8 September 2021

NEDRE DALÄLVEN RIVER LANDSCAPE BIOSPHERE RESERVE

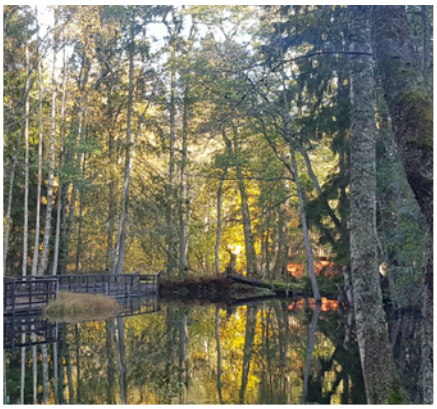
Periodic Review | 2011-2020











United Nations Educational, Scientific and Cultural Organization

Man and the Biosphere Programme

Biosphere Reserve
RIVER LANDSCAPE
NEDRE DALÄLVEN

United Nations Educational, Scientific and Cultural Organization

Biosphere Reserve RIVER LANDSCAPE NEDRE DALÄLVEN

Foreword

Ten years have passed since the Nedre Dalälven River Landscape was designated a biosphere reserve. Taking pride in the award over all these years, we have nurtured and maintained the vision that we should have the opportunity to live and work in this unique and abundant cultural and natural environment in a way that is sustainable for both humans and nature.

We have much to be proud of and happy about following this ten-year journey. In particular, I would like to highlight the active networks within the biosphere focus areas that have both developed and strengthened throughout the period. The focus areas have been, and still are; Conservation of the open cultural landscape, Sustainable fishing/fisheries management, Sustainable tourism and Biological Mosquito Control. Within these focus areas, broad and locally well-established networks have been successfully built up.

In these networks, action, ideas and the willingness to cooperate have come together and resulted in projects such as work to increase cultivation of river meadows and to create a common understanding in the fishing community of the management of migratory fish. Hopefully, the latter will mean that fish can soon migrate up the river again. Work has also continued on skills development and collaboration between entrepreneurs and businesses to jointly promote the vibrance and abundance our area has to offer. The well-functioning channels of communication that were developed in the fishing network, allowed stakeholders to speak with a shared and stronger voice, which influenced the national decision to bring forward the reassessment of water-related commercial activities in the lower parts of the Dalälven. This decision may have far-reaching positive consequences not only for the fishing tourism and the development of the tourist industry, but also for the job market in general. Fishing, fish and water are fantastic resources, and we look forward to continuing to develop the use of them in a sustainable way!

The complex year-round work carried out as part of the Biological Mosquito Control project has created a unique expertise and experience. Not least in how to sustainably control flood mosquitoes in environmentally protected areas. Mosquito control is not only a means to give people more pleasant lives in summer, but it is in fact necessary for people to be able to live and do business here. Both visitors and locals will have the opportunity to enjoy the unique conditions of the river landscape, outdoors.

I would like to extend my warm, sincere gratitude to everyone who has contributed to the development of the biosphere reserve since 2011. I would like to especially thank all those organisations, companies, individuals and others who, as early as 2004, were forward-thinking enough to initiate the process of establishing the biosphere reserve. You have made it possible for all of us to contribute to sustainability in a boundary-crossing and engaging way.

The work with the 10-year evaluation has given us a clearer picture of what we need to improve in the coming years and will provide an important basis for future development work. Going forward, I would like to see more cooperation between authorities, the research community and other stakeholders in the field. My hope is also that residents in the area will have better opportunities to get involved in the biosphere work. The new Action Plan will be linked to the Global Goals and Agenda 2030. Here I hope we can let new areas of focus emerge and allow new concrete goals to be formulated, based on our local opportunities and challenges, seen from a global perspective.

I am part of the Biosphere. So are you.

On behalf of the Board,

Peter Kärnström
Chairman

TABLE OF CONTENT

PART I: SUMMARY

a) Name of the biosphere reserve: Nedre Dalälven River Landscape

b) Country: Sweden

c) Year of designation: 2011

d) Year(s) of periodic review(s): 2021

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 its designation as a biosphere reserve in 2011, the Nedre Dalälven Biosphere Association (the Biosphere Association), which is the lead organisation for the biosphere reserve, has been working on the following:

- Established a biosphere office with a coordinator and other staff.
- Developed action plans with activities linked to conservation, development and support.
- Worked on ecological, social and economic sustainability in four selected focus areas: sustainable fisheries/fisheries management, open landscape, sustainable tourism and biological mosquito control.
- Engaged and coordinated different stakeholders in the process of being a model area for sustainable development.
- Communicated own and other initiatives and activities in the area, related to sustainable development, in order to inspire and spread knowledge.

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

The content of the evaluation covers the entire development of the biosphere reserve. In other words, the report contains results and examples from a wide range of activities within the biosphere reserve. The evaluation also shows the results that are directly linked to the activities of the Biosphere Association.

Work on the evaluation started in spring 2020 and has been carried out by the staff of the Biosphere Association. People from different organisations have been involved in the evaluation. This report went out for consultation in April 2021. See also PART II, 1.5

i) Area and spatial configuration:

In 2013, the board of the Biosphere Association made the decision to extend the transition area of the biosphere reserve, thereby extending its outer boundary, see 2.2.1. As part of this

review, zonation has been reviewed and a number of core areas have been added, see 2.4.5. The extent of the buffer zone has not changed.

	In the 2010 application	**Proposed changes (if any)**
Area of terrestrial Core Area(s)	13 156 ha	11 875 ha*
Area of terrestrial Buffer Zone(s)	11 444 ha	22 201 ha * (No changes)
Area of terrestrial Transition Area(s)	247 496 ha	652 403 ha
Area of marine/limnic Core Area(s)	1 597 ha/8 671 ha	1 671 ha/6 943 ha *
Area of marine/limnic Buffer Zone(s)	89 ha/7 816 ha	288 ha/12 698 ha * (No changes)
Size of marine/limnic Transition Area(s)	400 ha/18 124 ha	386 ha/31 412 ha

* During the work on this review, it was discovered that some minor errors were made when calculating the core areas and the buffer zones at the time of the nomination in 2010. This has now been corrected.

j) Human population of the biosphere reserve:

Note that figures for 2010 are taken from the nomination form and refer to the population of the original areas. Figures for 2020 refer to the population of the extended area. The doubling of the population is therefore mainly due to this extension.

