life and about providing targeted further education to preschool educators (Chapter 4.2)

The Eco-bus is aimed at all schools with students aged 7 to 15 years in Jönköping Municipality. The bus takes the children out to nature in the biosphere reserve, where they can solve assignments together in a class. The purpose of the activities is to stimulate the interest of children and young people in thinking and acting sustainably (Chapters 4.2 and 6.4).

The Biosphere Academy focus group offers regular guided tours and nature adventures for various groups, such as the Scouts.

Through the Tourism and Outdoor Recreation focus group, the biosphere association has developed a network with the 11 local history societies in the area. Through the *Nature takes over* project, the Biosphere Academy focus group initiated a collaboration with the Österängen Art Gallery, as well as with the municipality. Among other things, art exhibitions were held and activities conducted at the municipality's local culture, nature and youth centre, as well as at a district with a high percentage of new Swedes.

Collaboration with institutes of higher learning and universities. The university offers yearly courses about the biosphere reserve, as well as two university courses with a certain focus on biosphere reserves. One is at a general international level, and one is at a local level, where history, local awareness and local knowledge are mixed with practical elements within the East Vättern Scarp Landscape Biosphere Reserve.

To communicate a biosphere reserve. Work is ongoing continuously to communicate about the importance of a biosphere reserve, the natural and cultural values present in the East Vättern Scarp Landscape, as well as activities, methods of land use and intangible cultural heritage. This is taking place through, among other things, the information nodes created, demonstration areas, a varied and extensive range of information materials and visitors. A new communication plan (2021, Chapter 2.3.3) highlights the importance of working and communicating from the perspective of children, and one of the three prioritised target groups is "Active family with children".

3 ECOSYSTEM SERVICES

3.1 If possible, provide an update in the ecosystem services provided by each ecosystem of the biosphere reserve and the beneficiaries of these services.

Ecosystem services should be a central concept in a biosphere reserve's operations. The term ecosystem services refers to various benefits from nature that we humans depend on for our well-being. This report uses The Economics of Ecosystems and Biodiversity's (TEEB's) definition of ecosystem services as "the direct and indirect contributions of ecosystems to human well-being." This definition emphasises that there is a difference between the ecosystem services themselves and the benefits they help to create for people. In addition, we follow, as does Sweden in general, the division of ecosystem services into four categories: Living Environments/Supporting Services, Regulating Services, Provisioning Services and Cultural Services, as defined in the Millennium Ecosystem Assessment (MEA).

- Living environments and supporting services, contribute indirectly to human well-being. They are the underlying conditions that allow other ecosystem services to work, including primary production via photosynthesis, biogeochemical cycles and soil fertility.
- Regulating services affect or control the natural processes in the ecosystems, such as their water retention, air purification and pollination.
- Provisioning services provide important basic needs like food, drinking water, wood fibre and fuel that we can use more or less directly.
- Cultural services provide experience values like recreation and beauty in the form of landscapes, historical environments and so on.

In addition, this summary is based on the Swedish Environmental Protection Agency's 2017 report on Ecosystem Services, which describes how the spatial characteristics of ecosystem services can be categorised as regards how they flow from the place where they are produced to the place where the benefit is derived.

The Swedish Environmental Protection Agency's guide and listing of ecosystem services advocates a special way of working with and analysing ecosystems, ecosystem services and socioeconomic benefits and values derived from them. Indirect ecosystem services are not included as services here, but as functions and structures that lead to direct ecosystem services, which in turn lead to benefit and value in human socioeconomic systems. One perspective taken in this report is designated by the Swedish Environmental Protection Agency as an application of the "cascade model".

The descriptions in the report are based on CICES and the Swedish Environmental Protection Agency's list of ecosystem services, which differ from several Swedish and international reports. The review report does not treat things like recreation, tourism and knowledge as ecosystem services, but as benefits that ecosystem services contribute to creating.

This summary takes its starting point in the Swedish Environmental Protection Agency's guide and list of ecosystem services and the County Administrative Board of Jönköping's work on green infrastructure as well as the joint efforts of the biosphere reserve and the county administrative board with researchers, which resulted in an ecological gap and functionality analysis (BriFunk).

The work of defining what habitats are most important for ecosystem services in the biosphere reserve was a process of several steps. Broader existing data and studies were managed based

on the EUNIS habitat classification, which is strictly based on vegetation and living environments and does not consider the differences in cultural landscapes or biogeographic zones.

The UNESCO nomination form and the work done in BriFunk includes 16 terrestrial habitats, which are all subgroups of EUNIS habitat types. In the continuous biosphere reserve efforts during this 10-year period, the six habitat types discussed in this report are named in several reports at different levels of detail. This report uses the EUNIS classifications at the general level, followed by in-depth studies describing the habitat types analysed in BriFunk and Lake Vättern, smaller lakes and watercourses.

Below is an explanation of how this report has interpreted and described the 16 habitat types in the biosphere reserve in relation to the EUNIS habitat types:

1. Vättern – EUNIS Inland surface waters
2. Lakes and watercourses – EUNIS Inland surface waters
3. Ponds – EUNIS Mires, bogs and fens
4. Wetlands – EUNIS Mires, bogs and fens
5. Oak habitats – EUNIS Forest and other wooded land
6. Pollarded trees and ash-elm-maple habitats – EUNIS Forest and other wooded land
7. Flat rock dry meadows – EUNIS Grasslands and lands dominated by forbs, mosses or lichens
8. Pine environments – EUNIS Forest and other wooded land
9. Natural fodder lands – EUNIS Grasslands and lands dominated by forbs, mosses or lichens
10. Mountain slopes – EUNIS Forest and other wooded land
11. Forest-edge environments, Mosaic landscapes with a woodland element (bocages) – EUNIS Forest and other wooded land and EUNIS Grasslands and lands dominated by forbs, mosses or lichens
12. Spruce-dominated environments – EUNIS Forest and other wooded land
13. Pines in pasturelands and forest grazing lands – EUNIS Forest and other wooded land
14. East-facing mountain slopes with aspen, spruce and pine – EUNIS Forest and other wooded land
15. Brook ravines – EUNIS Forest and other wooded land
16. Rocky coasts – EUNIS Inland surface waters
17. Old birches – EUNIS Forest and other wooded land
18. Goat willow – EUNIS Heathland, scrub and tundra

The 16 habitat types do not include built environments. Knowledge of the role of ecosystem services in built environments has increased in the 10-year period. EUNIS habitat types found in the East Vättern Scarp Landscape Biosphere Reserve are:

1. Regularly or recently cultivated agricultural, horticultural and domestic habitats
2. Grasslands and lands dominated by forbs, mosses or lichens
3. Forest and other wooded land
4. Inland surface waters
5. Mires, bogs and fens
6. Constructed, industrial and other artificial habitats

At a comprehensive level, the biosphere reserve's eleven primary habitats/overall ecosystems can be seen to make up subgroups of the six EUNIS habitat types listed in the table below: The geographical distribution of the EUNIS habitat types can be seen in a map in chapter 9.

A. Farmland (fields, other open land)	1. Regularly or recently cultivated agricultural, horticultural and domestic habitats
B. Dry calcareous meadows, hay meadows and natural grassland	2. Grasslands and lands dominated by forbs, mosses or lichens
C. Oak habitats	3. Forest and other wooded land
D. Ash, elm, maple habitats	3. Forest and other wooded land
E. Flat rock dry forests	3. Forest and other wooded land
F. Forest-edge environments and mosaic landscapes in the agricultural landscape	3. Forest and other wooded land and 2. Grasslands and lands dominated by forbs, mosses or lichens
G. Vättern	5. Inland surface waters and water-influenced environments
H. Lakes and watercourses	5. Inland water and water-influenced environments
L. Wetlands	5. Inland surface waters and water-influenced environments
J. Cities, towns and built environments	6. Constructed, industrial and other artificial habitats

It should be clarified that this summary's description of the ecosystem services in the area is not comprehensive. The ecosystem services and benefits listed are examples. The tables and their content have not been listed in any particular order of importance. The ecosystem services are categorised based on CICES' three categories of provisioning, regulation and maintenance, and cultural. The supporting systems are not included in CICES and do not constitute ecosystem services according to CICES and the cascade model. They should therefore not be assessed and are thus not included in this report but can be important to acknowledge in future reviews.

Each section (1–6) begins with a brief description of the habitat type and examples of its ecosystem services. Due to a lack of access to ecosystem analyses in the biosphere reserve, the distribution of ecosystem services and benefits is not fully investigated. As far as possible, the review has noted whether the service is to be viewed as the result of an abiotic process. In addition, the ecosystem services in the table have been given the code CICES uses for the services. Examples are also given of what benefits the ecosystem services provide-

Ecosystem services of regularly cultivated land (habitat type 1.A)
The agricultural landscapes in the East Vättern Scarp Landscape consist in part of large open fields in valleys. Six open agricultural landscapes with fertile soil can be clearly delineated, in which there are many large farms and manors with tree-lined avenues and oak groves. Other parts of the biosphere reserve are dominated by small-scale agricultural lands in forest communities with moraine soils in the South-Swedish Highlands. On Visingsö Island and the area around Lake Vättern, the conditions for crop growing are favourable with hardiness zones 1–2, but just a few kilometres away the hardiness zone is 5. Fruit growing has been undertaken for a long time in the East Vättern Scarp Landscape. Rich soil types have been created through growing and grazing, which is a valuable result of humanity's ability to impact so-called supporting ecosystem services. The active agriculture that has continuously been pursued in the biosphere reserve has allowed the establishment of the traditional agricultural landscape.

The provisioning services of cultivated lands include the production of crops such as fruit, berries, cereals, legumes and vegetables as well as pastureland. In the central area of the biosphere reserve, dairy farming has been and remains a particularly important industry. Some parts of the biosphere reserve have good conditions for commercial growing of fruit and berries. A large portion of all Sweden's apples are grown and refined here. The orchards also provide regulating services such as carbon sequestration. The overall small-scale structures, topographical variations and frequent elements of what on a national scale are small farms and small agricultural fields create a variation in the biosphere reserve that creates good conditions for the regulating services of wild pollinators. This also creates cultural services that allow rich outdoor recreation and educational opportunities about culture and the environment.

Threats: overplanting, climate change, farm rationalisation, land development

Ecosystem services in arable land	Examples – who benefits	Benefits	*	CISES
Supporting services				
Production of food from cultivated terrestrial plants	Households, food industries	Harvested crops for further refinement		1111
Production of food from domestic animals	Households, food industries	Meat, eggs, milk, honey for household needs or sale		1112
Production of energy crops	Households, industries, workplaces,	Energy production		1311
Production of manure, butcher waste	Agriculture	Butcher waste and food waste for biogas production or fuel		1312
Production of genetic resources, industries	Households, agriculture, forestry	No direct benefit, but creates more resistant plants and animals, which results in more stable or better production	I	1213

Production of plant material fibres	Industries, households	Fibres for textiles	I	1211
Regulating services				
Pollination by domesticated or wild bees	Agriculture, gardens	Increased production of apples, berries, crops	I	2221
Carbon sequestration by plants	Everyone	Prevention/reduced impact of climate change, reduced emission of greenhouse gases		2261
Cultural services				
Organisms/ecological functions that contribute to maintaining the cultural landscape	Residents, visitors, tourism companies	A feeling of history and identity, knowledge and education		3123
Provision of attractive recreational environments	Residents, visitors, tourism companies	Outdoor activities		3111
Recreational environments, observed	Residents, visitors, tourism companies	Birdwatching, ecotourism		3112

Ecosystem services of natural pasture (habitat type 2.B)
The biosphere reserve contains a large mosaic landscape and a large frequency of naturally occurring natural pastures and partly forested pastures of varying status, at different points of the compass, in different topographical locations and with different traditions of management than in the county in general. The area includes southerly dry natural grazing lands, pasture lands with giant oak trees, damp soils and grazing lands in bedrock glades. Limited acreages of non-ploughable land are still managed as meadow lands. Historically, these lands were significantly larger, but the area is still remarkable for its remaining mosaic quality. In the 21st century, a number of overgrown areas have been restored to natural grazing lands and forest grazing.

The provisioning services of fodder lands include the production of food and refinement of ingredients. Natural grasslands are among the most species-rich natural environments in the landscape. The open to semi-open lands, with varying grassland management traditions and a wide variety of flowers, provide regulating services by spreading seeds via grazing animals and the management of hay meadows, providing good conditions for wild pollinators and carbon sequestration in the soil. Flowering land benefits wild pollinators. The many structures in the landscape – not only in the pastureland and wooded meadows, but also in the form of stone walls, clearance cairns and so on – allow for great biological variation. They create a landscape that contributes cultural services in the form of aesthetically appealing landscapes and attractive recreation areas.

Threats: encroaching vegetation, overplanting, climate change.

Ecosystem services in naturally occurring grasslands	Examples – who benefits	Benefits	*	CISES
Supporting services				
Production of food from domestic animals, cows, pigs, honeybees	Households, agriculture, food industries	Meat, milk, honey as food for sale or household needs		1112
Production via processing of domestic cattle	Agriculture, households, businesses	Leather products, wool, skins for sale or for own use		1212
Regulating services				
Pollination by domesticated or wild bees	Agriculture, gardens	Increased production of cultivated crops, apples, berries, cereals	I	2221
Spreading of seeds by animals	Everyone	No direct benefit but contributes to direct ecosystem services,	I	2222
Pest control	Agriculture, households, food industries	Reduced risk of the establishment of invasive species, or mass increase of domestic pests	I	2231
Decomposition of plant matter by worms, fungi, bacteria, etc.	Agriculture	No direct benefit but contributes to direct ecosystem services	I	2242
Carbon sequestration by plants	Everyone	Prevention/reduced impact of climate change, reduced emission of greenhouse gases		2261
Cultural services				
Organisms/ecological functions that contribute to maintaining the cultural landscape	Residents, visitors, tourism companies	A feeling of history and identity		3123
Provision of attractive recreational environments	Residents, visitors, tourism companies	Outdoor activities,		3111

Provision of areas with a variety of fauna/interesting vegetation	Residents, visitors, tourism companies	Watching wild animals, ecotourism		3112

*A=abiotic, I=indirect

Cultivated lands and naturally occurring fodder lands form the "agricultural landscape" (habitat types 2.B and G)

The rolling landscape of small-scale utilised lands in the biosphere reserve makes it difficult to firmly separate farmlands from naturally occurring grasslands. The sprawling combination of small-scale cultivation, hay-making, grazing and pollarding that is characteristic of the biosphere reserve is crucial to other ecosystem services and their potential.
Together they form the very image of the landscape and the countryside with its interwoven ecosystem services.

Examples of the provisioning services of cultivated lands are the production of plants and livestock to be used as food, energy and construction materials. The agricultural landscape also provides many genetic resources, primarily in the form of refined plants and animals from cultivated lands, which is a necessity for maintaining high production levels and resistance now and in the future. In naturally occurring grasslands, the genetic resources provided are critical for biodiversity. The naturally occurring grasslands, protection zones, field margins and fringe zones contribute with regulating services like pollination and elimination of pests. Many food and fodder crops are partly or completely dependent on pollinating insects for their harvests. The agricultural landscape has many insects that, when they are promoted, can control harmful insects in order to secure harvests and reduce the use of environmentally harmful pesticides.

Many people use and appreciate the rolling woodland and agricultural landscape in the biosphere reserve. Examples of cultural services the cultivated lands provide include aesthetic values and a living cultural heritage featuring clearance cairns, sunken lanes, old wooden buildings and pollarded trees that tell the tale of how our forefathers lived and tilled the soil. The richly varied agricultural landscape is also a beautiful place to visit. Studies from the county show that house sales near meadows and pasturelands generally have higher market values. Riding and rambling are popular outdoor activities in the biosphere reserve and are important to develop for tourism and health.

The ecosystem services of the forest (habitat types 3.C, D, E and F)

The biosphere reserve is in the boreonemoral forest region of Sweden. In scarp environments and at heights, the habitat consists of coniferous forest, mixed coniferous forest, oak and pine forest, dry bedrock pine forest, oak pastures, forests dominated by valuable broad-leaved species and sparsely growing elm-ash-maple habitats, as well as a large number of ancient warden trees at farmhouses and the once-so-important trees used for pollarding. Pine and mixed oak-and-pine forest dominates on flat rock. The forest lands have a varied history of forestry. In some places, forest grazing has occurred; some areas are multi-layered and some produce several types of trees in the same forestry unit, and there are also naturally occurring open areas.

The 2018 Regional Strategy for Formal Protection of Forest defines natural forest land in the biosphere reserve as a biological value region. The area has high natural values linked to four general types of forest: forest dominated by valuable broad-leaved species, broad-leaved

forest dominated by pioneer trees, coniferous forest rich with broadleaf trees, mixed coniferous forest. About 4% of the surface area of forest is formally protected and thus excepted from production-oriented forestry. About 8% of the surface area of forest has been voluntarily set aside by the owners for nature conservation purposes, more than the 5% that is required for PFC and FSC certification.

The forestry units within the biosphere reserve are smaller than the average in southern Sweden, and the forest landowners' association Södra Skogsägarna considers the land use to be more varied here than the average in Sweden. Södra also finds that the topographically varied nature, small-scale and privately owned status of the forestry units with individually selected forestry methods contribute to more and a greater variation of (provisioning?), regulating and cultural ecosystem services than the average in Sweden.

The forest's ecosystems include financially important provisioning services. The biosphere reserve is not a large-scale forest landscape; the privately owned forests are managed with multiple purposes and methods. The biosphere reserve's forest landscape contributes essential provisioning services, forest-based ingredients and products as well as raw materials for energy production and various qualities of wood – for traditional use as timber and pulpwood as well as to replace fossil-based raw materials and for use in both long-term and single-use products. Other provisioning services include textiles, berry picking, nature-based tourism, fodder lands and much more.

Other ecosystem services of the forests are photosynthesis and air scrubbing, carbon sequestration, water regulation and water purification. Multi-layer forests are thought to be useful for climate mitigation. Both individual trees and above all the complex ecosystems of the forest bind enormous amounts of carbon dioxide for long periods of time. This ecosystem service remains in action as long as the carbon is not released through draining or felling for products with a short life span.

As a destination for sporting and communing with nature in the form of riding, cycling, skiing and rambling, the forest is an arena for improved physical and mental health, as well as providing many cultural ecosystem services. Popular areas for play and recreation are often centred around heritage centres in the forest. Public awareness of the importance of the forest for our mental health is on the rise. Much of our shared cultural heritage is born of the rich associations of the forest; artist John Bauer is a classic example in Jönköping County.

Threats: grazing by wildlife, rationalisation, monocultures, climate change.

Forest-based ecosystem services	Examples – who benefits	Benefits	*	CISES
Supporting services				
Production of mushrooms and berries	Households, food industries	Picked berries and mushrooms for household needs or for sale		1113
Production of wood	Households, industries related to construction, textiles and energy	Cleared trees/fibres for timber, pulpwood, textiles		1211

Production of biomass	Households, industries, workplaces,	Fossil-free energy production		1311
Production of wild animals	Households, food industries	Game meat for sale or household needs		1114
Provision of drinking water from ground water	Households, workplaces, agriculture	Available drinking water	A	4112
Regulating services				
Carbon sequestration	Everyone	Prevention/reduced impact of climate change, reduced emission of greenhouse gases		2261
Water regulation through vegetation and forested wetlands	Households, agriculture, industries	Reduced risks of flooding and drought		2213
Erosion control by plants	Forestry, households, agriculture	Reduced risk of landslides and erosion damage		2211
Control of pests and invasive plants	Forestry, households, food industries, agriculture	Reduced risks of establishment of invasive species, or mass reproduction of domestic pests	I	2231
Air purification by trees	Households, workplaces, industries	Cleaner air and therefore fewer respiratory illnesses		2112
Protection of trees from storms	Households, agriculture, forestry	Reduced damage from storm winds		2214
Decay, breakdown of minerals by roots and fungi	Agriculture, forestry	No direct benefit, but contributes to direct ecosystem services through higher nutrient levels in the soil	I	2241
Decomposition of plant matter	Food industries, agriculture, forestry	No direct benefit, but contributes to direct ecosystem services through higher nutrient levels in the soil	I	2242
Cultural services				
Provision of attractive recreational environments	Residents, visitors, tourism companies	Walks in the woods, outdoor recreation, nature tourism, the recreation aspect of hunting, mushroom picking,		3111

Provision of areas with a variety of fauna/interesting vegetation	Residents, visitors, tourism companies	Birdwatching, watching wild animals, ecotourism		3112
Organisms/ecological functions that are beautiful	Residents, visitors, tourism companies	Recovery, inspiration, relaxation as a result of beautiful views		3124

*A=abiotic, I=indirect

Water – Ecosystem services of Vättern, smaller lakes and watercourses (habitat types 5.G, H)

Lake Vättern is Europe's sixth largest lake. It has a relatively small catchment basin (6,700 km^2) in relation to its size (1,970 km^2). Its deepest point is 128 meters and its average depth is 40 metres, giving it a volume of about 74 km^3. The oligotrophic water in Vättern makes it a good source of drinking water. Currently Lake Vättern is one of Sweden's most important water reservoirs, supplying around 300,000 people a year with drinking water. When another four municipalities begin using Vättern as planned, this figure will increase by another 200,000 people. The clear waters of Lake Vättern enable vegetation to grow on bottoms down to great depths. The near-shore bottom fauna community is unique and reminiscent of species communities in flowing waters in the mountain chain. Thirty-one of Sweden's just over 50 freshwater fish species occur in Lake Vättern. The portion of Lake Vättern located within the biosphere reserve is designated as a Natura 2000 site and is designated as particularly valuable to Sweden's fishing and nature. The entire lake is a water protection area.

In addition to Vättern, the biosphere reserve embraces 8 larger and about 30 smaller lakes of varying characters, from the eutrophic Lake Landsjön to the oligotrophic clear-water Lake Ören. Most of the lakes are originally oligotrophic in nature but have become more eutrophic as a result of human impact.

The lakes and watercourses in the area contribute several vital ecosystem services, where perhaps the most important supporting services are serving as the living environment for many species, contributing to the water and nutrient ecocycle and primary production of algae and phytoplankton. The ecosystem services of Vättern and water in the area also create benefit in the form of raw water provision and opportunities for fishing, tourism and outdoor recreation.

The aquatic ecosystem also provides several financially important provisioning services, such as drinking water and industrial water, and production of food in the form of fish and crayfish caught by the 18 currently licenced professional fishermen in Lake Vättern. In the past, the most financially important species were lavaret and char, but since the 2010s the signal crayfish has overtaken that role. In addition, some people without professional fishing licences have a fishing as a sideline, mainly for crayfishing in private waters. Angling is a popular pastime in the biosphere reserve, especially in Vättern. There are several professional fishing guides who assist fishing tourists in Vättern and the smaller lakes.

Another provisioning service is power generation in hydropower plants, millwheels, sawmills and so on. Vättern and the biosphere reserve's other water bodies provide many cultural services as they provide environments for recreation and enjoyment, including angling, boating and other activities in beautiful waterside environments. Art, literature, music, film and even advertising all draw inspiration from water, and science and education frequently benefit from it as well.

Examples of cultural services provided by the area's lakes and watercourses include breathtaking views and peaceful settings for both passive and active nature experiences, from sunbathing and birdwatching to swimming, canoeing and rambling. Vättern is a particularly ideal place for observing migratory birds. In many cases, cultural services are also inextricably linked to cultural heritage values. Many historical attractions, such as old watermills and sawmills, can be found around Vättern and several of the nearby lakes and watercourses.

In many of the lakes with working ecosystems, the water provides regulating services in which organisms, in particular mussels, consume surplus nitrogen and phosphorus to reduce eutrophication. Toxic substances can be broken down or stored in sediment, temporarily preventing their release into the ecosystem.

Threats: Environmental toxins, alien species and climate change. Insufficient and inaccessible information can lead to unsustainable use of Vättern's ecosystem services. The Water Conservation Association (Vattenvårdsförbundet) has allowed collaboration on the management of the whole of Vättern today, which is now working satisfactorily. However, collaboration on other focus areas is complicated by the fact that Vättern is shared by 8 municipalities, 4 county administrative boards, 4 regions and 6 Leader areas.

Lake and watercourse-based ecosystem services	Examples – who benefits	Benefits	*	CISES
Supporting services				
Running watercourses	Households, workplaces, industries	Hydropower	A	–
Production of wild fish	Professional fishermen, anglers, food industries, households, tourism companies	Fish and shellfish for sale or household needs		1114
Provision of drinking water from ground water	Agriculture, industries	Available drinking water	A	4211
Provision of drinking water from lakes/watercourses	Households, workplaces, agriculture	Available drinking water, water for watering	A	4111
Regulating services				
Eutrophication control	Households, agriculture, industries, users of aquatic environments	Cleaner water		2251
Water purification through filtering, binding by aquatic organisms	Households, agriculture, industries, users of water and its environments	Cleaner water and therefore reduced illnesses		2112

Control of nutrient levels in field margins	Households, agriculture, industries, users of water and its environments	Cleaner water, reduced eutrophication		2251
Water regulation by wetlands in the water systems	Households, agriculture, industries	Reduced risks of flooding, reduced risk of drought		2213
Carbon sequestration by plankton, aquatic plants	Everyone	Prevention/reduced impact of climate change, reduced emission of greenhouse gases		2261
Cultural services				
Provision of attractive recreational environments	Residents, visitors, tourism companies	Outdoor recreation, swimming, scuba diving, nature tourism, the recreational aspect of angling		3111
Provision of areas with a variety of fauna/interesting vegetation	Residents, visitors, tourism companies	Birdwatching, watching wild animals, ecotourism		3112
Organisms/ecological functions that contribute to maintaining the cultural landscape	Residents, visitors, tourism companies	A feeling of history and identity and cultural heritage		3123
Organisms/ecological functions that are beautiful	Residents, visitors, tourism companies	Recovery, inspiration, relaxation as a result of beautiful views		3124

*A=abiotic, I=indirect

Wetlands-related ecosystem services (habitat type 5.J)

Many plants and animals are dependent on wetlands, and 19% of Sweden's red-listed species are found here. Wetlands attract many birds, batrachians, insects and mammals, especially during the dry periods. Deer use cool wetlands rich in plant life on warm summer days and bats find food here when insects hatch in the waters. Many plant and animal species thrive in the nutrient-rich wet meadowlands, and a number of rare species are found in the base soils

of the rich fens, in particular those in the Hultarp region, which are known for their rare and demanding vascular plants and mosses. Marshes, wetlands and ponds are also important for species in surrounding ecosystems and for migratory birds to stop off along the way. Several species that are considered threatened or that have completely disappeared in the rest of Europe have their last strongholds in the Swedish marshlands. For a long time, wetlands were solely viewed as problem areas, discussed in negative terms as swamps and bogs. Throughout Sweden it was common to drain entire wetlands, and the biosphere reserve was no exception. In the 19th century, four large lakes were lowered here, and in the early 20th century significant areas of wetlands were drained, which impacted the land's ability to buffer the effects of both drought and flooding. It also impacted the living conditions of many plants and animals.

More recently, humans have begun re-evaluating the significance of wetlands for the landscape as a whole and realising how many ecosystem services they provide. Wetlands provide cultural services in the form of nature and recreational values, as well as provisioning services such as ensuring water tables that we can use as drinking water. Some of the regulating services include increased water tables, filtering, regulation and a slowing of water masses, which means that wetlands can reduce the effects of both drought and flooding. Wetlands contribute moisture, creating natural buffers for wildfires, and many wetlands also store large amounts of carbon. In agricultural areas, wetlands prevent eutrophication and serve to purify the water. Establishing wetlands can also reduce particles and sludge in nearby watercourses. Wetlands in connection with sewage treatment plants have also proven highly effective at filtering out bacteria and viruses, thus providing another excellent regulating service.

Threats: Encroaching vegetation, draining. Draining a wetland transforms the ecosystem service from carbon storage to carbon emission. A 2018 study showed that a drained wetland in Sweden releases 16 million tonnes of carbon dioxide equivalents each year.

Wetland-based ecosystem services	Examples – who benefits	Benefits	*	CISES
Supporting services				
Production of plant materials, biomass	Households, workplaces, industries	Fossil-free raw materials for energy production		1311
Production of berries and mushrooms	Households, food industries	Picked wild berries and mushrooms		1113
Production of wild animals	Households, food industries	Game meat for sale or household needs		1114
Provision of drinking water from ground water	Households, workplaces, agriculture	Available drinking water	A	4112
Regulating services				
Water regulation	Households, agriculture, industries	Reduced risks of flooding and drought		2213

Regulation of fresh-water chemistry through living processes	Communities, households, recreation areas, agriculture	Cleaner water		2251
Carbon sequestration by plants and plankton	Everyone	Prevention/reduced impact of climate change, reduced emission of greenhouse gases		2261
Cultural services				
Provision of attractive recreational environments	Residents, visitors, tourism companies	Outdoor activities, nature tourism		3111
Provision of areas with a variety of fauna/interesting vegetation	Residents, visitors, tourism companies	Birdwatching, watching wild animals, ecotourism		3112
Organisms/ecological functions that are beautiful	Residents, visitors, tourism companies	Recovery, inspiration, relaxation as a result of beautiful views		3124

*A=abiotic, I=indirect

Built environment and urban area-based ecosystem services (habitat type 6.J)

The biosphere reserve contains two cities, one large urban area and seven other built-up areas as well as extensive rural settlements. The three big urban areas are Huskvarna, Gränna and Tenhult. Huskvarna and Gränna evolved around industries, based on the generation of hydropower in Röttle and the Huskvarna Falls. Gränna, which consists of older houses and historically well-preserved structures like the Brahehus ruin and well-preserved mill environments along the Röttleån River, is a popular tourist town, while Huskvarna is still dominated by industrial companies. In addition, Huskvarna is well known as a park town with tree-lined avenues and a lovely walking area with giant trees worth protecting along the Huskvarnaån River, where spawning char are an attraction in the spring. The town spreads uphill on Huskvarnaberget in the north, where it meets popular outdoor recreation areas and several nature reserves within 500 m of the town, with very high natural values linked to hardwood trees, oaks and naturally occurring grasslands. Tenhult in the southern part of the area has a population of about 3,000 and is a typical station community with a strong tradition of small businesses. The biosphere reserve also includes a parish outside Jönköping Municipality, Adelöv parish in Tranås Municipality: a gently rolling pastoral landscape, a picturesque church village and about 500 residents.

Many of the urban areas in the biosphere reserve are especially known for their thick old trees, green spaces and neighbouring natural areas set up for recreation and the preservation of biodiversity. Tree-lined avenues, overgrown and alternatively managed gardens and park environments are generally environments with higher species variation and a greater frequency of demanding species than other parts of built-up environments.

Built environments are largely dependent on ecosystem services outside the built-up area, while at the same time creating many ecosystem services themselves. Natural environments

near population centres serve multiple functions. They provide regulating services such as local climate improvement and providing some filtering of dirty stormwater in dams, ditches and marshes as well as helping to delay high flow levels. Trees and shrubs bind dust, even out the temperature and reduce rain flows. The greenfield areas, green structures and inner gardens of urban areas provide regulating and provisioning services as they create the conditions for biodiversity and production of food in gardens and urban farming. Green spaces within and near population centres contribute cultural services because they offer attractions and opportunities for everyday recreation, play and educational development.

Threats: development, overgrowth

Ecosystem services in and near built environments	Examples – who benefits	Benefits	*	CISES
Supporting services				
Production of food in gardens and urban farms	Households	Vegetables for household needs or sale		
Regulating services				
Microorganisms' breakdown of industrial waste, petroleum products	Households, workplaces, industries	Removal of waste and petroleum products and therefore cleaner lands		211
Air purification by urban trees	Households, workplaces, recreation environments, industries	Cleaner air and cleaner water, and therefore reduced illnesses		2112
Visual screening with plants	Households, recreation environments	Avoidance of views of unattractive areas.		2123
Noise reduction by plants	Households, workplaces	Quieter areas provide more relaxation		2122
Water regulation by wetlands or with the help of vegetation	Households, workplaces, industries	Reduced risk of flooding, reduced risk of drought		2213
Local temperature regulation by urban trees	Households, workplaces	More pleasant temperatures		2262
Cultural services				
Provision of attractive recreational environments	Residents, visitors, tourism companies	Outdoor activities		3111

Provision of areas with a variety of fauna/interesting vegetation	Residents, visitors, tourism companies	Passive recreation, bird watching		3112
Provision of areas with interesting species that	Residents, visitors, tourism companies	Understanding and practical knowledge about nature and the environment		3122
can be used for practical learning				
Organisms/ecological functions that are beautiful or in combination with their surroundings contribute to beautiful views	Residents, visitors, tourism companies	Recovery, inspiration, relaxation as a result of beautiful views		3124

*A=abiotic, I=indirect

3.2 Specify if there are any changes regarding the indicators of ecosystem services that are being used to evaluate the three functions (conservation, development and logistic) of the biosphere reserve. If yes, which ones and give details and update.

The documentation that formed the basis of this report's description of general ecosystem services at national and regional level and additional documentation defining priority habitat types and species from different perspectives. More specifically, information and data were primarily retrieved from the following strategies and knowledge banks, all amassed in the 10-year period: The County Administrative Board's Action plan for Green Infrastructure, the results of the comprehensive ecological gap and functionality analysis BriFunk and the *Landscape in balance* report (chapters 3.4 and 4.2) and the ecosystem analysis that Jönköping Municipality had done in 2017 with a focus on the built environment in Jönköping city. Additional support was retrieved from Forest Target Scenarios the Swedish Forest Agency and the forestry industry developed (chapter 3.4).

Ecosystem services analyses are conducted to identify, catalogue or evaluate ecosystem services in order to ensure more effective and sustainable ecosystem management. The background reports analyse priority habitats and key factors described in section 3.1 as key factors for biodiversity, green infrastructure and potential ecosystem services rather than based on their actual ecosystem services.

In addition, the following projects and compilations have been established during the period and served as background material for the assessments in this report in chapter 3.1.

The majority of the biosphere reserve is included in a national interest in outdoor recreation, which indicates areas with a good status for several cultural ecosystem services. In collaboration with Jönköping Municipality and the County Administrative Board, the biosphere reserve ordered an evaluation of areas of particular importance for social values. The majority of these areas are both within the national interest area and in value areas for outdoor recreation as identified by the County Administrative Board. These areas can be assumed to be particularly important for the production of cultural services.

The corresponding work was carried out based on national interests for nature conservation and regionally established knowledge bases. This resulted in changes to the boundaries of forested biological value regions in the biosphere reserve and cluster areas with high natural values in specific habitat types. These areas can be assumed to be particularly important for the production of regulating services.

In the development of its Forest Target Scenarios, the Swedish Forest Agency noted what it called “Nearby Forests”, which also contribute significantly to cultural services as well as regulating, supporting and even some provisioning services.

The Swedish Forest Agency has drawn up the following summary of forest ecosystem services from a national perspective. The following table lists them and describes the status of each service in Sweden’s forests. This assessment may provide a valuable tool for future efforts to promote forest ecosystem services in the biosphere reserve.

-

	Ecosystem service	Good	Average	Insufficient
Provisioning	Timber and pulpwood			
	Biofuel			
	Game			
	Grazing animals and fodder			
	Forest berries			
	Mushrooms			
	Drinking water			
	Fish from forest lakes and watercourses			
	Genetic resources			
	Other provisioning services			
Regulating	Climate regulation			
	Prevention of storm damage and other weather-related damage			
	Prevention of erosion and landslides			
	Water regulation			
	Natural control of pests and disease			
	Ensuring the quality and quantity of the water table and surface water			
	Air purification			
Supporting	Biogeochemical cycle			
	Soil fertility			
	Pollination of plants			
	Photosynthesis			
	Habitats and living environments			
	Biodiversity			
	Stability and resilience			
	Spreading of seeds			
Cultural	Everyday recreation and exercise activities			
	Forest and nature for experience tourism			
	Mental and physical health			
	Environment and aesthetics			
	Knowledge and information			

Figure 10. This table shows a summary of the assessed status of 30 ecosystem services in Swedish forests. From the Swedish Forest Agency's Report 2017/13 The forest's ecosystem services – status and impact.

3.3 Update description on biodiversity involved in the provision of ecosystems services in the biosphere reserve (e.g. species or groups of species involved).

According to the Swedish definition, the East Vättern Scarp Landscape is in the boreonemoral zone. The topography of the biosphere reserve and its proximity to Lake Vättern leads to the presence of both northern and southern habitat types and species. Four hardiness zones are found within a stretch of just a few kilometres, with a wide variety of biological diversity. With its great depth and cold, oligotrophic waters, Lake Vättern has a significant impact on the local climate, creating cold springs and mild autumns. This atypical climate for the region has resulted in the presence of both warm relict species and Ice Age relicts living in the biosphere reserve. This is the only place in Scandinavia where the bulin snail is found. One of the country's biggest fruit-growing districts is in the biosphere reserve. Significant parts of the area were once thick with oak trees, and even now there are several core areas with many large oaks with high natural values.

Vättern and other limnic environments are vital ecosystems. The clear waters of Lake Vättern enable vegetation to grow on bottoms down to great depths. The near-shore bottom fauna community is unique and reminiscent of species communities in flowing waters in alpine environments. Typical fish species in Vättern are char, lavaret, fourhorn sculpin and vendace. Several of its tributaries are vital spawning beds for grayling, trout and river lamprey. In addition, there are more than 110 zooplankton species, around 300 phytoplankton species and around 30 benthic fauna species on deep bottoms. Among birds associated with the ecosystem are common tern, red-breasted merganser, osprey, black-throated loon and common sandpiper.