	2010	**2020**
Core Area(s) (permanent and seasonally)	36	192
Buffer Zone(s) (permanent and seasonally)	4 413	13 240
Transition Area(s) (permanent and seasonally)	61 370	108 127

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

Budget in 2010 application	Current budget
88,200 EUR (900,000 SEK)	90,863 EUR (927,177 SEK)

The budget for 2020 consists of 39,200 EUR in national funding from the Swedish Environmental Protection Agency and 51,633 EUR in Leader support from Leader Nedre Dalälven for the project "BUS i Biosfären" (see 2.3.2 and 7.2).

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.

Some examples of collaborative frameworks relevant to the biosphere reserve are described below:

Natura 2000
The biosphere reserve contains a total of 170 sites that are part of the EU's network of protected areas, Natura 2000. Of these, around 130 are under the EU Habitats Directive (SCI) and around 40 under the EU Birds Directive (SPA).

Convention on Biological Diversity (CBD).
All countries that have signed and ratified the Convention will contribute to a common effort to conserve species, use resources sustainably and share the benefits of genetic resources equitably. Sweden signed the Convention in 1993. The biosphere reserve contributes to the fulfilment of the Convention, for example through the work of the Biosphere Association in fisheries conservation and the cultivation of river meadows, but above all through the work of the county administrative boards and other actors in protecting nature and individual species.

Ramsar Convention
Convention on Wetlands of International Importance, especially as Wetland Bird Habitat. With the expansion, the biosphere reserve now also includes the Ramsar areas of Svartådalen in Västmanland, Sala municipality. The Ramsar sites of Hovran and Färnebofjärden are already part of the biosphere reserve.

MAB networks
The biosphere reserve is a committed member of the various networks for biosphere reserves, such as the network of Swedish biosphere reserves, NordMAB, and the network for European areas, EuroMAB, as well as in the collaborative projects "Biosphere Forests for the Future" and "Biosphere for Baltic", see further section 6.6 and Chapter 8.

Agenda 2030
The Association's work on fisheries conservation and open landscapes is clearly linked to Global Goals, 14 Oceans and Marine Resources and 15 Ecosystems and Biodiversity.

PART II: PERIODIC REVIEW REPORT

1. BIOSPHERE RESERVE

1.1 Year designated: 2011

1.2 Year of first periodic review and of any following periodic review(s) (when appropriate): No previous evaluations

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

1.4 Other observations or comments on the above: Not applicable

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

Work on the evaluation began in the spring of 2020 when the board of the Nedre Dalälvens Intresseförening (Biosphere Association), which is the principal administrative body of the biosphere reserve, and the staff of the biosphere office reviewed the form and developed a plan for the work. The evaluation work was then organised by the staff of the Biosphere Association. The original plan was to produce a new Action Plan in conjunction with the evaluation, but due to the Corona pandemic and the restrictions it imposed on physical gatherings, the Board decided to postpone the completion of the new Action Plan until the end of 2021. This is done in the hope of being able to hold physical meetings with the biosphere reserve's stakeholders and actors to foster a broad participation and long-term establishment around the new plan. The Programme Committee of the Swedish Biosphere Programme was informed of this decision and has since received regular updates on the progress of the evaluation and the new action plan.

The work was carried out as follows:

1. Review of the 2010 application and the activity reports of the Biosphere Association from 2010-2020. Also a review of the 10-year evaluations of biosphere reserves "Kristianstad Vattenrike" and "Lake Vänern Archipelago and Kinnekulle", which have been important sources of inspiration.

2. The process of evaluation with stakeholders from different parts of the biosphere reserve community started in autumn 2019. This is how the data was collected:

> Interviews and consultations were conducted with about 20 experts or persons representing different stakeholders in the biosphere reserve.
>
> The County Administrative Board of Gävleborg and the County Administrative Board of Dalarna have contributed texts and other material that formed the basis for large parts of Chapter 4, The Conservation Function.
>
> The 10-year review has been a regular item on the agenda of the Biosphere Association's board and staff meetings, where various aspects have been discussed and commented on.

Important sources of information on how the area has changed and what activities have taken place are: statistical databases, various forms of reports, websites, newspaper articles and other documentation.

A survey targeting stakeholders and actors who are or have been involved in the biosphere reserve's activities was conducted in January 2021. The survey focused on focus areas, opportunities and challenges for the biosphere reserve. The results will provide an important basis for the new action plan.

3. In the course of the evaluation, strengths and weaknesses in the activities of the Biosphere Association have been identified. At a meeting on 2021-02-18, the Board of the Biosphere Association was informed about these.

4. The report was circulated to municipalities and other stakeholders in April 2021. The report was also available on the biosphere reserve's website for public comment.

5. The Board of Directors of the Biosphere Association decided to approve the final version on 17 June 2021.

6. The evaluation was translated into English in July and August 2021.

7. The evaluation was submitted to the Swedish Programme Committee in September 2021.

1.5.1 Which stakeholders were involved?

Participants in the process include the members of the Biosphere Association, consisting of elected representatives of the area's nine municipalities, several large and small companies, land and water owners, and an NGO (see 7.5.2). Other participants have included staff from the four county councils in the area, members of Leader Nedre Dalälven and current and former staff from the Biosphere Association and Leader Nedre Dalälven. The first draft of the evaluation was circulated in April 2021 to various stakeholders for comments (e.g. members of the Biosphere Association, Development Council, other Swedish biosphere reserves, the Programme Committee for the Swedish Biosphere Programme, municipalities, county councils and Leader Nedre Dalälven). The evaluation was then also available on the biosphere reserve's website, allowing other interested parties to participate in the work and provide feedback. A total of eleven formal responses were received from authorities and other organisations. These included all four county administrative boards, half of the area's nine municipalities, the Swedish Forestry Commission and LRF Gävleborg and Dalarna. In addition, four responses were received from individuals connected to the Biosphere Association. All organisations and individuals wishing to respond to the consultation had to download the document from the Biosphere Association's website. A total of 145 such downloads were made.

The aforementioned questionnaire, which forms the basis for the new action plan, was sent to around 100 stakeholders and actors who are or have been involved in the biosphere reserve's activities. These include members of the Biosphere Association, municipal politicians and officials, businesses, biosphere reserve ambassadors, researchers, non-profit associations, residents in the area, government authorities and members of Leader Nedre Dalälven. Around 50 respondents answered the survey. The above groups will be further involved in the development of the new Action Plan.

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

Methods used include interviews, surveys, email consultation, digital and, in some cases, face-to-face meetings. At the beginning of the process (March 2020), the plan was to hold a series of major workshops, but this was not considered possible due to the restrictions imposed by the Corona pandemic. The Biosphere Association plans to organise workshops in connection with the development of the new action plan in 2021. Unless restrictions are eased, these will be able to be conducted remotely now that digital meeting skills are far greater than they were in spring 2020.

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

The evaluation has been discussed at four of the Biosphere Association's board meetings. The evaluation has also been discussed at all staff meetings throughout the process. 20 people have been interviewed. A number of evaluation questions have also been addressed via email conversations with various experts and stakeholders throughout the process.

For the parallel process of developing a new Action Plan, a survey was conducted with 100 recipients, of which 50 responded. In connection with the development of the new action plan, the Biosphere Association will organise workshops with stakeholders and actors in the biosphere reserve.

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

Among the interviewees, there was a roughly equal number of men and women. For the workshops planned in connection with the development of the new action plan, the ambition is that the proportion of men and women participating should be at least 40 percent.

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.

The economy of the biosphere reserve has not undergone any major changes in the last ten years. Although forestry and agriculture provide livelihoods for relatively few people, they are the main agricultural activities in the area.

In agriculture, the number of people working in agriculture has decreased slightly, while turnover has increased slightly. The area of cultivated land has decreased slightly while the share of organically farmed land has increased. With regard to forestry, there are no specific statistics for the area, but there have been no major changes in supply and turnover over the last ten years.

Available but insufficient statistics indicate that tourism has increased in the area. In Färnebofjärden National Park, which makes up a large part of the core areas, the number of visitors per year has more than doubled in ten years. Economic development in the area is further described in Chapter 5.

As before, the biosphere reserve is managed by the Nedre Dalälvens Intresseförening (Biosphere Association). In the last ten years, the Association has changed its CEO twice, in 2015 and 2017. Since 2019, a new Biosphere Reserve Coordinator has been hired. As before, it is the Board of the Biosphere Association that employs the CEO and the CEO that employs the coordinator. This is described in more detail in Chapter 7.

The Biosphere Association has chosen to extend the outer boundaries of the biosphere reserve and to add some core areas (see 2.2.1 and 2.4.5). Otherwise, there have been no significant changes in the management of the various zones. The core areas are formally protected and, in most cases, managed by the county administrative boards. In the last ten years, around 50 new nature reserves have been created in the biosphere reserve, covering an area of almost 14,000 hectares. In 2018, Färnebofjärden National Park received a new management plan, which is described in more detail in Chapter 4.

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):

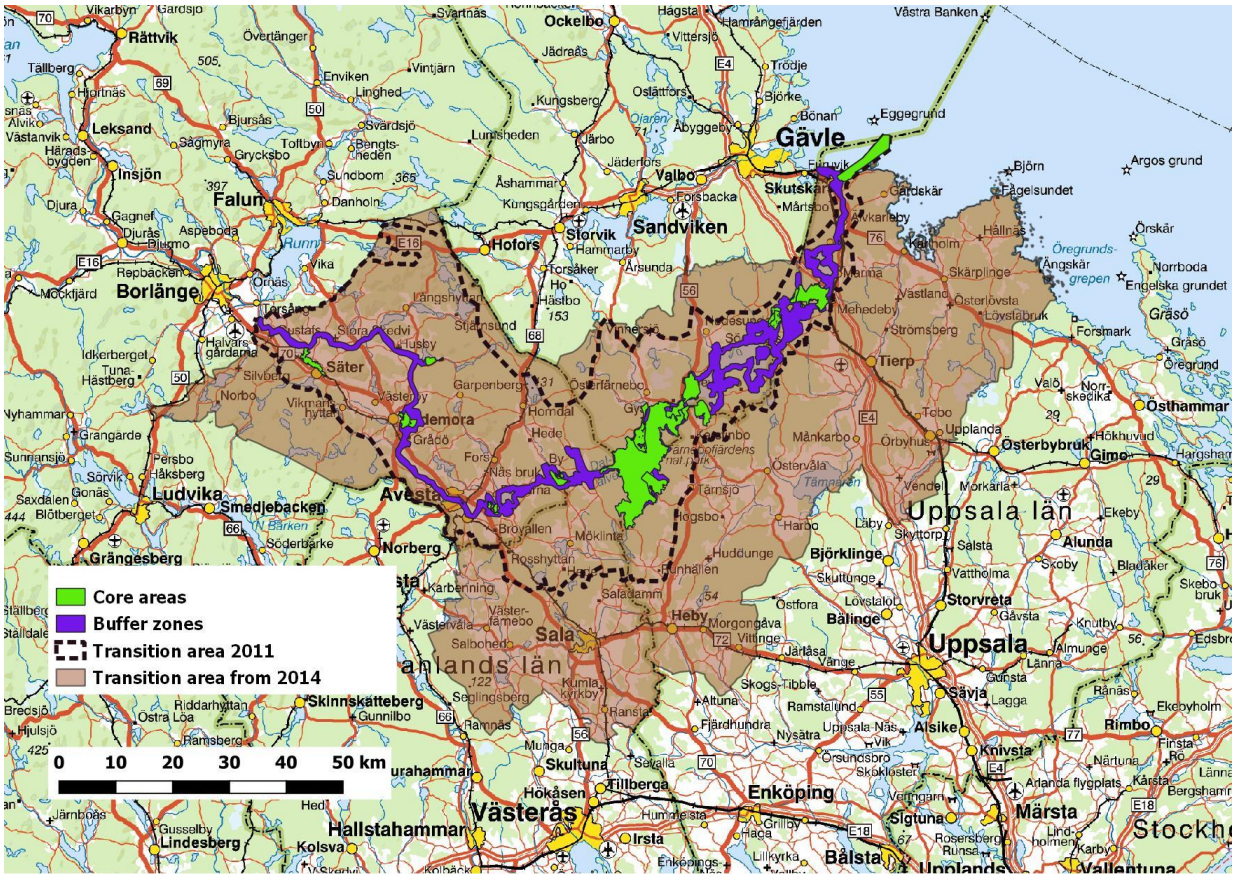
In 2013, the board of the Biosphere Association decided to effectively extend the outer boundary of the biosphere reserve to coincide with the Leader Nedre Dalälven area. The extended boundary also coincides to a greater extent with the boundaries of the municipalities in the area (see map below). The extension almost triples the size of the transition area and is a natural evolution of a local process in the area. The association was founded in 1986 with the aim of promoting development in the area based on its high natural and cultural heritage values and taking into account the interests of the agricultural sector and its members. For the first 15