Please see chapter 4 for more information about the natural setting and chapter 9 for species lists.

The majority of the biosphere reserve consists of agricultural and forestry land, with villages and scattered settlements consisting of small farms and individual homes. Job opportunities close to home have allowed about the same amount of people to pursue agriculture or forestry part-time in 2022 as in 2012. The proximity of urban areas is thought to be an important reason that the rural areas have not seen the same degree of depopulation that many other rural communities have suffered. For example, the population of Ölmstad parish is about the same in 2021 as it was in the mid-19th century.

The number of dairy farms and grazing animals has decreased, but there are several good examples of successful entrepreneurs in land-based and other green industries. They have contributed to maintaining a living agricultural landscape, providing provisioning, supporting and regulating services, which in turn creates attractive living environments with cultural services.

The "Action Plan for Green Infrastructure for the County of Jönköping" briefly describes the county's 27 most prioritised habitat types and a selection of the ecosystem services they contribute to.
The diagram below shows 16 of those habitat types' distribution in the biosphere reserve as a percentage. Western taiga is the most common habitat type, followed by species-rich unfertilised grasslands (which are naturally occurring fodder lands) and watercourses with a high proportion of key biotopes).

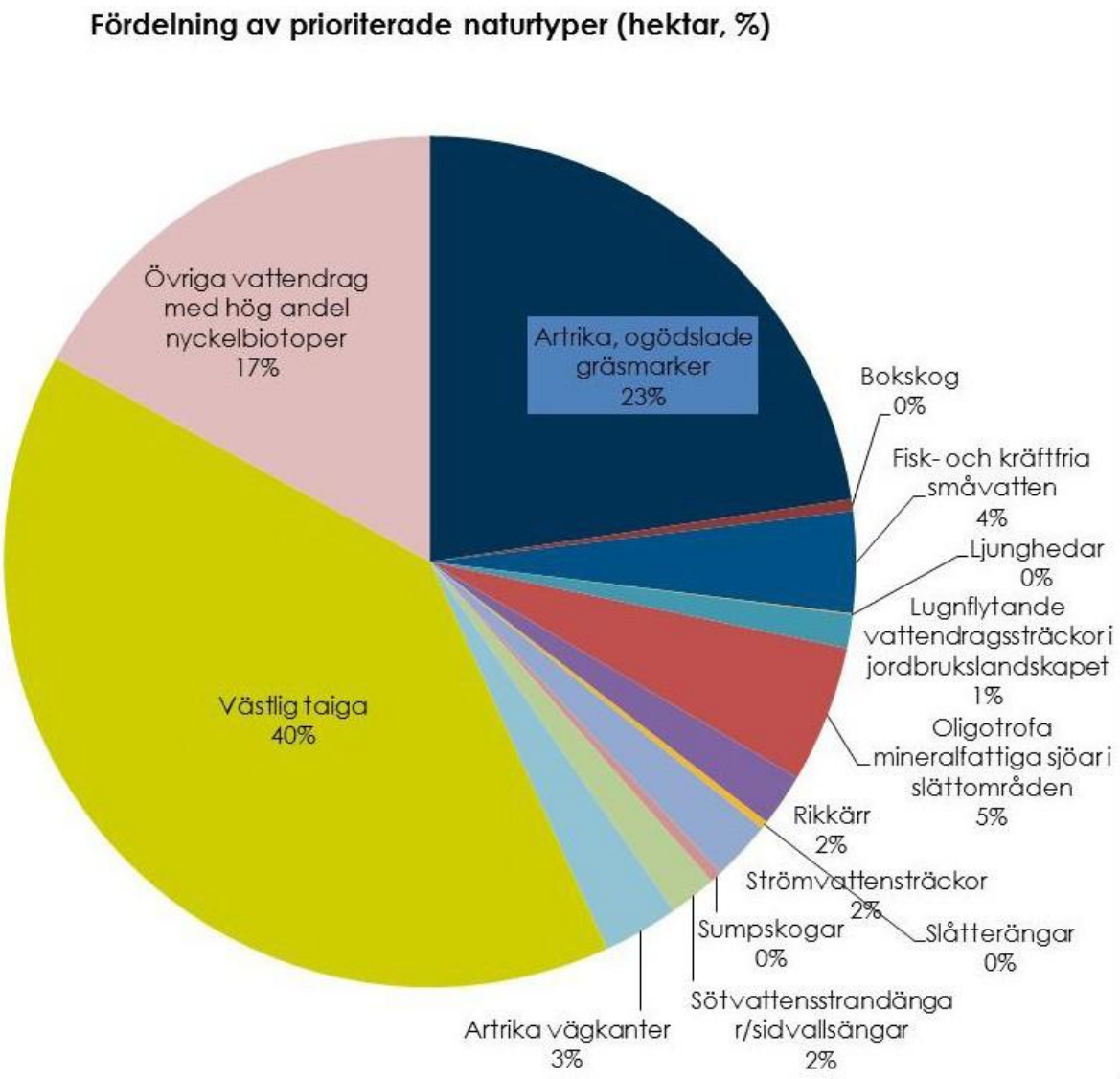

Figure 11. Prioritised habitat types and key factors in the biosphere reserve. The habitat types are not analysed based on their function as ecosystem services, but as key factors for biodiversity, green infrastructure and potential ecosystem services. Source: Action Plan for Green Infrastructure for the County of Jönköping.

Figure 11 Clockwise from the top:
Species-rich, unfertilised grasslands 23%
Beech forest 0%
Ponds free from fish and crayfish 4%
Heather moors 0%
Slow-flowing stretches of water through agricultural landscapes 1%
Oligotrophic, low-mineral content lakes in plains areas 5%
Rich fens 2%
Stretches of running water 2%
Hay meadows 2%
Freshwater swamp forests 0%
Freshwater beach meadows/wet meadows 2%
Species-rich roadsides
Western taiga
Other watercourses with a large proportion of key biotopes 17%

This diagram clearly shows that the biosphere reserve meets many of our basic needs through

the production of wood and pulpwood as well as meat, fish, fruit and vegetables. These are the most obvious benefits or "provisioning services", which are also financially important for the rural economy. Berry farms, mushrooms and berries in the woods and game meat are important benefits.

Regulating and provisioning services in varied ecosystems are a necessity for many of these benefits. In addition, a high frequency of varied natural fodder lands is important for achieving a functioning and geographically widespread pollination by insects and biological pest control in the ecosystem. Ecosystem services like purification of the air and water, carbon sequestration and erosion protection also need to be secured in order to ensure the financially important benefits.

A living landscape with active agriculture and forestry facilitates the preservation of the many cultural ecosystem services. As an example, the grazing of natural grasslands ensures a rich flora and fauna in the biosphere reserve, which promotes biodiversity, binds carbon in the soil, purifies the air, feeds the livestock and creates beautiful recreation areas. Access to attractive and varied natural environments boosts our physical and mental health. All these cultural services can also contribute to local entrepreneurship, increased tourism and in-migration.

Finally, the health of our entire shared biosphere depends on a wide array of supporting ecosystem services working properly. These include nutrient and water cycles, soil formation, photosynthesis and seed distribution. Habitats for preservation of biological and genetic diversity are an important part because they contribute to greater stability and resilience.

3.4 Specify whether any recent/updated ecosystem services assessment has been done for the biosphere reserve since its nomination/last report. If yes, please specify and indicate if and how this is being used in the management plan.

The loss of biodiversity has a negative impact on the ability of ecosystems to deliver many ecosystem services. The direct impact factors are driven by a number of indirect underlying factors, which in turn are related to financial and social values and human behavioural patterns (the Swedish Environmental Protection Agency). The County Administrative Board states that "Ecosystem services are an important effect of a functioning green infrastructure and preserved biological diversity". Many different ecosystems and habitat types, different species and broad genetic variation within the species are needed for ecosystems to be viable and resilient. The East Vättern Scarp Landscape – with the diversity of landscapes, habitats and species it boasts in its small-scale farmed and forested landscape – has a wealth of ecosystem services and conditions for preserving biodiversity.

The loss of biodiversity is one of the greatest environmental problems of our age. Some of the causes of this are climate change, habitat loss due to changes in land use and that the remaining environments are fragmented into small, more or less isolated areas.

Unfortunately, no specific measurements or assessments have been conducted of ecosystem services at the habitat level in the biosphere reserve. The biosphere association is working with the County Administrative Board, which in turn is working with a number of researchers to boost our shared knowledge of their function and distribution. The following is a short summary.

The social function of the forest is an important part of its cultural ecosystem services. In their work with target objectives in the past 10 years, the forestry industry has listed Nearby Forests and Outdoor Recreation Forests as important for people's social experience, living

environment and experience of the natural world: "*Nearby Forests are people's closest, most accessible and most used forests.*" "*Outdoor Recreation Forests are for outdoor recreation.*" Nearby Forests and Outdoor Recreation Forests often have high accessibility and well-organised recreational facilities. (To read more, visit the Swedish Forest Agency website). The biosphere association's participation in the preliminary study "Hyper-Localised Tourism" and the establishment of the new walking trails Fransiscusleden and Biosfärleden are concrete examples of how the target objectives and strategies of authorities can be translated into practical operations.
The biosphere association's practical activities were particularly significant when a heatwave, drought and the pandemic all struck the area in 2018–2022, elevating the needs and demands of residents and visitors on the cultural ecosystem services.

The report "Enhanced Landscape Analysis for Biodiversity, background data for biosphere programme" (County Administrative Board 2014) aimed to contribute to future work with ecosystem services. The report served as background data for the development of a green action plan and served as the basis for the biosphere association's continuing work with the preserve and support functions.

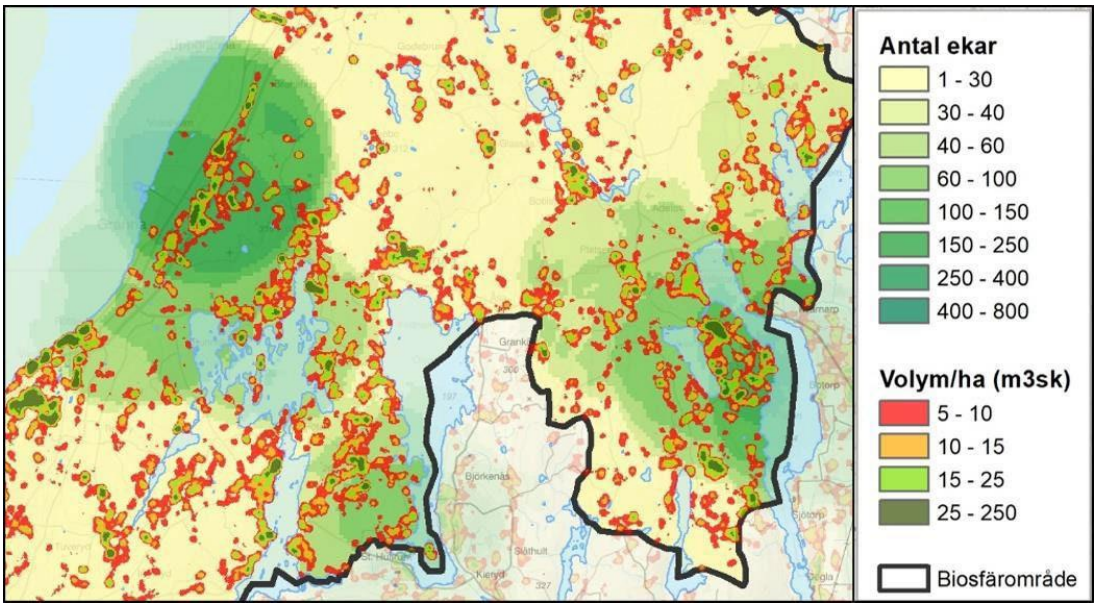

Figure 12. Above is an example of extracted oak density based on volume and number of trees. The outlined area is located in the middle of the biosphere reserve.

Figure 12 Legend shows: Number of oaks, Volume/ha (m3 forest), Biosphere reserve

In collaboration with the County Administrative Board and other organisations, the biosphere reserve took the results of BriFunk further with a number of projects, analyses and practical conservation measures focused within the buffer zones, development zone and value regions of different habitats. Some examples include Broadleaf Success, Continuity Forest, More Outdoor Recreation and LEIF in Practice. The two projects Rewild and Oak Success (chapters 2 and 4.2), which are being initiated in 2022, originated in BriFunk and the *Landscape in Balance* report.

The biosphere reserve – a partner in the County Administrative Board's efforts to follow up on the environmental objectives and the regional action plan for Green Infrastructure. The County Administrative Board monitors the work towards the 14 of 16 environmental targets in the county. The follow-up of the environmental objective A Good Built Environment in

2020 demonstrates the importance of the biosphere association's work, as it mentions the cataloguing of socially important natural areas.

To contribute to meeting the national and global goals for sustainable development, it is important that many stakeholders work with green infrastructure. The County Administrative Board's long-term efforts to involve as many stakeholders as possible, such as landowners, government agencies, local authorities, clubs and associations to jointly plan to ensure landscapes that will be sustainable in the long term. Several of the supporting documents, analyses and exemplifying projects for the action plan originated within the biosphere reserve.

Below is a schematic diagram of the work of mapping out and creating measures to secure a green infrastructure.

The action plan defines the five factors that are the greatest challenges to a green infrastructure.

- Working ecosystem services
- Interlinked structures
- Accessible natural areas
- Tolerance of change
- Space for water and local management of water

With its starting point in previously developed supporting documents, including the biosphere project, the action plan develops an advanced geographic information system describing what landowners, individuals and organisations can do to contribute to securing ecosystem services and a green infrastructure. A ready reference guide to all this information has been developed with a map illustration, called *Jordbruksmarkens framtid* (The Future of Arable Land).

Biological value regions and value clusters for various habitats primarily coincide with those identified in the Regional Strategy for Formal Protection of Forest in the County of Jönköping (see chapter 4.1) and affect what measures are most suited to carry out to contribute to enhanced ecosystem services in a given area. Habitat-specific measures should be prioritised in a biological value region for that habitat. Outside biological value regions, the span of suitable measures is broader. Boosting ecosystem services there may mean enhancing variation in the utilised landscape overall. Examples may include promoting or creating wetlands, promoting or creating forest-edge environments, creating functional field margins that reduce leaching of nutrients, promoting pollinators and beneficial insects. The action plan for green infrastructure and identified biological value regions can be used to help implement targeted projects and collaborative measures that will allow the right steps to be taken in the right place in future biosphere efforts.

4 THE CONSERVATION FUNCTION

[This refers to programmes that seek to protect biodiversity at landscape and site levels and/or ecological functions that provide ecosystem goods and services in the biosphere reserve. While actions to address this function might be focused on core area(s) and buffer zone(s), ecosystem dynamics occur across a range of spatial and temporal scales throughout the biosphere reserve and beyond.]

4.1 Significant changes (if any) in the main habitat types, ecosystems, species or varieties of traditional or economic importance identified for the biosphere reserve, including natural processes or events, main human impacts, and/or relevant management practices (since the last report).

The encroachment of vegetation on natural grasslands has been identified as a major threat to biodiversity conservation in the biosphere reserve. Extensive projects and knowledge-enhancing activities have been undertaken to counteract this, and the new formal protections added since the 2011 nomination represent significant changes affecting ecosystems and species. See also the table in Chapter 9.

Protection decided at the time of nomination (2011):	Protection decided at the time of evaluation (2021):
16 Nature reserves	32 Nature reserves
17 Biotope protection	20 Biotope protection
28 Natura 2000 sites	28 Natura 2000 sites

The County Administrative Board, the Swedish Forest Agency and the municipalities are all involved in formal protection of natural areas. The work follows a regional strategy for the formal protection of forests, such as nature reserves and biotope protection. For some time now, landowners have had greater opportunities to choose whether their land should be protected. There are also other tools such as conservation agreements, state support for hardwood forests, support for nature conservation and cultural heritage preservation measures (Nokås), and also advisory services. In addition, individual landowners take care in connection with forestry measures and voluntarily set aside areas for conservation, which has a major impact on the conservation of the landscape.

The regional strategy for formal protection (2006) has been revised over the 10-year period. Previously designated forest value regions within the biosphere reserve in 2006–2017 (forest dominated by valuable broad-leaved species, broad-leaved forest dominated by pioneer trees, forest rich in broad-leaved trees and mixed coniferous forest) were assessed as geographically partially separate. Based on new knowledge, the entire biosphere reserve is now defined as a forest value region for coniferous forest, oak habitats and broad-leaved forest dominated by pioneer trees.

During the 10-year period, the County Administrative Board updated all the conservation plans for Natura 2000 sites and decided on 16 new nature reserves, 12 of which are located in the core area. Management plans were adopted for all nature reserves, the aim of which is to preserve and develop biodiversity, based on the purpose of each site, and promote outdoor recreation, provided that this is not at the expense of the designated natural values. Due to the increased visitor pressure in natural areas, especially in protected natural areas, during the Covid-19 pandemic, the County Administrative Board had all areas inspected from a visitor perspective in 2021. The assessment provided a good overview and new knowledge about visitor behaviour and will result in greater adaptation for outdoor recreation in the most

popular areas. The pandemic has resulted in a boom and a new interest in visiting nature reserves. Previously rarely visited reserves are now seeing more tourism and many expect accessibility features such as car parks and walking trails to be available. There is slightly more inconvenience for landowners as inexperienced visitors park inappropriately/block access and litter more. The County Administrative Board estimates that there are about 10 times as many people in the nature reserves as before the pandemic. On weekdays in particular, the field staff have noticed a marked increase in the number of senior citizens in our nature reserves. Despite the increase in the number of visitors, there has been no increase in problems with littering.

The larger eight-toothed European spruce bark beetle (*Ips typographus*) has caused significant economic damage to forests in connection with dry, hot summers in the biosphere reserve and throughout southern Sweden since 2018. Since 2019, the Swedish Forest Agency has been actively monitoring the status and distribution of the bark beetles. Foresters in the East Vättern Scarp Landscape can consult the Swedish Forest Agency's (below) or Södra's maps showing the risk analysis for their own property. In these stands, it is important to implement active control measures to prevent further spread of the insect and protect both timber assets and biodiversity.

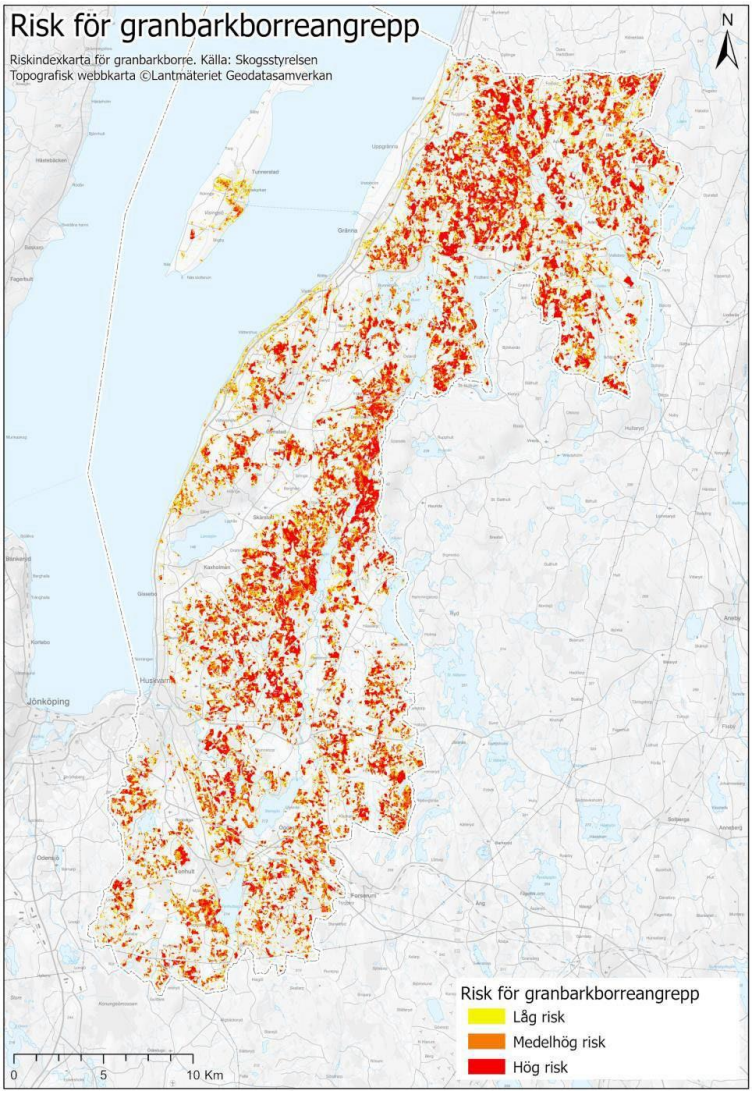

Figure 13. Risk index map from the Swedish Forest Agency showing which forests are at risk of spruce bark beetle infestation. The map clearly shows that large parts of the spruce stands in the East Vättern Scarp Landscape are at high risk of spruce bark beetle infestation. The risk may be reduced with an increased per

centage of broadleaf trees.

Figure 13 Legend shows the risk of spruce bark beetle infestation:
-Low risk - yellow
-Average risk - orange
-High risk - red

The problem of spruce bark beetle infestation is largely due to dry summers and winter storms with fallen trees. In addition, the high game populations of recent decades have made adequate site adaptation difficult, with spruce often being planted in too poor, dry soils. Forests with a low risk of heavy bark beetle infestation have some variation in tree species mix and often a history as cultivated forest. In the 20th century, this was a common forest type in the East Vättern Scarp Landscape, often grazed periodically by animals, which has been rare in the 21st century. Spruce-dominated cultivated forests produce valuable timber but may have an increased risk of bark beetle infestation and a lower diversity of ecosystem services than uneven-aged or mixed-species forests. The Continuity Forest biosphere project (see more in chapter 4.2) used demonstration areas and fencing grants to disseminate knowledge about methods and economic conditions for forest grazing as a management method for continuity forestry. In forest grazing, there are continual timber harvests but the main income for landowners is often the area-based environmental payment for the grazing regime. Far from all forests are suitable for grazing.

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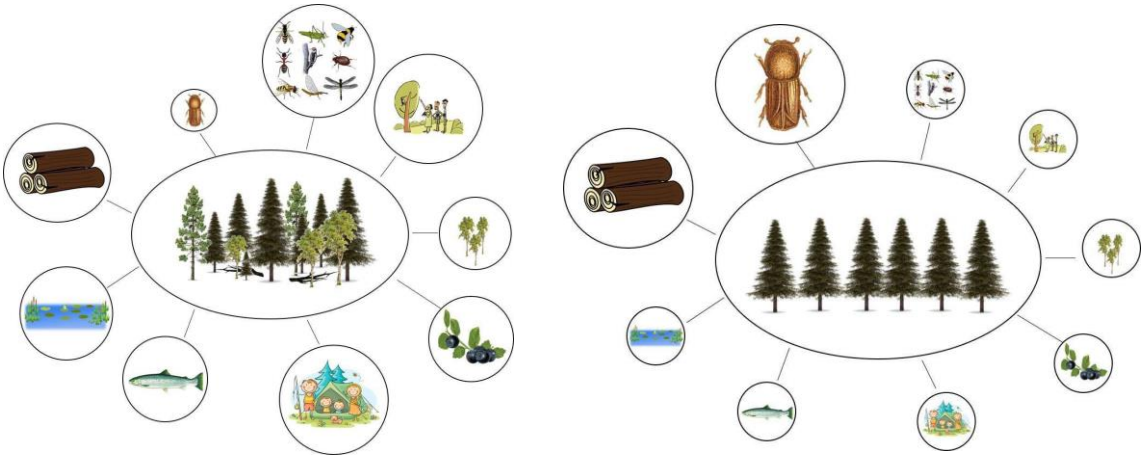


Figure 14. The benefits of different forest types with varied management purposes are high for outdoor recreation and biodiversity, but more difficult to measure in monetary terms than the production of wood fibre volume. The figure above illustrates the differences between a single-layer spruce production stand and a stand managed with continuity forestry through forest grazing in terms of biodiversity and production of regulating, provisioning and cultural forest ecosystem services (source: Landscape in Balance, 2021).

4.2 Describe the main conservation programmes that have been conducted in the biosphere reserve over the past ten years as well as current on-going ones. Note their main goals and the scope of activities, e.g. biotic inventories, species-at-risk, landscape analyses, conservation stewardship actions. Cross reference to other sections below where appropriate.

Local nature conservation projects, known as LONA projects, are an ongoing nature conservation initiative to stimulate human commitment to nature and outdoor recreation and emphasise the importance of nature to public health. The initiative is part of Sweden's work with its environmental objectives. (LONA stands for Local Nature Conservation Projects – the state and the municipality share the funding and the projects are implemented in

partnership with a third party). The following LONA projects have been implemented within the biosphere reserve:

- Feasibility study for restoration of the river in Huskvarna
- Higher biodiversity in municipal grasslands
- Forest-edge environments for pollinators on municipal land
- Inventorying trails and running tracks
- Integration project information on the right of public access and nature
- Watercourse measures to benefit otters
- Mollusc inventory in Jönköping Municipality

The following four LONA projects run by the biosphere association are described below.

- BioBlitz in the East Vättern Scarp Landscape
- The Year of the Sheep
- Continuity Forest
- More Outdoor Recreation

The LONA project BioBlitz in the East Vättern Scarp Landscape 2012.
Sweden's first BioBlitz was held in Västanå Nature Reserve and Röttle Village. The event was attended by around one thousand enthusiasts and many national experts. The collaboration with the Swedish Species Information Centre enabled contact with several experts who helped with the inventory and also with preparatory work in the national database www.artportalen.se, where a specific "purpose" and delimitation of habitats facilitated reporting in the field. Over the course of a week, around ten people worked hard to set up the camp for administration, information, cooking and camping. Signs, information boards and maps were produced. Griddles and BBQ barrels were made and a fridge and an ice cream freezer were installed on site. At the same time, marketing was a high priority, with interviews and features on TV and radio and in newspapers daily. The radio programme Naturmorgon on P1 reported live.

The LONA project The Year of the Sheep.
An integration project. With physical meetings for unaccompanied young refugees with different themes on a sheep farm in the biosphere reserve. Before each visit, the young people were given a glossary in Swedish to enable them to participate in the events on the farm better. Upper-secondary teachers from Per Brahegymnasiet participated on all occasions, as did the farmer on the farm. Magnus Appelqvist, representative of the East Vättern Scarp Landscape Biosphere Reserve Association, attended the third meeting. Anna Isaksson from the County Administrative Board attended the fourth meeting, and participants from the East Vättern Scarp Landscape Biosphere Reserve association also attended the fifth meeting.

The LONA project Continuity Forest.
Initially, potentially suitable forests and what measures the project could contribute to complement the agri-environmental payments scheme were analysed. A number of forest owners showed interest and their land was inventoried and its historical use mapped. The project showed how forest grazing can be designed and managed and the benefits of this land use. Grazed forests are an important element of the cultural environment of the biosphere reserve. Two demo areas have been completed and can be used by tourist guides for training purposes.

The LONA project More Outdoor Recreation
The project includes work on information points with maps on nature and outdoor recreation.

Wooden infonodes are placed in popular indoor and outdoor locations. The Nature Tourism and Outdoor Recreation on Other People's Land workshop was held on 11 October 2018 and was attended by landowners, associations, Jönköping Municipality, the County Administrative Board of Jönköping County, Småland Tourism, LRF, Destination Jönköping and Region Jönköping County. The aim was to establish common ground rules for nature tourism and general outdoor recreation. Around 50 representatives from different interests actively participated in the workshop at Smålandsgården on Lake Ören. Everything was documented and sent to the participants – and the outdoor strategist at Jönköping Municipality. The biosphere reserve's website is being updated to become a channel for digital nature guidance. Information in Swedish and English.

Other projects

Broadleaf areas and value regions with broadleaf trees. The biosphere projects BriFunk, Enhanced Landscape Analysis for Biodiversity and Broadleaf Success have resulted in analyses, results and methods that have contributed to the County Administrative Board's work, for example in developing value regions for green infrastructure. The map images below show the results when the analysis method for Broadleaf Success was carried out for the entire county.

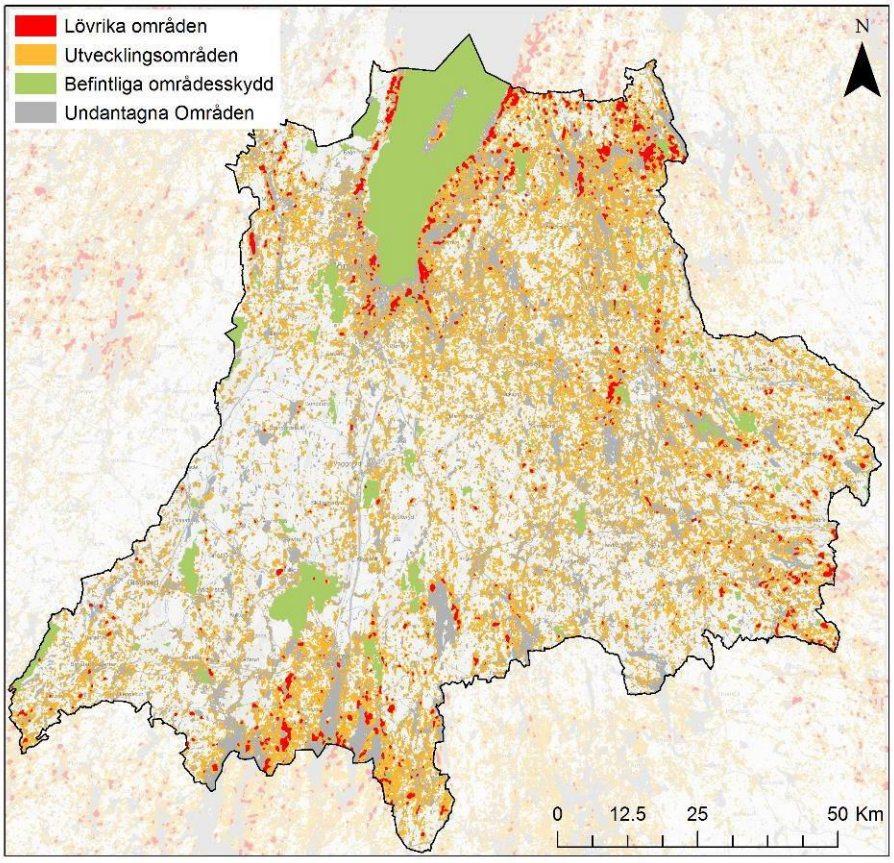


Figure 15. Broadleaf forest values in Jönköping County. Red areas have high densities of broadleaf forest (at least 35% older broadleaf forest).

Figure 15 Legend shows:
- High densities of broadleaf forest
- Transition areas
- Existing area protection
- Excepted areas

Demonstration areas with physical measures and information signs have resulted in seven different sites and six different habitats (ponds, pollination, natural grasslands, grassland/old settlements, broadleaf forest, forest grazing). Signs have been erected for all of them with information about ecology, cultural history and the biosphere reserve as a model area for sustainable development. The work on the demonstration areas aims to create interest and contribute to knowledge about how users can develop and manage high natural values in combination with active management on their own properties. The work has been complemented by numerous guided visits, text folders and information on the biosphere reserve's website.

Living Ecosystems in the Future (LEIF) – Practical application of the BriFunk method. In the project, individual landowners in the Vättern Scarp Landscape received personal advice and maps were produced of broadleaf biotopes that met criteria for ecological sustainability and areas that could be restored to meet the threshold values. In addition to maps, data from BRIFUNK was used as a basis. On one farm, the result was that 30 hectares of encroaching spruce was felled to prioritise oak and birch, and a new forest management plan was developed that took into account more forest values. The advisor Mattias Pontén writes in the project report: 'With the information from BRIFUNK and LEIF on the distribution of oak habitats in the landscape and the threshold values for species occurrence and ecological functionality, I fully understand the importance of oak habitats on an individual farm like Botorp.'

Oak Success – Another practical application of the BriFunk method in the East Vättern Scarp Landscape. The project starts in 2022 and, after interested landowners have joined, measures will be carried out within the oak habitat value region. The project is being implemented in collaboration between authorities, interest groups and users. For example, a forest owner may be informed that oak should be prioritised as a nature conservation consideration in connection with felling if it is located within a designated landscape section. The choice of management method and tree species is then up to the individual landowner. If the work is successful and the method is scaled up and interested landowners opt for oak timber production combined with "forever trees" in forests, it can contribute to an enhanced green infrastructure through tree bridges between ecologically valuable oak habitats that are currently isolated, enhanced forest ecosystem services, good economics and an attractive rural area.

Landscape in Balance

The biosphere report *Landscape in Balance* (2021) was produced by WWF as that organisation's input to the review of the Biosphere Programme. The report is based on five challenges (chapter 3.4) and compiles most of the terrestrial knowledge bases and projects in which the biosphere association has been involved. There are several examples of how future collaborative processes, projects, habitat management and economic activities could contribute to the East Vättern Scarp Landscape continuing to be a model area for sustainable development.

Figure 16. The East Vättern Scarp Landscape has excellent potential to create sustainable supply chains and brands based on ecologically functional landscapes. The hospitality industry benefits from the scenic, varied landscape, including natural fodder lands which, in turn, produce environmentally friendly meat. Diversified forests with increased carbon storage, quantity and quality based commodity production, increased biodiversity and resilience. Overall, this can lead to increased value added and local sales, lower risks and higher profitability for landowners, biodiversity, the climate and society. (Source: Landscape in Balance, *2021)*

Figure 16. Legend shows:
Left top corner:
-More regular harvests of timber and crops. Increased drought tolerance. Fewer attacks by pests.
-Top right: Diversified economy based on more resilient and diverse agriculture and forestry.
-Bottom right: Jönköpings Energi, WWF, the Swedish Forest Agency, Säby Gård, Karl Andersson & Sons, LRF, the county administrative boards, Södra, Urnatur,
-Bottom left: Biochar, Pollarding, Ecotourism, Forest,grazing, Grass-fed,meat, Locally-producedfurniture, Sustainable renewable energy.

The authors of the report conclude that: "Strengthening the area's ecosystem services will ensure its long-term ability to provide, for example, forest commodities, food and water. The biosphere reserve has the potential to achieve an ecologically, economically and socially sustainable landscape." The report highlights a number of examples of activities that can help ecology, the economy and human well-being go hand in hand in future biosphere work. Below is an interpretation of the report's vision for future projects and focus areas of biosphere work. These proposals, with input from founding organisations, the Board and others active in the biosphere reserve, will be processed in the forthcoming revision of the biosphere programme.

1. Developing a more sustainable tourism industry
2. The value of natural grasslands and pollinators to fruit growing and food production
3. Natural grassland meat for increased production of ecosystem services with economic benefits
4. Production of biochar with raw material from natural grasslands

5. More diverse and continuous forestry with increased resilience and economic returns
6. Wetlands, micro-level biodiversity with climate and social benefits
7. Rewild – thriving biodiversity and pollination in built environments contribute to ecosystem services and more resilient landscapes

The encroachment of other vegetation on natural grasslands is part of the problem in the negative trend of the environmental objective of a rich agricultural landscape. Being able to produce food sustainably is one of the keys to achieving the UN Sustainable Development Goals. The biosphere reserve worked throughout the 10-year period, through projects and ongoing activities, to contribute to the positive development of the environmental objective and sustainable food production, for example by supporting the restoration of natural fodder lands and the establishment of demonstration areas. Natural grasslands are often poor and not suitable for cereal cultivation, while they are also a prerequisite for preserving a large part of the biodiversity in Sweden in general, and in the East Vättern Scarp Landscape in particular.

In parallel with ongoing societal development, the biosphere work has resulted in increased awareness among producers and consumers. This can be demonstrated through an increased number of farm shops, several farms starting direct sales of meat boxes and REKO rings with local sales to conscious end consumers. Quality products with added value in the form of direct contact between consumer and producer, good animal welfare, enhanced biodiversity and ecosystem services are products for which more and more consumers are prepared to pay extra.

Broadleaf Success – two projects to raise awareness of and interest in managing climate change, storms, drought and pest infestations

One of the five main tasks of the national biosphere programme is to further develop existing tools and develop new tools that can mitigate the effects of climate change and other global environmental changes. Forest fires, spruce bark beetle infestation and storm damage have caused major financial losses for affected forest owners in Sweden, including the biosphere reserve. Research has shown that the risk of forest damage is often linked to the tree composition of stands and that mixed stands with mixed ages are more resilient. Climate change has increased the risk of forest damage in several ways, and projections of future climate show that these risks are more likely to increase than decrease.

Efforts to increase interest in and knowledge about how to mitigate climate impacts began in 2016 by working to raise awareness of both the ecological benefits and the financial opportunities of replacing spruce with other tree species for timber production. One of the measures was the Broadleaf Success project (1.0), which aimed to find models for creating landscape sections with a green infrastructure of broadleaf forests. The Swedish University of Agricultural Sciences was linked to the project and carried out analyses in the Heureka modelling tool. The modelling highlighted how the proportion of broadleaf trees in the landscape can change over time through various forestry interventions. The analyses also provided an estimate of the financial outcome. The calculations show that it can be profitable to invest in broadleaf forests, especially if more values than those related to timber are taken into account.

The differences in financial outcomes between more broadleaf-oriented forestry and more traditional forestry were relatively small. In addition to the production aspects mentioned above, Broadleaf Success also highlighted the value for outdoor recreation, the hospitality industry and ecological sustainability. There is thus a strong case for increasing the proportion of broadleaf trees in sustainable forestry, both for financial reasons and for ecological sustainability. The East Vättern Scarp Landscape proved to have good conditions for

broadleaf production, and the project Broadleaf Success 2.0 continues to work on this, but on a larger regional scale.