years, the Biosphere Association worked on behalf of the municipalities and other members to strengthen the local economy in a sustainable way. Thanks to this work, with strong support from public organisations and businesses as well as local people in the area, there were good opportunities to develop a new strategy for the development of the area and to form a Leader area through the already existing partnership. The next step in the area's development work was to focus even more on sustainability issues through the 2011 biosphere designation. The Biosphere Association and Leader Nedre Dalälven are two separate organisations, but are often viewed as one stakeholder in the field of sustainable development in the area. Thus, in order to increase the potential for significant and impactful work on sustainability, drawing on the engagement of already established partnerships and networks across the area, the decision was taken to effectively expand the area. The fact that the geographical area is the same for both organisations as a result of the expansion means, among other things, that communication about the biosphere reserve is simplified and the municipalities become more involved. It also enables the Association to carry out biosphere-related activities throughout the area and increases the possibility of attracting more external support. In the context of the evaluation, the Biosphere Association would also like UNESCO to formally extend the biosphere reserve as shown on the map below.

Cardinal points:	**Latitude**	**Longitude**
Most central point:	60° 13’ 47’’ N	16° 39’ 49’’ E
Northernmost point:	60° 42’ 16’’ N	17° 35’ 14’’ E
Southernmost point:	59° 45’ 19’’ N	16° 39’ 18’’ E
Westernmost point:	60° 18’ 16’’ N	15° 12’ 31’’ E
Easternmost point:	60° 28’ 28’’ N	18° 09’ 43’’ E

When describing changes to the biosphere reserve in this report, they are based on the area extended since 2013, unless otherwise stated.

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.



2.2.3 Changes in the human population of the biosphere reserve.

Note that figures for 2010 are taken from the application and refer to the population of the original areas. Figures for 2019 refer to the population of the extended area. The doubling of the population is therefore mainly due to this extension.

	2010	2020
Core Area(s) (permanent and seasonally)	36	192
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2.2.4 Update on conservation function, including main changes since last report.
(Note briefly here and refer to 4 below).

In terms of the conservation function, the Biosphere Association has focused mainly on fisheries conservation and river meadow management over the past ten years. The work has included providing inspiration, spreading knowledge and creating collaboration between

different actors active in these issues. The activities of the Biosphere Association have included:

- Strengthening the network of fishing rights owners in the Nedre Dalälven area in general and increasing awareness of the different conditions for fisheries conservation, management and control in the area.

- On the lower part of the Dalälven, the stretch from Bysjön to the sea, development of a joint simplified fisheries management plan together with the fishing rights owners. This has important signalling value both internally and externally, with regard the upcoming work on restoring migration routes for migratory species.

- Developing knowledge on the importance of prioritising investments in indigenous fish stocks and natural reproduction rather than relying too heavily on stocking.

- Inspiring the restoration of overgrown river meadows, inside and outside the protected areas, which are now cultivated annually through grazing and mowing to benefit biodiversity.

Biodiversity conservation work is carried out primarily by the area's four county administrative boards and, to some extent, by the municipalities, as well as by private individuals and associations working on a voluntary basis.

Some of the projects and activities of the county administrative boards that are particularly worth mentioning are:

- Sustainable hydropower in the Dalälven area (HÅVD), where the county administrative boards have developed a comprehensive action plan for hydropower related environmental measures, in collaboration with hydropower companies Fortum and Vattenfall.

- Salmonids in the Nedre Dalälven (Laxfisk i nedre Dalälven, LIV) where the county administrative boards in cooperation with Fortum and Vattenfall have investigated the possibility of restoring fish migration and reproduction potential for salmonids in order to regain self-reproducing wild salmon and sea trout in the Dalälven in the future. The investigation has led to the restoration of several sections of the stream.

- Conservation burns have been carried out in several places in Färnebofjärden National Park to promote rare habitats and species.

- Several river meadows and other meadows and pastures with potentially biological nature values have been restored. These are now cultivated annually through grazing and mowing to promote biodiversity.

- Over the ten-year period, approximately 50 new nature reserves have been created in the biosphere reserve, covering an area of almost 14,000 hectares. Färnebofjärden National Park has been assigned a new management plan.

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

Within the development function, during the ten year period, the Biosphere Association has mainly focused on developing the tourism industry and continuing to further develop the work on biological mosquito control.

Sustainable tourism

Tourism issues have had major importance throughout the entire history of the Association. Since the mid-1980s, the starting point for this work has been the high natural and cultural values of the local environment.