For 30 years, the Eco-Bus has taken pupils from the municipality's secondary schools into the biosphere reserve. From the initial focus on nature experiences and ecology, the activities of the Eco-Bus have been complemented over the past 10 years to include sustainable development and the biosphere reserve as regular themes. Over the years, more than 2,500 schoolchildren have been educated about nature in the biosphere reserve with the help of the Eco-Bus. In addition to secondary school pupils, the Eco-Bus has regularly taken politicians, civil servants and teachers on educational excursions in the East Vättern Scarp Landscape. Over the years, the bus has often been parked in strategic locations to spread knowledge and inspiration about nature and ecology.

A Mini Ambassadors project has been running since 2020. This is a pilot study to teach preschool children aged 3–5 years about ecology, the outdoors and sustainability. In addition, lectures are held for prospective preschool teachers at university and open lectures for already active preschool teachers. The aim is to disseminate the concept as it involves long-term initiatives that contribute to the early learning of children. The mini ambassadors' activities take place both indoors and outdoors in the preschool's green local environment and also involve the children's parents. The training ends with a festive activity with children, staff and parents.

The County Administrative Board has carried out inventories of trees worthy of protection in both the East Vättern Scarp Landscape and the county as a whole. Where such trees are present, landowners have been given the opportunity to receive advice and financial support for pruning, liberation felling and restoration pollarding through the action programme for trees that are particularly worth protecting and the Tree Project. A large number of measures have been implemented in the East Vättern Scarp Landscape which have contributed to the preservation of trees in the landscape and to the conservation of species and ecosystem services associated with old trees there.

Value regions, value networks and value clusters that concern the East Vättern Scarp Landscape have also been identified in the work on the Action Plan for Green Infrastructure – Green Action Plan (chapter 3.4). The value regions describe areas with higher concentrations of values and value clusters than surrounding landscapes. They will serve as a basis for prioritising agricultural and forestry measures, for nature conservation measures and as a basis for assessments and planning. The biosphere reserve's value regions include forests dominated by valuable broad-leaved species, grasslands and water areas.

As part of the Green Action Plan, the County Administrative Board, in partnership with the Swedish Forest Agency, the County Museum, the Swedish University of Agricultural Sciences (SLU) and a landowner, started work on "Green infrastructure at property level". The aim was to concretise green infrastructure by showing how relatively simple means within a property can contribute to the promotion of biodiversity and ecosystem services from a landscape perspective. Heureka analyses were also carried out for the property.

Within the County Administrative Board's pollination mission, all golf clubs have been informed about how they can benefit pollinators. Two demonstration meadows have been established in the biosphere reserve, where meadow land is being created on old pasture. The demonstration meadows are sites for field walks, community meetings, courses and newspaper reports to provide inspiration and information about measures to benefit meadow plants and wild pollinators. The areas were inventoried for bats and wild pollinators after the

measures.

Char and Trout Day. The County Administrative Board and the Jönköping anglers' association arrange an annual Char Day at Huskvarna harbour and a Trout Day at the Tabergsån river in Hovslätt. The spawning of the char and the trout is a great natural spectacle that attracts hundreds of visitors. Children often love to scoop up some of the thousands of aquatic animals that live in the Tabergsån river. The day is always covered in the local press and the leaping trout as they spawn have been live-streamed.

One visitor had the following to say about Char Day: "The authorities and the organisations involved are to be highly commended for the success of their information efforts. When you arrive at the party as an outsider, the locals enthusiastically take care of you as their guest and proudly tell you about the shared "treasures" of the Vättern fauna! This annual event and information have made the local people good ambassadors for the unique wildlife of Lake Vättern." (Ingemar Alenäs, 2018).

Several authorities have the task of carrying out environmental monitoring. Eight different sub-areas are managed in the regional environmental monitoring programme, and in the current programme period they are divided into 31 different sub-programmes, all of which are more or less relevant to the biosphere reserve. The Vättern national environmental monitoring programme includes water quality, biology such as plankton, fish, bottom fauna, birds and environmental toxins in Lake Vättern. The environmental monitoring investigates and monitors the state of the environment and most of the monitoring is coordinated by the County Administrative Board or the Water Conservation Association (Vattenvårdsförbundet). The municipality carries out local monitoring and some monitoring is carried out by other organisations, non-profit organisations and associations.

Within the land-based regional environmental monitoring, inventories have been carried out for bats, trees worthy of conservation, western capercaillies, butterflies, breeding birds and otters, among others. Satellite mapping of the forest landscape has also been carried out, showing the location of suitable forest areas for western capercaillies and their companion species.

Environmental monitoring shows a negative trend nationally for the environmental objective of a rich agricultural landscape, a trend that can be expected to hold true for the biosphere reserve as well. The conservation of this land is of great importance for ensuring many ecosystem services and contributes to affecting the economic conditions of farmers, food producers and other business owners. The County Administrative Board coordinates regional environmental monitoring, which is carried out in 31 different areas. The biosphere reserve is also included in some national monitoring programmes, such as "Green Infrastructure of Grasslands" and "Small Biotopes in the Agricultural Landscape". The physical sites at which the monitoring is carried out are not linked to areas in which relevant projects or measures have been implemented. They are randomly selected and the biosphere reserve has not played an active part in the work to date.

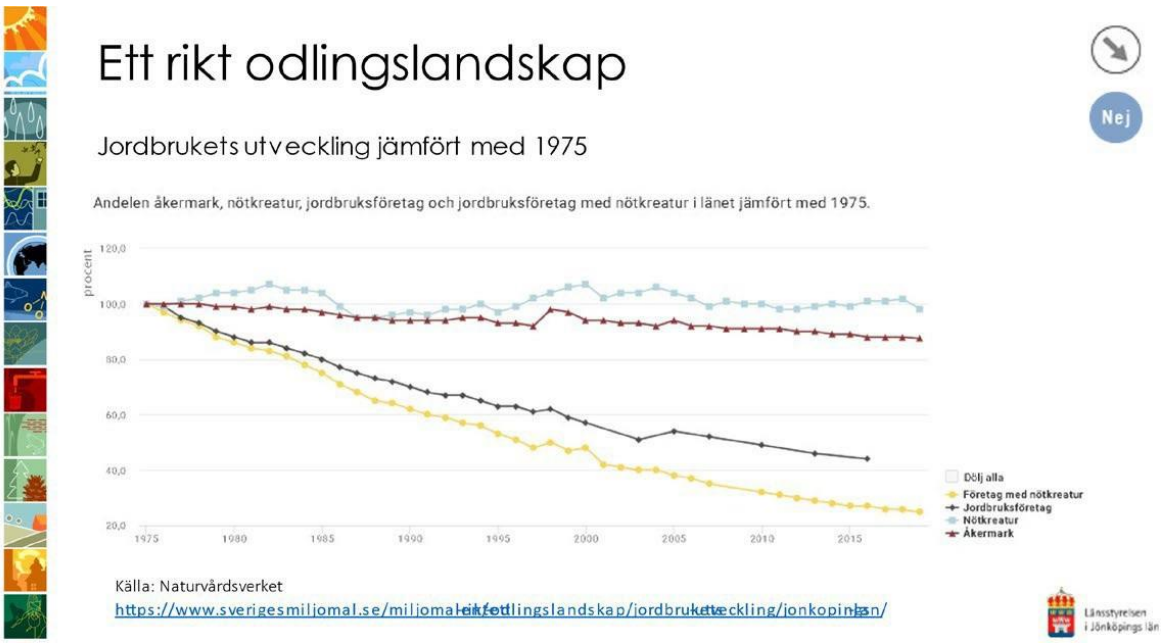


Figure 17. The development of the proportion of arable land, cattle, agricultural holdings and agricultural holdings with cattle in Jönköping County from 1975 to 2020. Trends observed in the monitoring of the Swedish environmental objective "A rich agricultural landscape".

Title: A rich agricultural landscape
The development of agriculture compared with 1975. Proportion of arable land, cattle, agricultural holdings and agricultural holdings with cattle in the county compared with 1975:
-Companies with cattle
-Agricultural holdings
-Cattle
-Arable land

The condition of fish in watercourses is monitored through electric pulse fishing surveys. Four (4) watercourses are monitored within the biosphere reserve. The emphasis of the monitoring is on the recruitment of trout and grayling, and the development of ecological status. All sampled watercourses are assessed as having good status for fish, while the overall assessment of ecological status for fish is not good due to lack of connectivity for the ability of aquatic animals to migrate. This may be due to dams, weirs and incorrectly located culverts.

The condition of fish in lakes is monitored by net sampling. Many of the lakes in the area are popular with recreational anglers, but several of the small lakes were found to have poor ecological status over the 10-year period, partly due to a lack of connectivity, and partly due to eutrophication.

Lake	1990–2000	2001–2010	2011–2020
Tenhultasjön			Moderate
Stensjön			Unsatisfactory
Ramsjön			Moderate
Ylen		Moderate	Unsatisfactory
Landsjön		Moderate	Moderate
Ören	Good	Moderate	Moderate*
Bunn		Good	Good
Sötåsasjön			Moderate
Vättern	Good	Good	Good

Figure 18. Net sampling results from lakes surveyed within the biosphere reserve during the period 2011–2020.

Three policy documents for Lake Vättern, aquatic environments, fish and fishing within the biosphere reserve have been produced by the Water Conservation Association. These are the Water Conservation Plan for Lake Vättern, the Administration Plan for Fish and Fishing in Lake Vättern, and the Natura 2000 Conservation Plan for Lake Vättern. In the Water Conservation Plan for Lake Vättern, the environmental quality objectives are monitored and improvement measures are proposed. The plan was adopted in 2015 and revised in 2021 and 2022. Although the proposals for measures are not legally binding, there is broad consensus on both the state of Lake Vättern and the need for measures among stakeholders around the lake.
The Administration Plan for Fish and Fishing is a policy document that complements the Water Conservation Plan with the elements related to fish and fishing.

Climate change and its impact on the ecosystem is identified as one of the three biggest challenges in Lake Vättern, along with environmental toxins and invasive species.
Local measures implemented have only a limited effect on climate, and the County Administrative Board has conducted training on how management of habitats and species needs to take into account the changing climate.

The issue of eutrophication in the lakes in the biosphere reserve is a priority in the County Administrative Board's work. Environmental monitoring has been expanded to map nutrient inputs to the biosphere reserve's largest lakes. An action group has been created, meetings with stakeholders have been held and potential wetland sites have been inventoried. It is hoped that an improved knowledge base and collaboration will lead to physical measures in waters affected by eutrophication.

Physical restoration of Musslebobäcken. Several of the tributaries of Lake Vättern serve as important spawning and nursery grounds for lake trout in Lake Vättern. In addition to trout, other fish species such as grayling and European river lamprey depend on the tributaries for their reproduction. In addition to serving as important breeding grounds for fish, there are almost always other high natural values associated with the watercourses, such as the presence

of rare animal and plant species. The Lillån river in the built-up area of Huskvarna is one of the most important watercourses for breeding of trout for Lake Vättern. In the Musslebobäcken tributary, active remedial work has been under way since 2017 to remove unnatural obstacles to migration.

Signal crayfish are widely distributed in the biosphere reserve and have been included in the EU list of invasive species since 2016. There is a national management programme developed by the Swedish Agency for Marine and Water Management with the aim of minimising the spread of the crayfish plague, of which the species is a carrier. This has led to changes in the regulatory framework both regionally and nationally to reduce the spread of crayfish plague. For Lake Vättern, this has meant, among other things, a reduction in the number of weekends on which the public can fish for crayfish.

The unique char in Lake Ören. Lake Ören is one of the few lakes in southern Sweden that still has a population of Vättern char. Test fishing in 2012 and 2014 showed that the population situation was very critical with a falling, ageing population. This threat is addressed with fishing bans, large, protected areas and a breeding project to preserve the unique lake char. By 2020, more than 6,000 char had been released. Subsequent surveys in autumn 2021 showed that the released char survived and it is hoped that the population will recover. Further and follow-up surveys are planned. The measures were paid for by the County Administrative Board, the Ören fishery conservation area association, Jönköping and Aneby municipalities and Jönköpings Energi AB.

Grayling in Lake Vättern. In 2021, a breeding fishery for grayling was conducted in several tributaries of Lake Vättern, including Röttleån. The main objective was to strengthen the recruitment of grayling as a measure to reverse the negative trend for grayling in Lake Vättern. Thousands of grayling fry were hatched on farms and about 3,000 were returned to the Röttleån river. Measures are planned to continue in the years to come. The measure was carried out by Sportfiskarna, the anglers' association, with support from the County Administrative Board.

Adjustment of fishing rules in the lakes. Most of the popular fishing lakes in the area are managed by fishery conservation area associations. In several lakes, fishing regulations have been introduced to improve conditions for certain species. In some lakes, fishing regulations have been introduced to maintain sustainable fishing for individual species. These measures can have a positive impact, as predatory fish are often the most popular species to catch.

Compensatory measures in Gränna and Visingsö harbours. As a result of dredging in the biosphere reserve's harbour areas, compensatory measures were implemented to improve the conditions for char and grayling to spawn in the vicinity of the harbours. The measures have been followed up and documented. Grayling and char have been observed spawning on the newly created spawning beds.

4.3 In what ways are conservation activities linked to, or integrated with, sustainable development issues (e.g. stewardship for conservation on private lands used for other purposes)?

Over the years, the County Administrative Board, local experts and the biosphere association have gained considerable experience of working on protected areas within the biosphere reserve. The work has led to good opportunities for collaboration and exchange of knowledge without formal barriers. For example, there has been collaboration on the management of spruce bark beetle infestation. Research and new knowledge are continuously collected and

included in the management. The fact that these processes are locally based to some extent is of great importance for long-term acceptance and collaboration with local residents, interest groups and rural businesses.

Several long-term effects are visible within the LONA projects that the biosphere association has implemented: Long-term effects of the LONA project BioBlitz in the East Vättern Scarp Landscape: Biodiversity has been presented as a fun, interesting topic to a wide public. With around 1,000 visitors during the BioBlitz, we have succeeded in reaching out with our presentation and the main purpose of public education. In addition to promoting the initiative and attracting visitors to the BioBlitz, the material has disseminated information about nature conservation and local nature conservation initiatives to a broad public. Furthermore, the media have served as a source of additional information in local newspapers and TV news and a couple of information films have also been made with Jönköping Municipality. Dissemination in national and international networks and on the websites of organisations and authorities made information visible during the summer.

Long-term effects of the Year of the Sheep project: it provided information and knowledge about the relationship between agricultural companies, the appearance of the cultural landscape and biodiversity in the East Vättern Scarp Landscape to unaccompanied young refugees.

There are mainly two long-term effects of the Continuity Forest project:

1. They show a specific alternative to conventional forestry in which the landowner can use the land in a way that enhances outdoor recreation and biodiversity and make a good profit. This method is not suitable for all types of forest. Where appropriate, it provides forest areas with multiple types of production that are also attractive land for outdoor recreation, providing opportunities for the public to experience nature.

2. Forest pastures, with their different structures, act as ecological bridges between both natural grasslands and different forest types.

Long-term effects of the More Outdoor Recreation project: improved public health, greater knowledge of the value of biodiversity conservation and the importance of cultural landscapes for this, benefit to the hospitality industry, greater attractiveness, greater environmental commitment. For the general public, natural areas available for outdoor recreation and infonodes contribute to increased knowledge, meaningful leisure time and improved public health. To improve understanding of how nature is used and which areas outside urban green spaces are important, the biosphere association and the County Administrative Board mapped socially important outdoor areas.

The biosphere association’s establishment of demonstration areas in seven different locations and six different habitats (ponds, pollination, natural grasslands, grassland/old settlements, broadleaf forest, forest grazing) with signage and forest days for the public and users promotes local involvement and personal involvement in users to conserve, on their own initiative, biological cultural heritage and cultural historical environments as well as species-rich environments and recreate environments that used to exist in the local landscape such as ponds and grazed forests open to light. In addition to pride, this process also creates innovative processes that sometimes lead users to change their use of each habitat. This in turn leads to increased sustainability, ecologically and economically, but also socially, as it creates pride in one’s own land and home region.

The survey conducted as part of the evaluation process allows us to learn about members' perceptions of the contribution made by the biosphere reserve work: "I feel that the biosphere reserve makes a strong contribution to sustainable development in all three areas, through an active group that creates engagement, organises events and runs projects that benefit both people and nature."

Questions asked respondents to rate the link to sustainability in 16 different projects and activities carried out over the 10 years. The 16 activities were decided through a workshop during the association's 2021 members' meeting.

The results of the survey show a relatively low awareness of most of the selected activities. 12 out of 16 were more unknown than known. On the other hand, very few people felt that the project did not serve a purpose/was pointless. The best-known activities were those aimed at the general public, relating to outdoor recreation and tourism, such as "work and projects on walking trails" and "Gränna food tour". The next best known were projects of high public interest such as "More Outdoor Recreation" and the training of biosphere ambassadors and the mini ambassadors activities targeting both university students and preschool children.

Public health through increased outdoor recreation

The County Administrative Board reports that, over the past 10 years, more and more areas have been made accessible for outdoor recreation through the provision of parking, trails and barbecue areas. In a national summary, Jönköping is highlighted as an area with sustainable material choices in the creation of visitor facilities. The County Administrative Board reports a high increase in outdoor recreation and a new interest in visiting nature reserves in the county as a whole, and in the biosphere reserve in particular. Nature reserves that were previously rarely visited are now also being used for outdoor recreation. Visitors expect walking trails and parking to be available. Where this not the case, landowners are sometimes inconvenienced by inexperienced people parking cars inappropriately and causing some littering. This trend increased dramatically during the pandemic. On average, the number of visitors is expected to be 10 times higher in 2021 than before the pandemic. On weekdays in 2020 in particular, there was a noticeable increase in the number of senior citizens in the nature reserves.

The work with the mini ambassadors contributes to increased understanding of, interest in and knowledge about nature, outdoor recreation and the environment. In addition, parents are given the opportunity to be involved, which makes it more likely that children's curiosity and knowledge will be maintained outside the preschool activities as well.

The two Broadleaf Success projects have resulted in increased knowledge of non-coniferous forest production, which contributes to climate adaptation and increased resilience in forest areas. The project's activities were appreciated and attended by a large number of landowners and other interested parties. It also resulted in specific measures and a national film on green infrastructure, produced by the Swedish Environmental Protection Agency. The green infrastructure work at the property level and the Broadleaf Success project in the biosphere reserve involved several property analyses and the involvement of many landowners. This in turn resulted in excursions for interested users and authorities and projects such as the national "More diverse forestry" project and the national association Multiple-purpose forestry. Heureka analyses can be used to produce financial calculations. Green infrastructure and a climate-adapted forest can thus be accurately compared with or contribute to financial returns and financial sustainability in synergy with ecological sustainability and a forest that is attractive for outdoor recreation.

Figure 19. Map from Broadleaf Success 2017, the results of the project's method for defining density of broadleaf tree used in the analysis of green infrastructure value regions.

Within the biosphere reserve, the County Administrative Board, in partnership with the Swedish Forest Agency, has been working on a demonstration area for green infrastructure at the property level. The long-term effect of testing different measures is increased interest, increased knowledge and the ability to show through practical examples how interested individual farmers and foresters can supplement their regular management with measures that promote ecological and social sustainability. The fact that several Heureka analyses were carried out for forest properties as part of the green infrastructure work and the Broadleaf Success project in the biosphere reserve is generating regional and national interest. The sites analysed will be excursion destinations for interested farmers, authorities and projects working to diversify farming and income in rural areas, such as the national "More diverse forestry" project and the national association Skogens mångbruk (Multiple-purpose forestry). The work on Broadleaf Success is contributing to achieving the objectives of the Green Action Plan and the Green Infrastructure Action Programme (part 3 of the Green Infrastructure Action Plan).

The County Administrative Board's management is channelled to formally protected areas, Lake Vättern and Natura 2000 sites. Management is adapted to the respective conservation values of the different areas in terms of natural values and outdoor recreation. The extent to which areas are made accessible and adapted for outdoor recreation is determined by a regional strategy and each area's geographical location, proximity to built-up areas and

habitat-related suitability for different types of outdoor recreation. Within the biosphere reserve there are both completely inaccessible protected natural areas and a wide variety of natural areas that are managed to promote active outdoor recreation for increased knowledge, meaningful leisure and improved public health. For example, Huskvarnaberget is managed to preserve high natural values with broadleaf forest and giant oaks alongside an abundance of facilities equipped for high impact from activities such as mountain biking.

Examples of local support and collaboration
In 2018, the County Administrative Board conducted an inventory of potential forest pastures to identify areas with a high level of biological cultural heritage. Before the field visits, the landowners concerned were informed. For purposes of contacting landowners, it was of great importance that those active in the Continuity Forest Project and the County Administrative Board's inventory staff were well acquainted with each other.

Public outreach channels to provide information about the biosphere reserve and its natural values: No nature information centre has been established within the East Vättern Scarp Landscape. Since 2020, Jönköping Municipality has been working to establish a nature information centre at Munksjön in central Jönköping. Although it is outside the East Vättern Scarp Landscape, such a nature information centre could be a strategically important place to spread knowledge about and interest in the East Vättern Scarp Landscape and the work on sustainable development.

The development of fisheries management for Lake Vättern and other large lakes is becoming increasingly ecosystem-based. In such management, the participation of fisheries stakeholders is important and a natural part of knowledge gathering, local/regional management and the development of management proposals. For Lake Vättern, Samförvaltning Fiske (Joint Fisheries Management) contributes to ecosystem-based fisheries management. For the smaller lakes, fishery conservation area associations determine fishing rules and are responsible for providing services for fishing and outdoor recreation.

The involvement of associations in the biosphere reserve is crucial to outdoor recreation on the lakes, in particular for recreational fishing. In turn, the fishery conservation area associations contribute to ecosystem-based fisheries management locally in their areas. The main objective of all environmental measures for fisheries and water is to contribute to ecologically sustainable development. Measures to improve fish populations through regulation or restoration contribute to well-managed waters and the maintenance of ecosystem services, which in turn lead to increased benefits in terms of better opportunities for recreational fishing. Many environmental measures also have a positive impact on quality of life, for example through better opportunities for outdoor recreation or improved water quality.

Seine fishing at Vätterstranden is an example of joint activities aimed at creating interest in, understanding of and knowledge about historical perspectives on fishing. Other examples are the annual Röttle Day and Trout Day. The activities are popular and educational for all ages and result in increased interest in and curiosity about nature and cultural history in our local area. They also contribute to the transfer of intangible knowledge and knowledge about the living conditions of species.

The recurring Röttle Day takes place in an area with many different interacting interests. Within a limited area near the community and tourist resort of Gränna, Röttle is a national heritage site and a nature reserve with high values linked to cultural and historical environments, forest environments, floral areas that are good for pollinating insects and

aquatic environments with both grayling and trout. There are small-scale businesses that work with the County Administrative Board on cultural environments and biologically rich natural areas. The forest environments are protected as nature reserves.

Sustainable meat production. The ability to produce food sustainably is one of the keys to achieving the UN Sustainable Development Goals. Throughout the 10-year period, the biosphere reserve worked to raise awareness of how natural grass-fed meat can contribute to viable agriculture while enhancing biodiversity. The high quality of the meat, combined with good care for the animals and careful management of the landscape, has led to an increasing number of farms in the biosphere reserve selling meat directly to the end consumer via farm shops, REKO rings and local retailers.

Various biosphere projects have raised awareness and interest among both producers and consumers. For example, the *Vätterbrantskött* project resulted in work to encourage restaurants to serve meat from adult ewes. The final forest day in the Continuity Forest project and forest grazing attracted about a hundred interested people.

The *Landscape in Balance* (2021) report summarises much of the knowledge about biodiversity and its development, as well as projects carried out for the conservation of terrestrial biodiversity in parallel with the further development of a managed living landscape. In the report, the authors argue that the East Vättern Scarp Landscape has great potential to act as a model area for sustainable development in terms of green infrastructure, ecosystem services and an actively farmed landscape, combined with biodiversity conservation.

The biosphere reserve's pollarding project produced, among other things, the following map to illustrate how to enhance existing values at a detailed level. Many species have limited distribution and, if a greater density of a mixed forest with many deciduous and hampered trees linking, for example, the villages to the north and south could be achieved, the area's ability to maintain its species diversity would be greatly enhanced.

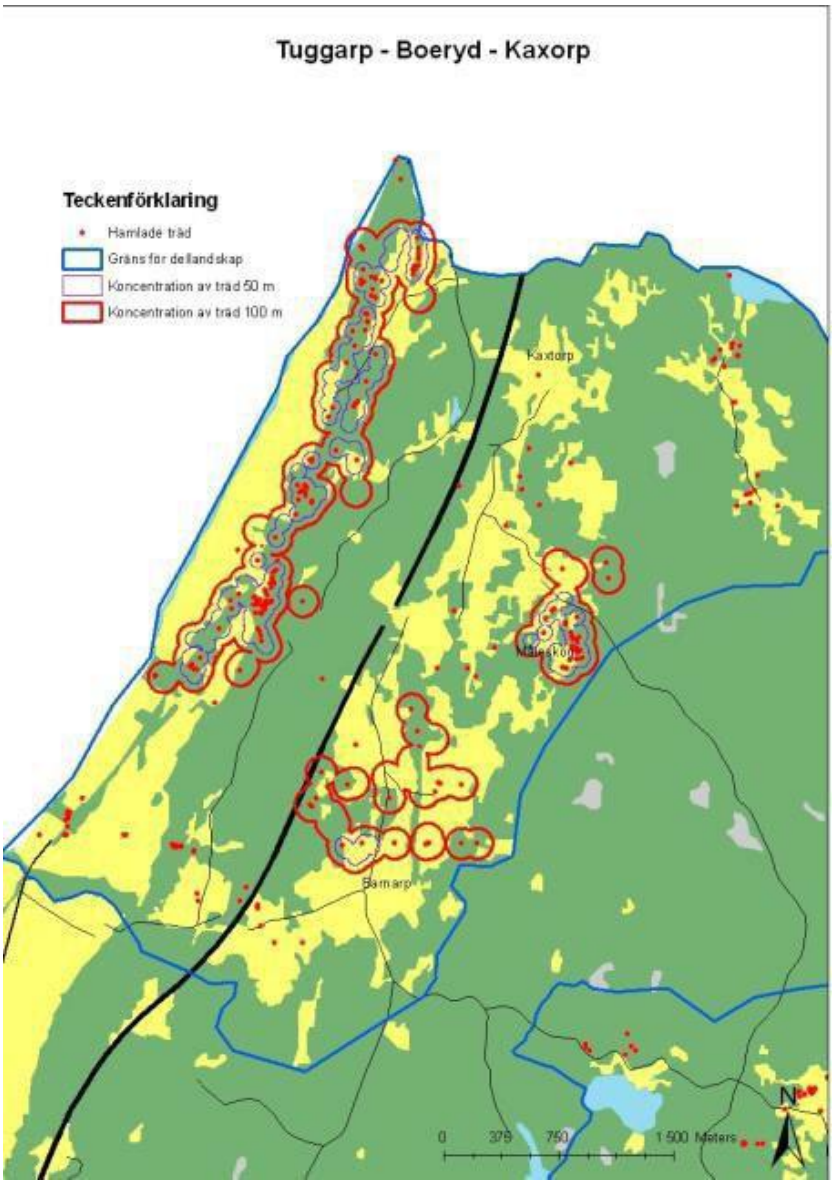


Figure 20. Map of one of the sub-landscapes for hampered trees (blue) showing the opportunities for propagation of the trees (red).

Legend shows: Sub-landscape boundary, Concentration of trees 50 m, Concentration of trees 100 m.

The biosphere reserve as part of a southern Swedish forest region

The province of Småland is Sweden's leading forest region in terms of sales, added value and employment. Forests are important for Småland and contribute economic growth, jobs and important ecosystem services. 70% of the region's land area is covered by forest, growth is high and we have areas with unique natural environments. In addition to production values, natural values and recreational opportunities, forests also play an important role in the transition to a bio-based economy and in reducing climate impact. Against this background, several regional actors linked to forests and regional development have now decided to jointly develop a strategy and an action plan for the development of the various values of forests.

The regional forestry strategy is intended to lead to improvements in the economy,

employment, the environment and climate, gender equality and integration. Discussions and analysis of the current situation, potential, problems and needs have resulted in six proposed strategies to achieve improvements in the designated areas. In addition, there are a number of conflicting objectives relating to the management of the forest and its ecosystem services within the biosphere reserve. One of the major challenges is simultaneously to make use of the timber the forest produces, to ensure biodiversity and to develop the forest for recreation and tourism. There is an additional economic challenge in that the current economic situation does not favour an increased proportion of broadleaf trees, greater tree species diversity, sparser tree environments and longer forest continuity. The biosphere association participates in a southern Swedish collaboration group within the national dialogue project "More Diverse Forestry" which contributed to the Swedish Environmental Protection Agency's new films on green infrastructure. In spring 2022, the biosphere reserve hosts an excursion.

4.4 How do you assess the effectiveness of actions or strategies applied? (Describe the methods, indicators used).

Biosphere reserves as model regions for sustainable development serve an important function by sharing the results and experiences they have had as an area, and because the role of biosphere reserves is increasingly taken into account for different organisations' strategies. The legitimacy of the biosphere reserve is confirmed by its inclusion in the long-term plans and strategies of the municipalities and some of those of the County Administrative Board, including the regional action plan for green infrastructure (see chapter 2.4.1 and chapter 3.4). Awareness of the reserve is gradually increasing. The impact of the biosphere association's efforts is demonstrated by the large number of requests for study visits, lectures and collaboration of various kinds both locally and regionally. The impact is also demonstrated by the frequent coverage by local, regional and national media highlighting measures, projects and events. Examples of local impact include a number of well-attended theme days organised in the reserve: forest days with varied themes, plus Water Release Day, Röttle Day and Trout Day, which are held annually and attract hundreds of visitors.

The BriFunk knowledge base has attracted national attention and formed the basis for the development and implementation of several projects in the biosphere reserve, for example LEIF (2014) and Oak Success (2021-2022). The Broadleaf Success project was run in the East Vättern Scarp Landscape and was highlighted in a national information film and then scaled up to a regional project for the whole of Småland. The methods developed in Broadleaf Success have also been used in the County Administrative Board's work to develop an action plan for green infrastructure.

The biosphere reserve's 2016–2021 biosphere programme describes which of the 17 global goals the biosphere work should contribute to. It identifies a large number of projects, activities and measures that are appropriate in the context of the six focus groups' areas of activity. No indicators were developed in the existing biosphere programme. However, the measures carried out are followed up in the annual activity report. The annual operational planning based on the biosphere programme provides the opportunity to revise the planning of partially implemented measures and review and modify the planning of measures that have not been implemented. For externally funded measures, the purpose, implementation and impact or achievement of objectives are monitored in the final reporting.

The biosphere association's annual operational plan forms the basis for prioritising the strategy's focus areas. The annual activities are linked to the global sustainability goals.

The *Landscape in Balance* (2021) report summarises the knowledge bases and activities carried out for the conservation of terrestrial biodiversity, in which the biosphere association has been a driving force. Based on the measures carried out, summaries of knowledge gathered and future needs, the report proposes a number of measures and projects to be worked on in the future. In the report, the authors argue that it is possible to find models for sustainable production in the East Vättern Scarp Landscape.

Regarding the protection and management of protected nature (chapter 4.2), the County Administrative Board and Jönköping Municipality are responsible for both initiating formal protection and monitoring the purpose and designated species and habitats. Regional environmental monitoring is usually carried out at locations other than where measures have been implemented. Current monitoring of indicator species is by means of nationally and regionally controlled environmental monitoring. The County Administrative Board does not monitor measures in the work on endangered species and green infrastructure. Pollination is monitored to some extent and where two demo meadows were established, in Röttle and Grenåsa, inventories of wild pollinators and bats were carried out one year after the measures. Wild pollinators were inventoried on three occasions at different times during the summer, spring, midsummer, and late summer. The method used was netting, and a richer diversity of focal species was observed in areas where measures were carried out.

An inventory of trees with a high conservation value in the County of Jönköping has been running since 2004, and currently lists over 120,000 trees. A small number of these are included in the environmental monitoring programme with arbitrarily selected trees and locations in the county (including the biosphere reserve) reinventoried in order to identify changes in, for example, tree status and need for conservation measures. Repeat inventories have been initiated but conclusions cannot yet be drawn. The results of the repeat inventories within the environmental monitoring will illustrate the condition of trees worthy of protection in Jönköping County.

The state of Lake Vättern is monitored via the three policy documents developed by the Water Conservation Association (chapter 4.2). The first two policy documents include SMART goals that concern both water and fish as well as other goals linked to the use of Lake Vättern. Measures carried out are evaluated in six-year cycles and most are included in existing environmental monitoring programmes (for example monitoring of water chemistry, fish in lakes and watercourses or aquatic vegetation). Targeted inventories are carried out using standardised methods to monitor small and local biotope conservation measures. Net sampling has been carried out in nine lakes in the East Vättern Scarp Landscape during the last ten years. Electric pulse fishing is carried out frequently in four watercourses in the reserve.

The ecosystem-based approach of the Water Conservation Association and Joint Fisheries Management results in increased collaboration on water, fish and fisheries in Lake Vättern and between fishery conservation area associations. Collaboration between those who manage and use the resource contributes to impact in the form of:

1. Better support for management
2. Increased opportunities for adaptive management of resources and ecosystem services
3. Increased understanding leading to increased compliance
4. Ecosystem-based fish management in local fishery conservation area associations

Conservation plans are used to decide on appropriate conservation objectives and to monitor the status of all Natura 2000 sites in the biosphere reserve. Through other important policy documents for the biosphere reserve, such as the Regional Food Strategy for Jönköping

County, the Regional Development Strategy for Jönköping County 2020–2035, the Regional Environmental Monitoring Programme, Jönköping County, and the Regional Strategy for the Hospitality Industry, the various industries and societal development are continuously monitored without the biosphere reserve being a driving force in the processes.

The impact of the biosphere work may also be said to achieve ecological impact as the number of red-listed species recorded in the reserve increased over the 10-year period. The number of red-listed species in 2012–2022 was 340 unique species, compared to 321 unique species in 2001–2011.

4.5 What are the main factors that influenced (positively or negatively) the successes of conservation efforts in the entire biosphere reserve? Given the experiences and lessons learned in the past ten years, what new strategies or approaches will be most effective for conservation for sustainable development?

For the Broadleaf Success project, collaboration with landowners and various stakeholders has been a strength. Bringing together several authorities and organisations around a shared initiative facilitates the work and the dialogue with landowners.

Projects and measures that take place in partnership between landowners/users, authorities and various interest groups will be a key working method over the coming ten years. In 2022, two new projects will be launched, “Let nature return”, focusing on built-up areas, and “Oak success”, operating within an oak value region to increase the proportion of oak trees on private properties and properties managed for financial gain. Both projects are seen as the beginning of the potential for more extensive projects involving and engaging a large number of private individuals and companies and taking place in partnership between the biosphere association, managing authorities and interest groups. Measures to combat eutrophication are a national and regional priority, and funding for measures is available in part through LOVA grants. There is great potential to improve collaboration on and knowledge about eutrophication issues within the biosphere reserve with methods developed for collaboration and projects.

The work to conserve natural values and enhance farmers’ long-term sustainability also economically by producing high-quality meat grazed on natural grasslands was ongoing throughout the 10-year period. Since 2018, a process has been under way to develop a brand for natural grassland meat from the biosphere reserve. The work also includes disseminating information on the diversity of added value of locally produced natural grassland meat and creating interest among local consumers, wholesalers and restaurateurs. In 2022, work is in progress to build an infrastructure for locally produced mutton from ecologically significant natural grasslands.

Positive impact. There has been a long, sustained dialogue between three opposing parties: the County Administrative Board’s Nature Conservation and Rural Affairs Department; a local non-profit nature conservation NGO (Gränna Skogsgrupp); and the special-interest organisations the Federation of Swedish Farmers and the forest landowners’ association Södra Skogsägarna. In addition, in various constellations, between the municipality, WWF, the Swedish Forest Agency, the County Museum, local associations and church organisations.

The benefit and application of BriFunk through projects such as Living Ecosystems in the Future (LEIF) in specific nature conservation work. Analyses such as the Landscape Ecological Deficit and Functionality Analysis (BriFunk) carried out for six different biotope types within the biosphere reserve are considered very important for the future conservation

of demanding species. BriFunk analyses identify the criteria needed for certain species to exist, as well as the need for both analyses and targeted interventions in appropriate locations for certain species to survive. In the specific work of the LEIF project, the aim was to connect habitats and reduce fragmentation in a green infrastructure in a constructive and comprehensible manner, based on BriFunk analyses. In "Status and trends of species and their habitats – red-listed species in Sweden in 2015", the Swedish Species Information Centre writes that knowledge about the occurrence, ecology and ability to spread of species needs to be incorporated in nature conservation work. LEIF contributed such knowledge at both landscape and stand/population levels.

Swedish Forest Agency advisers have used BriFunk to provide practical advice. The information has mainly been used in connection with advice relating to "Forest Environmental Values", a part of the Rural Development Programme. The experience is that BriFunk is highly beneficial for advisory purposes and that the information may also be used in many other areas of the Swedish Forest Agency's work.