The tourism industry is important for the biosphere reserve as it provides an opportunity to promote sustainable tourism and to showcase the area to the outside world. The Biosphere Association has worked to strengthen the attractiveness of the Nedre Dalälven area as a destination and of the area's tourism activities (activities, accommodation, destinations and locally produced products). The objectives have included increased collaboration between tourism operators, product development and increased skills and knowledge of digital channels. This has been achieved through networking meetings and inspirational trips on themes such as packaging and sustainability, social media and film/photography, but also through individual guidance on, for example, digital sales and marketing tools with individual tourism entrepreneurs. Furthermore, during the evaluation period, the association has participated in a number of local, national and international tourism and fishing fairs and on two occasions developed and launched a new website promoting the area and its tourism activities. The work has also involved developing relationships and networking with the four regional tourism organisations that affect the Nedre Dalälven area.

The current focus of the Biosphere Association's work on developing the local tourism industry is largely based on the pilot study for tourism projects in the Nedre Dalälven region that Leader Nedre Dalälven carried out in 2016-2017. The feasibility study looked at how local small businesses and visitor destinations can boost their turnover and contribute to an attractive area and more jobs. The aim was to produce a basis for the tourism conditions and development opportunities. The results of the feasibility study and developments in the tourism industry and investments in it are described in more detail in Chapter 5.

Biological Mosquito Control

The area has previously, occasionally, been severely affected by huge numbers of floodwater mosquitoes. This led to negative media publicity which scared visitors away and had a negative impact on the local economy and on the quality of life of the local population. For almost 20 years, floodwater mosquitoes have been controlled by Biological Mosquito Control, a unit of the Biosphere Association's subsidiary, NEDAB. The control activities have led to a significant reduction in floodwater mosquitoes and thus a positive effect on the tourism industry and other parts of the local economy. In the early years, much of the work focused on establishing operations. Over the last ten years, the Biological Mosquito Control unit has successfully controlled all parts of the affected areas. The self-monitoring programme aimed at detecting possible side-effects on the ecosystem has improved and the amount of biological pesticide per controlled area has decreased, as a result of more effective control methods. The activities of the Biological Mosquito Control unit are described in more detail in Chapters 5 and 6.

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

When it comes to the logistic support function, over the ten-year period, the Association has focused on communication with and between sustainable development actors in the area and with the wider public. The association has been working to showcase the area and communicate good examples of sustainable development efforts. This has been done through social media and other digital communication channels such as newsletters and the internet, as well as through participation in newspaper and radio reports. Perhaps the most important communication efforts are the creation and dissemination of contacts through the association's networking activities, which include the organisation of seminars, training days, guided tours, guided walks and bioblitzes. The communication activities of the Biosphere Association are further described, primarily in sections 2.3.3 and 2.3.4 and Chapter 6.

The Biosphere Association itself does not conduct any research or training, nor has it focused on initiating such activities. However, there are several other organisations that conduct research and training activities in the area. Much of this research is focused on biodiversity, such as inventories of single species or monitoring their evolution. It may also involve investigating how water regulation in the Dalälven can be adapted to ecological values. There is also a lot of research on mosquitoes and mosquito control and some on renewable energy.

In terms of education, there have been no major changes in the last ten years. There are still three folk high schools in the area, which offer courses in sustainable development, among other things. The Naturum in Gysinge, which is directly adjacent to Färnebofjärden National Park, fulfils an important function as a visitor centre. The exhibitions and guided excursions generate interest and spread knowledge about the natural environment of the area, to both adults and children. Some colleges conduct their field studies in the area.

Monitoring, research and training are described in more detail in section 2.4.6 and in Chapter 6.

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).

The Association, which is the main body of the biosphere reserve, works to fulfil the three functions of a biosphere reserve (conservation, development and support) and to coordinate stakeholders. Much of the work involves initiating, supporting, monitoring and communicating activities in the area related to sustainable development, particularly in the focus areas relevant to the biosphere reserve. The board of the association consists of elected representatives from the area's municipalities, businesses and non-governmental organisations. The association has changed its president and coordinator since the nomination.

The biosphere reserve also has a development council consisting of officials from the municipalities and representatives from the Swedish Forestry Commission, the County Administrative Board of Gävleborg, universities and non-profit organisations.

The Biosphere Association does not exercise any formal authority. Instead, the work is done through close dialogue with authorities, associations, landowners and other stakeholders.

The county administrative boards manage the core areas through protection and other management activities. Some exceptions are Östa nature reserve, managed by Heby municipality, Stadsjön managed by Hedemora municipality and parts of Bredforsen managed by Upplandsstiftelsen. The county administrative boards and municipalities are also

responsible for a large part of the work on sustainable development and for regional and local environmental monitoring.

See further chapter 7.

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 2012, an action plan was also developed and revised during the first couple of years. The Biosphere Association now sees the need for a new action plan and has begun work on this together with relevant actors and stakeholders. The new Action Plan is expected to be completed by the end of 2021 (see 7.7 and Chapter 1). The main areas of focus for the association over the ten-year period have been: sustainable fishing/fisheries management, open landscapes, sustainable tourism and biological mosquito control (see 2.3.3 and 2.3.4).

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.

In 2020, the budget of the Biosphere Association for biosphere specific work was 90,863 EUR. The annual budget has varied, but has remained at about this level throughout the 10-year period. The funding has been provided by Leader Nedre Dalälven, 51,663 EUR and by the Swedish Environmental Protection Agency, 39,200 EUR. The money is used for the Biosphere Office's information and communication activities, including staff and office costs. Approximately two years of work can be financed with this money.