For the work on Lake Vättern, the most important factors are monitoring, adapting and communicating the results. In the future, it is a matter of continuing to work as we do today within the framework of the Water Conservation Association in accordance with the strategies and policy documents that have been developed. Collaboration with stakeholders is currently good and well developed, especially in the context of fish and fisheries, but it can be further developed in certain areas.

There is deemed to be great potential to develop collaboration across the biosphere reserve in terms of water and fish, to improve the links between land and water. This applies in the context of the hospitality industry, outdoor recreation, fisheries and also fish as local products. Tourism and outdoor recreation are major industries in the reserve today. Fishing waters in the biosphere reserve are well managed and interest in fishing and fish populations is high among both recreational anglers and fishing water owners. Lake Vättern also has a well-developed commercial fishery. There is a high level of involvement in the reserve's fishery conservation area associations. Separately, the different areas of activity are large today but there is a need to link and use each other's skills better to contribute to sustainable development in the reserve.

4.6 Other comments/observations from a biosphere reserve perspective.

Invasive species have arrived and increased in the biosphere reserve and throughout the country. This trend is considered by the County Administrative Board to be a potentially major concern in the future. In addition to the common problem species giant hogweed, western waterweed has also been recorded in the biosphere reserve. This species is extremely difficult to control and is established in Lake Noen.

As it is a national, regional and local concern, and individual landowners have a great responsibility to control unwanted species, the County Administrative Board has developed digital documents to facilitate control, information dissemination, monitoring and follow-up. Within the core area of the biosphere reserve, several control measures have been taken against specific species.

5 THE DEVELOPMENT FUNCTION

[This refers to programmes that address sustainability issues at the individual livelihood and community levels, including economic trends in different sectors that drive the need to innovate and/or adapt, the main adaptive strategies being implemented within the biosphere reserve, and initiatives to develop certain sectors such as tourism to complement and/or compensate for losses in other markets, employment, and community well-being over the past ten years]

5.1 Briefly describe the prevailing trends over the past decade in each main sector of the economic base of the biosphere reserve (e.g. agriculture and forest activities, renewable resources, non-renewable resources, manufacturing and construction, tourism and other service industries).

In general, the trends in the biosphere reserve have been positive over the past decade, with an increase in employment from around 11,000 jobs to just over 13,000, i.e. an increase of some 20%. The five largest sectors between the years of 2011–2019 showed the following figures:

- Manufacturing industry: 3,400 → 3,700 jobs (+10%)
- Care and welfare: 1,600 → 1,900 jobs (+17%)
- Education: 1,500 → 1,700 jobs (+17%)
- Commerce: 970 → 1,280 jobs (+33%)
- Construction: 750 → 1,000 jobs (+37%)

In the case of green industries, which play a crucial role in the development of the biosphere reserve, the changes between 2011-2019 were as follows:

- Agriculture, forestry and fishing: 500 → 630 jobs (+25%)

The general trends for the sectors most relevant to the biosphere reserve are described below.

Agriculture
We currently see two parallel trends in agriculture, with some farmers expanding and increasing their businesses with more animals and leased land, and others opting to offer more niche products selling directly to consumers. Several dairy farms have completely switched over to breeding cattle for meat. Locally produced foods are increasingly popular among shoppers and are heavily marketed in shops. Municipalities and regions have also started developing criteria for public procurement to make it easier for Swedish and local producers to submit tenders. Much greater emphasis has been placed on protecting arable land against development in municipal planning. The 2018 summer heat wave was a real challenge for the sector, but it was able to cope well with the help of cooperation and finding alternative methods and raw materials for feeding the animals, for example. The arable land used in an environmentally friendly way in Jönköping Municipality (around half of which is made up of the biosphere reserve) has increased from approximately 3,400 ha in 2012 to around 4,000 ha in 2020.

Forestry
In Sweden, the last few years have seen some intense debate surrounding the role of forests in mitigating climate change and also their importance for recreation and biodiversity. The

2018 summer heat wave subjected the forested areas of the biosphere reserve to stress, particularly due to large-scale spruce bark beetle attacks on the spruce forests. This has meant that several forest owners have started to consider other types of trees and forestry management, although this is still very much in its infancy. Ownership of the forests is considered to be relatively constant, with a large number of small forest owners and a small number of large-scale owners. The 2018 summer heat wave was a major test for forestry, and the forests continue to this day to suffer from large spruce bark beetle infestations as sequelae of reduced vitality.

Manufacturing

The manufacturing industry currently employs around 3,700 people in the East Vättern Scarp Landscape. The largest company located within the biosphere reserve is Husqvarna AB. Husqvarna is a global brand with a division manufacturing items such as battery-powered forest and garden products. This division has experienced significant growth over the last decade. Inside the biosphere reserve there are also clusters of businesses including companies in the wood/furniture, electronics and confectionery industries. The manufacturing industry is considered to have weathered the pandemic relatively successfully.

Non-renewable resources

Within the extractive industries, there are a number of rock quarries in the East Vättern Scarp Landscape, including some which have grown in size during the time this review covers. Although there is currently no mineral excavation in the area, some prospecting for rare earth metals is ongoing in the northernmost part of the biosphere reserve.

Construction

Interest in building and living within the biosphere reserve remains high, both in existing urban areas and out in the countryside. Within Jönköping Municipality, the smallest urban areas located within the East Vättern Scarp Landscape have experienced the highest growth rates over the last decade. Construction-related businesses have grown rapidly over the 10-year period, now employing around 1,000 people within the East Vättern Scarp Landscape. Especially the southern and eastern areas of the biosphere reserve are home to a large number of construction companies and have experienced a significant increase in employment related to construction. The trend for sustainable building and building preservation is clearly recognisable and a number of companies specialising in providing construction materials in this sector have opened recently in the biosphere reserve. The number of photovoltaic installations has increased considerably within the biosphere reserve, especially in more rural areas.

Tourism and commerce

Tourism is an important industry with a long tradition in parts of the biosphere reserve. Most noticeably, activity-based tourism (such as cycling, fishing and hiking) has undergone significant expansion during the time this review covers. Similarly, interest in the merits of the countryside have increased, becoming a destination in its own right. The COVID-19 pandemic hit the sector hard, leading to a reduction in the number of international visitors, but an increase in local holidaymakers.

Commerce employs 1,280 people in the biosphere reserve – with around 700 in Huskvarna which has seen particular growth (76%). Food retail stores are an important part of commerce and a relatively large employer. Within the East Vättern Scarp Landscape, there are around 10 different supermarket chains which can be found in most of the urban areas in the biosphere reserve. The trend towards internet shopping is growing rapidly, driven partly by COVID-19 restrictions. Simultaneously, interest in shopping in smaller shops directly from producers of

meat and vegetables, etc., has grown considerably over the last 10 years.

Education
Education is the third largest sector in terms of employment figures and has experienced overall growth in the biosphere reserve. However, Grennaskolan, which was one of Sweden's three National Boarding Schools, suspended operations in 2019. This resulted in a drop of 70 people (40%) working in education in Gränna Parish.

5.2 Describe the tourism industry in the biosphere reserve. Has tourism increased or decreased since nomination or the last periodic review? What new projects or initiatives have been undertaken? What types of tourism activities? What effect have these activities had on the economy, ecology and society of the biosphere reserve? Are there any studies that examine whether designation of the area as a biosphere reserve has influenced the number of tourists? Please provide the bibliographic information of any studies and/or a paper copy in an annex.

Throughout the last decade, tourism has seen impressive growth in the East Vättern Scarp Landscape. The area has long been a destination for business travel where people came together to close deals and exchange knowledge. Its strategic location in southern Sweden has made it a natural meeting point since as far back as the Middle Ages, and anyone passing through the region nowadays along the E4 European motorway cannot fail to be struck by the magnificent and stunning landscape around the southern end of Lake Vättern.

The whole area has appealed to visitors for almost 100 years, with Gränna and Visingsö Island the leading attractions. Holidaymakers have always been (and still are) drawn to the area thanks to its beautiful landscape, the picturesque town of Gränna with its *polkagris* stick candy and the historical – almost mystical – island of Visingsö where time appears to stand still.

In recent years, the dramatic landscape combining water and scarps has also become a natural backdrop for sports and competitions, opening up the area to another new group of visitors. Road cycling and mountain biking have seen dramatic growth over the last few years, both as competitive sports and also simply as a pastime and way of keeping fit. One of the clearest signs of the growing interest in cycling is the jump in the number of cycles transported on the ferries over to Visingsö Island during the summer months. Between May and September 2015, 9,000 cycles were transported; for the same period in 2021, the number was 17,000.

Another aspect that has become increasingly important for both locals living and working in the area and those coming to the region on holiday is the living landscape with plantations, farms and processed products. The last 10 years have seen a large rise in the number of farm shops and cafés, as well as existing ones growing in size. This development is a result of a combination of the increasing demand for locally grown, sustainable products and experiences, and a new generation of businesspeople who have been ingenious when it comes to identifying the region's possibilities from a new perspective and making use of digital tools to reach out to their target groups. Many have also opened up and made their farms and businesses welcoming so visitors can take part. Together with the apple, wine and other fruit growers, these farms, shops and producers are one of the main reasons to visit the area nowadays, both as an excursion for the local population and for visitors coming from outside the region.

Opportunities for staying the night and enjoying a good meal combined with different activities such as hiking, cycling or paddling have also grown over recent years. Offering

overnight accommodation in beautiful surroundings, in addition to providing revenue, also gives visitors more time to discover what the region has to offer – strengthening their affection for and connection to the place.

Pescatourism draws visitors to the lakes to varying degrees across the biosphere reserve. There are several popular lakes that have been designated for fishing and require a paid permit. Lake Vättern itself is frequently used for both recreational fishing and pescatourism. Several fishing guides work on Lake Vättern, some based in Gränna, which lies within the biosphere reserve. There are also some guides that fish Lake Vättern for part of the year and other areas the rest of the year.

The pescatourism season runs from spring to autumn and means that some companies in the hospitality industry are able to stay open for a longer season. Most of the visitors who come to the County of Jönköping to fish are from Germany and Denmark, and the statistics show that the majority of them stay in cottages and rent boats. Within the East Vättern Scarp Landscape area, there has even been a company set up that specialises in bringing together private cottage owners with fishing tourists and which is likely to have made a considerable contribution to revenue from pescatourism in the region. Not all of the information on how fishing tourism has changed in the East Vättern Scarp Landscape area for the period under review is available; however, records show that the number of permits has increased. This proves that fishing numbers – as well as other forms of outdoor recreation – have increased throughout both years of the pandemic in 2020/21.

A series of development projects have been conducted in the area to strengthen the collaboration between different stakeholders to help them find out more about one another, as well as on subjects relevant to them such as levels of demand, business development and marketing. The largest – as potentially most sweeping – development project so far was entitled "Sustainable Product Development" (shortened to *HPU* in Swedish) and ran between 2016 and 2019 with the aim of: "developing and launching an internationally competitive product range based on the region's unique value in terms of nature, culture and dining experiences which is able to meet the high demand for nature and culture-based activities". One of the three priority areas was the East Vättern Scarp Landscape Biosphere Reserve. The project, which had a total budget of SEK 18 million, was led by the Småland Tourist Board in close conjunction with bodies such as Destination Jönköping and the Swedish Agency for Economic and Regional Growth. This project is now being followed up by major on-going investment in 2020–2023 with the focus on improving businesses' competitiveness thanks to a better understanding of the world around us, rapid company innovation and clusters, and improved accessibility. "The aim is to create commercially viable businesses and diversify tourist attractions, which will help to foster a more attractive, more sustainable environment for visitors and locals alike".

As a result of the development initiatives rolled out, new hiking and cycle routes have been created, companies focusing on hiking and dining experiences have been launched and the existing infrastructure (such as signage and public toilets and grilling areas) has been reinforced.

In addition to the development projects, the area has also seen continued investment in events planning, not least of which is the cycling competitions mentioned above. The region has hosted a number of major sporting events over the last few years, such as the 2016 Mountain Bike European Championships, which attracted over 25,000 visitors, and several Swedish Championships and other annual events such as the Vätternrundan and the IRONMAN 70.3 Jönköping. A number of smaller events which benefit from and show off the best of what the

region's varied landscape has to offer have been held, including the Visingsö Open Water swimming competition and the Winter Challenge and 13 Hills cycling events. Other events finding their niche in the region and experiencing renewed popularity are different art tours, culinary tours and autumn and food markets.

Marketing tourist attractions in the area has been the focus both at a local and regional level. Contact with foreign travel agencies has been established and new, inspiring materials such as films and photos to attract and arouse interest have been created. Different destinations, attractions, activities and events can also be found on social media platforms and YouTube in an attempt to make good use of the channels where people turn to find inspiration nowadays.

In many ways, the COVID-19 pandemic has represented a series of challenges for companies operating in the tourism industry that are worried about the economy, cancellations and layoffs due to a lack of guests and difficulties in estimating when demand will return. Companies in the countryside (cafés/restaurants, farm shops and accommodation) have broadly fared much better than their colleagues in town centres, which were much more reliant on business travel. The drop in tourists visiting from abroad has naturally also been noticeable in the East Vättern Scarp Landscape, but to a large extent was balanced out by Swedish holidaymakers (both those living close by and visitors from further afield). Many companies, in fact, even enjoyed record visitor figures in the summer of 2021. A preliminary study (entitled "Hyper-Localised Tourism") into finding ways of helping local residents without access to a car to visit nature areas was prepared by the biosphere reserve and Jönköping Municipality in 2019.

The figures for overnight stays have been very good since the East Vättern Scarp Landscape Biosphere Reserve was established. In 2012, the number of commercial overnight stays (in hotels, holiday villages, youth hostels and camp sites) in Jönköping Municipality was just over 600,000 for the whole year. By 2019, this had increased to just under 825,000. Although business travellers make up a large proportion of visitor numbers, it is holidaymaker figures that have risen and which basically represent all the growth seen. This change is particularly noticeable in hotel occupancy rates: in 2012, business travel accounted for 68% of all rooms, but by 2019 this figure had dropped to 54%. Where business travel experienced modest growth of around 12%, private travel has more than doubled (+103%) since 2012. The COVID-19 pandemic accentuated this change, with business travel experiencing a marked slowdown while private travel continued, albeit at a lower level than before the pandemic. In 2020, private travel accounted for just over 52% of all hotel room rentals and – despite COVID-19 – for considerably more room bookings (130,000) when compared with 2012 (95,000).

Local communities and, for example, local producers profit from growing tourism as it leads to increased tax revenue, a better foundation for business and more demand for quality, locally grown products. This, in turn, has a positive environmental impact as it contributes to active agriculture, which promotes biodiversity in the region.

During the busiest holiday weeks, the number of visitors to some of the more popular destinations can place considerable stress on physical infrastructure and accessibility. Some nature areas are displaying signs of deterioration from hiking and cycling, particularly recreational reserves located close to built-up areas, but also some spaces close to Lake Vättern, which have experienced a large increase in visitor numbers. Some landowners have noticed growing issues with people camping on arable land and leaving litter and gates to pastures open. The problem was particularly bad during the extremely hot summer of 2018, which could suggest even higher future visitor figures with the forecast warmer climate and

the fact that there were more holidaymakers in 2020–2021 even despite the COVID-19 pandemic.

5.3 When applicable, describe other key sectors and uses such as agriculture, fishing, forestry. Have they increased or decreased since the nomination or the last periodic review? What kind of new projects or initiatives have been undertaken? What effect have they had on the economy and ecology of the biosphere reserve, and on its biodiversity? Are there any studies that examine whether designation as a biosphere reserve has influenced the frequency of its activities? If so, provide the bibliographic information of these studies and/or a paper copy in an annex.

Agriculture

Between the years of 2010 and 2020, agriculture experienced a slight drop in the number of companies working in the field (18%). During the pandemic, the costs for different production inputs such as electricity, fuel and fertiliser rose significantly, putting many agricultural businesses under enormous economic pressure. This has meant that there is now a risk of the number of businesses working in agriculture decreasing in the future.

The greatest reduction has been in the number of diary farms and, as a result, the number of overall dairy cows (20% drop). To some degree this has been compensated by the rise in suckler cow numbers (16% increase), but overall there has still been around a 5% drop in overall grazing cattle numbers. Compared to other regions in the province of Småland and Sweden as a whole, the number of dairy farms and grazing cattle is still unusually high, affecting the East Vättern Scarp Landscape positively. The area has also seen a fall in the number of sheep by some 15%.

In the East Vättern Scarp Landscape area, there are high biological, aesthetic and cultural values associated with grazing and hay meadows. In total, the region is home to some 16,750 ha arable land (fields and grazing land), of which 6,800 ha is grazing land (not including forest grazing and areas undergoing land restoration). Despite the relatively large acreage, there are still no areas which currently fulfil the highest requirements for ecologically sustainable land for species associated with grazing and hay meadows.

In 2011 – while writing the nomination to become a biosphere reserve – biological gap and functionality analyses were carried out on the landscape ecology of the East Vättern Scarp Landscape. The purpose of the project was to develop threshold values for a number of species to identify what is necessary for ecologically sustainable landscapes. The study materials contributed to increasing knowledge on the need for protecting such areas as the natural grazing lands of the East Vättern Scarp Landscape.

The fact the number of grazing animals is falling is extremely worrying in terms of sustainability. Several initiatives have been undertaken by different organisations in an attempt to highlight the problems and stem the negative development. However, even greater attention needs to be drawn to the question and new approaches are required to reverse the trend, particularly towards consumers. As part of the biosphere programme currently being developed for the East Vättern Scarp Landscape, the aim is to attach even greater importance to this question than previously.

In 2015, the East Vättern Scarp Landscape Biosphere Reserve arranged a bus trip for politicians at local, regional and national level together with public administration officials to visit locations around the biosphere reserve to show them the negative consequences of

encroaching vegetation and the positive effects of grazing. This was the first visit of this kind in Sweden and has been repeated in many different locations since.

From a historical point of view, the type of land that has seen the greatest decline is land used for forest grazing. Between 2019 and 2021, the Local Nature Conservation Initiative (LONA) project entitled "Continuity forest in forest grazing" brought together several organisations with the aim of promoting land used for forest grazing as a valuable resource for grazing, forestry and rural development in the East Vättern Scarp Landscape. The project has collated and spread knowledge around how invaluable land used for forest grazing is and has allocated and created physical demo areas where land has been restored and fenced in, and where visitors can learn more about this type of land.

A food strategy for 2030 has also been created in the area. Within the East Vättern Scarp Landscape Biosphere Reserve there is a focus area entitled *Gastronomic Region* where a group is working towards "developing the East Vättern Scarp Landscape Biosphere Reserve as a gastronomic region and destination for food, drink and wildlife experiences". Many of the participants in the focus group have direct links to the regional food strategy. A great deal has happened over the study period related to the focus area's goals, including a large increase in the number of visitors to now well-known local food and drink producers as well as places to eat. The *Mat runt Gränna* initiative – which saw around 30 food producers and businesspeople come together – was launched with the aim of making it easier for customers to find locally produced food. It also organises a yearly food tour in the region.

The number of small-scale food producers has grown significantly over the last decade. The number of farm shops and cafés producing their own food has also shot up. Local, hand-made drinks have also experienced a renaissance, and the area is currently the fourth-largest producer of cider in Sweden. In addition, the "REKO ring" scheme has made it possible for many primary producers to both sell their products direct to consumers without intermediaries and strengthened the likelihood of and enabled them to become small-scale food producers. The area boasts two REKO rings which make it possible for consumers to meet and buy directly from the producers at least 4 times a year. During the period of this study, *polkagrisar* stick candies applied for and were awarded EU protected designation of origin status and other initiatives are currently underway for other products from the region.

The "Vättern Scarps Grass-Fed Meat Brand" project was implemented with the intention of increasing commitment to and knowledge of the high ecological value of and essential ecosystem services provided by natural grasslands, and to conserve and even increase the area of traditionally managed naturally occurring grasslands. Over the project's lifetime, market conditions changed, improving beef producers' finances and offering the opportunity for local and regional sales, including as a result of the rise in REKO rings with direct sales from producers to consumers. The limited interest in setting up and promoting a local certification and platform for the direct selling of grass-fed meat from the biosphere reserve meant that the project focused instead on sharing information and initiating collaboration between a range of different regional stakeholders. The project contacted a total of just over 300 livestock farmers with natural grasslands located within the biosphere reserve, with 80 replying and showing an interest in finding out more about the advantages of grass-fed meat.

As part of the scope of the project, a collaborative scheme involving national grass-fed meat associations, the regional food strategy and officials from the County Administrative Board's agricultural and heritage units was set up. Field meetings during the region's climate week were held jointly for producers and consumers alike, with a series of follow-up meetings for producers and digital lectures for consumers held later on. The project, which concluded in

2020, gave rise to a dynamic knowledge network and identified common interests within a sustainable living rural community with functional green infrastructure. In 2021, the network met and launched a project aimed at gathering knowledge and identifying parties interested in selling and processing mutton locally.

Forestry

Forestry is an important industry in the biosphere reserve and is closely related to agriculture at individual farm level. Activity in forests varies to a degree depending upon the need for timber on the global market (which saw an increase during the pandemic in 2020–2021) but which on the whole remained relatively constant throughout the review period. Ownership of the forest remains quite steady, just with a certain tendency towards a number of larger forestry units. The total area of productive forest lands comes to around 44,000 ha distributed across approximately 1,875 properties of over 5 ha. The average area of productive forest lands on these estates is 23 ha. The species distribution within the biosphere reserve is estimated to be around 20% pine, 62% spruce, 15% "soft" broadleaf trees and 3% valuable hardwood species.

The forest is affected by the changing climate with mild winters and lower levels of precipitation during the summer. The 2018 summer heat wave was extremely favourable to the larger eight-toothed spruce bark beetle, with the population exploding and attacking huge numbers of spruce trees belonging to forest owners in the biosphere reserve as well as elsewhere. One consequence of this has been that more and more forest owners are increasing the percentage of other tree types such as pine and various broadleaf trees on their land. However, over the 10-year period, the number of elm and ash trees affected by disease has increased significantly, meaning this type of tree is disappearing from the landscape and is not commercially viable to grow in the forestry sector.

The composition of the forest is also affected to a considerable degree by cloven-hooved wildlife (elk, roe deer and fallow deer), which graze heavily on desirable tree types such as pine, rowan, aspen, goat willow and oak. Surveys in the biosphere reserve's current elk management areas show that the percentage of young pine trunks damaged by grazing game was about 10% (severe damage) in 2021. The aim is to reach a figure of 5% damaged trees. The trend is, however, overall positive, as the figures for 2016 were 30%. An increasing number of forest owners within the biosphere reserve are now taking the chance and rejuvenating the population with pine trees on suitable land, which will have a huge effect long-term on variety in the landscape and resilience against climate change.

The Broadleaf Success project was conducted in the biosphere reserve between 2015 and 2016, bringing together land and forest owners' associations, authorities, non-profit nature conservation organisations and universities. The aim of the project was to study the conditions needed to create a structure that would promote biodiversity and varied use of the forest with the help of broadleaf forests of varying ages. The project resulted in a wealth of knowledge, including information on the economic effects of increasing the percentage of broadleaf forests at owner and landscape level. Part of the project involved consultations on farms and a popular forest excursion for interested landowners with forest owners' association Södra making a considerable contribution to the visit.

The Broadleaf Success project was met with great interest and was picked up in other places such as the province of Småland's forestry strategy. One effect of this was the launch of the Broadleaf Success 2.0 project covering 3 counties in Småland with a sharper focus on the economic aspects associated with an increased percentage of broadleaf forest in the region.

The implementation of the project was affected heavily by the COVID-19 pandemic, but the project design has been met with nationwide interest.

For several years, the Swedish Forest Agency has been given the mission by the government of reporting on continuous cover forestry, and the opinion of the authorities is that the area used for this method of growth should increase. In the biosphere reserve between 2019 and 2021, the Local Nature Conservation Initiative (LONA) project entitled "Continuity forest in forest grazing" aimed to promote knowledge of and increase the percentage of forest grazing land. Continuous cover forestry was a part of this project. The state-owned forest owner Sveaskog is in charge of a 280 ha trial area within the biosphere reserve designed to help us learn lessons on and evaluate different methods of implementing continuous cover forestry.

Since 2020, the County Administrative Board in association with the County Museum, the Swedish Forest Agency and to some extent the Swedish University of Agricultural Sciences (SLU) has conducted a project within Green Infrastructure (GI) on a property located in the biosphere reserve. The project looked into what considering GI and its use of land and forest involves in practical terms. In 2021 the project received funds from the Swedish Environmental Protection Agency and there are plans to roll it out to other properties – including inside the biosphere reserve – to provide further good examples regarding GI.

Fishing

28 different species of fish can be found in Lake Vättern, 7 of which are important for fishing. The char is the species most closely associated with Lake Vättern. This fish dates back as far as the ice age and is a markedly cold-water relict species that is sensitive to climate change. The char population had fallen to such a critical level at the start of the 21st century that between 2005 and 2007 strict regulations were implemented to save the remaining fish (total protection of the region all year round, larger minimum size, modification of fishing rules for both recreational and commercial fishing). Since then numbers have recovered and are now relatively stable, although they are still very susceptible to overfishing and climate change. This is something that will need to be monitored closely when managing the char population.

The grayling is another cold-water fish which dates back to the ice age. Its main spawning grounds are Lake Vättern's watercourses and it grows out in the lake itself. The population has fallen over the years, but the reason for this remains unclear. Measures have already been planned and implemented to help discover why there are fewer grayling and potentially reverse the trend.

The trout is another species dependent on Lake Vättern's watercourses for spawning and growth. During the autumn, adult fish seek out the watercourses they once came from to spawn. After 1–3 years, the young fish swims out into the lake to grow in size. For a long time, the trout was prevented from returning to its breeding grounds due to obstacles to migration in the watercourses. Different fish conservation measures have been introduced to help the trout swim further back up Lake Vättern's tributaries to spawn and larger areas have been cleared to provide suitable areas to reproduce and grow. This has led to an increase in trout numbers in the lake. Since the mid-90s, the calculated yearly smolt production figures in Lake Vättern's tributaries has risen around 50%.

Whitefish numbers in Lake Vättern have gone from relatively low levels to robust stocks in the waters. The regulatory package introduced in 2005–2007 to save the char involved changing the rules for commercial fishing using mesh sizes at certain depths to reduce by-catch of undersized char. This has also resulted in a drop in whitefish catching, which has meant the population has grown. More opportunities to fish using smaller mesh sizes in certain

areas while still avoiding or limiting by-catch of undersized char have resulted in improved whitefish catches between 2012 and 2014. There is an EU regulation that limits the marketing of certain fish species due to increased dioxin and PCB levels, but Sweden has a permanent derogation for salmon, trout, char and herring. The requirement is to warn of the dietary recommendations and ban export for these species. This derogation does not cover whitefish, however. Test samples taken from Lake Vättern in 2013 showed that whitefish also contained elevated levels of dioxins and PCBs, and to be able to sell the whitefish from Vättern, commercial fish sellers need to show that their catches fall below the limits. Each round of testing costs more than what the catch is actually worth, meaning there has been a steep drop in the number of whitefish caught in Lake Vättern. Nowadays, the stocks of whitefish are considered very good and the populations are so high that discussions have started on what effect this might have on other species and Lake Vättern's ecosystem.

In addition to the 28 fish species, Lake Vättern is also home to the signal crayfish, which is also important to fishing. This species is not native to Lake Vättern, but was introduced there during the 1960s to replace the native European crayfish which had died out in the region. In fact, this species was introduced deliberately in many bodies of water across Sweden. It was not until towards the end of the 1990s that the species grew rapidly in northern Vättern, resulting in a huge increase in commercial fishing since 2000. Since that date, it has also been possible during certain periods in August/September for the general public to be able to catch signal crayfish on Lake Vättern in public waters. Lake Vättern is the only place the general public is allowed to fish for crayfish; in any other lake or watercourse, you need to either have a fishing permit or permission from the owners of the fishing rights.

The char population in Lake Ören, which is one of just a few areas with char in southern Sweden, has fallen during the period of the study. A number of fish are caught during the autumn with the aim of monitoring spawning; the catches during 2014 and 2015 showed fewer and fewer fish spawning each year. Several measures have been implemented in an attempt to improve the situation, and follow-up studies will be carried out in the future.

5.4 How do economic activities in the biosphere benefit local communities?

The local community generally benefits through increased local trade and tourism, and through the processing of local resources. The study of the business community in East Vättern Scarp Landscape Biosphere Reserve emphasises that it is the tourism and green industries that have the best prospects for growth and which reap the greatest rewards from being part of the biosphere reserve. Other industries also benefit indirectly, partly thanks to the growth of the hospitality and green industries themselves and partly because it can be beneficial for individual companies to be located within the biosphere reserve.

The study concluded that an economy based on a living rural community with high-quality production/processing for the local market in conjunction with a growing hospitality sector offers major direct and indirect opportunities for growth and the chance to achieve high local employment levels.

Over the last 10 years, a number of initiatives have been launched in this direction. There is a clear positive trend in the biosphere reserve with some businesspeople recognising potential in the area, especially in the tourism and small-scale food processing industries. The increase in commercial processing of products includes drinks based on the region's traditional fruit and berry growers and local meat production, but also vegetable growing and milk production, which have also enjoyed robust growth.

Attractive and profitable agriculture and forestry are especially important for the experience value and identity of the landscape, creating the conditions for more genuine value within the tourism sector. Good use of the land and local markets also create more attractive living environments for people living in the area. Food shops with a clear focus on locally produced items have also invested in the area.

Increased interest from outside the region (particularly in the tourism industry) has also resulted in increased pride among those living and working in the biosphere reserve. Certain areas within the East Vättern Scarp Landscape, such as Äppledalen, have developed over the period of this study into well-established tourist attractions. One interesting phenomenon is that several previously abandoned agricultural buildings in the countryside have been repurposed as floor space for cafés and similar ventures, which has increased the countryside's attractiveness and economic viability.

It should be pointed out that it is the companies themselves in the region that are driving this development, whereas the biosphere reserve itself has a leading role to play in promoting local pride and positioning the region in different segments and with new target groups with other stakeholders across Sweden as a whole.

5.5 How do you assess the effectiveness of actions or strategies applied? (Describe the methods, indicators).

Biosphere reserves as model regions for sustainable development serve an important function by sharing the results and experiences they have had, and because the role of biosphere reserves is increasingly taken into account for different organisations' strategies. The East Vättern Scarp Landscape has been mentioned in several different municipal and regional strategies (see chapter 2.4.1). The impact of the biosphere associations' achievements can be seen in the large number of requests they receive for study visits, lectures and collaboration projects of different kinds, many of them at a national level.

A good example of the impact one project in the biosphere reserve had was Broadleaf Success, with active participation from organisations representing land and forest owners, the authorities, non-profit nature conservation organisations and universities. The project ran from 2015–2016 in the East Vättern Scarp Landscape, after which it was picked up by the Federation of Swedish Farmers (LRF) and scaled up to a regional project covering the entire province of Småland. Later on it achieved national recognition, with other regional forestry strategies around the country wanting to find out more about how the approach had worked and what the working method was.

The biosphere reserve's own strategy was entitled "Strategy for sustainable development in the East Vättern Scarp Landscape" and was launched in 2016 to run up to 2022. A revision of the biosphere programme is currently underway with the goals and measures being reviewed and analysed. No indicators were developed in the existing biosphere programme.

The biosphere association's annual operational plan forms the basis for prioritising the strategy's focus areas. The annual activities are linked to the global sustainability goals.

The study of the business community for the biosphere reserve (2014) highlights the potential for developing the tourism industry by at least 50% in the East Vättern Scarp Landscape, achieving a turnover of around SEK 600-750 million. However, to make this a reality, the authors of the report indicated that a clear profile and strategy focusing on and refining the qualities of the region would be required. The large potential for the East Vättern Scarp

Landscape to develop its tourism industry and the rest of its business community can be unlocked by finding areas of cooperation and identifying how the different sectors can contribute to increasing the area's qualities together. Visit Sweden recently carried out an analysis of trends in the tourism sector, especially nature tourism. The conclusion from its "Nature tourism 2020 trend report" is that "nature tourism – as a way of disconnecting from technology and enjoying a slower pace of life – is likely to become more and more popular. Travellers are increasingly looking for remote, beautiful locations where they can "lose themselves" out in nature. The change from more built-up areas to more remote destinations in the country is another consequence of COVID-19."

Visit Sweden's trend analysis also indicates a desire for enjoying nature and genuine experiences in an increasingly stressful world as important for tourists (Fig. 64). Travellers are looking to do more than just "scratch the surface": they want to actively interact with the local population during their visit and experience both local products and the local culture.

The East Vättern Scarp Landscape has a huge potential with an increasing number of local businesses working to combine wildlife experiences in both open heritage landscapes and the forests as depicted by artist John Bauer with culture and sustainable production of food products to attractive tourist packages. Discovering Lake Vättern, the forest-clad scarps and the small-scale agricultural landscape's biological cultural heritage draws visitors to the region. Concentrating on how this heritage is part of a biosphere reserve in which more and more stakeholders are taking active responsibility for their contribution to more sustainable development should be a magnet for even greater visitor numbers to the region. Based on this, NIRAS (2014) estimated that it should be possible to double turnover from local production and processing for products sold in stores or served in restaurants in the vicinity.

NIRAS envisages a development of the green sector (milk, meat, lamb and fruit) to preserve and promote the region's natural assets and growth in locally produced foods in collaboration with established tourism companies and businesspeople so as to further strengthen the area's profile and identity. Since the report, major steps have been made towards this, and the ideas are still being developed.

The green, tourism and food processing industries also have a correlation to a series of other businesses ranging from furniture manufacture from sustainably produced timber to carbon offset from individuals on the other side of the planet.

How well do you know the East Vättern Scarp Landscape Biosphere Reserve?
Number of replies: 217

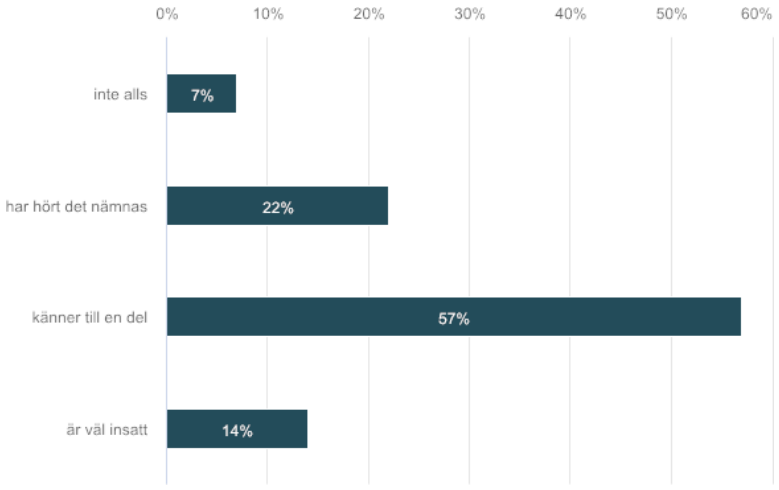


Figure 21. Results of survey on awareness of the East Vättern Scarp Landscape Biosphere Reserve carried out by PlaceBrander 2019.

Legend answers: not at all, I've heard of it, somewhat familiar, very familiar.

5.6 Community economic development initiatives. What programmes exist to promote comprehensive strategies for economic innovation, change, and adaptation within the biosphere reserve, and to what extent are they implemented?

Rural Development Programme

The Swedish Rural Development Programme exists to develop the countryside in Sweden and is part of the EU's strategy for smart, sustainable growth. It is jointly financed by the Swedish government and the European agricultural fund for rural development. Logistical support and compensation is available for the environment, sustainability and innovation to help meet the programme's objectives. One example of support within the Rural Development Programme is the payment of environmental subsidies available to farmers owning pastureland and hay meadows. Throughout the 10-year period, a number of farmers have taken advantage of the offer to receive funds and advice to help restore pastureland. This has been of particular benefit in conjunction with other projects or measures under the aegis of the biosphere reserve, e.g. together with the Local Nature Conservation Initiative (LONA) project entitled "Continuity forest in forest grazing".

Environmental subsidies are key to re-creating and protecting the East Vättern Scarp Landscape's characteristic agricultural landscape. Other forms of investment aid have also had a significant impact on promoting profitable and competitive agriculture in the area. The programme also provides logistical support for switching over to organic farming or innovation projects.

Locally led development using the LEADER method

LEADER is a development initiative partly financed through the Rural Development Programme, which has contributed to development in the biosphere reserve by promoting the implementation of various local projects. LEADER has been the EU's approach to develop the countryside over 30 years by putting local stakeholders in charge of how the funds should be spent. Various parts of the community work to develop the local economy: in a tri-partite partnership, associations team up with business and the public sector (e.g. the municipality) to achieve joint goals. During the study period, the biosphere reserve has been geographically included in the Lake Vättern LEADER area and the former LEADER area Sommenbygd-Vätterstrand which worked in a similar vein but without European financing. From 2023 onwards, the biosphere reserve will be included in its entirety in the LEADER area of West Småland and contacts have already been made for collaboration during the coming review period. In the spring of 2021, the LEADER Vättern association produced a strategy for how the work on Lake Vättern can continue within the LEADER framework for the next programme period (LEADER Vättern 2021). The strategy was put together to be passed onto the LEADER areas around Lake Vättern as LEADER Vättern will no longer exist in the programme period starting in 2023.

5.7 Local business or other economic development initiatives. Are there specific "green" alternatives being undertaken to address sustainability issues? What relationships (if any) are there among these different activities?

Within the biosphere reserve, it is clear that the green and food processing industries form the basis for a new type of business development, particularly in the hospitality industry. By promoting an active agriculture and forestry sector, more jobs will be created in branches linked to these industries. Responsible agriculture will also help keep the landscape attractive to both residents and visitors.

A compilation of existing knowledge – *Landscape in Balance* – developed by the World Wide Fund for Nature (WWF) highlights how an ecologically sustainable landscape in the East Vättern Scarp Landscape could act as a basis for long-term sustainable production and diverse entrepreneurial activity. The report provides several examples of how different environmental initiatives can contribute to positive economic development. The hospitality industry, fruit cultivation, grass-fed meat, a diverse forestry sector and initiatives aimed at local wetlands are the clearest examples of where progress has been made in the East Vättern Scarp Landscape, but where there is still work to be done. It also highlights how the different activities can actually benefit one another.

Many of the companies located in the biosphere reserve have already implemented – and continue to implement – energy initiatives and the sustainability measures they have introduced have become more widespread and much more wide-reaching over the past decade. Within the hospitality industry, special initiatives have been implemented in the biosphere reserve, the largest of which is the four-year "Sustainable Product Development" (shortened to HPU in Swedish) project which is described in more detail under the heading 5.2. The project showed very clearly that the unique values in terms of nature, culture and dining experiences are of crucial importance when creating an attractive range of products for sale, particularly when it comes to international visitors.

Special efforts have also been made within the biosphere reserve to increase the number of photovoltaic installations in the countryside. Meetings have also been held together with officials from the County Administrative Board with the aim of encouraging the roll-out of more photovoltaic schemes.

The biosphere reserve represents a large and lively part of Jönköping Municipality. Biosphere-related projects and collaborations with other stakeholders have been a major contributor to awards or prizes the municipality has been awarded in recent years.

In 2020, Jönköping Municipality was awarded the Swedish Environmental Protection Agency's "Sweden's Outdoor Municipality of the Year" award, with the Agency naming the region's information nodes, biosphere trails, the Franciskusleden hiking trail and international cycling and skiing competitions in the nature reserves, as well as the Huskvarnabergen outdoor recreation area, as some of the reasons why it was given the accolade. It also praised the municipality's improved accessibility for people with disabilities to get out and participate in outdoor recreation and sporting activities, as well as very active work during the Year of Outdoor Sports and Recreation 2021 creating activities, knowledge and engagement to help get the general public outdoors and into nature. Outdoor activities were held in the biosphere reserve in conjunction with the Swedish Outdoor Association, other associations and the authorities. Knowledge enhancement also took place during digital seminars, and activities were announced and promoted via the biosphere reserve's information channels.

Jönköping Municipality was also awarded the Swedish Society for Nature Conservation's "Sweden's most bee-friendly municipality" award in 2021. This honour, awarded for the second year in a row, is based on the municipality's own information gained from surveys.

5.8 Describe the main changes (if there are any) in terms of cultural values (religious, historical, political, social, ethnological) and others, if possible with distinction between material and intangible heritage.

An important part of the biosphere reserve's operations is to document and disseminate the traditional knowledge associated with the use of the land within the East Vättern Scarp Landscape. This local knowledge is currently dying out as the older generation slowly disappears. Knowledge on how the region's natural resources were used from a historical point of view is a form of intangible cultural heritage which, of course, has its own cultural value. It can also be significant in helping develop a more sustainable use of nature in the future.

A major cultural change has involved the agricultural landscape which has over time become more dense and darker as a result of a reduction in traditional grassland management and an increased number of trees. As the change has been so gradual, many local residents living within the biosphere reserve are not even aware of this encroaching vegetation. Of all the different types of land, it as been hay meadows and forest grazing areas – which historically covered large swathes of the landscape – which are disappearing the most rapidly. Both land types are crucial for rural farming societies and carry with them extensive bio-cultural heritage.

Built-up areas are continuously changing, and for a long time traditional construction methods were ignored when building new-builds, extensions or reconstruction work. However, over the last decade, there has been a marked increase in interest for preserving old buildings. A number of houses have been renovated according to cultural values, and there is plenty of knowledge and good materials available.

Large numbers of refugees coming to Sweden, which peaked in 2015, resulted in major changes to society in general, and both public and non-profit entities have been put under pressure. The increasing number of refugees and attempts to integrate them into society have had a large cultural, religious, political and ethnic impact.

5.9 Community support facilities and services. What programmes in/for the biosphere reserve address issues such as job preparation and skills training, health and social services, and social justice questions? What are the relationships among them and with community economic development?

In Sweden, the different initiatives and programmes for social justice are organised and financed to a large extent by the public authorities at a national, regional or local level. All residents are entitled to health and social services, and the public authorities are also responsible for different work preparation and skills enhancement initiatives. In the different municipalities, schools and the social services have different methods of identifying children and young people facing difficulties. As well as the official bodies, there is also strong non-profit engagement for supporting and defending the interests of vulnerable groups in society.

The biosphere association participates in skills enhancement training for different groups in

society, arranging lectures and workshops and contributing to the creation of new networks across different projects. As a consequence of the large influx of refugees in 2015, for example, it implemented several specific initiatives which brought together the Swedish population and the "new Swedes" in a range of integration projects and activities. It has even carried out a project for unaccompanied minors involving periodic visits and activities as part of everyday agricultural life. This is thought to contribute to bringing together social justice and economic development long-term.

5.10 What indicators are in place to assess the effectiveness of activities aiming to foster sustainable development? What have these indicators shown?

No specific indicators have been established as part of the biosphere association's self-initiated work to measure the effectiveness of its activities promoting sustainable development. The organisations involved with the East Vättern Scarp Landscape Biosphere Reserve have their own indicators for their operations and projects, but they are often on a different scale than just the biosphere reserve.

The biosphere programme covering the initiatives undertaken in the East Vättern Scarp Landscape is currently being revised. Part of this revision involves investigating whether relevant, measurable indicators can be introduced to make it easier to monitor the work in the future.

The County Administrative Board measures a series of different factors when monitoring environmental objectives, which in turn can be linked to certain activities being carried out. Some examples of this are advisory services for clearing the ground around and the restoration of old, protected trees, and monitoring the status of naturally occurring grasslands by monitoring vascular flora and performing periodic butterfly counts.

Jönköping Municipality uses four policy areas to measure the success of its environmental objectives: our living environment; housing and urban development; energy and transport; and production and consumption. To evaluate how successful the work towards achieving these local environmental objectives has been, a large number of important trends are monitored with the help of indicators. As the East Vättern Scarp Landscape makes up around half of the entire surface area of Jönköping Municipality, these indicators are also extremely relevant to the biosphere reserve. The latest review took place in 2018 and showed that 58% of the key indicators were considered to have experienced positive development and 42% basically remain unchanged. None of the key indicators was considered to have experienced a negative change.

Where specific objectives were linked to the key indicators, it was found that 43% had a good chance of being attained. It was uncertain whether 7% of the objectives would be reached, and 50% were judged as being difficult to achieve. Overall, the outcome of the 2018 key indicator review was insufficient, and as a result environmental work will need to be intensified in many areas.

5.11 What are the main factors that influenced (positively or negatively) the success of development efforts in the entire biosphere reserve? Given the experiences and lessons learned in the past ten years, what new strategies or approaches will be most effective?

The publication *A Wonderful Friday* summarises the key to success that arose from the work taking place within the East Vättern Scarp Landscape up to 2012. These factors contributing toward project success were as follows:

- Take time to build trust between the different interests
- Invest in conversation to resolve conflicts
- Avoid the sending out of official letters to landowners and other interested parties
- Openly report the knowledge gleaned from surveys and other information
- Develop good local knowledge and apply it to a larger nationwide context
- Surveys help develop a "common hymn sheet" which can then be used as a basis for discussion
- Rally behind a shared concept (e.g. "East Vättern Scarp Landscape")
- Develop good examples (e.g. for sustainable land use) which can then ripple out into the remaining areas

The method employed in the East Vättern Scarp Landscape for different development initiatives was largely built on broad cooperation between many different stakeholders. This method – involving the authorities, non-profit organisations and representatives for the landowners/businesspeople – has achieved nationwide recognition.

The most important keys to success for development initiatives within the biosphere reserve are ensuring there are active, concrete steps people can take as part of the different biosphere projects. These projects then bring together different special interest groups to answer specific questions that can highlight the biosphere reserve's potential. Results of the evaluation surveys carried out show that the most well-known measures are those which affect the area as a tourist destination for both locals and visitors, walking trails, etc. Members and local residents are more affected by and to a greater extent want to drive local projects which they feel are more tangible and improve everyday life. Membership organisations, however, generally want to promote larger, more general projects of a regional, national or international nature, and preferably in conjunction with other biosphere reserves.

One challenge related to the development initiatives in the biosphere reserve continues to be that the message regarding what a biosphere reserve is and the work that goes on there does not appear to be getting out. Better knowledge of the biosphere reserve would strengthen the area's identity and pride among those living and working in the East Vättern Scarp Landscape, which, in turn, should act as a lever to drive the development initiatives underway.

6 THE LOGISTIC FUNCTION

[This refers to programs that enhance the capacity of people and organizations in the biosphere reserve to address both conservation and development issues for sustainable development as well as research, monitoring, demonstration projects and education needed to deal with the specific context and conditions of the biosphere reserve.]

6.1 Describe the main institutions conducting research or monitoring in the biosphere reserve, and their programmes. Comment on organizational changes (if any) in these institutions over the past ten years as they relate to their work in the biosphere reserve.

There are a number of areas of research within the East Vättern Scarp Landscape Biosphere Reserve, conducted by institutes of higher learning, universities and state institutions. The most active institutions during the review period are Linköping University, the University of Gothenburg, the Stockholm Resilience Centre and Jönköping University. The Grenna Museum and County Museum of Jönköping have conducted research within the fields of cultural and landscape history in the area.

Monitoring in the biosphere reserve forms part of general monitoring by the public authorities and follows the Swedish model with long-term, regular environmental monitoring, which has generated comprehensive data sets with no equivalent in other parts of the world. The monitoring of indicators through national or regional environmental monitoring schemes is often carried out in places different to where the actual specific measures were implemented. Among other things, the results are used to follow up on work with environmental objectives, to identify new threats to the environment and to act as reference materials for other types of environmental study.

Every six years, the County Administrative Board produces a regional environmental monitoring programme. The current programme runs between 2020 and 2026 and is split into the following eight programme areas: landscape, arable land, forest lands, freshwater, wetlands, air, health-related monitoring and coordination of measures regarding environmental toxins. The County Administrative Board and Swedish Forest Agency then coordinate the monitoring at regional level. Jönköping and Tranås Municipalities are responsible for local monitoring inside the biosphere reserve. Environmental monitoring is also carried out by non-profit organisations (e.g. the *Floravä*kteri and *Naturens kalender* schemes) in conjunction with the authorities. All the associations and organisations named here carry out some form of monitoring within the biosphere reserve.

The Water Conservation Association (Vattenvårdsförbundet) coordinates the environmental monitoring for Lake Vättern and two tributaries located within the biosphere reserve (Röttleån and Huskvarnaån River). The coordinated programme investigates the water quality, including a number of biological references – plankton, benthic fauna, plants, fish, birds, etc. – and environmental toxin measurements in the water, biota and sediment.

Environmental monitoring is also carried out by non-profit organisations such as the local Gränna Skogsgrupp forest conservation association, the Swedish Society for Nature Conservation, the Botanical Society, the southern Lake Vättern region ornithological society, the southern Lake Vättern region mycological society, etc. The recorded numbers are primarily logged on the Species Observation System at Uppsala University. The data from the Species Observation System is extremely extensive; organisations and individuals constantly upload detailed information on sightings to the portal.

6.2 Summarize the main themes of research and monitoring undertaken over the past ten years and the area(s) in which they were undertaken in order to address specific questions related to biosphere reserve management and for the implementation of the management plan (please refer to variables in Annex I).

(For each specific topic provide reference citations. Provide the full citations alphabetically by lead author at the end of Section 6 or in a separate annex).

Environmental monitoring
It is the County Administrative Board which monitors the work towards the 14 current environmental objectives in the county (of a total of 16 national targets). The following section provides an example of one of the most important focuses for environmental monitoring in the East Vättern Scarp Landscape.

High frequency of trees with a high conservation value found in the biosphere reserve
An inventory of trees with a high conservation value in the County of Jönköping has been running since 2004, and currently lists over 120,000 trees. A small number of these are included in the environmental monitoring programme with arbitrarily selected trees and locations in the county (including the biosphere reserve) reinventoried in order to identify changes in, for example, tree status and need for conservation measures. The result of the reinventory as part of environmental monitoring will show the status of trees with a high conservation value within the County of Jönköping.

Monitoring of aquatic environments
In addition to the Water Conservation Association's (Vattenvårdsförbundet) coordinated programme and water quality monitoring scheme, several studies have been carried out since 2012 with the aim of finding out more about the condition of Lake Vättern's water and how it may have been affected by human influence. The studies have included research into the presence of microplastics in the water (Rotander & Kärrman, 2019) and sediment (Rotander, 2021), as well as pharmaceutical residues and other toxins in the water (Malnes, et al., 2021) and fish (Waldetoft, et al., 2021).

Custom follow-up within certain areas
To manage protected areas, monitoring takes place according to national guidelines and based on each area's stewardship plan. As part of the County Administrative Board's pollination mission, two demo meadows specially set up are monitored. Numbers of wild pollinators and bats were recorded one year after the measures were implemented. The methods used were capturing with nets and visual observations, and digital sound measurements to record bat activity.

Research
The East Vättern Scarp Landscape's history is based partly on collaborative processes between different stakeholders and partly on landscape processes with a balance between land conservation and use as the focus. These areas have also seen the most important research taking place during the review period.

Collaborative processes
Several research projects carried out over the last decade have looked at the model employed by the East Vättern Scarp Landscape biosphere reserve with regard to management and collaboration. Before the creation of the biosphere reserve, a social network analysis was carried out which described the types of contacts between the different stakeholders in the area and how this network would contribute to the creation of socioecological resilience.

Studies have been conducted around adaptive joint management and the relationship between collaboration, learning and results in Swedish (and therefore covering East Vättern Scarp Landscape) and Canadian biosphere reserves, and have resulted in a number of scientific articles being published. In addition, comparative studies of organisational forms and learning processes have also been carried out in Swedish biosphere reserves. These studies have contributed towards deploying the East Vättern Scarp Landscape's model for collaboration and conflict resolution in issues related to the landscape in comparable national and international contexts.

Landscape processes

Ten years ago saw the launch of an ambitious methods development scheme by leading researchers in collaboration with stakeholders from the East Vättern Scarp Landscape to conduct a landscape ecological gap and functionality analysis (BRI-FUNK) on behalf of the East Vättern Scarp Landscape and the Lake Vänern Archipelago and Mount Kinnekulle biosphere reserves. In 2014 and 2015, the method was implemented across six different habitats of special conservation importance for the East Vättern Scarp Landscape with the aim of establishing specific targets for how demanding species will be able to survive in their environment. The method, despite being developed for the East Vättern Scarp Landscape, can be applied to other parts of Sweden and the world.

One major finding of the BRI-FUNK analysis is how the availability or lack of a given habitat varies according to the geography. Maps displaying these variations form a valuable foundation in prioritising measures to be implemented and proposing targets for conservation measures from a landscape perspective. Examples of activities for which this type of material is essential include such topics as protected areas, planning of nature conservation restoration and protection aims, as well as planning of land use for infrastructure, building, etc.

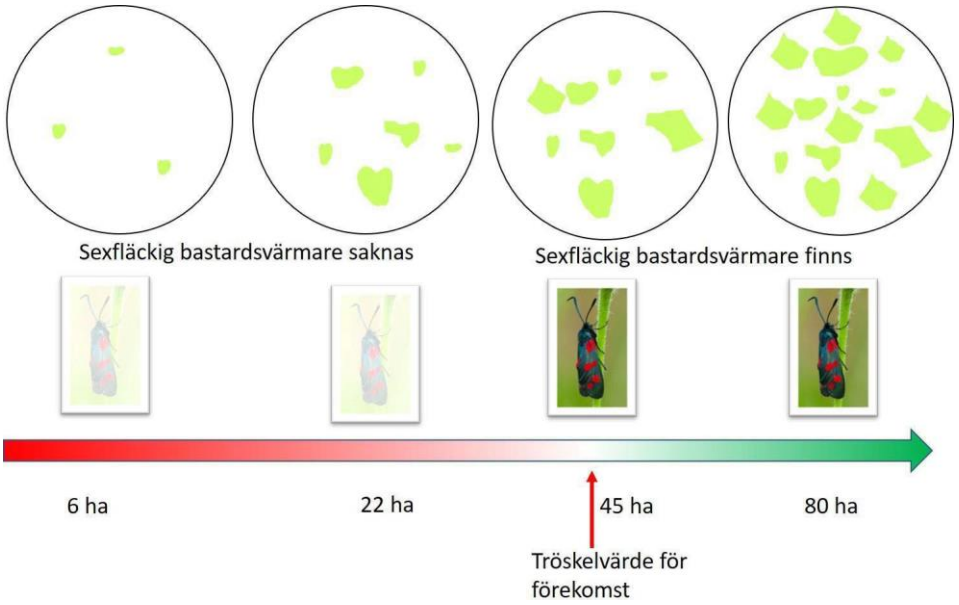


Figure 22. The six-spot burnet moth from the Landscape in Balance *report. Schematic description of the threshold value of living environment required for a species to survive. The example shows that the threshold value for the six-spot burnet moth to survive is 45 hectares of dry, fresh natural grasslands within an area of 25 km².*

Figure 22 Legend shows: No finds of the six-spot burnet moth, Finds of the six-spot burnet moth, Threshold for finds.

Research driven by the biosphere association has resulted in several important knowledge bases. These have then led to several initiatives involving different projects, activities, communication initiatives and practical measures. A schematic table of these initiatives can be found in Annex 2. In the run-up to the evaluation and coming revision of the biosphere programme, WWF had a compilation of the projects conducted, a description of the current situation and a compilation of existing knowledge put together, which has resulted in a long list of potential future projects and measures for continued work as a model area for sustainable development.

6.3 Describe how traditional and local knowledge and knowledge from relating to management practices have been collected, synthesized and disseminated. Explain how such knowledge is being applied to new management practices, and how and if it has been integrated into training and educational programmes.

The East Vättern Scarp Landscape has a long history of working with traditional and local knowledge, especially with regard to the inclusion of aspects learnt from historical land use for landscape management. The impact of the high-profile project on hamped/pollarded trees was all thanks to this historic knowledge and is believed to have influenced other projects in the same vein across the East Vättern Scarp Landscape.

One example of this mix of traditional local knowledge from the last few years is seine fishing (i.e. rowing out, dropping and then drawing a narrow-gauge, conical net from the land at specific locations) on Lake Vättern. This knowledge, which was beginning to disappear, was documented in a project initiated by the biosphere reserve in 2013, and which involved interviews with a number of spokespeople, mapping of the different positions for the nets and drawing up an inventory of the tools required. Additionally, demonstrations of traditional reeling in of the nets have been organised for several years now with hundreds of visitors coming to watch. A popular booklet has also been published and distributed explaining more about the process.

To increase the general public's awareness of changes in the landscape and the issue of encroaching vegetation, a "re-photographing" project was conducted in 2012 at the initiative of the biosphere reserve. Together with a local sports association (IKHP), 20 locations were identified within the reserve in which old photographs had been taken around the mid-20th century. With the help of a specially-designed map, the general public was able to find these locations where they were asked to take new photos. The project collected a total of around 500 new photos which showed clearly how the landscape had changed (and how some things remained the same) in comparison with the old pictures.

In pre-industrial agriculture, forest grazing lands covered large areas of the region. Owning animals in the forest was a form of agroforestry which quickly went out of practice as a result of specialisation in agriculture and forestry. One project conducted between 2018 and 2021 focused on highlighting the importance of forest grazing land in promoting sustainable land use in terms of biodiversity, cultural heritage and outdoor recreation. In several areas, geographical surveys were carried out which provided a good understanding of how grazing in forests a fully integrated part of the landscape and village was historically farming systems. Local historical knowledge on forest grazing was shared within the project through a series of newspaper articles, forest visits and a film. Two physical demo areas were set up with signs so visitors can come and find out more about forest grazing.

Initiatives regarding the tradition of maintaining hay meadows have also been implemented

over the last decade, including courses on clearing the meadows with the help of grass burning in the spring in Röttle village held in 2020 and a digital specialist course with national experts in 2021. The training of biosphere ambassadors have also included aspects such as caring for the meadows to promote pollinators.

6.4 Environmental/sustainability education. Which are the main educational institutions ("formal" – schools, colleges, universities, and "informal" services for the general public) that are active in the biosphere reserve? Describe their programmes, including special school or adult education programmes, as these contribute towards the functions of the biosphere reserve. Comment on organizational changes (if any) in institutions and programmes that were identified in the biosphere reserve ten or so years ago (e.g. closed down, redesigned, new initiatives). Refer to programmes and initiatives of UNESCO Associated Schools networks, UNESCO Chairs and Centers where applicable.

The Swedish primary school curriculum includes education on sustainability and ecosystem services. Since 1992, Jönköping Municipality has operated a nature school on wheels, the Eco-Bus. The bus has equipment for advanced measurements and examination of animals and plants, but also provides personal equipment such as boots and waterproof clothing. Its operations are mainly geared towards day trips for older primary school and secondary school students under the tutelage of trained, dedicated staff. Over the past decade, around 25,000 students have enjoyed a full day's learning on the Eco-Bus. Many excursions take place in the biosphere reserve.

The Erik Dahlberg Secondary School offers "sustainable development" as an optional course with the biosphere reserve as its most important example. Other local secondary schools (Sanda, PB and Bäckadal) have decided to integrate the teaching of sustainable development into other subjects (biology, natural sciences, social studies and geography). The Österängens Konsthall contemporary art space has also worked on projects investigating the link between the residential areas, nature and Lake Vättern in collaboration with the biosphere reserve, artists and locals (especially children and young people).

The biosphere programme was introduced just as the UNESCO-led UN Decade of Education for Sustainable Development (2005–2014) was coming to an end. It was replaced in 2015 by the Global Action Programme (GAP) for ESD. In Sweden, the programme was implemented by SWEDESD, which the biosphere reserve set up a partnership with via Jönköping University. This programme led to the biosphere reserve launching the Biosphere Academy based on the programme's intention of promoting collaboration between different stakeholders in the field of education. The Academy's purpose is to create a collaborative platform for knowledge and education on sustainability that brings together traditional knowledge and experience with new knowledge and innovation.

The intention is to work together with infant schools and students in compulsory schooling, vocational training or at university as well as community learning and informal (i.e. outside the usual educational channels) learning. Over the 10-year period this study covers, the intention was to consult representatives of all these areas, although unfortunately only two such meetings have taken place due to practical difficulties. However, collaboration has resulted in joint activities such as study circles, university courses and documenting the local history museum's work on initiatives around the biosphere reserve.

The 26th session of the International Co-ordinating Council of the Man and the Biosphere

(MAB) Programme (MAB-ICC) was held locally in 2014 by the East Vättern Scarp Landscape Biosphere Reserve at Jönköping University (JU), located right next to the biosphere reserve. Around 20 students participating in the international work (global studies) programme acted as student ambassadors for the duration of the conference. After that, UNESCO, the MAB Programme and the East Vättern Scarp Landscape Biosphere Reserve have been presented annually to students on the course, which has also included smaller-scale studies inside the biosphere reserve. In addition, a number of students on the programme have also completed work placement training and their theses in conjunction with the biosphere reserve.

Inspired by the Lake Vänern Archipelago and Mount Kinnekulle biosphere reserve, a scheme for training biosphere ambassadors has been launched, and currently around 50 people have completed the course. Based on the experiences from this training and in conjunction with Jönköping University's research programme entitled *Multifunctional outdoor environments that promote health and sustainability*, a training scheme for mini ambassadors was also launched across preschools within the biosphere reserve.

The County Administrative Board's agricultural department carries out annual field walks and targeted educational activities for different subject matters in the biosphere reserve aimed at contributing towards more sustainable agriculture. This is aimed solely at users/landowners and on many occasions over the 10-year period was held in collaboration with the biosphere association and other interested parties. Two examples of this kind of project are *Kontinuitetsskogsbruk* (a continuity forest scheme) and *Vätterbrantskött* (a project promoting local meats in restaurants in the region).

6.5 How do you assess the effectiveness of actions or strategies applied? (Describe the methods, indicators).

The biosphere association does not have its own research and education strategy, but attaches great importance to its support capacity for sharing knowledge with different target groups. One of the biosphere reserve's major functions is to stimulate interest in knowledge related to sustainable use of the landscape. When done in a way that engages and involves different special interest groups, this type of task can have excellent results.

One example of this type of activity that had a huge impact was Sweden's first ever BioBlitz (for more information, see Chapters 4.2 and 4.3), which brought together around 50 of the country's leading biologists – experts in different groups of organisms – to work together to carry out a species inventory over a 24-hour period. A total of almost 1,000 people took part together with the experts, surveying an area of one square kilometre. The activity, which was part of the inauguration of the biosphere reserve, aroused considerable local interest and even made it into the national media with a large number of articles in the Swedish and specialised press. The nationwide radio programme "Naturmorgon" even reported directly from the count for three hours, reaching around a million listeners.

Another positive example is the Broadleaf Success project (see Chapters 4.2 and 4.3), which started in the East Vättern Scarp Landscape where it was met with great interest and was even mentioned in such areas as the province of Småland's regional forestry strategy. One effect of this was the launch of the Broadleaf Success 2.0 project covering 3 counties in Småland with a sharper focus on the economic aspects associated with an increased percentage of broadleaf forest in the region.

6.5.1 Describe the biosphere reserve's main internal and external communication mechanisms/systems.

For internal communications, memos are used for recording meetings and email and phone are used for ongoing communication.

Communication between the coordinator/directors and focus groups takes place via email with a certain amount of verbal clarification as well as annual business planning. Focus groups communicate to a varying degree with volunteers, people responsible for ongoing projects and other external interested parties.

External communication generally takes place via the website, social media (Facebook) and the mailing of newsletters. In the case of major events or activities, the biosphere reserve has received good media attention – both local and nationwide – in both the printed press and on TV.

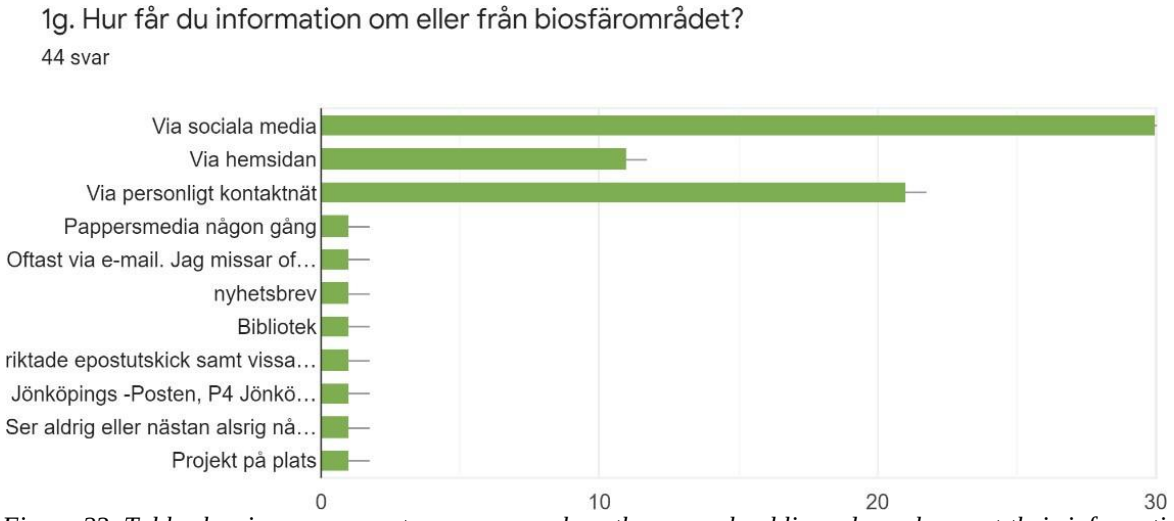


Figure 23. Table showing responses to a survey on how the general public and members get their information about the biosphere reserve.

Figure 23. Title: How do you receive information about the biosphere reserve?
Legend show following answers from 44 persons that participated: Via social media, Via the website, Via personal contact network, Paper media some time, Usually by email. I often miss all information, Newsletter, Library, Targeted emails, Local newspapers and radio as Jänköpings-Posten, P4 Jönköping, Projects with physical activities/on-site.

6.5.2 Is there a biosphere reserve website? If so, provide the link.

www.ostravatterbranterna.se

6.5.3 Is there an electronic newsletter? How often is it published? (provide the link, if applicable).

Yes. A digital newsletter is sent out four times a year. In 2021, just over 500 recipients subscribed to the newsletter. No link is available.

6.5.4 Does the biosphere reserve belong to a social network (Facebook, Twitter, etc.)? Provide the contact.

The biosphere reserve has a Facebook account for which the biosphere coordinator is administrator. www.facebook.com/eastvatternscarplandscape

6.5.5 Are there any other internal communication systems? If so, describe them.

No, not other than the newsletter (see Chapter 6.5.3).

6.6 Describe how the biosphere reserve currently contributes to the World Network of Biosphere Reserves and/or could do so in the future.

Individuals from the biosphere association have actively participated in a series of international biosphere conferences such as NordMAB, EuroMAB and the world conference held in Lima over the 10-year period. Meeting representatives from other biosphere reserves and exchanging experiences and knowledge is considered rewarding and productive for the work on the ground.

In 2014, the East Vättern Scarp Landscape Biosphere Reserve hosted the 26th ICC meeting, which was held in Jönköping and welcomed 140 participants from 27 different countries. As the biosphere reserve was relatively new at that time, the conference was a fantastic opportunity to both gather locally around the biosphere reserve efforts and show an international convention around the area and talk about the process that characterised its development. It also represented a unique opportunity to shine a light on how the biosphere reserve is part of a global network and the opportunities this affords.

Different sectors of society – particularly business associations and non-profit organisations – were all involved in the organisation of the ICC meeting to help create broad endorsement of the proceedings. This included both Husqvarna AB and Södra Skogsägarna, which played a key role in showing how modern environmental engineering is growing in the area and different ways how to make use of it within forestry. A number of representatives from the hospitality industry also got involved in practical arrangements. Several local associations held activities as part of a "biosphere week", where a total of 43 exhibitions, courses, walks, guided tours, food markets and workshops were organised all over the biosphere reserve and which attracted around 1,200 visitors. The conference itself, which was held at Jönköping University, was also marked with a number of peripheral events including exhibitions, workshops, music and dance. Delegates were able to meet in person with local representatives and enjoy local food products and locations and come face-to-face with people in the biosphere reserve on organised excursions.

All in all, the ICC meeting was considered to have been the catalyst for a large number of new joint projects at all different levels. At a local level, it was possibly the first time people came together around the concept of the biosphere reserve. The biosphere association developed a closer contact network with regional stakeholders, but also with national representatives and international participants in the meeting. The conference attracted relatively large media attention on the radio and TV and in newspapers. The East Vättern Scarp Landscape Biosphere Reserve was awarded the prize for the conference of the year at the Jönköpingsgalan ceremony in 2015.

A part of the information material developed from the biosphere reserve has been translated

into English to share with the world network, including the booklet *A Wonderful Friday*, which describes the social processes which took place in the East Vättern Scarp Landscape to get from conflict to dialogue and ultimately collaboration.

In the future, the biosphere reserve should play a major role in different collaborative projects related to a series of different themes such as sustainable use of water resources, climate mitigation and land use, landscaping with scientifically based restoration measures in terms of measurable goals/threshold levels for species pools.

6.6.1 Describe any collaboration with existing biosphere reserves at national, regional, and international levels, also within regional and bilateral agreements.

National level
The Swedish biosphere reserves have a well-developed system of collaboration and meet on a monthly basis via the Swedish Biosphere Programme to share their experiences. Representatives of the different biosphere reserves in Sweden also meet generally once a year to participate in workshops and conferences around the biosphere reserve efforts.

In autumn 2016, the East Vättern Scarp Landscape hosted the annual two-day board conference for biosphere reserves in Sweden. Two national networks were set up as a result of the meeting: one on tourism and the hospitality industry, the other on teaching and training biosphere ambassadors.

The biosphere reserve located closest to the East Vättern Scarp Landscape is the Lake Vänern Archipelago and Mount Kinnekulle biosphere reserve, which is the one it has had the most successful exchange with. The two reserves have developed joint project ideas and shared experiences on biochar and mini ambassadors.

The East Vättern Scarp Landscape Biosphere Reserve was also instrumental in the establishment of the Vindelälven-Juhttátahkka Biosphere Reserve, helping with such things as training ambassadors.

Regional/international level
During the 10-year period, several national and international collaborative projects were carried out together with other biosphere reserves. Within the European network, meetings and information-sharing have been organised with other biosphere reserve, especially in Norway, Finland, Italy and Scotland. At a global level, the East Vättern Scarp Landscape has worked together with such countries as Canada and South Africa. The last few years have, however, seen some limits to both economic and personnel resources for this international cooperation, plus the recent COVID-19 pandemic has made travel and other activities impossible.

6.6.2 What are the current and expected benefits of international cooperation for the biosphere reserve?

Many of the representatives from the biosphere association consider it essential to maintain contact with biosphere reserves in other countries to help share knowledge and find inspiration. Meetings arranged by organisations such as NordMAB and EuroMAB are good platforms for promoting the building of networks with representatives from other biosphere reserves that can share their challenges. Experience exchanges regarding partnership processes, conflict resolution and network building have been crucial to the East Vättern Scarp Landscape's international cooperation during the period and will hopefully continue in the

future.

6.6.3 How do you intend to contribute to the World Network of Biosphere Reserves in the future and to the Regional and Thematic Networks?

From the biosphere association's side, there is definite interest in contributing to the global and regional networks for biosphere reserves and participating in international projects. Over the last few years, a number of large projects have been discussed and remained in the pipeline but have so far been impossible to implement. There are opportunities for international cooperation in the World Network through some of the biosphere association's collaborative organisations.

The biosphere association is working on getting additional personnel resources and reviewing the biosphere programme, as the tasks for the association over the coming years need to be set out and hopefully further opportunities for international collaboration can be created. The different networks within UNESCO are important for both the biosphere reserve and the biosphere association, and the intention is to continue to share the methods and results for different projects in both the regional and thematic networks. One further hope is that the new opportunities for digital meetings that have arisen over the last few years will facilitate this work in the future.

6.7 What are the main factors that influenced (positively or negatively) the success of activities contributing to the logistic support function? Given the experiences and lessons learned in the past ten years, what new strategies or approaches will be favoured as being most effective?

Collaboration is the biosphere reserve's most visible and most successful strategy, and has been shown to work well on both a smaller and larger scale. It is important to note that the methods of collaboration require continuous renewal and redevelopment in order to continue to provide a good support capacity.

The East Vättern Scarp Landscape Biosphere Reserve also plays an important role in engaging individuals and sharing knowledge on sustainable development and the responsible use of natural resources, and engagement with volunteers and biosphere ambassadors is a major part of this task. The biosphere association considers it essential to renew and reinforce this task in the future.

Compiling information related to different areas of sustainable use of the landscape in a range of brochures has also been a successful concept. One particularly successful example of this is the book *A Wonderful Friday* which describes the process of establishing the biosphere reserve and had a print run of around 4,000 in Swedish and 500 in English. Recently, the production of different thematic films have been well received and had a positive effect; this is something the biosphere association should look into more in the future. The use of social media has reached new target groups and the number of followers to the association's Facebook group has successively increased. Further enhancement of the biosphere's digital presence will continue to be important in the future.

The biosphere association has also been happy to take part in various public events (e.g. Röttle Day, Fallens dag festival, the agricultural society's summer meet, the European mountain bike championships, Arctic Char Day, Öxnehaga Day and Jönköping Market) where it had the opportunity to share knowledge on and around the biosphere reserve in a concrete and interesting way.

In addition, the biosphere reserve acts as an important arena for knowledge-sharing between different organisations with separate roles related to the management of the area. Developing demo areas is a leading factor in showing in an educational manner how different interests can work together towards a common aim for the landscape. In total, seven demo areas have been set up to show off different topics such as forest grazing, salamander ponds, the restoration of pastureland, pollarding and a rich agricultural landscape. Plans are currently in the pipeline for developing new demo areas.

6.8 Other comments/observations from a biosphere reserve perspective.

A strategically important measure would be to have signposts along roads in the region indicating how the East Vättern Scarp Landscape is a UNESCO-designated biosphere reserve. Despite negotiations at different levels, no signs have come to fruition. Part of the E4 European motorway, one of Sweden's most important arteries, runs through the East Vättern Scarp Landscape.

7 GOVERNANCE, BIOSPHERE RESERVE MANAGEMENT AND COORDINATION

[Biosphere reserve coordination/management coordinators/managers have to work within extensive overlays of government bodies, business enterprises, and a "civil society" mix of non-governmental organizations and community groups. These collectively constitute the structures of governance for the area of the biosphere reserve. Success in carrying out the functions of a biosphere reserve can be crucially dependent upon the collaborative arrangements that evolve with these organizations and actors. Key roles for those responsible for the biosphere reserve coordination/management are to learn about the governance system they must work within and to explore ways to enhance its collective capacities for fulfilling the functions of the biosphere reserve.]

7.1 What are the technical and logistical resources for the coordination of the biosphere reserve?

The East Vättern Scarp Landscape Biosphere Reserve – a non-profit association is responsible for the coordination of the biosphere reserve. The association has its office in Jönköping City Hall, which is close (about 5 km) to the biosphere reserve. The office has workrooms and meeting rooms and modern documentation and communication equipment connected to broadband. Transport is mostly by car.