In addition to the annual grant from the Swedish Environmental Protection Agency, the association has received approximately 1.3 million EUR in project support for various forms of projects that support biosphere work since its inception in 2011. The subsidiary Nedre Dalälvens Utvecklings AB has received about 245,000 EUR in Leader support from the Swedish government for its work on sustainable tourism, through Leader Nedre Dalälven and Leader Nedre Dalälven has also worked on projects linked to the biosphere initiative amounting to approximately 500,000 EUR, since the appointment. In addition, Biological Mosquito Control has received around 1.1 million EUR each year from municipalities, regions, the EU and the state for its work on mosquito control in the biosphere reserve. Other stakeholders in the biosphere reserve have also received support for activities and projects. It is not possible to estimate the total amount for the other actors, but most of the approved leader projects in the area fall under the biosphere work. In total, the Leader project has provided approximately 700,000 EUR per year for local projects. Leader support consists of project funding from the EU and the state, as well as dedicated public funding from the municipalities in the area.

In addition to actual funding of the biosphere work, a great deal of work has been done on a voluntary basis by individuals and entrepreneurs. Public employees have also contributed work without remuneration from the Biosphere Association. The value of these efforts is not reflected in the budget or funding, but is a very important resource.

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

Since the creation of the biosphere reserve, communication has been incorporated into the existing communication channels and networks of the Biosphere Association. Since its foundation in 1986, the mission of the Association has been to be a networking and rural development organisation with an active focus on the local community. This mission was further strengthened during the process of establishing, and ultimately obtaining, the Biosphere Reserve designation in 2011. Since then, the biosphere reserve has carried out a number of communication projects to raise awareness and among civil society organizations, business, the general public and public officials about what a biosphere reserve is and what function it provides, at a local, regional and national level, and to generate participation. The projects have mainly been funded with Leader support. (https://enrd.ec.europa.eu/leader-clld/leader-toolkit/leaderclld-explained_en)

The work with sustainable development and the communication around this was further strengthened in the area when it was established in the strategy for Leader Nedre Dalälven 2014-2020 that:

> *"The Dalälven River, which affects all nine municipalities, runs through the area. The river is what primarily connects all parts of the area. Due to the east-west direction of the river, topography, other landscape and natural factors, as well as climate, the Nedre Dalälven area forms the natural border of Norrland (Limes Norrlandicus). The high natural and cultural values are particularly noteworthy. In 2011, the area received the UNESCO Biosphere Reserve designation, after nomination by the Government and extensive preparatory work funded primarily by Leader Nedre Dalälven. Large parts of the area are designated nature reserves and Natura 2000. A central part is the Färnebofjärden National Park.*
>
> *It is with this in mind that Leader Nedre Dalälven plans its direction for the next programming period.*
>
> *Our areas of action and overall objectives are:*
>
> 1) *An attractive area*
> 2) *Sustainable jobs*
> 3) *Viable businesses"*

The main focus of the biosphere reserve and the Biosphere Association has been networking, communication and work with:

- Sustainable fisheries/fisheries management
- An open landscape
- Sustainable tourism
- Biological Mosquito Control

Communication and development work in the networks and in the focus areas has taken place through, among other things: future development seminars, study and demonstration trips, network meetings, individual meetings, lectures, coordinated participation in trade fairs and

knowledge-building workshops. Most of the activities have been financed primarily through Leader support.

The ongoing communication project "BUS in the Biosphere" is an important tool for raising awareness of the biosphere, creating new networking contacts and strengthening the biosphere's brand. The project will run from 2017-2022 and will include a range of activities, including major public events, study visits and tours. Training of the biosphere reserve's board is also part of the project activities. For example, the project has included guided walks on the theme of "Outdoor living in the biosphere", study visits to the Italian biosphere reserve Appennino Tosco Emiliano, a course in nature-centred forestry, a tour of the biosphere reserve, participation in fairs and the organisation of so-called bioblitz events. The project has also used social media to highlight good examples of sustainable development in the area. Thanks to the project's funding through Leader, a project manager and communicator were hired in 2019. Read more about BUS in the biosphere in section 6.5.1.

The website of the Biosphere Association, www.nedredalalven.se, has always been a priority platform for communicating activities and initiatives in the biosphere reserve.

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 Association has a long history as a networking organisation with a strong presence in civil society, among local businesses and in the public sector. The association is and has been the natural partner in the focus areas of the biosphere reserve and the initiating force for several different networks, and it has a high level of trust among stakeholders. Its origins and fundamental purpose is to be built by and for members with a wide range of interests in the area. The board of the Biosphere Association therefore includes representatives from the municipalities involved, land and water owners, and business representatives.

The Biosphere Association operates in the same geographical area as, and shares offices with, Leader Nedre Dalälven. It provides a set of tools in the form of development funds from which the Biosphere Association can apply for funding to implement various projects throughout the biosphere reserve. As mentioned earlier, it was established by the strategy of Leader Nedre Dalälven that the development funds granted in the current programming period should be harmonised with the core values of the biosphere reserve. The Leader strategy states, among other things, as part of the horizontal objectives:

> ***Environment and sustainable development***
>
> *Nedre Dalälven has been designated a UNESCO Biosphere Reserve. The designation confirms that the Nedre Dalälven area has uniquely valuable natural and cultural environments and that there is active cooperation in the area for sustainable development from an ecological, economic and social point of view. This also applies to work that is part of the Leader project. Social sustainability is a matter of building a society that is stable and dynamic in the long term where basic human needs are met. Ecological sustainability is about conserving human and material resources in the long term. Economic sustainability means that economic growth must not come at the cost of a segregated, unequal society and a degraded environment. Leader projects must be adapted to what is suitable for the environment and human health, so that we invest in these resources in the long term.*

Read more about the relationship between the Biosphere Association and Leader in chapter 5

THE DIFFERENT NETWORKS OF THE FOUR FOCUS AREAS

By leading and participating in projects, other actions and constellations for sustainable development, the Biosphere Association has contributed to building active networks in several areas. Networks where, for example, local Biosphere Associations, associations, municipalities, county councils, companies, land and water owners meet and interact. The biosphere reserve works through its four focus areas in the following networks: sustainable fishing/fisheries management, open landscape, sustainable tourism and biological mosquito control.