7.2 What is the overall framework for governance in the area of the biosphere reserve? Identify the main components and their contributions to the biosphere reserve.

The governance and coordination model of the East Vättern Scarp Landscape Biosphere Reserve is based on broad collaboration between public, non-profit and private organisations and actors. The members of the Board of Directors represent different sectors of society with a variety of interests in and knowledge about the reserve. In addition, the members represent different geographical levels (national, regional, municipal and local), which means that the biosphere reserve can also be coordinated in relation to the processes that are taking place in different parts of society.

The biosphere association's values emphasise that governance should be based on participation in decisions and processes and that the association should be a learning organisation that continuously develops consensus about how the landscape's values can be conserved and developed. This model of governance is usually referred to as adaptive co-management.

The Board of Directors and the Executive Committee do not exercise authority but have a combined bottom-up and authority perspective on the measures taken to fulfil the three functions of the biosphere reserve. The biosphere association coordinates activities in the reserve and supports, initiates and monitors activities carried out by the actors within the framework of the Vättern Scarp Landscape Biosphere Programme.

7.3 Describe social impact assessments or similar tools and guidelines used to support indigenous and local rights and cultural initiatives (e.g. CBD Akwé:Kon guidelines, Free, Prior, and Informed Consent Programme/policy, access and benefit sharing institutional arrangements, etc.).

The East Vättern Scarp Landscape Biosphere Reserve has no indigenous people, so this question is not relevant.

7.4 What (if any) are the main conflicts relating to the biosphere reserve and what solutions have been implemented?

The background of the East Vättern Scarp Landscape Biosphere Reserve is based on conflicts between different interest groups, mainly related to forestry and biodiversity. Long before the biosphere designation, representatives of these organisations met to discuss the conflicts. These organisations then became the founding organisations of the biosphere association with the creation of the biosphere reserve. Creating a platform for dialogue and exchange of knowledge is one of the most important lessons learned from the history of the East Vättern Scarp Landscape.
The process from conflict to dialogue to collaboration has been documented in the book *A Wonderful Friday* and presented nationally and internationally in various contexts.

However, discussing and developing the balance between use and conservation is an ongoing process. Conflicts persist over issues of landscape use and relate to different industries and sectors of society. In addition to the well-known agriculture and forestry industries in the biosphere reserve, in which representatives of different interests are well acquainted with each other, tourism, wind power and mining, for example, have increased in scale and created new conflicts in which the biosphere reserve as such has found it more difficult to find a role in the processes. See more below.

7.4.1 Describe the main conflicts regarding access to, or the use of, resources in the area and the relevant timeframe. If the biosphere reserve has contributed to preventing or resolving some of these conflicts, explain what has been resolved or prevented, and how this was achieved for each zone?

The background to the biosphere reserve stems from the conflicts that arose in the 1990s when different organisations had different views on how forests and land should be managed, balancing use and conservation. This process is well described and has been highlighted in many contexts as the "Vättern Scarp Landscape model", in which collaboration between different organisations has led to greater consensus and increased knowledge. This process is still ongoing on this issue, but in the last decade other areas of conflict have emerged in the reserve.

The East Vättern Scarp Landscape is an area of high geoscientific value, and its geology has been crucial to the rich natural assets found within the biosphere reserve. The reserve is also home to sites with unique geology such as Norra Kärr, with extremely rare minerals. The question of a major mining operation in the northernmost part of the biosphere reserve has been more or less on the agenda for the past decade. The process concerns a rare earth metal deposit for which Leading Edge Materials Corp was granted an exploration permit in 2010 and has been applying for a mining licence since 2012. In May 2021, the Mining Inspectorate of Sweden decided to reject the application for a mining licence at Norra Kärr on the grounds that a Natura 2000 permit under the Environmental Code is required before a decision on a

mining licence can be made. The company has appealed against the decision.

The deposit is located in the development zone of the biosphere reserve, but is considered also to have a potential impact on the buffer zone and possibly the core area. The conflicts surrounding a possible mining operation cover many aspects of the local resources such as agriculture and forestry, tourism, living environments, biodiversity and not least water supply and quality, with the proximity to Lake Vättern in particular. On the other hand, proponents of the mine argue that the rare earth metals are needed for a global green transition.

In 2013, the biosphere reserve took the initiative to form a dialogue group with representatives of various interests, including the CEO of the mining company, representatives of green industries, local organisations and the Water Conservation Association. With the help of a professional facilitator, this dialogue group met on a number of occasions to get to know each other better and take the first steps towards understanding the process and the starting points of the different interests. The dialogue group was forced to close due to the legal process, but may have contributed to a somewhat better understanding of the complexity of the issue among key players in the conflict. A large open meeting for a broader group of stakeholders was also organised at a time when conflicts over mining development were at their most intense. With a Canadian biosphere reserve (Manicouagan-Uapishka), the then coordinators of both biosphere reserves developed a description of how biosphere reserves can contribute to increasing knowledge and improving dialogue in the context of mine development. The application to mine rare earth metals in Norra Kärr demonstrates the need to balance geosystem services and ecosystem services. The same balance has historically existed in connection with the use of watercourses along the escarpment for hydropower.

Another relatively new and contentious issue for the East Vättern Scarp Landscape is that of wind power development. There have been wind turbines on Visingsö since 1993, but with the establishment of new, larger wind turbines in greater numbers on the mainland, the issue has become increasingly contentious. Northeast of Gränna, two major wind farms were commissioned in the biosphere reserve in 2011, one with nine, the other with four 150-meters high turbines. East of Gränna, in the village of Örserum, there were plans for another wind farm, which was politically voted down in 2014 after local protests. At Skärstaddalen, another farm has been under discussion for over ten years, and has met with strong local opposition and created conflicts in the local community. The issue of establishing wind power within the biosphere reserve shows the conflicting interests surrounding the use of the landscape for production, housing, recreation and tourism, etc. Regarding wind power, there is a national statement that biosphere reserves should not take a position for or against the establishment of wind turbines. All wind power planning has taken place and is taking place in the biosphere reserve's development area apart from Visingsö, which is in the buffer zone.

Development of agricultural land for housing and infrastructure was a contentious issue in the biosphere reserve during the period. Jönköping Municipality was one of the municipalities in Sweden that allowed the most development of agricultural land through the planning process. Thanks to lobbying from groups including farmers in the biosphere reserve, the municipality has now decided to stop all development on agricultural land, which has attracted a lot of attention and has been highlighted nationally as a good example.

Other areas where conflicts of interest and objectives are deemed to exist include (i) tourism on other people's land, (ii) the spread of spruce bark beetles from protected areas, (iii) growing game populations (wild boar, elk and fallow deer) and the possibility of sustainable agriculture and forestry, and (iv) the application of the Species Protection Ordinance and its impact on the processing of felling notifications.

7.4.2 Describe any conflicts in competence among the different administrative authorities involved in the management of the area comprising the biosphere reserve.

Jönköping Municipality's interest in and work for the active promotion of outdoor recreation in protected areas close to built-up areas and the County Administrative Board's work to ensure natural values and public access to active outdoor recreation in the reserves is an area in which conflicts between public stakeholders may arise.

7.4.3 Explain the means used to resolve these conflicts, and their effectiveness. Describe its composition and functioning, resolution on a case-by-case basis. Are there local mediators; if so, are they approved by the biosphere reserve or by another authority?

With its experience of collaborative processes and providing an arena for knowledge gathering, dialogue and conflict management, the East Vättern Scarp Landscape Biosphere Reserve has the potential to extend this function to other conflict areas. The projects and initiatives undertaken within the biosphere reserve must incorporate the three dimensions of sustainable development, bringing representatives of different interests closer together and enabling them to find reasonable trade-offs and common objectives.

The "Outdoor recreation on other people's land" meeting is an example of such an activity organised by the biosphere reserve, as the increase in tourism and outdoor recreation activities has led to an increase in problems concerning the right of public access. By bringing together representatives of different interest groups, companies and authorities and bringing in external expertise in the field, experiences were exchanged and this is expected to lead to a better situation in the future.

The use of an external mediator (facilitator) can be justified in particularly contentious situations and has been done in the context of the conflicts surrounding mine development (see section 7.4.1). This person was approved by the Board of Directors of the biosphere association, which also includes representatives of local and regional authorities. Using the global network of biosphere reserves to bring in knowledge from other contexts but with similar challenges also proved valuable in this conflict.

7.5 Updated information about the representation and consultation of local communities and their participation in the life of the biosphere reserve.

The biosphere association is a non-profit association and residents, companies, associations and organisations are invited to become members. The non-profit association is the basis for the coordination of activities in the biosphere reserve.

7.5.1 Describe how local people (including women and indigenous people) are represented in the planning and management of the biosphere reserve (e.g., assembly of representatives, consultation of associations, women's groups).

Men and women have equal opportunities to participate in the biosphere reserve's activities. The biosphere association is a non-partisan and non-religious non-profit organisation and anyone who shares the values of the association is welcome to join. By being a member, individuals and organisations have the opportunity to influence the coordinating activities. Everyone, regardless of gender, ethnicity, disability, etc., has the opportunity to participate in and initiate activities that are in line with the biosphere reserve's purpose and objectives.

7.5.2 What form does this representation take: companies, associations, environmental associations, trade unions (list the various groups)?

The work of the biosphere reserve is based on collaboration between the private, public and non-profit sectors. A social network analysis of the biosphere reserve when it was newly formed was carried out by a student at Stockholm University (Heinrup 2012). The study shows a large network of over 100 individuals representing over 20 organisations, and the management form shows several characteristics of adaptive co-management.

Since the study, there have been changes on several levels and the biosphere association's organisation has replaced the previous management form. The organisation of the biosphere reserve mainly comprises the following groups:

- **Board of Directors**: The Board of Directors of the biosphere association consists of members representing the five of the seven founding organisations that are still members, as well as individuals with a personal mandate to complete the representation and contribute other expertise. The gender balance on the Board is about 40/60.
- **Members**: The biosphere association has 128 members, the vast majority (90%) of whom are individuals, the remainder being companies, associations and organisations (5%) and founding organisations (5%). A broad membership with varied interests is a strength of the association.
- **Working groups for focus areas**: Participants in the six focus groups include 50 people (5–12 per focus group) representing a wide range of stakeholders, mainly authorities, non-profit organisations, interest groups and business owners.

7.5.3 Indicate whether there are procedures for integrating the representative body of local communities (e.g., financial, election of representatives, traditional authorities).

The biosphere association operates as a non-profit association and has broad representation from the public, non-profit and private sectors. The biosphere association also works to involve non-member actors. The East Vättern Scarp Landscape is an arena for collaboration on sustainability issues between different actors from different sectors of society and interests. This work is done partly in the association's Board of Directors, partly through the various projects that East Vättern Scarp Landscape runs or is associated with in various ways.

The Board of Directors of the biosphere association consists of 9 to 13 members. According to the current statutes, the seven founding organisations each have a member and a deputy member. In addition to the three public authorities (the County Administrative Board, the Swedish Forest Agency and Jönköping Municipality), the founding organisations are the Federation of Swedish Farmers (LRF); the southern section of the Federation of Swedish Family Forest Owners, Södra Skogsägarna; the World Wildlife Fund (WWF); and the Swedish Society for Nature Conservation via the local Gränna Skogsgrupp forest conservation association. These four organisations represent the landowners, farmers and foresters in the biosphere reserve, and the non-profit nature conservation interests. The other members of the Board of Directors who participate on a personal mandate are elected at the annual general meeting of the association at which each participating member of the biosphere association has one vote.

However, as described in chapter 7.6.3, the Swedish Forest Agency and LRF have decided to no longer be members of the biosphere association and thus of the Board.

The members of the Board who do not participate on a paid basis in the form of their office receive a financial fee for their work through the association. This is not always the case in similar organisations but is very important for participation to be on a more equal footing.

7.5.4 How long-lived is the consultation mechanism (e.g., permanent assembly, consultation on specific projects)?

The annual general meeting of the members of the biosphere association takes place once a year. If necessary, the Board of Directors or the members may request an extraordinary general meeting. The Board of the biosphere association and the Executive Committee meet at least four times a year.

The Board, the Executive Committee and the annual general meeting are permanent assemblies, with some turnover of representatives over time, but the organisational structure itself remains.

The working groups for the focus areas are linked to the biosphere programme developed by the biosphere reserve and are adjusted when the biosphere programme is revised. Each focus group strives to have a working group with broad subject expertise and engagement in the area in question. The focus groups include representatives of public authorities, interest groups and private individuals. The number of people varies from group to group and over time.

The specific project groups usually only exist during the project, but can still be valuable contact networks even after the project has ended.

7.5.5 What is the impact of this consultation on the decision-making process (decisional, consultative or merely to inform the population)?

The annual general meeting of the association, at which the members of the association each have one vote, is the highest decision-making body of the biosphere association. The Board of Directors is then responsible for planning, directing and distributing the work of the association and making decisions on day-to-day activities, delegating some of these tasks to the Chair, the Executive Committee or the Coordinator. If necessary, information meetings are held for specific groups or the general public.

7.5.6 At which step in the existence of a biosphere reserve is the population involved: creation of the biosphere reserve, drawing up of the management plan, implementation of the plan, day to day management of the biosphere reserve? Give some practical examples.

The East Vättern Scarp Landscape's democratic model has primarily been to provide a platform for collaboration between non-profit, private and public organisations. The public have thus been able to become involved in the East Vättern Scarp Landscape primarily through the local organisations. However, for a long time (i.e. before the biosphere reserve was established), a large number of information meetings and dialogue forums were held in community centres and parish halls around the East Vättern Scarp Landscape to listen to local views and gain support for the ongoing work.

During the formation process, a number of dialogue meetings were organised to gather views and to gain support for the design and content of the biosphere reserve. The application was also sent out for an unusually broad consultation, in which a large number of local associations

and parties were invited to submit their views. The opening of the biosphere reserve was open to the public and over 1,000 people attended the various opening activities.

In the development of and work on the East Vättern Scarp Landscape biosphere programme, the public in the form of stakeholders in specific areas have been offered the opportunity to be involved in the work of the various focus groups. Several of the East Vättern Scarp Landscape's various projects and information initiatives have had the aim of involving the public in the biosphere reserve and its activities. Examples of this include the organisation of Sweden's first BioBlitz with around 1,000 participants, the *Hitta Ut* re-photographing project with 500 photos taken by the public, and the seine fishing events with hundreds of visitors every year.

The fact that the biosphere reserve is run as a non-profit association is an advantage when it comes to involving the public in the day-to-day work. Individuals can become members of the association and influence how it works at association meetings, etc. Biosphere ambassadors play an important role by telling people about the biosphere reserve and gathering their views when they meet them in different contexts. Through the biosphere reserve's communication via social media, for example, the public are involved and invited to various meetings, etc.

7.6 Update on management and coordination structure

7.6.1 Describe any changes regarding administrative authorities that have competence for each zone of the biosphere reserve (core area(s), buffer zone(s) and transition area(s))? If there are any changes since the nomination form/last periodic review report, please submit the original endorsements for each area.

No change.

7.6.2 Update information about the manager(s)/coordinator(s) of the biosphere reserve including designation procedures.

The Board of Directors of the non-profit biosphere association appoints a coordinator. Over the 10-year period, 5 people have held the role of coordinator: Simon Jonegård (2012–2014), Malena Heinrup (2014–2016), Josefin Gustafsson (2016–2018) and Charlotte Strandell (2019–2022). From May 2022, Johan Wallin will act as temporary coordinator while a new one is appointed.

The non-profit association has been chaired by four people during the period: Ann-Marie Nilsson (2012–2014), Erik Lindfelt (2015–2017), Christian Friis (2018) and Inger Ekengard (2019–present). The Chair of the association is elected at the annual general meeting for one year.

7.6.3 Are there any changes with regard to the coordination structure of the biosphere reserve? (if yes, describe in details its functioning, composition and the relative proportion of each group in this structure, its role and competence.). Is this coordination structure autonomous or is it under the authority of local or central government, or of the manager of the biosphere reserve?).

Shortly before the biosphere reserve nomination was officially approved, the East Vättern Scarp Landscape Biosphere Reserve non-profit association was established. The association

was given the task of being responsible for biosphere activities in the reserve. The coordination structure is autonomous and the annual general meeting of the association is the highest decision-making body. The association is governed by statutes decided by its members.

In 2018, the Swedish Forest Agency announced that the agency's senior management had made a general policy decision to no longer participate in association boards. The Swedish Forest Agency requested to leave several boards, of which the East Vättern Scarp Landscape Biosphere Reserve non-profit association was one. This decision entered into force in 2019.

The Swedish Forest Agency stressed that it was in favour of continued collaboration and that it wanted to participate in various forms of project and development initiatives, and it has done so since its withdrawal. The agency also stated that the association is an important arena for dialogue between different stakeholders and in the work for sustainable social development.

In 2018, the Federation of Swedish Farmers (LRF) announced that, as a county organisation, it did not wish to continue to be part of the biosphere association's Board of Directors. For a long time, LRF had been deeply involved in the coordination of the East Vättern Scarp Landscape and saw difficulties in continuing to support the biosphere reserve in terms of workforce and funding. When LRF left the association, Södra Skogsägarna assumed a more active role in the association to compensate to some extent for LRF's withdrawal. Södra Skogsägarna is the other founding organisation that emphasises the landowner perspective and together these two organisations were instrumental in the creation of the biosphere reserve and the implementation of many of the most important measures and projects during the period.

Within the biosphere reserve, there are several LRF local branches that are more directly related to the East Vättern Scarp Landscape than the county organisation. Several LRF members are also individual members of the biosphere association and influence its work through their own involvement. A process is under way to see whether and how LRF can become a member and once again participate more in the biosphere reserve's development in the future.

At the time of its withdrawal, LRF also felt that there was a certain imbalance in terms of the importance given to the biosphere reserve's conservation and development functions in its operational work. It felt that the biosphere organisation lacked sufficient strength to realise the great development potential of the East Vättern Scarp Landscape. Through LRF's broad network and expertise in the green industries (which, with Södra Skogsägarna, are crucial for the development of the reserve, especially in sustainable agriculture and forestry) there is the potential to continue to collaborate on appropriate projects and for it to contribute its knowledge to the biosphere reserve. A good example of this is the Broadleaf Success project, where LRF took a local biosphere project and scaled it up to regional level.

7.6.4 How has the management/coordination been adapted to the local situation?

The history of dialogue, collaboration and work on issues related to the sustainable use of the landscape in the East Vättern Scarp Landscape goes back long before its designation as a biosphere reserve. In its early phases of dialogue and collaboration, the work was driven by a project organisation which, with the establishment of the biosphere reserve, developed into a more formalised management organisation in the form of the non-profit association.

The organisations and individuals involved in the coordination of the East Vättern Scarp

Landscape work at different levels (from national to local) and on different issues related to sustainable development. The issues that are currently relevant locally are discussed through the platform for dialogue and collaboration that the Board of Directors of the non-profit association represents.

The biosphere programme adopted by the association sets out the direction and priorities of the work. The revision of the biosphere programme, which is currently under way, is adjusting the focus to the current local situation.

7.6.5 Was the effectiveness of the management/coordination evaluated? If yes, was it according to a procedure?

No. The biosphere association did not carry out its own evaluation of the effectiveness of coordination.

Through researchers from SLU, the Swedish Environmental Protection Agency studied organisational forms and collaboration processes in Sweden's biosphere reserves (see Emil Sandström and Emma Sahlström 2020).

7.7 Update on the management/cooperation plan/policy

7.7.1 Are there any changes with regard to the management/cooperation plan/policy and the stakeholders involved? If yes, provide detailed information on process for involvement of stakeholders, adoption and revision of the plan.

The biosphere reserve's first action programme, Strategy for Sustainable Development in the East Vättern Scarp Landscape (also called the Biosphere Programme), was developed in an ambitious two-year project involving many individuals, organisations and interest groups. The biosphere programme is based on the Lima Action Plan and describes the biosphere association's values, the national and international action programmes to which the biosphere association aims to contribute and how the work is organised through six different focus groups.

One important document that was produced in conjunction with the biosphere programme is a business study that analyses the current situation and potential of the reserve in terms of economic activities. In this study, a large number of business owners and associations were interviewed. Another fundamental document is the landscape ecological gap and functionality analysis, which provides a valuable basis for prioritising measures and formulating objectives for nature conservation work from a landscape perspective.

The biosphere programme was adopted by the Board of Directors of the biosphere association in 2016. The biosphere programme is a living document that will be updated every five years or as necessary. This work has been ongoing in parallel with the writing of this evaluation but is likely to be completed in 2023. The mandate to revise the biosphere programme includes reviewing the existing focus areas and their objectives in dialogue with stakeholders, and adjusting and modifying the programme to meet the new challenges facing the biosphere reserve. New knowledge and strategies have been added, including the communication strategy and the *Landscape in Balance* report, which will be included in the programme.

7.7.2 Describe contents of the management/cooperation plan (provide some examples of measures and guidelines). Is the plan binding? Is it based on consensus?

An important part of the biosphere programme is to show how existing or ongoing strategy processes are linked to a landscape perspective to achieve an overview of the conditions, opportunities and difficulties that the East Vättern Scarp Landscape offers.

The areas on which the biosphere association's work should focus in the next five years were selected on the basis of these conditions, combined with the association's ongoing work.
The focus areas for 2016–2021 are: Biosphere Academy, Energy and Climate, Gastronomic Region, Living Landscape, the East Vättern Scarp Landscape Brand and Tourism and Outdoor Recreation. Examples of objectives and measures for the different focus areas are given in chapter 2.3.4.

The focus areas all have a description of the focus area itself, a five-year vision, a description of the value for the East Vättern Scarp Landscape and project proposals that are designed to contribute to the achievement of the objectives. In addition, a summary is made of ongoing and completed projects carried out under the auspices of the association or in partnership with the association. The biosphere programme's motto "Conserve-Develop-Support" runs through the entire process.

The biosphere programme should provide the basis for an annual operational plan for the association, but it should also inspire other actors to implement measures and projects that are in line with the biosphere association's mission and values.

7.7.3 Describe the role of the authorities in charge of the implementation of the plan. Describe institutional changes since the nomination form/last periodic review report. Please provide evidence of the role of these authorities.

The Board of Directors of the biosphere association currently includes representatives of Jönköping Municipality and the County Administrative Board of Jönköping County. Until 2019, the Swedish Forest Agency also had a seat on the Board. The biosphere programme was adopted by the Board of Directors in 2016 with the three authorities represented.
The Board of Directors adopts annual operational plans to guide the work towards the objectives of the biosphere programme.

Like other organisations, the authorities have also played an active role in the working groups set up to implement the various focus areas, and each board member must be part of at least one working group. The respective roles of the authorities (current situation) in these are described in brief below:

Jönköping Municipality is the convenor of the working group on tourism and outdoor recreation and has participated in the work on several other focus areas.

The County Administrative Board of Jönköping County is the convenor of two of the working groups, Living Landscapes and the Branding Group, and has also participated in the work on other focus areas.

Region Jönköping County is not currently on the Board of Directors of the biosphere association, but has been the convenor of the Gastronomic Region focus area.

The Swedish Forest Agency was previously a member of a focus group, but due to its

withdrawal from the Board of Directors it does not currently play an active role in the biosphere programme. It is invited to and attends meetings with relevant links to the role of the Swedish Forest Agency. The Agency is also active in several projects that have clear links to several of the biosphere programme's focus areas.

7.7.4 Indicate how the management plan addresses the objectives of the biosphere reserve.

The biosphere programme not only considers the three functions of the biosphere reserve (conservation, development and support) separately. It also takes an integrated approach to them. The biosphere programme is based on the landscape perspective, in which the ecological, social and economic dimensions form a whole. Using the landscape as a starting point, the sustainability perspective has been applied to a real and complex arena through activities, partnerships and projects.

The biosphere programme provides the conditions for the association to be a unifying force between individual members and residents, companies, authorities and organisations. Through its members and its affiliation to national and international networks under UNESCO, the association is in a position to achieve sustainable solutions to both local and global challenges.

Based on the conditions and challenges that were the starting point for the development of the biosphere programme, a direction for the continued work of the association was developed around six focus areas and focus groups (chapter 2.2.5). Each focus area has specific objectives in the programme, as well as proposed projects and strategies to achieve these objectives (chapter 2.3.4).

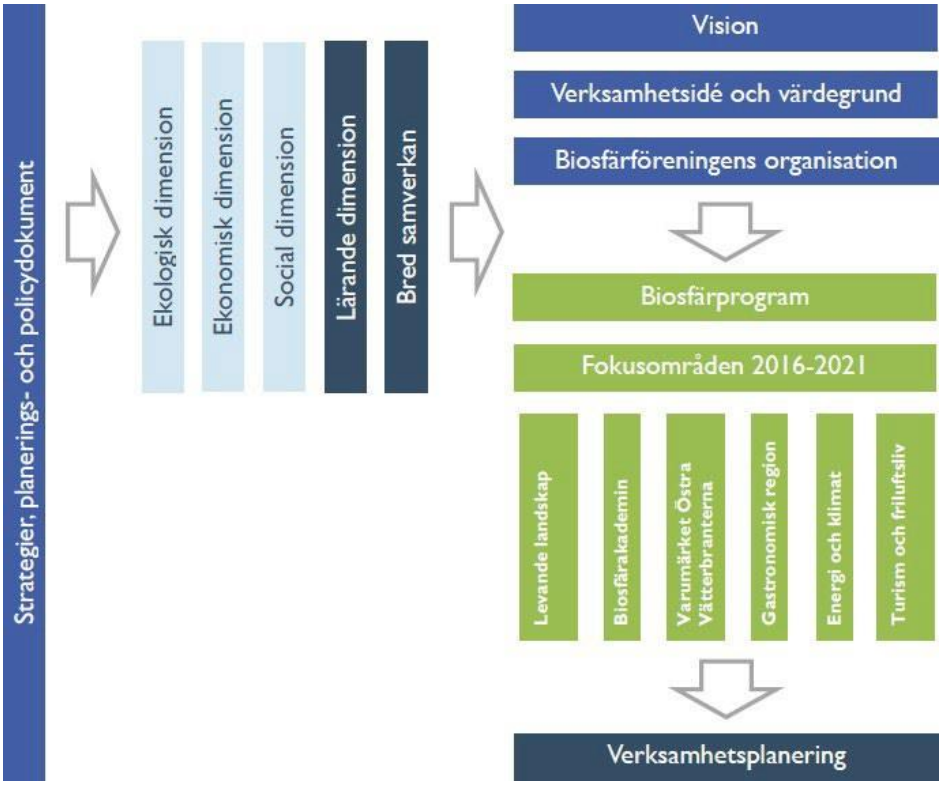


Figure 24. A schematic model of how existing planning, policy and strategy documents are "sifted" through a sustainability perspective, with the three dimensions of sustainable development, learning and broad collaboration, and then indicate a direction for the work through the biosphere programme and its focus areas. This then guides the annual operational planning.

Strategies, planning and policy documents

Ecological dimension, Economic dimension, Social dimension, Educational dimension, Broad collaboration.

Vision, Mission and values, Biosphere association's organisation

Biosphere programme
6 Focus areas 2016-2021
Living Landscapes, Biosphere Academy, East Vättern Scarp Landscape Brand, Gastronomic Region, Energy and Climate, Tourism and Outdoor Recreation.

Operational planning

7.7.5 What are the progresses with regard to the guidelines of the management/cooperation plan/policy?

Work on revising the biosphere programme has begun, but is not yet quite complete. Consequently, in this evaluation, progress could not be quantified. Major progress has included the establishment of work in the different focus areas and the development of networks in different sustainability areas.

7.7.6 Were there any factors and/or changes that impeded or helped with the implementation of the management/coordination plan/policy? (Reluctance of local people, conflicts between different levels of decision-making).

The implementation of the biosphere programme and the objectives, projects and strategies proposed for each focus area depended on the work carried out by the working groups set up. The fact that the working groups have had a wide range of representatives from different sectors has been a success factor. Continuity, or lack of it, in the working groups, and varying capacities and resources to facilitate communication and collaboration between the focus groups, have also had a significant impact on the ability to implement the biosphere programme. The fact that good collaboration has developed over the years between different authorities, such as between the Swedish Forest Agency and the County Administrative Board, has facilitated the implementation of several activities. The working groups are therefore fundamentally good, but need to be renewed and integrated more clearly to counteract silo mentalities, difficulties with long-term planning and the omission of important areas.

The biosphere association has limited human and financial resources, which forces the organisation to set tough priorities between activities. To make it less vulnerable in the future, it is essential to secure long-term, stable funding.

7.7.7 If applicable, how is the biosphere integrated in regional/national strategies? Vice versa, how are the local/municipal plans integrated in the planning of the biosphere reserve? (Please provide detailed information if there are any changes since the nomination form/last periodic review report).

Since 2015, the biosphere work has been based on the biosphere programme and the six focus groups, which are kept up to date with many existing planning, policy and strategy documents through the operational planning process. The biosphere association thus contributes to the objectives of strategies adopted by, among others, Jönköping Municipality, the County Administrative Board of Jönköping, Region Jönköping County, the Swedish Parliament, UNESCO and the United Nations. The strategies are “sifted” through the biosphere programme’s sustainability perspective, via which ecological, economic and social sustainability is addressed. An important part of the biosphere programme is to show how these existing or ongoing strategy processes are linked to a landscape perspective and the work in the East Vättern Scarp Landscape.

At landowner level, each individual owner or user has a driving force and a vision for their property or business. In projects such as Broadleaf Success, LEIF in Practice and Continuity Forest, the biosphere work is based on the interests and plans of the owners and users.

At local level, municipalities have a planning monopoly with responsibility for physical planning. The land use plans for Jönköping and Tranås municipalities mention the biosphere

reserve and the East Vättern Scarp Landscape is, for example, well incorporated in Jönköping Municipality's nature conservation programme.

At regional level, the County Administrative Board was responsible for developing an action plan for green infrastructure, a basis for adapting land use and planning specific measures related to nature conservation in a landscape perspective (chapter 3.4).

At national level, biosphere reserves have become a tool in Swedish nature conservation policy with the aim of achieving sustainable development. The Swedish Environmental Protection Agency highlights biosphere reserves as pilot areas in which new methods and new knowledge can be tested in terms of sustainably managing the relationship between humans and nature.

8 CRITERIA AND PROGRESS MADE

[Conclude by highlighting the major changes, achievements, and progress made in your biosphere reserve since nomination or the last periodic review. How does your biosphere reserve fulfil the criteria. Develop justification for the site to be a biosphere reserve and rationale for the zonation. What is lacking, and how could it be improved? What can your biosphere reserve share with others on how to implement sustainable development into practice?]

Brief justification of the way in which the biosphere reserve fulfils each criteria of article 4 of the Statutory Framework of the World Network of Biosphere Reserves:

1) "Encompass a mosaic of ecological systems representative of major biogeographic region(s), including a gradation of human intervention"
(The term "major biogeographic region" is not strictly defined but it would be useful to refer to the Udvardy classification system (http://www.unep-wcmc.org/udvardys-biogeographical-provinces-1975_745.html)).

The biosphere reserve consists of 66% land and 34% water, primarily Lake Vättern, which is Europe's fifth largest lake. Lake Vättern, which is a deep lake in a fault depression with cold, clear and nutrient-poor water, has a distinct influence on the local climate, causing cold springs and long, mild autumns.

By Swedish definitions, the East Vättern Scarp Landscape is located in a boreonemoral zone. However, the forests are varied, with predominantly coniferous trees to the east and an abundance of broadleaf trees to the west. On a stretch of just a few kilometres there are four different hardiness zones and a high level of biodiversity.

Due to the biosphere reserve's topography, numerous hardiness zones and Lake Vättern's cold waters, typically northern habitats and species are clustered in a limited area adjacent to more typically southern habitats and species. Both glacial relicts and ectotherms can be found here. In the forest scarps next to Lake Vättern the high humidity levels are stable. Due to the area's central location in the southern third of Sweden, both eastern and western species are found here, as well as typically northern coniferous forest environments and typically southern Swedish wooded meadows. Despite the presence of Scandinavia's only existing *Ena montana* snails in the scarp environments, the hazel dormouse linked to sparse broadleaf forests and forest-edge environments has been designated the mascot of the biosphere reserve and its habitats.

The area's topography, with its numerous fault scarps, has helped to form an extremely varied smallholder farming landscape. The wooded landscape essentially comprises productive forests – from boreal coniferous forest land to forests dominated by valuable broad-leaved species – with excellent growing conditions, in small forestry units. Topographical conditions and the preserved structure of rolling landscapes give rise to the considerable variation in the forest landscape and wooded scarp environments that are nearly untouched even to this day.

As a whole, the landscape is characterised by smallholder farming communities with varied forests, patchwork fields, traditional old gardens, wooded fodder lands, forest-edge environments and pollarded trees that surround red-painted crofts, farms and manors. One of the country's largest fruit-growing districts located in one of the biosphere reserve's valleys. The agrarian environments are well-preserved and largely traditionally managed and

maintained. Beyond the inland areas is a rolling forest landscape comprising most of the non-alpine forest habitats that can be found in Sweden.

That land-use traditions are still alive in the community may be due to employment opportunities within commuting distance, a strong entrepreneurial spirit with more local processing and a growing hospitality industry.

Within the area, a distinct urban environment with Sweden's ninth largest urban area transitions into a vibrant countryside in a more sparsely populated border zone. Near to the urban areas, large swathes of the nature and forest areas are protected as nature reserves.

Read more in Chapters 2 and 3.

2) "Be of significance for biological diversity conservation".

Within the East Vättern Scarp Landscape Biosphere Reserve, there is a small-scale farming landscape with a large variety of habitats that is atypical to Sweden. The basic conditions of the area's rich biological diversity are derived from the combination of the area's collective and complex biogeography, both limnic and terrestrial, as well as the small-scale structure and land use that is preserved in the living countryside. Most of the East Vättern Scarp Landscape is subject to a national interest in nature conservation.

Many species that were common in our south-Swedish landscapes in the 1950s have disappeared or become increasingly rare. The national red list contains slightly more than 4,000 species, of which about 340 were found in the biosphere reserve during the period of 2012–2022, 321 during the preceding 10-year period and a total of 520 species over the years. The overall total comprises species associated with natural pastureland, mixed coniferous forests, damp ravines, warm bedrock environments and areas with a number of hundred-year-old oaks, as well as nutrient-poor lakes, ponds and wetlands.
The biosphere reserve also accommodates important lay-bys for migratory birds. The East Vättern Scarp Landscape has historical information about species that once lived here, but which have now disappeared. Several other species have happily made a comeback after an absence of decades or longer.

In the East Vättern Scarp Landscape, the EU's ecological network, Natura 2000, encompasses the entire water surface of Lake Vättern and several land areas with habitats such as silicate grassland and western taiga. According to the EU Habitats Directive, as many as 48 species are listed here. The area also provides habitats for 60 species encompassed by the EU Birds Directive and eight habitats are included in the EU Habitats Directive.

Due to well-preserved cultural historically interesting environments with high species variation, bio-cultural heritage and distinctive landscapes, four subdivisions in the East Vättern Scarp Landscape are part of the national interest in cultural heritage preservation. (National interests in cultural heritage preservation are regulated under the Swedish Environmental Code, Chapter 3, Section 6).

3) "Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale".
(Including examples or learning experiences from practicing sustainable development).

The considerable variation in landmass elevation makes it representative of a large part of the boreonemoral region, which makes the East Vättern Scarp Landscape ideal for testing and modelling for other landscapes in the region. The biosphere association's work is carried out in line with the ambitions of the European Landscape Convention, which aim to increase awareness, participation and a holistic view of the landscape. Demonstration areas for six habitat types were established jointly with property owners on the same basis, but on a smaller geographic scale. Their function is to provide clear examples of how various type of nature and habitats can be preserved through active land use.

Years before the problem of climate change for individual land users became noticeable on the scale that has occurred in Sweden since 2016 – forest fires, droughts, and spruce bark beetle infestations – projects and activities aimed at green industries were permeated by the objective of improving sustainability, resilience and biodiversity preservation, alongside the economical use of forests and arable land. For example, projects such as LEIF in practice, Broadleaf Success and Continuity Forest (see more in Chapter 4.2) have provided landowners who are interested in producing different tree species with ideas about how their timber can be sold, and how additional ecosystem services such as the social, economic and ecological benefits of these farming methods, can contribute to the County Administrative Board's pollination mission. Support has been provided to stakeholders in two areas, with the conversion of arable land to meadow embankments. In this regard, the state's assignment coincides with the interest of land users in strengthening cultural-historical values, through the increased dissemination of knowledge to the general public and the strengthening of their own activities.

In the past ten years, work on issues related to sustainable development has gained momentum. Strategies have been developed and action plans have translated goals into practical measures with long-term results. Many of the measures and activities implemented within or initiated by the biosphere association have reached beyond the biosphere reserve. Pilot projects in the biosphere reserve have been scaled up geographically, such as Broadleaf Success 2.0. These measures and activities have attracted the attention of national authorities and now provide the basis for education and inspiration through informational films, such as Broadleaf Success 1 and Continuity Forest (see more in Chapter 4.2).

Research and knowledge acquisition from the biosphere reserve, such as the Ecological Gap and Functionality Analysis and the subsequent LEIF project, have received national attention. The data and methods from these projects have been utilised by regional authorities; for example, the County Administrative Board's action plan for Green Infrastructure utilised one of the methods to identify habitat-specific biological value regions. The approach with the Ecological Gap and Functionality Analysis is deemed to be potentially critical for other biosphere reserves or landscape initiatives that wish to systematically create a tool for goal formulation and prioritisation in nature conservation work. The East Vättern Scarp Landscape intends to continue disseminating this knowledge through various biosphere networks.