FOCUS AREA Sustainable fishing/fisheries management

Fishing in the Nedre Dalälven area is and has long been a major attraction for visiting guests and locals alike. The stretch of river that runs through the biosphere reserve is approximately 190 km long and involves a range of fisheries/fisheries management stakeholders. A major challenge in fisheries management has been to establish dialogue on fisheries management, create consensus and unite fisheries stakeholders around shared commitments. One objective has been to create a simplified management plan for the dozen or so fisheries management areas and other fishing rights holders, downstream of Lake Bysjön and down to the estuary. One of the goals has been to prepare for the re-establishment of migratory fish (salmon and trout) once fish migration passages have been constructed along the regulated river.

Over the past ten years, the Association has participated in and led several projects concerning the fundamental resource of the river, fisheries management and fishing tourism. An extensive fisheries network has been developed over the years, consisting of local stakeholders in fisheries management and sustainable fisheries. Stakeholders include fisheries management associations and other fishing rights owners, landowners, hydropower companies, fishing tourism operators, Biosphere Associations and government officials. The Biosphere Association has played, and continues to play, a coordinating role with a bottom-up perspective to contribute to and inspire various fisheries conservation efforts throughout the geography that makes up the biosphere reserve, not just along the river section itself. Knowledge, consensus and initiative have been built up in the network over the years.

Success factors for the strong network in this focus area have been, for example:

- The intention to be a neutral meeting place, which has enabled dialogues that have created consensus over time.
- The broad, long-term involvement of local communities in the biosphere reserve, providing knowledge of local needs, opportunities and challenges.
- Network meetings and needs-based training.
- Anchoring and dialogue with authorities and hydropower companies.
- The ability to create and participate in forward-looking fisheries management projects.
- Continuity through these fisheries management projects which have included networking, collaboration and information dissemination.

The network's ability to cooperate and act quickly was demonstrated in 2019, for example, when the authorities proposed that the environmental assessment of hydropower (see 4.6) in the Nedre Dalälven area be postponed until 2035-40. If the proposal were to become reality, much of the extensive scientific research and preparatory work carried out in the lower part of the Dalälven, from Bysjön to the mouth of the river, would have been in vain. For example, collected data and research results risked being lost, and the proactive energy and focus of the network, with its strong local roots, would have been negatively affected. Also, preparatory

actions undertaken and planned, such as the restoration of gravel riverbeds as spawning and nursery grounds for migratory fish, would have had to be redone.

> *"Thanks to our ability to quickly mobilise the network, using it to summarise the extensive research and evidence gathering initiatives in the area, including the projects we have carried out, we were able to communicate the information to advisory and decision-making bodies. Valuable information that would otherwise have been overlooked. A joint networking that contributed to the Agency's proposal being amended so that the environmental assessment was brought forward to 2024. This means that we do not lose momentum in our development and do not have to start from scratch in our networking efforts. This is a very positive step in enabling the return of migratory fish to the river." / Henrik Thomke, Project Manager*

Participants at a seminar on sustainable fishing at Söderfors Manor 2014. During the meeting, a SWOT analysis of sustainable fishing in Nedre Dalälven was carried out.

FOCUS AREA Open landscapes

An important issue that the biosphere reserve has been working on continuously over the last ten years is the promotion of open landscapes. By leading several projects on the management of river meadows, i.e. grazing and mowing, the Biosphere Association has developed a network of local stakeholders, mainly around the open landscape near the river. The projects have, among other things, organised events focused on learning about, for example, nature conservation, law and the marketing of meat from naturally grazing animals. The Biosphere Association has helped to bring together county officials, landowners, farmers with grazing cattle, local abattoirs, nutrition managers and others.

> *"Grazing and mowing are important for biodiversity and the landscape. The area has great potential for resuming the cultivation of overgrown meadows, not least because many farmers are interested and knowledgeable. But getting started requires grants and permission from landowners, and this area can be difficult to navigate. The threshold is therefore high for an individual farmer. I hope that through our projects on the management of river meadows we have been able to help make the necessary contacts, increase knowledge about grants and legal aspects and, through good examples, inspire more people to invest in conservation management in the area." / Elias Regelin, Project Manager*

In 2015, together with the county councils of Gävleborg and Uppsala, the Biosphere Association applied for support from the EU LIFE programme to carry out a major nature conservation project. The aim of the project, LIFE Älväng, was to restore previously cultivated

river meadows, which have now become overgrown. The application included nine Natura 2000 sites and a total of 577 hectares of river meadows, which were to be restored over a six-year period. The plan was that after the end of the project, the river meadows would be grazed or mowed by independent farmers or contractors. The application to the LIFE programme was approved but was not prioritised for 2016, despite high scores in the assessment.

Success factors for the network in this focus area have been:

- The initiative and participation of the Biosphere Association in a major stakeholder meeting on naturally grazing animals and management of river meadows, which led to the Biosphere Association taking on a project management role for an initial development project.
- Study tours of the biosphere reserve for farmers, landowners, politicians, organisations, biologists and interested entrepreneurs.
- Thematic network meetings for skills development.
- Development projects on natural grazing and management of river meadows involving the network.

The 2016 Bush trip is one of the study tours carried out in the network on natural grazing and the cultivation of river meadows. In the photo, participants are shown how contractors at the 120-hectare Nordmyran river meadow have joined forces to cultivate the land.

FOCUS AREA Sustainable tourism

Tourism has been an important issue for the Association since its foundation in 1986. Over the years, the Biosphere Association and its subsidiary NEDAB have worked on destination development and knowledge building for entrepreneurs active in the tourism industry in the biosphere reserve. Over the past ten years, the Association has led several destination development projects and strengthened the existing network. The network includes local entrepreneurs, small and medium-sized businesses, in the hospitality industry. Over the years, good relationships have been built with and between many entrepreneurs and a deep knowledge of their needs has been gained. Thanks to the Association's contacts in the tourism industry, at municipal, regional, national and international levels, good conditions have been created for knowledge transfer and trend communication to the local network.

Success factors of the strong network in this focus area include:

- Continuity in communication and networking.