National NGOs, as well as regional and national authorities have arranged numerous biosphere-reserve excursions and study visits to participate in and learn from the experiences of various projects, and to study the practical measures undertaken jointly with landowners to combine the conservation of natural values with economic land use, within the same natural environments or properties.

The varied small-holding landscape has a rich knowledge of the traditional use of natural resources that remains largely intact through memory or active land use. In order to leverage intangible knowledge and nurture an interest in the preservation and use of this bio-cultural heritage, the biosphere reserve's historical development has been described in a general landscape mapping. In partnership with the County Administrative Board, seine fishing traditions and knowledge have been communicated through activities aimed at the general public, and through the production of a book. The know-hows of pollarding and gathering of leaf fodder has been compiled in a publication. Within the six demonstration areas, information days have been held for land users, stakeholders and the general public. National stakeholders and authorities have visited the areas upon request.

In order to set up a knowledge base and create commitment to biodiversity, Sweden's first BioBlitz was implemented (see more in Chapter 4.2). The BioBlitz generated considerable mass-media attention to the biosphere reserve's activities and attracted national specialists as well as 1,000 interested biosphere residents (see Chapter 4.2). All species finds have been registered in the national database, Species Observation System at Uppsala University (see Chapter 9.5).

A shared forum for founding organisations, local enterprises and non-profit organisations provides conditions conducive to cross-border collaboration between various community interests and groups. Activities are conducted within different spheres of interest in order to work towards shared goals. In the course of establishing the biosphere association's collaborative work and active measures, an interactive collaborative process was undertaken for several years, resulting in a strategy for sustainable development, known as the Biosphere Programme. The programme defined six focus areas and associated working groups, which engage stakeholders who subscribe to both shared and opposing interests (see chapters 2.2.5 and 2.3.4).

When unanticipated changes to society occur, such as the refugee crisis of 2015, the drought of 2018 and the pandemic of 2020–2021, the existing partnerships between various parties have allowed for the biosphere association to act dynamically and rise to the new challenges. For example, information meetings and field visits were arranged for property owners, as well as integration projects with activities that bring together new Swedes and the Swedish rural population through language walks, nature school activities and participation through regular visits to a farm (see Chapters 4 and 5).

During the heat wave of summer 2018 and the ensuing pandemic years, infrastructure and management was improved by the biosphere reserve's work, including a feasibility study of "hyper-localised tourism", the development of information nodes in popular locations, the creation of new hiking trails and the mapping of socially important nature areas (see Chapter 4). As a result, opportunities for biosphere residents and visitors to pursue an active outdoor life and meaningful leisure activities have been better than if the pandemic had occurred earlier.

The vibrant countryside and its strong entrepreneurial spirit, combined with the implementation of the regional food strategy and efforts to create a sustainable hospitality industry – for which the biosphere association has been a partner – have all contributed to the biosphere reserve's positive development of small-scale enterprises in several important industries.

4) "Have an appropriate size to serve the three functions of biosphere reserves".

When applying for biosphere reserve status, the biosphere association and its founding and member organisations, which comprise regional and local authorities, as well as local, regional and national NGOs with varied interests, made the assessment that the area's size and zoning are sufficient for fulfilling the functions of preservation, development and support.

The biosphere reserve consists of a large geographical area (approximately 104,000 hectares) where multi-faceted and extremely rich conservation-worthy biological core areas with differing conservation objectives are located within a large buffer zone. The majority of the biosphere reserve's inhabitants live in the transition area – or more precisely, in the numerous urban areas and the two cities of Huskvarna and Gränna. However, the countryside is also densely populated compared with the rest of the country.

When applying for biosphere reserve status, the biosphere association's founding organisations deemed the area's size and zoning to be sufficient for fulfilling the functions of preservation, development and support. Since then, however, the core area has been expanded and strengthened. Based on new information, the area's forest biological-value regions have been expanded to include all three zones (see Chapter 2.4.2).

5) Appropriate zonation to serve the three functions

(Describe the core area(s) briefly, indicating their legal status, their size, the main conservation objectives)

In accordance with UNESCO criteria, the biosphere reserve is divided into three zones: the core areas, buffer zone and transition area. The core areas consist of nature reserves, Natura 2000 sites, habitat protection areas and shoreline protection areas, which are protected under the Environmental Code (SFS 1998:808) in Swedish legislation. The Natura 2000 sites are encompassed by the EU Birds and Habitats Directives.

Since 2012, the core area has been expanded to include new nature areas with formal protection.

The core areas within the biosphere reserve comprise both terrestrial and limnic environments. The core areas consist of a total of 2,811 hectares, which corresponds to about 3% of the total area of the biosphere reserve.

The core areas' conservation objectives are uniquely adapted to each individual area. Common conservation objectives include biological values associated with forest dominated by valuable broad-leaved species, coniferous forests, natural fodder lands and aquatic environments. In addition to these, there are also smaller core areas consisting of other forest lands and small marshlands. Commercial activity in the core areas is limited to those permitted in accordance with regulations and conservation plans, and other regulations for the protected areas described above.

The buffer zone consists of areas of national interest for nature conservation, the cultural environment and the Natura 2000 site, which includes Lake Vättern. National interests are subject to the Swedish Environmental Code (SFS 1998:808). The buffer zone also comprises lands where the state, through the Swedish Forest Agency, has signed nature conservation agreements with the landowners. The buffer zones of the proposed biosphere reserve cover

about 40,100 ha (38% of the total area). Of this area, approximately 31,800 hectares (80%) comprise water surfaces, through Lake Vättern and Lake Landsjön.

The buffer zone on land primarily consists of privately owned forest lands and arable land. Commercial activity in the buffer zone is limited by regulations on the above-described forms of protection. It will be possible to utilise the values in the buffer zone to enhance financial and practical opportunities for the benefit of businesses in the area. Large-scale and small-scale forestry, agriculture and fishing are conducted here. In addition, frequent activities include small-scale food production, recreation and the hospitality industry, such as housing rental, fishing and wildlife experiences, education, research and environmental monitoring.

The transition area includes approximately 61,500 hectares and constitutes 59% of the total area, and comprises forest lands, arable land and small lakes, as well as urban areas and scattered settlements. Several nature reserves and habitat protection areas are located within the transition area.

In all three zones, there is considerable potential to promote sustainable development, which can be realised through collaborative projects, practical measures, research, information and education. Initiatives for sustainable development are pursued in several sectors of society, see Chapter 8.2.

6) "Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and the carrying out of the functions of a biosphere reserve".

The non-profit association is based on its members from various sectors of society, including the founding organisations (Chapter 5) and other supporting members, such as authorities and local companies, as well as private volunteers.

The biosphere association's activities are organised through a board, with the broad support of the above-mentioned interest groups, as well as an executive committee and six focus groups. The focus groups' work may involve the planning of operations, or encouraging, supporting and facilitating project implementation, or coordinating and collaborating with other stakeholders. Private volunteers and representatives of the member organisations participate in the focus groups.

7) Mechanisms for implementation:

a) Mechanisms to manage human use and activities

Activities that impact the environment are regulated by existing national laws and by municipal planning. Several activities, primarily related to nature conservation, are regulated through the country's existing statutory regulations and through municipal planning. Furthermore, the EU provides agri-environmental payments for the use of arable land and valuable habitats. For most of the 10-year period, agri-environmental payments have been available from the EU for the restoration of valuable pastureland.

Activities within core areas and buffer zones are regulated by legislation through the Swedish Environmental Code. Within the buffer zone, business activities and human activity are regulated by applicable legislation, such as the Planning and Building Act, municipal general

plans and regulatory frameworks for national interests. While activities are subject to less restriction in transition areas, they are also subject to legislation on what is permissible under what conditions, such as the Forest Management Act, the Planning and Building Act and the Off-Road Driving Act, all of which are applicable in the core areas and buffer zones.

b) Management policy or plan

The biosphere association has adopted a strategy for the sustainable development of the East Vättern Scarp Landscape Biosphere Reserve, known as the Biosphere Programme. In 2022, work will begin on revising the biosphere programme, which will describe how to integrate the three functions and the overarching goals of sustainable development. The work began during the in-depth interviews and surveys, conducted for the 10-year review. Thoughts have been raised, and ideas and requests for improvements and changes, and what works well, have been received. The concept of the revised biosphere programme is to review and consolidate new goals within each focus area, and to review the willingness, ambition and resources to maintain, reduce or increase the number of focus groups and their organisation. The work is to be conducted through workshops and in-depth discussions with the board, those involved and other stakeholders.

As of 2023, the biosphere programme will again be part of a Leader area (Locally managed development). For this period, a development strategy within the Leader area has been formulated with the aim of encouraging the attainment of the 17 Sustainable Development Goals of Agenda 2030. Jönköping and Tranås municipalities address and manage items in the biosphere programme through newly developed general and local plans that regulate the long-term development of physical and built-up environments.

The County Administrative Board has developed a number of strategies for dealing with the various dimensions and targets of Agenda 2030. Where applicable, these strategies include the biosphere reserve as an arena and model area for sustainable development.

Within the core area, there are unique decisions that, with the support of the Swedish Environmental Code, stipulate the management focus and conservation plans for each individual nature reserve, habitat protection area and Natura 2000 site (see Chapter 9).

c) Authority or mechanism to implement this policy or plan

The biosphere work is undertaken by a non-profit association that provides an arena for collaboration between stakeholders with partly opposing interests. Although the biosphere association cannot exercise authority, it has created a document that describes how projects can be implemented in order to ensure gender equality, democracy and partnership. A policy has been adopted on how the association should conduct and facilitate socially important discussions without bias or pursuing advocacy work. The association conducts its work in this manner in order to fulfil the biosphere reserve's three functions.

d) Programmes for research, monitoring, education and training

The biosphere association, through its focus group Biosphere Academy, has a strategy for initiating, encouraging and ensuring that research, education and practice are located within the biosphere reserve. Via the Biosphere Academy, the biosphere reserve maintains a close and continuous collaboration with Jönköping University, which conducts lectures on the specific biosphere reserve, as well as UNESCO's international work on biosphere reserves. The university has held a course on biosphere knowledge, which will be made available again after the pandemic. During the 10-year period, frequent research was conducted in close collaboration between the biosphere association and Linköping University.

Monitoring is undertaken in accordance with the state's requirements on the biosphere reserve. Environmental monitoring is performed regularly by both national, regional and local authorities, as well as non-profit associations,
and is coordinated by the County Administrative Board.

Does the biosphere reserve have cooperative activities with other biosphere reserves (exchanges of information and staff, joint programmes, etc.)?

At the national level
See the section "National level" in Chapter 6.6.

At the regional level
Members of the biosphere association have participated in several EuroMAB conferences since 2012. The East Vättern Scarp Landscape has also participated in several field trips, including to biosphere reserves in Norway, Finland, Italy and Scotland.

During the 10-year period, several projects were implemented through national and international-level collaborations with other biosphere reserves. However, in recent years, financial and human resources for international collaborations have been limited, and the COVID-19 pandemic has rendered travel and other activities impossible.

Through twinning and/or transboundary biosphere reserves
Not applicable

Within the World Network
In 2014, the East Vättern Scarp Landscape Biosphere Reserve hosted the 26th ICC conference, held in Jönköping. The meeting provided a unique opportunity to shed light on how the biosphere reserve is part of a world network and to make contact with representatives from this network. The East Vättern Scarp Landscape took the opportunity during the conference's arranged activities to demonstrate the importance of the biosphere reserve to locals, and the important challenges to sustainability efforts in Sweden. Read more in Chapter 6.6.

Representatives from the East Vättern Scarp Landscape have participated in the world conference in Lima. In recent years, the East Vättern Scarp Landscape has contributed reference facts from the East Vättern Scarp Landscape to an international research project.

Obstacles encountered, measures to be taken and, if appropriate, assistance expected from the Secretariat.

It is a continuous challenge to impart knowledge, reach out to relevant target groups and to prioritise the wide range of activities that being a model area for sustainable development entails. During the period, the national coordinator provided crucial support when issues were discussed, which has facilitated the dissemination of information and provided a framework of priorities. The MAB Secretariat has conveyed requests and inquiries from various MAB networks and facilitated the biosphere association's contact with various networks and other biosphere reserves.

There has been difficulty in creating continuity in the association and nurturing long-term commitments in various MAB networks due to a scarcity of human resources and a significant turnover of staff in leading positions, such as chairman, coordinator and focus group managers. This has also resulted in some inconsistencies in communication about the

biosphere reserve's significance, potential and activities. To address the challenges, a new communication plan was developed between 2019 and 2021. In 2022, work will commence to revise the biosphere programme. In connection with the revision, the MAB Secretariat is expected to provide comments and advice upon request.

Main objectives of the Biosphere Reserve

Describe the main objectives of the biosphere reserve integrating the three functions and the sustainable development objectives for the coming years.

The overarching objectives of the biosphere reserve can be expressed at different levels. The operation's fundamental goals are for the East Vättern Scarp Landscape to continue its work based on the Lima Action Plan, Agenda 2030 and various existing national and regional level plans for sustainable development and conservation – in order to pursue preservation, development and support activities that are permeated by UNESCO's intentions for biosphere reserves. These fundamental goals are referenced when developing and revising the Biosphere programme, which clarifies the association's goals. They define which of the UN's Sustainable Development Goals the operations help to attain and how work is to be undertaken in order to continuously contribute to the three functions. The biosphere programme with its six defined focus groups, serves as an advisory document for annual operations planning.

In the review-related survey, respondents were asked what type of project they wanted the association to pursue. They were also given the opportunity to provide concrete proposals.

This is how board members and those concerned (20 respondents) answered that they would like to get involved:
61% – projects within green industries,
42% – social and cultural projects
38% – climate-related projects
28% – major national/international projects
19% – the association should manage projects, but I do not want to be personally involved
14% – projects via a local association in their native area

This is how members and the general public (46 respondents) answered that they would like to get involved:
50% – the association should manage projects, but I do not want to be personally involved
30% – climate-related projects
23% – projects via a local association in their native area
23% – social and cultural projects
20% – projects within green industries,
11% – major national/international projects

In 2023, the biosphere reserve will resume being part of a LEADER area, which will further contribute to the biosphere reserve being an arena and model area for sustainable development, with the three functions supported and developed in an integrated manner. In 2022, work will commence on revising the biosphere programme. Decisions about which specific goals and targets the association can and needs to prioritise in the future must be incorporated into a larger process that includes the many different stakeholders concerned. Such a process is to be initiated and implemented in connection with the revision of the biosphere programme.

9 SUPPORTING DOCUMENTS

[List of the annexes submitted with periodic review report.]

(1) Updated location and zonation map with coordinates

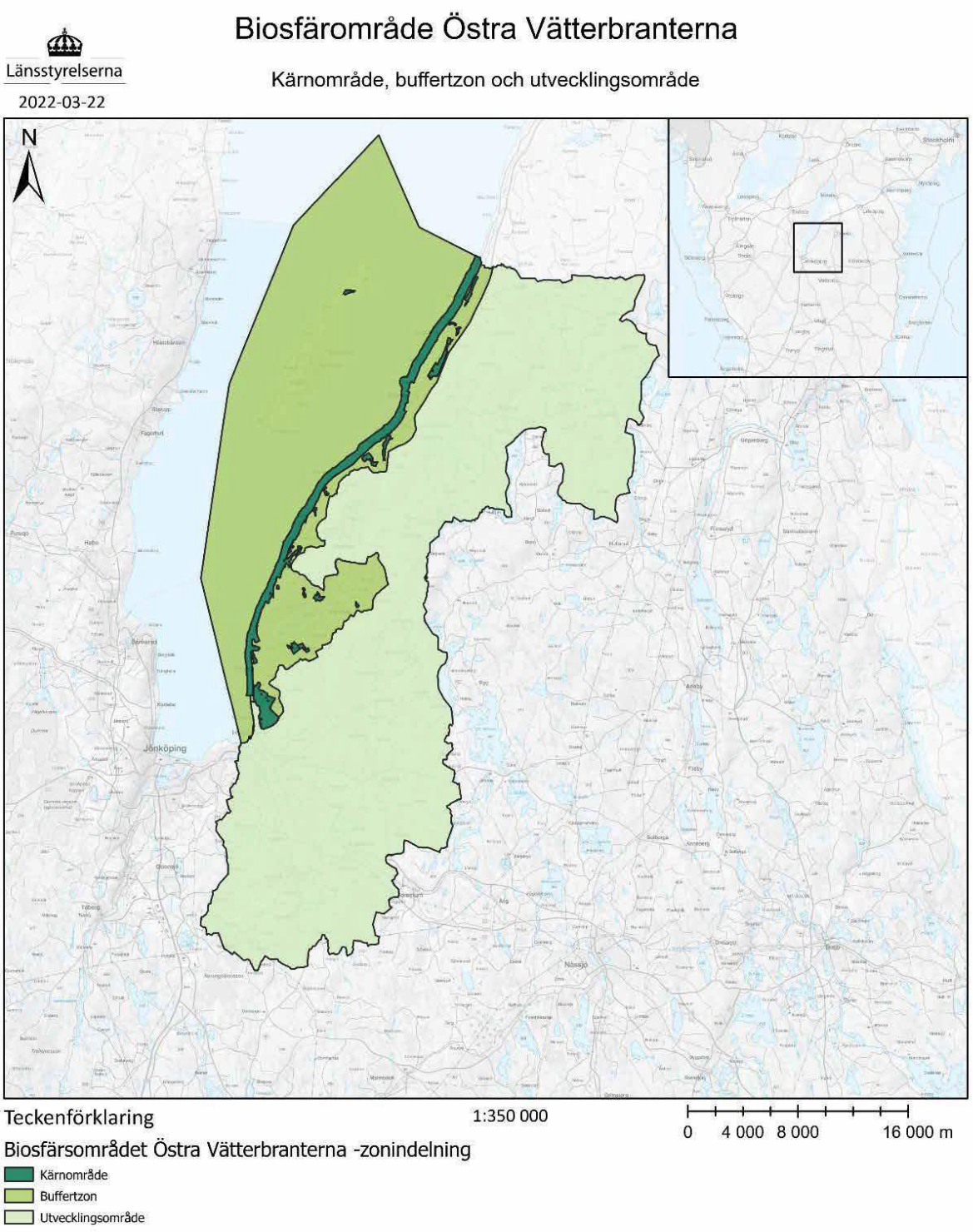
[Provide the biosphere reserve's standard geographical coordinates (all projected under WGS 84). Provide a map on a topographic layer of the precise location and delimitation of the three zones of the biosphere reserve. (Map(s) shall be provided in both paper and electronic copies). Shapefiles (also in WGS 84 projection system) used to produce the map must also be attached to the electronic copy of the form. If applicable, also provide a link to access this map on the internet (e.g. Google map, website…).]

Cardinal points:	Latitude	Longitude
Most central point:	64° 30' 00" N	14° 21' 60" O
Northernmost point:	64° 52' 80" N	14° 18' 40" O
Southernmost point:	63° 92' 20" N	14° 08' 90" O
Westernmost point:	63° 95' 50" N	14° 04' 80" O
Easternmost point:	64° 36' 50" N	14° 38' 60" O

(2) Updated vegetation map or land cover map

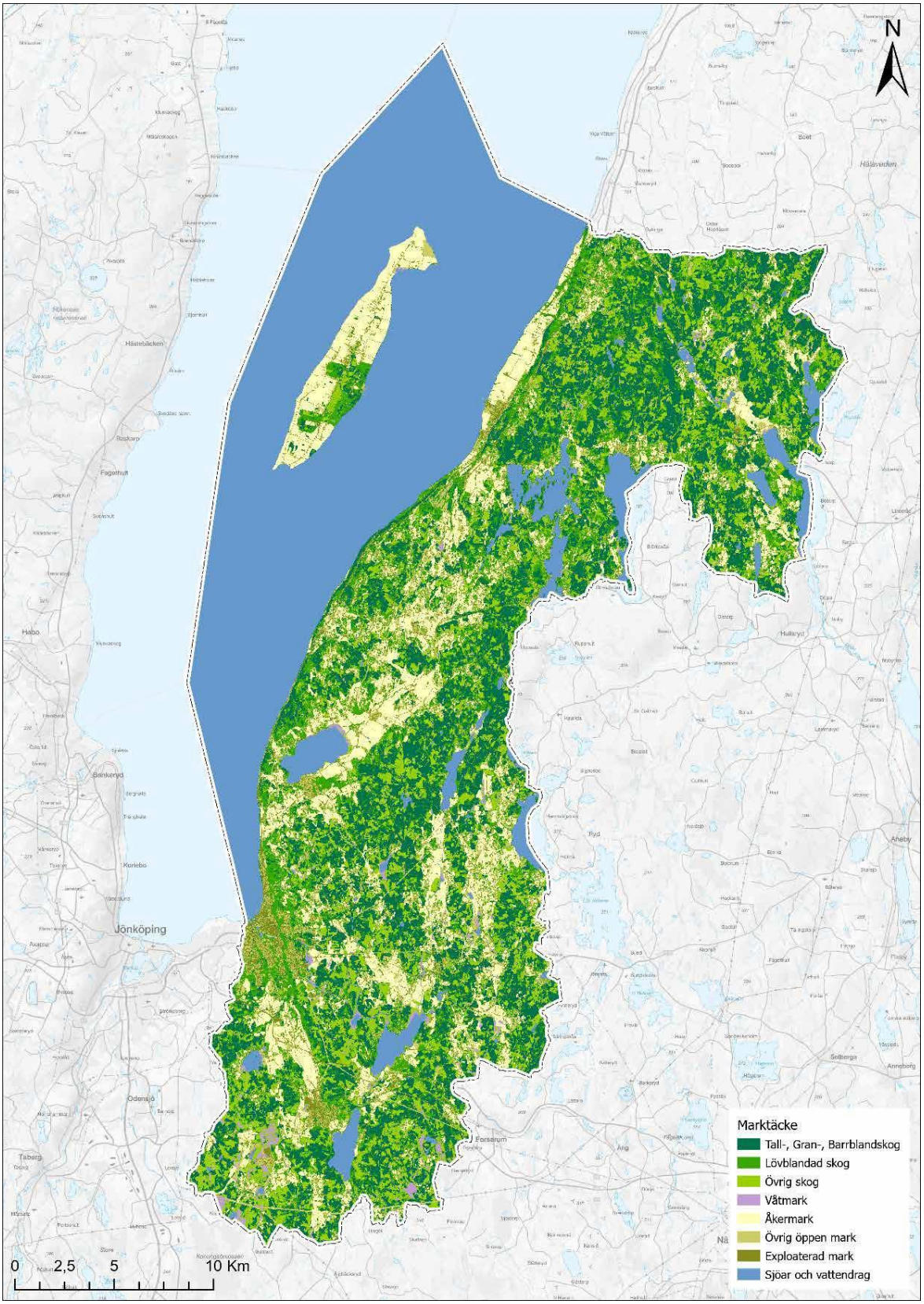
[A vegetation map or land cover map showing the principal habitats and land cover types of the biosphere reserve should be provided, if available.]

Link to map below: 8https://ext-geoportal.lansstyrelsen.se/standard/?appid=82af5da19f4c47d497c96a3261d82304&bookmar kid=30271



East Vättern Scarp Landscape Biosphere Reserve. Core area, buffer zone and transition area

Legend:
-Core area
-Buffer zone
-Transition area



East Vättern Scarp Landscape Biosphere Reserve. Vegetation cover.

Legend: Land cover, Pine, Spruce, Mixed coniferous forest, Mixed broadleaf forest, Other forest, Wetland, Arable land, Other open land, Developed land, Lakes and watercourses.

(3) Updated list of legal documents (if possible with English, French or Spanish synthesis of its contents and a translation of its most relevant provisions)

[If applicable update the principal legal documents since the nomination of the biosphere reserve and provide a copy of these documents.]

Adopted nature reserves, Natura 2000 sites, municipal general plans and in-depth general plans in the biosphere reserve.
All decisions and conservation plans can be found in Skyddad natur: Skyddad natur (the Swedish Environmental Protection Agency's data and statistics on formally protected areas, www.naturvardsverket.se). For decisions before the nomination, see the appendices to the nomination form.

New habitat protections since the nomination

Case number	Date	Municipality	Designating authority
SK 2-2016	2016-10-12	Tranås	Swedish Forest Agency
SK 546-2014	2015-10-16	Tranås	Swedish Forest Agency
SK 457-2012	2012-10-15	Jönköping	Swedish Forest Agency
SK 744-2012	2012-01-18	Jönköping	Swedish Forest Agency
SK 722-2012	2012-01-04	Jönköping	Swedish Forest Agency

New nature reserves since the nomination

Nature reserve's name	Designating authority	Date of designation
Kaxholmens lövskog	Jönköping Municipality	2020
Berget	County admin. board	2014-02-28
Jordanstorp	County admin. board	2015-11-20
Stänkelstorp	County admin. board	2011-11-18
Målabråten	County admin. board	2012-03-09
Uvaberget Tenhult	County admin. board	2013-12-20
Högemålsbranten	County admin. board	2011-11-18
Klevenbranten	County admin. board	2014-11-13
Bosgårdsbranten	County admin. board	2012-03-09
Gisebobranten	County admin. board	2015-03-06
Sandvik-Västanå	County admin. board	2018-12-21
Klevabergen	County admin. board	2013-05-30
Boerydsberget	County admin. board	2014-07-18
Säbybranten	County admin. board	2011-07-15
Röjeberget	County admin. board	2011-12-30
Sjöbergen	County admin. board	2012-06-29
Klevenbranten	County admin. board	2014-11-13
Sjöbergen	County admin. board	2012-06-29
Klevenbranten	County admin. board	2014-11-13

Changed nature reserves since the nomination

Vretaholm oak landscape	County admin. board	2016-06-20
Bondberget	County admin. board	2016-01-05
Västanå	County admin. board	2015-06-12

New municipal general plans and in-depth general plans have been approved since the nomination:
Jönköping Municipality general plan adopted in 2016.
Tranås Municipality general plan adopted in 2011.
The in-depth general plan primarily describes how rural housing can be developed in harmony with local nature and cultural values. It also deals with opportunities to develop outdoor recreation, tourism and the hospitality industry so that more people can take advantage of the region's natural and cultural values without damaging those values.

(4) Updated list of land use and management/cooperation plans
[List existing land use and management/cooperation plans (with dates and reference numbers) for the administrative area(s) included within the biosphere reserve. Provide a copy of these documents. It is recommended to produce an English, French or Spanish synthesis of its contents and a translation of its most relevant provisions.]

General plans show what is planned for a specific area and the general interests to be considered in planning. They can be downloaded via the links below.

General plan for Jönköping Municipality, adopted 2016-06-22. Link:
https://karta.jonkoping.se/app/oplan/antagen

General plan for Tranås Municipality, adopted in 2011.
Link: https://www.tranas.se/download/18.3f48f4917c07331707bb8/1632740453349/4%20Kartor.pdf
Proposed new general plan for Tranås Municipality for 2022.
Link: https://karta.itsam.se/tranas/oversiktsplan/antagande/

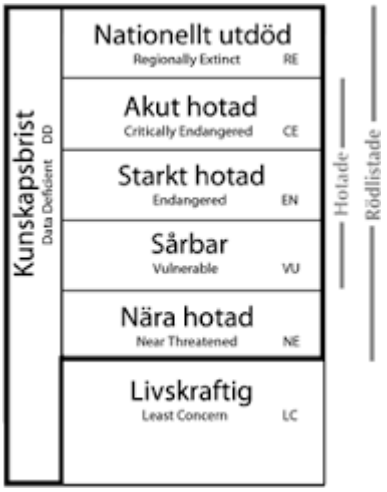
Regional action plan for work with green infrastructure in the County of Jönköping
(Message 2018:21). According to its government remit, the County Administrative Board has developed a Regional Action Plan for Green Infrastructure (see more in chapters 3.3–3.4). The County Administrative Board's website provides a platform for work with green infrastructure in the County of Jönköping (lansstyrelsen.se).
https://www.lansstyrelsen.se/jonkoping/samhalle/planering-och-byggande/gron-infrastruktur/regional-handlingsplan.html (This refers to documents and Regional plans for green infrastructure with specific targets and actions.)

Update of conservation plans
According to its government remit, the County Administrative Board updated the conservation plans for all Natura 2000 sites in the county in 2016–2017. All stewardship plans and conservation plans can be found in Skyddad natur: Skyddad natur (the Swedish Environmental Protection Agency's data and statistics on Protected areas,

(5) Updated species list (to be annexed)
[Provide a list of important species occurring within the proposed biosphere reserve, including common names, wherever possible.]

The Swedish Species Information Centre is tasked with gathering data on Sweden's flora and fauna and continuously updating red lists according to the IUCN guidelines. The Swedish red list uses the IUCN categories.

The attached lists show internationally, and nationally red-listed species found in the biosphere reserve. Species that are categorised as data deficient (DD), regionally extinct (RE), critically endangered (CR), endangered (EN), vulnerable (VU) and near-threatened (NT) are red listed. Red-listed species that are categorised as critically endangered (CR), endangered (EN) or vulnerable (VU) are designated as threatened.



The evaluation lists globally and nationally red-listed species as well as those listed by the EU during the 10-year period from 2012–2022. For species found in earlier time periods and tables of species that are typical for habitats in the biosphere reserves, please consult the nomination form.

The summary of nationally red-listed species on the following pages is based on data from the Swedish Species Information Centre. A total of 481 species on the national red list have been observed since 1970. The nomination form for the East Vättern Scarp Landscape biosphere reserve listed known threatened species in the area in 2011. The reported data pertains to observations as of its designation as a biosphere reserve in 2012 until May 2022.

Knowledge about endangered species in the biosphere reserve has increased and consequently, the number of known endangered species has also increased. The national red lists were substantially revised twice during the 10-year period (in 2015 and 2020). The revisions of the national red lists have entailed some changes to the species content in the lists for the biosphere reserve. Nevertheless, the increase in the total number of red-listed species is mainly attributable to the acquisition of information after 2011. New locations for previously known species have also been discovered. However, it is difficult to draw any conclusions about general changes to the status of threatened species in the biosphere reserve during the current period. A reliable analysis of any such changes would require a longer period of time and more targeted follow-ups. Relevant data is available and has been compiled for numerous species groups, but considerable work remains with respect to inventories, compilations and analyses to determine the current occurrence and distribution of all the groups.

Globally red-listed species – IUCN Red List
Species in the biosphere reserve that are globally red-listed in accordance with the IUCN Red List of threatened species. Categories in the IUCN red list: Critically endangered (CR), endangered (EN), vulnerable (VU), lower risk (LR), conservation dependent (CD), near threatened (NT), least concern (LC).

Observed globally red-listed species in the East Vättern Scarp Landscape. Source: Swedish Species Information Centre (Artdatabanken) (Ulf Bjelke, June 2022) and manual processing by evaluators.

A total of 48 species and 4 subspecies found on IUCN's red-listed species were observed in the East Vättern Scarp Landscape. One of the species has a CR status (subspecies, forest elm), six species have a status as EN-endangered and 11 species have a VU status. The most common species group is vascular plants, with 14 species, followed by birds with 8 breeding species (a total of 12 bird species have been observed, including resting individuals). The selection of birds is based on breeding criteria. Of the recorded species, 21 are protected in Sweden and 8 are included in an action plan for threatened species (ÅGP). That so few species were recorded as occurring in the 2011 application, compared with this evaluation, is deemed to be attributable to an inadequate assessment of the IUCN list in 2011.

Globally red-listed species in the IUCN Redlist noted in the East Vättern Scarp Landscape from 2012 to 2022; for birds, it entails that they were registered as breeding.

Group	Scientific name	Common name	Threat category
Molluscs	*Vertigo angustior*	Narrow-mouthed whorl snail	LC
Molluscs	*Vertigo lilljeborgi*	Liljeborg's whorl snail	LC
Mammals	*Barbastella barbastellus*	Barbastelle bat	NT
Mammals	*Lutra lutra*	European otter	NT
Mammals	*Myotis dasycneme*	Pond bat	NT
Butterflies	*Euphydryas maturna*	Scarce fritillary	EN
Butterflies	*Parnassius apollo*	Mountain Apollo	NT
Birds	*Milvus milvus*	Red kite	LC
Birds	*Numenius arquata*	Eurasian curlew	EN
Birds	*Podiceps auritus*	Horned grebe	LC
Birds	*Aythya ferina*	Common pochard	EN
Birds	*Haematopus ostralegus*	Eurasian oystercatcher	NT°
Birds	*Vanellus vanellus*	Northern lapwing	VU
Birds	*Anthus pratensis*	Meadow pipit	LC
Birds	*Turdus iliacus*	Redwing	NT
Vascular plants	*Avena strigosa*	Lopsided oat	RE
Vascular plants	*Galanthus nivalis*	Snowdrop	LC
Vascular plants	*Fraxinus excelsior*	European ash	EN
Vascular plants	*Avena fatua*	Common wild oat	LC

Vascular plants	*Pulsatilla vulgaris*	Pasqueflower	VU
Vascular plants	*Malus sylvestris*	European crab apple	LC
Vascular plants	*Prunus domestica*	Damson/Common plum	LC
Vascular plants	*Ulmus glabra*	Wych elm	CR
Vascular plants	*Populus nigra*	Black poplar	NA
Vascular plants	*Aesculus hippocastanum*	Horse chestnut	NA
Vascular plants	*Pulsatilla vulgaris subsp. vulgaris*	Greater pasqueflower	VU
Vascular plants	*Prunus domestica*	Common plum	LC
Vascular plants	*Prunus domestica subsp. insititia*	Damson plum	LC
Vascular plants	*Ulmus glabra subsp. glabra*	Wych elm	NE
Beetles	*Ampedus hjorti*	Click beetle	LC
Beetles	*Pedostrangalia revestita*	Black-and-red longhorn beetle	EN
Beetles	*Graphoderus bilineatus*	No common English name found	LC
Arachnids	*Dolomedes plantarius*	Great raft spider	LC
Hymenoptera	*Nomada armata*	Cleptoparasite species, no common English name found	VU
Hymenoptera	*Andrena fulva*	Tawny mining bee	LC
Hymenoptera	*Andrena bicolor*	Gwynne's mining bee	LC
Hymenoptera	*Andrena semilaevis*	Species of mining bee, no common English name found	LC
Hymenoptera	*Bombus bohemicus*	Gypsy's cuckoo bumblebee	LC
Hymenoptera	*Bombus cryptarum*	Species of bumblebee, no common English name found	LC
Hymenoptera	*Formica rufa*	Red wood ant	LC
Macro fungi	*Clavaria zollingeri*	Violet coral	VU
Macro fungi	*Entoloma griseocyaneum*	Species of gilled mushroom, no common English name found	NT
Macro fungi	*Entoloma prunuloides*	Mealy Pinkgill	NT
Macro fungi	*Hygrocybe citrinovirens*	Citrine waxcap	VU
Macro fungi	*Neohygrocybe ingrata*	Dingy waxcap	VU
Macro fungi	*Neohygrocybe nitrata*	Nitrous waxcap	NT
Macro fungi	*Neohygrocybe ovina*	Blushing waxcap	VU
Macro fungi	*Hygrocybe punicea*	Crimson waxcap	NT
Macro fungi	*Hygrocybe spadicea*	Date waxcap	VU

Macro fungi	*Hygrocybe splendidissima*	Splendid waxcap	NT
Macro fungi	*Perenniporia medulla-panis*	Species of poroid fungus, no common English name found	NT
Macro fungi	*Tricholoma apium*	Species of mushroom, no common English name found	VU

EU-listed species

In the EU Habitat and Birds Directive more than 900 plant and animal species and more than 170 habitats are listed as threatened or unique from a European perspective. In accordance with the EU Habitats Directive, the species that were observed in the East Vättern Scarp Landscape during the 10-year period are listed in the tables below.

All the data can be retrieved by searching the biosphere reserve website, using any time period, via the following link to the Species Observation System: https://artportalen.se/ViewSighting/SharedSearch?storedSearchId=5879&identifier=926B62F9

Species under the EU Habitats Directive Annex 2 that were registered within the East Vättern Scarp Landscape between 2012 and 2022.

Group	Latin name	Common name	Threat category
Insects	*Hesperia comma*	Silver-spotted skipper	NT
Insects	*Leucorrhinia pectoralis*	Yellow-spotted whiteface	
Fishes	*Lampetra fluviatilis*	European river lamprey	
Fishes	*Cottus gobio*	European bullhead	
Fishes	*Salmo salar*	Atlantic salmon	
Mammals	*Lutra lutra*	European otter	NT
Bats	*Barbastella barbastellus*	Barbastelle bat	NT
Bats	*Eptesicus nilssonii*	Northern bat	NT
Bats	*Eptesicus serotinus*	Serotine bat	NT
Bats	*Myotis dasycneme*	Pond bat	NT
Bats	*Myotis daubentonii*	Daubenton's bat	
Bats	*Myotis myotis*	Greater mouse-eared bat	EN
Bats	*Myotis mystacinus*	Whiskered bat	
Bats	*Nyctalus noctula*	Common noctule bat	
Bats	*Myotis nattereri*	Natterer's bat	NT
Bats	*Pipistrellus nathusii*	Nathusius' pipistrelle	
Bats	*Pipistrellus pygmaeus*	Soprano pipistrelle	
Bats	*Plecotus auritus*	Brown long-eared bat	NT
Bats	*Vespertilio murinus*	Particoloured bat	
Reptiles and amphibians	*Triturus cristatus*	Great crested newt	
Mosses	*Buxbaumia viridis*	Green shield moss	
Mosses	*Dicranum viride*	Dicranum moss	EN

Species under the EU Habitats Directive Annex 5 that were registered within the East Vättern Scarp Landscape between 2012 and 2022.

Group	Latin name	Common name	threat category
Plants	*Arnica montana*	Mountain arnica	VU
Plants	*Lycopodium annotinum*	Interrupted club-moss	
Plants	*Lycopodium clavatum*	Common club moss	
Plants	*Galanthus nivalis*	Snowdrop	
Insects	*Hesperia comma*	Silver-spotted skipper	NT
Fishes	*Lampetra fluviatilis*	European river lamprey	
Fishes	*Coregonus albula*	Vendace	
Fishes	*Salmo salar*	Atlantic salmon	
Mammals	*Lepus timidus*	Mountain hare	NT
Mammals	*Castor fiber*	Beaver	
Mammals	*Martes martes*	European pine marten	
Reptiles and amphibians	*Rana temporaria*	Common frog	
Mollusca	*Helix pomatia*	Burgundy snail	
Lichens	*Cladonia arbuscula*	Reindeer lichen	
Lichens	*Cladonia rangiferina*	Reindeer cup lichen	
Lichens	*Cladonia stellaris*	Star-tipped reindeer lichen	
Mosses	*Leucobryum glaucum*	Pin cushion moss	
Mosses	*Sphagnum capillifolium*	Red bogmoss	
Mosses	*Sphagnum girgensohnii*	Girgensohn's sphagnum	
Mosses	*Sphagnum warnstorfii*	No common English name found	
Mosses	*Sphagnum squarrosum*	Spiky bogmoss	
Mosses	*Sphagnum cuspidatum*	Feathery bogmoss	
Mosses	*Sphagnum compactum*	Compact bogmoss	
Mosses	*Sphagnum subsecundum*	Slender cow-horn bogmoss	
Mosses	*Sphagnum magellanicum s. lat.*	Species of rust-white moss, no common English name found	

Species according to the EU Birds Directive that have bred or regularly rested within the East Vättern Scarp Landscape from 2012 to 2022.

Latin name	Common name	threat category
Branta leucopsis	Barnacle goose	
Cygnus columbianus	Tundra swan	
Cygnus cygnus	Whooper swan	
Anser erythropus	Lesser white-fronted goose	CR

Mergellus albellus	Smew	
Tetrastes bonasia	Hazel grouse	NT
Tetrao urogallus	Western capercaillie	
Lyrurus tetrix	Black grouse	
Caprimulgus europaeus	European nightjar	
Crex crex	Corn crake	NT
Porzana porzana	Spotted crake	VU
Grus grus	Common crane	
Podiceps auritus	Horned grebe	
Recurvirostra avosetta	Pied avocet	
Charadrius alexandrinus	Kentish plover	RE
Pluvialis apricaria	Golden plover	
Charadrius morinellus	Eurasian dotterel	
Limosa lapponica	Bar-tailed godwit	VU
Calidris pugnax	Ruff	VU
Gallinago media	Great snipe	NT
Phalaropus lobatus	Red-necked phalarope	
Tringa glareola	Wood sandpiper	
Hydrocoloeus minutus	Little gull	
Hydroprogne caspia	Caspian tern	NT
Sternula albifrons	Little tern	NT
Thalasseus sandvicensis	Sandwich tern	NT
Sterna hirundo	Common tern	
Sterna paradisaea	Arctic tern	
Chlidonias niger	Black tern	VU
Gavia arctica	Black-throated diver	
Gavia stellata	Red-throated loon	NT
Ciconia nigra	Black stork	RE
Ciconia ciconia	White stork	EN
Botaurus stellaris	Eurasian bittern	NT
Pandion haliaetus	Osprey	
Pernis apivorus	European honey buzzard	
Aquila chrysaetos	Golden eagle	NT
Circus cyaneus	Hen harrier	NT
Milvus migrans	Black kite	EN
Circus aeruginosus	Western marsh-harrier	
Milvus milvus	Red kite	
Circus pygargus	Montagu’s harrier	EN
Haliaeetus albicilla	White-tailed eagle	NT
Aegolius funereus	Tengmalm’s owl	
Surnia ulula	Northern hawk owl	
Glaucidium passerinum	Eurasian pygmy owl	
Asio flammeus	Short-eared owl	
Bubo scandiacus	Snowy owl	CR
Bubo bubo	Eurasian eagle-owl	VU
Strix nebulosa	Great grey owl	VU
Coracias garrulus	European roller	RE
Alcedo atthis	Common kingfisher	VU
Dryocopus martius	Black woodpecker	NT
Falco peregrinus	Peregrine falcon	NT

Falco columbarius	Merlin	NT
Lanius collurio	Red-backed shrike	
Lullula arborea	Woodlark	
Luscinia svecica	Bluethroat	
Ficedula parva	Red-breasted flycatcher	
Emberiza hortulana	Ortolan bunting	CR

Nationally red-listed species

Since 1970, a total of 481 nationally red-listed species have been observed in the area. During the period 2012–2022, a total of 332 different finds of nationally red-listed species were registered in the area with the following distribution: (RE) 4 species are listed as nationally extinct; (CR) 5 critically endangered species; (EN) 34 endangered species; (VU) 40 vulnerable species; (NT) 197 near-threatened species. 60 species under the EU Birds Directive and 40 species included in the EU Habitats Directive, Annexes 2 and 5. Distribution of species groups shown in the tables below.

Red-listed species in category CR (critically endangered) that were registered within the East Vättern Scarp Landscape. Excerpted from the Species Observation System for the period of 2012 to May 2022.

Group	Latin name	Common name
Vascular plant	*Taraxacum subalpinum*	Dandelion species
Vascular plant	*Ulmus glabra*	Wych elm
Birds	*Remiz pendulinus*	European penduline tit
Birds	*Emberiza hortulana*	Ortolan bunting
Lichens	*Scutula effusa*	No common English name found

Red-listed species under category EN (endangered) registered within the East Vättern Scarp Landscape. Excerpted from the Species Observation System for the period of 2012 to May 2022.

Group	Latin name	Common name
Vascular plants	*Agrostemma githago*	Corn cockle
Vascular plants	*Gentianella campestris subsp. campestris*	Field gentian
Vascular plants	*Lappula squarrosa*	European stickseed
Vascular plants	*Fraxinus excelsior*	European ash
Vascular plants	*Euphrasia officinalis subsp. Officinalis*	Eyebright
Vascular plants	*Bromus secalinus*	Rye brome
Vascular plants	*Vicia dumetorum*	Species of legume, no common English name found
Vascular plants	*Vicia pisiformis*	Pea vetch
Birds	*Spatula querquedula*	Garganey
Birds	*Aythya ferina*	Common pochard
Birds	*Aythya marila*	Scaup

Birds	*Somateria mollissima*	Common eider
Birds	*Apus apus*	Common swift
Birds	*Podiceps nigricollis*	Black-necked grebe
Birds	*Numenius arquata*	Eurasian curlew
Birds	*Limosa limosa*	Black-tailed godwit
Birds	*Arenaria interpres*	Ruddy turnstone
Birds	*Rissa tridactyla*	Black-legged kittiwake
Birds	*Ciconia ciconia*	White stork
Birds	*Milvus migrans*	Black kite
Birds	*Circus pygargus*	Montagu's harrier
Birds	*Oriolus oriolus*	Golden oriole
Birds	*Chloris chloris*	European greenfinch
Bats	*Myotis myotis*	Greater mouse-eared bat
Lichens	*Sclerophora amabilis*	No common English name found
Lichens	*Pyrenula nitidella*	Pyrenula nitidella lichen
Lichens	*Calicium notarisii*	Species of soot lichen
Lichens	*Bryoria bicolor*	Two-colour horsehair lichen
Lichens	*Bellicidia incompta*	Sap-groove lichen
Lichens	*Caloplaca biatorina*	Visingsö lichen
Fungi	*Hymenochaete ulmicola*	No common English name found
Fungi	*Steccherinum robustius*	No common English name found
Mosses	*Dicranum viride*	Dicranum moss
Mosses	*Metzgeria pubescens*	Downy veilwort

Red-listed species under category VU (vulnerable) registered within the East Vättern Scarp Landscape. Excerpted from the Species Observation System for the period of 2012 to May 2022.

Group	Latin name	Common name
Vascular plants	*Verbascum lychnitis*	White mullein
Vascular plants	*Arnica montana*	Mountain arnica
Vascular plants	*Andrena nitida*	Grey-patched mining bee
Vascular plants	*Nomada armata*	Cleptoparasite species, no common English name found
Vascular plants	*Anser fabalis fabalis*	Taiga bean goose
Vascular plants	*Goodyera repens*	Creeping lady's tresses
Vascular plants	*Pulsatilla vulgaris*	Pasqueflower
Vascular plants	*Pulsatilla vulgaris subsp. Vulgaris*	Greater pasqueflower
Birds	*Anas acuta*	Northern pintail
Birds	*Anas crecca*	Eurasian teal
Birds	*Mareca penelope*	Eurasian wigeon
Birds	*Melanitta fusca*	Velvet scoter

Birds	*Porzana porzana*	Spotted crake
Birds	*Vanellus vanellus*	Northern lapwing
Birds	*Limosa lapponica*	Bar-tailed godwit
Birds	*Calidris pugnax*	Ruff
Birds	*Larus argentatus*	Herring gull
Birds	*Larus fuscus fuscus*	Lesser black-backed gull
Birds	*Larus marinus*	Great black-backed gull
Birds	*Chlidonias niger*	Black tern
Birds	*Bubo bubo*	Eurasian eagle-owl
Birds	*Strix nebulosa*	Great grey owl
Birds	*Alcedo atthis*	Common kingfisher
Birds	*Riparia riparia*	Sand martin
Birds	*Delichon urbicum*	Common house martin
Birds	*Sturnus vulgaris*	European starling
Birds	*Saxicola rubicola*	European stonechat
Birds	*Anthus cervinus*	Red-throated pipit
Birds	*Pinicola enucleator*	Pine grosbeak
Birds	*Linaria flavirostris*	Twite
Birds	*Calcarius lapponicus*	Lapland longspur
Molluscs	*Macrogastra ventricosa*	Ventricose door snail
Lichens	*Sclerophora peronella*	Frosted glass-whiskers
Lichens	*Sphinctrina turbinata*	No common English name found
Lichens	*Gyalecta flotowii*	Flotow's dimple lichen
Fungi	*Hygrocybe intermedia*	Fibrous Waxcap
Fungi	*Cuphophyllus radiatus*	Species of European waxcap, no common English name found
Fungi	*Aureoboletus gentilis*	Species of bolete fungus, no common English name found
Fungi	*Butyriboletus fechtneri*	Basidiomycete fungus, no common English name found
Mosses	*Thamnobryum neckeroides*	Species of Neckeraceae moss, no common English name found

Red-listed species under category NT (near threatened) registered within the East Vättern Scarp Landscape. Excerpted from the Species Observation System for the period of 2012 to May 2022.

Group	Latin name	Common name
Vascular plants	*Hypericum montanum*	Pale St John's wort
Vascular plants	*Geranium bohemicum*	No common English name found
Vascular plants	*Helianthemum nummularium*	Common rock-rose
Vascular plants	*Helianthemum nummularium subsp. Nummularium*	Species related to Common rock-rose, no common English name

		found
Vascular plants	*Thesium alpinum*	Alpine bastard toadflax
Vascular plants	*Holosteum umbellatum*	Jagged chickweed
Vascular plants	*Buglossoides arvensis var. Arvensis*	Species related to Corn gromwell, no common English name found
Vascular plants	*Hyoscyamus niger*	Henbane
Vascular plants	*Veronica spicata*	Spike speedwell
Vascular plants	*Odontites vernus*	Red bartsia
Vascular plants	*Campanula cervicaria*	Bristly bellflower
Vascular plants	*Anthemis arvensis*	Corn chamomile
Vascular plants	*Cirsium acaule*	Dwarf thistle
Vascular plants	*Adoxa moschatellina*	Moschatel
Vascular plants	*Crepis praemorsa*	Leafless Hawk's-beard
Vascular plants	*Hypochaeris maculata*	Spotted cat's-ear
Vascular plants	*Leontodon hispidus*	Rough hawkbit
Vascular plants	*Scorzonera humilis*	Viper's grass
Vascular plants	*Selinum carvifolia*	Flowering plant of the genus Selinum, no common English name found
Vascular plants	*Fuscocephaloziopsis catenulata*	Chain Pincerwort
Vascular plants	*Botrychium lunaria*	Common moonwort
Vascular plants	*Platanthera bifolia subsp. Bifolia*	Lesser butterfly orchid
Vascular plants	*Juncus squarrosus*	Goose corn
Vascular plants	*Carex caryophyllea*	Vernal sedge
Vascular plants	*Carex pulicaris*	Flea sedge
Vascular plants	*Apera spica-venti*	Loose silky-bent
Vascular plants	*Poa remota*	Poa remota grass
Vascular plants	*Corydalis cava*	Hollowroot
Vascular plants	*Consolida regalis*	Forking larkspur
Vascular plants	*Lathyrus niger*	Black pea
Vascular plants	*Ononis spinosa subsp. Hircina*	Field rest-harrow
Vascular plants	*Trifolium aureum*	Large hop clover
Vascular plants	*Urtica urens*	Small nettle
Insects	*Anthicus sellatus*	No common English name found
Insects	*Ischnomera cinerascens*	Genus of false blister beetle, no common English name found
Insects	*Clusia tigrina*	Druid flies (clusiidae)
Insects	*Callicera aenea*	Species of hoverfly, no common English name found
Insects	*Callicera aurata*	Species of hoverfly, no common English name found
Insects	*Rocetelion humerale*	
Insects	*Tipula flavolineata*	Species of true cranefly,

		no common English name found
Insects	*Tipula siebkei*	
Insects	*Andrena marginata*	Small scabious mining bee
Insects	*Ancistrocerus gazella*	European tube wasp
Insects	*Pseudorhyssa nigricornis*	
Insects	*Hemaris tityus*	Narrow-bordered bee hawk-moth
Insects	*Eupithecia venosata*	Netted pug moth
Insects	*Philereme vetulata*	Brown scallop moth
Insects	*Telechrysis tripuncta*	Telechrysis (genus of gelechioid moths)
Insects	*Hepialus humuli*	Ghost moth
Insects	*Craniophora ligustri*	Coronet
Insects	*Hadena confusa*	Marbled coronet
Insects	*Hesperia comma*	Silver-spotted skipper
Insects	*Lycaena hippothoe*	Purple-edged copper
Insects	*Cupido minimus*	Small blue (butterfly)
Insects	*Satyrium w-album*	White-letter hairstreak
Insects	*Melitaea cinxia*	Glanville fritillary
Insects	*Melitaea diamina*	False heath fritillary
Insects	*Merrifieldia baliodactyla*	Dingy white plume (moth)
Insects	*Udea olivalis*	Moth of the Crambidae family, no common English name found
Insects	*Apomyelois bistriatella*	Species of snout moth, no common English name found
Insects	*Euzophera pinguis*	Olive moth
Insects	*Adscita statices*	Green forester
Insects	*Zygaena filipendulae*	Six-spot burnet
Insects	*Zygaena lonicerae*	Narrow-bordered five-spot burnet
Insects	*Zygaena minos*	Insect of the Zygaenidae family, no common English name found
Insects	*Zygaena osterodensis*	Moth of the Zygaenidae family, no common English name found
Insects	*Zygaena viciae*	New forest burnet
Insects	*Zelleria hepariella*	Moth of the Yponomeutidae family, no common English name found
Insects	*Xyletinus longitarsis*	
Insects	*Anaglyptus mysticus*	Rufous-shouldered longhorn beetle
Insects	*Callidium aeneum*	No common English

		name found
Insects	*Mesosa nebulosa*	Beetle of the Cerambycidae family, no common English name found
Insects	*Philodromus praedatus*	Arachnid species, no common English name found
Insects	*Labidostomis humeralis*	Genus of short-horned leaf beetle, no common English name found
Insects	*Cryptocephalus hypochoeridis*	No common English name found
Insects	*Hydraena nigrita*	
Insects	*Gnorimus nobilis*	Noble chafer
Insects	*Pseudeuparius sepicola*	No common English name found
Insects	*Nothorhina muricata*	Wood-boring beetle, no common English name found
Fishes	*Cottus poecilopus*	Alpine bullhead
Birds	*Tadorna tadorna*	Common shelduck
Birds	*Spatula clypeata*	Northern shoveller
Birds	*Clangula hyemalis*	Long-tailed duck
Birds	*Tetrastes bonasia*	Hazel grouse
Birds	*Perdix perdix*	Grey partridge
Birds	*Coturnix coturnix*	Common quail
Birds	*Crex crex*	Corn crake
Birds	*Tachybaptus ruficollis*	Little grebe
Birds	*Haematopus ostralegus*	Eurasian oystercatcher
Birds	*Gallinago media*	Great snipe
Birds	*Actitis hypoleucos*	Common sandpiper
Birds	*Tringa erythropus*	Spotted redshank
Birds	*Chroicocephalus ridibundus*	Black-headed gull
Birds	*Larus canus*	Common gull
Birds	*Hydroprogne caspia*	Caspian tern
Birds	*Sternula albifrons*	Little tern
Birds	*Thalasseus sandvicensis*	Sandwich tern
Birds	*Stercorarius parasiticus*	Parasitic jaeger
Birds	*Gavia stellata*	Red-throated loon
Birds	*Botaurus stellaris*	Eurasian bittern
Birds	*Aquila chrysaetos*	Golden eagle
Birds	*Accipiter gentilis*	Northern goshawk
Birds	*Circus cyaneus*	Hen harrier
Birds	*Haliaeetus albicilla*	White-tailed eagle
Birds	*Buteo lagopus*	Rough-legged buzzard
Birds	*Asio otus*	Long-eared owl
Birds	*Dryobates minor*	Lesser spotted woodpecker

Birds	*Dryocopus martius*	Black woodpecker
Birds	*Falco peregrinus*	Peregrine falcon
Birds	*Falco columbarius*	Merlin
Birds	*Longitarsus pellucidus*	Species of flea beetle, no common English name found
Birds	*Corvus corone*	Hooded crow
Birds	*Poecile palustris*	Marsh tit
Birds	*Poecile montanus*	Willow tit
Birds	*Phylloscopus trochiloides*	Greenish warbler
Birds	*Phylloscopus sibilatrix*	Wood warbler
Birds	*Acrocephalus arundinaceus*	Great reed warbler
Birds	*Acrocephalus dumetorum*	Blyth's reed warbler
Birds	*Acrocephalus scirpaceus*	Eurasian reed warbler
Birds	*Locustella fluviatilis*	River warbler
Birds	*Curruca curruca*	Lesser whitethroat
Birds	*Turdus pilaris*	Fieldfare
Birds	*Turdus iliacus*	Redwing
Birds	*Phoenicurus ochruros*	Black redstart
Birds	*Ficedula hypoleuca*	European pied flycatcher
Birds	*Saxicola rubetra*	Whinchat
Birds	*Carpodacus erythrinus*	Common rosefinch
Birds	*Emberiza citrinella*	Yellowhammer
Birds	*Emberiza schoeniclus*	Reed bunting
Mammals	*Lepus timidus*	Mountain hare
Mammals	*Erinaceus europaeus*	European hedgehog
Bats	*Barbastella barbastellus*	Barbastelle bat
Bats	*Eptesicus nilssonii*	Northern bat
Bats	*Eptesicus serotinus*	Serotine bat
Bats	*Myotis dasycneme*	Pond bat
Bats	*Myotis nattereri*	Natterer's bat
Bats	*Plecotus auritus*	Brown long-eared bat
Molluscs	*Unio pictorum*	Painter's mussel
Molluscs	*Ena montana*	Bulin snail
Lichens	*Alyxoria ochrocheila*	Species of scribble lichen
Lichens	*Lecanographa amylacea*	Gyalecta ulmi lichen
Lichens	*Opegrapha vermicellifera*	Species of scribble lichen
Lichens	*Schismatomma pericleum*	Species of Roccellaceae fungus, no common English name found
Lichens	*Chaenotheca gracillima*	No common English name found
Lichens	*Chaenotheca hispidula*	Hispid needle lichen
Lichens	*Sclerophora coniophaea*	Cinnamon whiskers
Lichens	*Splanchnonema foedans*	
Lichens	*Agonimia allobata*	Genus of lichen-forming fungi, no common English name found
Lichens	*Cladonia parasitica*	Fence-rail cladonia

Lichens	*Alectoria sarmentosa*	Witch's hair lichen
Lichens	*Cliostomum corrugatum*	No common English name found
Lichens	*Lobaria pulmonaria*	Lung lichen
Lichens	*Peltigera polydactyla*	Shield lichen
Lichens	*Ramalina baltica*	Baltic cartilage lichen
Lichens	*Hertelidea botryosa*	No common English name found
Lichens	*Caloplaca lucifuga*	Species of Teloschistaceae fungus, no common English name found
Lichens	*Camarops tubulina*	Genus of Boliniaceae fungi, no common English name found
Fungi	*Eutypella stellulata*	No common English name found
Fungi	*Quaternaria dissepta*	No common English name found
Fungi	*Microcalicium ahlneri*	No common English name found
Fungi	*Amanita ceciliae*	Cecilia's ringless amanita
Fungi	*Camarophyllopsis schulzeri*	No common English name found
Fungi	*Clavaria fumosa*	Smoky clavaria
Fungi	*Amphotis marginata*	
Fungi	*Neohygrocybe nitrata*	Nitrous waxcap
Fungi	*Hygrocybe calciphila*	Limestone Waxcap
Fungi	*Hygrocybe constrictospora*	Hourglass Waxcap
Fungi	*Hygrocybe punicea*	Crimson waxcap
Fungi	*Hygrocybe splendidissima*	Splendid waxcap
Fungi	*Cuphophyllus radiatus*	Slender Waxcap
Fungi	*Entoloma griseocyaneum*	Species of gilled mushroom, no common English name found
Fungi	*Entoloma prunuloides*	Mealy Pinkgill
Fungi	*Ancistronycha cyanipennis*	
Fungi	*Fistulina hepatica*	Beefsteak fungus
Fungi	*Caloboletus radicans*	Rooting bolete
Fungi	*Porphyrellus porphyrosporus*	Dusky bolete
Fungi	*Ramaria pallida*	No common English name found
Fungi	*Auricularia mesenterica*	Tripe fungus
Fungi	*Fomitiporia robusta*	Robust bracket
Fungi	*Phellinidium ferrugineofuscum*	No common English name found
Fungi	*Phellopilus nigrolimitatus*	No common English name found
Fungi	*Porodaedalea pini*	Pine bracket
Fungi	*Alloclavaria purpurea*	Purple fairy club

Fungi	*Flavidoporia pulvinascens*	No common English name found
Fungi	*Grifola frondosa*	Hen of the woods
Fungi	*Climacodon septentrionalis*	Northern tooth
Fungi	*Perenniporia medulla-panis*	Species of poroid fungus, no common English name found
Fungi	*Artomyces pyxidatus*	Crown-tipped coral fungus
Fungi	*Hericium coralloides*	Comb tooth mushroom
Fungi	*Lactarius acris*	Raspberry Milkcap
Fungi	*Xylobolus frustulatus*	Oak mosaic fungus
Fungi	*Hydnellum caeruleum*	Blue tooth
Mosses	*Orthotrichum pallens*	Pale Bristle-moss
Mosses	*Cirriphyllum crassinervium*	Beech feather-moss
Mosses	*Plagiothecium platyphyllum*	Alpine silk-moss
Mosses	*Grimmia decipiens*	Great grimmia
Mosses	*Crossocalyx hellerianus*	Heller's notchwort

(6) Updated list of main bibliographic references (to be annexed)
[Provide a list of the main publications and articles (2012–2022) of relevance to the proposed biosphere reserve.]

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(7) Further supporting documents

Regional environmental monitoring programme for the County of Jönköping, 2021–2026. Notice no. 2021:35

Regional environmental monitoring programme for the County of Jönköping, 2015–2020. Notice no. 2014:23

Revised regional strategy for formal protection of forest in the County of Jönköping. Notice no. 2020:04

Regional food strategy for the County of Jönköping. Notice no. 2019:17

Action plan for Green Infrastructure for the County of Jönköping. Notice no. 2018:21

Leader Vättern, 2021. Strategy for development in and around Lake Vättern – development through Leader during the programme period 2021–2027.

Regional development strategy for the County of Jönköping, 2020–2035 (https://utveckling.rjl.se/strategier-- handlingsplaner/regional-utvecklingsstrategi-2020-2035/)

Regional strategy for the hospitality industry, 2013–2020.
(https://catalog.lansstyrelsen.se/store/25/resource/47)
Website for information distribution on environmental monitoring in the County of Jönköping: www.rmo.nu

10 ADDRESSES

10.1 Contact address of the proposed biosphere reserve

[Government agency, organization, or other entity (entities) to serve as the main contact to whom all correspondence within the World Network of Biosphere Reserves should be addressed.]

Name:
Street or P.O. Box: Stadskontoret, Rådhusparken 1
City with postal code: SE-551 89 Jönköping
E-mail: info@ostravatterbranterna.se
Web site: www.ostravatterbranterna.se

10.2 Administering entity of the core areas and buffer zones

The right administrative department to turn to regarding a Swedish biosphere reserve depends on what the issue pertains to. The administrative responsibility for core areas and buffer zones is mainly distributed between the following authorities and stakeholders. The biosphere association passes on any questions relating to core areas and buffer zones to the respective authority or stakeholder responsible.

Swedish Environmental Protection Agency: www.naturvardsverket.se
County Administrative Board of Jönköping: www.lansstyrelsen.se/jonkoping
Swedish Forest Agency: www.skogsstyrelsen.se
Jönköping Municipality: www.jonkoping.se

10.3 Administering entity of the transition area(s)

The right administrative department to turn to regarding a Swedish biosphere reserve transition area depends on what the issue pertains to. Matters could be within the domain of national authorities, municipalities, the County Administrative Board or the biosphere office.

Swedish Environmental Protection Agency: www.naturvardsverket.se
County Administrative Board of Jönköping: www.lansstyrelsen.se/jonkoping
Swedish Forest Agency: www.skogsstyrelsen.se
Jönköping Municipality: www.jonkoping.se
Tranås Municipality: www.tranas.se

Annex I to the Periodic Review of the East Vättern Scarp Landscape Biosphere Reserve, June 2022

MABnet Directory of Biosphere Reserves

Administrative details
Country: Sweden

Name of the biosphere reserve: East Vättern Scarp Landscape Biosphere Reserve

Year designated: 2012

Administrative authorities: (7.6)
Jönköping Municipality: www.jonkoping.se
Tranås Municipality: www.tranas.se
County Administrative Board of Jönköping: www.lansstyrelsen.se/jonkoping
Swedish Environmental Protection Agency: www.naturvardsverket.se
Swedish Forest Agency: www.skogsstyrelsen.se

Contact Name: Coordinator Johan Wallin, or chair Inger Ekengard

Contact address:
Street or P.O. Box: Stadskontoret, Rådhusparken 1
City with postal code: SE-551 89 Jönköping
Country: Sweden
E-mail: info@ostravatterbranterna.se
Phone: +46(0)36 10 55 11 / +46(0)72 214 70 98

Related links: www.ostravatterbranterna.se

Social networks: See section 6.5.4

Description
General description:

The East Vättern Scarp Landscape biosphere reserve is centrally located in southern Sweden, with elements of habitats reflecting the country's southern broadleaf forest region and the northern coniferous forest region. The area is typified by a patchwork of greenfields on a landscape with the character of a fissure valley. This creates a grand, majestic setting on steep terrain, as well as a small-scale agricultural landscape with varying climatic conditions. Human beings have shaped the countryside for millennia, and they continue to do so. For the best opportunities to preserve valuable cultural and natural environments, individual landowners must be able to continue creating jobs and revenues through multifaceted use of their properties, combining new businesses with traditional agriculture and forestry.

The East Vättern Scarp Landscape has an extensive history of collaborating with various organisations on the landscape's values. One key premise for these collaborations was to work from the perspective of incorporating environmental protection and production in a holistic approach. Although the biosphere reserve's activities are mainly visible through various projects aimed at preservation, development and support, the area also boasts a broader engagement and everyday life where people thrive in and make a living from the countryside and modern society.

The biosphere programme specifies the main goals and visions of the biosphere association's work from the perspective of long-term sustainability, which includes social, ecological and

economic aspects. The six focus groups consolidate the comprehensive visions into practical activities by means of various knowledge exchanges, activities and the joint implementation of projects with several different parties.

Major ecosystem type: Boreonemoral zone

Major habitats & land cover types: Arable land (fields and other open land), flat rock dry meadows / hay meadows / natural grazing lands, oak habitats, ash, elm, maple environments, heathland dry forests, forest-edge environments and patchwork lands in the agricultural landscape, Lake Vättern, lakes and watercourses and wetlands, as well as cities, urban areas and built environments.

Bioclimatic zone: Cold temperate climate in accordance with the Köppen climate classification

Location (latitude & longitude):

Cardinal points:	**Latitude**	**Longitude**
Most central point:	64° 30' 00" N	14° 21' 60" O
Northernmost point:	64º 52' 80" N	14º 18' 40" O
Southernmost point:	63º 92' 20" N	14º 08' 90" O
Westernmost point:	63º 95' 50" N	14º 04' 80" O
Easternmost point:	64º 36' 50" N	14º 38' 60" O

Total Area (ha): **Core area**(s): **Buffer zone**(s): **Transition area**(s):

Different existing zonation:	**Hectares**
Area of terrestrial core area(s)	1,779
Area of terrestrial Buffer Zone(s)	9,513
Area of terrestrial Transition Area(s)	57,433
Area of marine/limnic Core Area(s)	1,032
Area of marine/limnic Buffer Zone(s)	30,615
Size of marine/limnic Transition Area(s)	4,109
Total:	**104,481**

Altitudinal range (metres above sea level):
Highest altitude on land: 345 metres
Lowest altitude on land: 88.5 metres
Deepest water depth: -40 metres

Zonation map(s) (refer to section 2.2.2):

Main objectives of the biosphere reserve
Brief description

The East Vättern Scarp Landscape's overarching goal is to strive in the long term to consistently develop as a local and international model zone for sustainable development and to be a role model for broad collaborations between various special interest groups.
More practical objectives can be found in the biosphere programme, where they are divided into the various focus areas.

Research
Brief description

The most relevant research during the period includes studies of collaboration processes and landscape processes. Several research projects have examined the management of the East Vättern Scarp Landscape and compared the area's model for collaboration and conflict resolution on issues related to the landscape with comparable national and international contexts. An ambitious Landscape Ecological Gap and Functionality Analysis was created for East Vättern Scarp Landscape, which can also be applied to other parts of Sweden and the world.

Monitoring
Brief description

The biosphere reserve does not conduct its own follow-up and monitoring. This is done using national and regional programmes, primarily through the Swedish Environmental Protection Agency, the Swedish Forest Agency, the Jönköping County Administrative Board and the Water Conservation Association (Vattenvårdsförbundet). The municipalities also monitor certain indicators relevant to the biosphere reserve. Environmental monitoring is also conducted by non-profit organisations and individuals who register species finds in the national database, Artportalen (the Species Observation System).

Specific variables (fill in the table below and tick the relevant parameters)

Abiotic		**Biodiversity**	
Abiotic factors	X	Afforestation/Reforestation	X
Acidic rain/Atmospheric factors		Algae	X
Air quality	X	Alien and/or invasive species	X
Air temperature	X	Amphibians	X
Climate, climatology	X	Arid and semi-arid systems	
Contaminants		Autoecology	
Drought		Beach/soft bottom systems	
Erosion	X	Benthos	
Geology	X	Biodiversity aspects	X
Geomorphology		Biogeography	X
Geophysics		Biology	X
Glaciology		Biotechnology	X
Global change	X	Birds	X
Groundwater	X	Boreal forest systems	X
Habitat issues	X	Breeding	X
Heavy metals		Coastal/marine systems	
Hydrology	X	Community studies	X
Indicators	X	Conservation	X
Meteorology		Coral reefs	
Modelling	X	Degraded areas	
Monitoring/methodologies	X	Desertification	
Nutrients	X	Dune systems	
Physical oceanography		Ecology	X
Pollution, pollutants		Ecosystem assessment	X
Siltation/sedimentation		Ecosystem functioning/structure	X
Soil	X	Ecosystem services	X
Speleology		Ecotones	
Topography	X	Endemic species	X
Toxicology		Ethology	
UV radiation		Evapotranspiration	
		Evolutionary studies/Palaeoecology	
		Fauna	X
		Fires/fire ecology	
		Fishes	X
		Flora	X
		Forest systems	X
		Freshwater systems	X
		Fungi	X
		Genetic resources	X
		Genetically modified organisms	
		Home gardens	X
		Indicators	X
		Invertebrates	X
		Island systems/studies	
		Lagoon systems	
		Lichens	X
		Mammals	X
		Mangrove systems	
		Mediterranean type systems	
		Microorganisms	X

		Migrating populations	X
		Modelling	X
		Monitoring/methodologies	X
		Mountain and highland systems	
		Natural and other resources	X
		Natural medicinal products	
		Perturbations and resilience	X
		Pests/Diseases	X
		Phenology	
		Phytosociology/Succession	
		Plankton	X
		Plants	X
		Polar systems	
		Pollination	X
		Population genetics/dynamics	X
		Productivity	X
		Rare/Endangered species	X
		Reptiles	X
		Restoration/Rehabilitation	
		Species (re) introduction	
		Species inventorying	X
		Sub-tropical and temperate rainforest	
		Taxonomy	X
		Temperate forest systems	
		Temperate grassland systems	
		Tropical dry forest systems	
		Tropical grassland and savannah	
		Tropical humid forest systems	
		Tundra systems	
		Vegetation studies	
		Volcanic/Geothermal systems	
		Wetland systems	X
		Wildlife	X

		Integrated monitoring	
Agriculture/Other production systems	X	Biogeochemical studies	
Agroforestry	X	Carrying capacity	
Anthropological studies	X	Climate change	X
Aquaculture	X	Conflict analysis/resolution	X
Archaeology	X	Ecosystem approach	X
Bioprospecting		Education and public awareness	X
Capacity building	X	Environmental changes	X
Cottage (home-based) industry		Geographic Information System	X
Cultural aspects	X	Impact and risk studies	
Demography	X	Indicators	X
Economic studies	X	Indicators of environmental quality	X
Economically important species	X	Infrastructure development	X
Energy production systems	X	Institutional and legal aspects	X
Ethnology/traditional practices/knowledge	X	Integrated studies	
Firewood cutting	X	Interdisciplinary studies	X
Fishery	X	Land tenure	
Forestry	X	Land use/Land cover	X
Human health	X	Landscape inventorying/monitoring	x
Human migration	X	Management issues	X
Hunting	X	Mapping	x
Indicators	X	Modelling	x
Indicators of sustainability	X	Monitoring/methodologies	x
Indigenous people's issues		Planning and zoning measures	X
Industry	X	Policy issues	
Livelihood measures		Remote-sensing analysis	X
Livestock and related impacts	X	Rural systems	x
Local participation	X	Sustainable development/use	X
Micro-credits		Transboundary issues/measures	
Mining	X	Urban systems	x
Modelling	X	Watershed studies/monitoring	x
Monitoring/methodologies	X		
Natural hazards			
Non-timber forest products	X		
Pastoralism	X		
People-Nature relations	X		
Poverty			
Quality economies/marketing	X		
Recreation	X		
Resource use	X		
Role of women	X		
Sacred sites			
Small business initiatives	X		
Social/Socio-economic aspects	X		
Stakeholders' interests			
Tourism	X		
Transports	X		

Annex II to the Biosphere Reserve Periodic Review, January 2013
Promotion and Communication Materials
for the biosphere reserve

Provide some promotional material regarding the site, notably high-quality photos, and/or short videos on the site so as to allow the Secretariat to prepare appropriate files for press events. To this end, a selection of photographs in high resolution (300 dpi), with photo credits and captions and video footage (rushes), without any comments or sub-titles, of professional quality – DV CAM or BETA only, will be needed.

YouTube links:
Södra Vätterbygden Folk High School (2014 20 May) *East Vättern Scarp Landscape biosphere reserve* (video). YouTube. https://www.youtube.com/watch?v=hKYJ_6jVowE

Södra Vätterbygden Folk High School (2014 20 May) *East Vättern Scarp Landscape* (video). YouTube. https://www.youtube.com/watch?v=MM1HisGctrg

Swedish Environmental Protection Agency (2019 5 Feb) *East Vättern Scarp Landscape Biosphere Reserve (video).* YouTube. https://www.youtube.com/watch?v=ZlDBqwFjVSE

Magnus Apelqvist (2022 1 January) *Forest Grazing in East Vättern Scarp Landscape (video).* YouTube. https://www.youtube.com/watch?v=epuI21zu7Cw

Magnus Apelqvist (2021 20 December) *Water salamanders (video).* YouTube. https://www.youtube.com/watch?v=ayWBACCIoBc

Magnus Apelqvist (2021 20 December) *The oak tree's history (video).* YouTube. https://www.youtube.com/watch?v=wxDfQwgatUc

Printed informational material:

Sign at one of the East Vättern Scarp Landscape's demonstration areas. This sign is posted at a demonstration area for A Rich Agricultural Landscape in Grenåsa in the southern part of the biosphere reserve. Photo: Simon Jonegård.