- A number of study tours where entrepreneurs have both showcased their own operations and learned from each other. The trips have contributed to a sense of common identity and cohesion, and have also helped entrepreneurs to market each other.
- Participation in national fairs where the network's often small businesses have had the opportunity to showcase themselves as part of a wider community. In addition to positive effects such as strengthened collaboration and increased confidence among the business owners, the joint fairs have of course also generated visits to the biosphere reserve.
- The ability to listen and respond to the skills development needs of the network.
- The ability to create and run destination projects that are at the forefront of development.

A number of the network's business owners have had recurring opportunities to showcase their activities and experience the pride of representing the area at various trade fairs, by attending the Biosphere Association's large and multi-award winning booths. The image is from Sweden's largest fair focusing on outdoor recreation and wilderness experiences, Vildmarksmässan 2016.

FOCUS AREA Biological mosquito control

Much of the biosphere's geographical area is affected by the aggressive floodwater mosquito Aedes sticticus. Biological Mosquito Control, a unit of the Biosphere Association's subsidiary NEDAB, has since 2000 had the mission to carry out biological control of mosquito larvae under controlled conditions when a massive hatching season is predicted. The mission comes from seven of the nine municipalities in the biosphere reserve. Biological control is carried out as a result of dialogue, authorisation and funding by the municipalities, regions, the state and the EU. Biological control came about because the mosquito situation became so difficult for people, livestock and pets to endure, that local people got together and demanded action. Since then, local involvement has been, and still is, very important for biological mosquito control. Every year, up to thirty local people go out into the field to survey for mosquito larvae for up to ten days. This can be seen as a sign of the strong community roots and the good spirit that has been built up in the network.

At a national level, the success of biological mosquito control has led to requests for help from other hard-hit areas in Sweden. Internationally, Biological Mosquito Control is part of several mosquito control, research and application networks. For example, the Biological Mosquito Control Manager was the President of the European Mosquito Control Association in 2017-2019.

Success factors of the strong network in this focus area include:

- The great commitment and initiative of the local population. For example, they have contacted authorities and made statements in the media. The network still contributes by doing field work in inventories and similar activities.
- The ability to respond to the needs of the local population and to maintain dialogue with the local population.
- Biosphere municipalities' recognition of the need for biological mosquito control and their funding of this resource-intensive activity.
- The strong trust of, and cooperation with, the local population, municipalities and authorities. Confidence has been achieved through long-term sustainable and result-oriented biological mosquito control that complies with all government directives.

The Mosquito Control Association brings together a strong local commitment to mosquito control. Here, Jan. O. Lundström from Biological Mosquito Control talks to the association's members and other interested parties about the current situation regarding mosquito control, permit applications, self-monitoring and more. The picture is from 2019.

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 Association promotes various cultural exhibitions and events in the biosphere reserve on its website. These could include events in one of the well-preserved mill environments (see 5.8), museums and musical performances. The association also participates in several cultural events. One such example is the events held at Svarthälls fäbod (see 2.3.7). The farmhouse has been reconstructed by the Nora Hembygds- och fornminnesförening in Heby municipality with the support of Leader. Various events are held at the farm where participants can experience what it was like to live on the farm and learn about timbering, meadow management and history, among other things.

In 2015, the Biosphere Association created a Wiki Nedre Dalälven. In this open and internet-based knowledge bank, the public could share gems, stories and history from the Nedre Dalälven area.

The Österfärnebo development group made several important efforts to welcome the many refugees who came to Sweden in 2015. Other efforts in the field of integration have been made in some of the Leader projects described in section 5.9. Sjövik Folk High School has courses in subjects such as folk music and log house building. The area has no indigenous peoples.

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

In the restoration of river meadows, the knowledge of local farmers and residents is important. They often know how the land has been managed in the past, how high the water may rise or which technique is most suitable. They can also make suggestions on how to use the harvest or provide information on who has animals and needs more pasture land. The fish network is another example of where local knowledge is important in management see 2.4.7 and 2.3.4.

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?

Perhaps the most important custodians and disseminators of local traditions and folklore in the biosphere reserve and elsewhere in the country are the many non-profit local associations. There are an estimated 40 local associations in the biosphere reserve, which organise lectures and traditional festivals, publish books and films and run museums. One example is the Nora Hembygds- och fornminnesförening in Heby municipality, which is running a Leader project with the aim of documenting and presenting the once so important culture of the mountain pastures in the area. The project includes reconstructing a former mountain pasture wall and building a mountain pasture cabin on the old site, clearing paths and preparing for meadow mowing. The project also includes inventorying memories of the pastoral culture in the Nedre Dalälven area and documenting this in film and writing.

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?

The main spoken and written language in the biosphere reserve is Swedish. Sandviken, Gävle, Älvkarleby and Tierps are part of the Finnish language administrative areas. In these municipalities, the option to use Finnish in communication with authorities, both orally and in writing, must be provided. Municipalities must also be able to provide child and elderly care in Finnish. In addition to Swedish and Finnish, a number of other languages are used by people who have moved here from other countries.

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

The association has a long history of networking and coordinating actors in sustainable development in the Nedre Dalälven region. Networking and coordination is perhaps the administration's greatest strength and success factor. Another important success factor is the close cooperation between the Biosphere Association and Leader Nedre Dalälven and the fact that the two organisations' areas of activity have the same geographical scope. The local Leader strategy has also been shaped by biosphere ideals, following the nomination. This facilitates things such as funding for projects promoting sustainable development. The association's success in bringing about collaboration between fishery stakeholders, creating skills development in the local tourism network and inspiring increased cultivation of river meadows are some examples where coordination and networking combined with Leader support have been success factors.

The few surveys that have been carried out suggest that awareness of the biosphere reserve has been low among the general public. This has at times been a problem for the Biosphere Association and other actors who use the term in their communications. The association is now

running a leadership project, BUS *in the Biosphere, which* aims, among other things, to raise awareness (see 6.5.1).

All municipalities in the area are represented on the board of the Biosphere Association (see 7.2). However, there are no longer specially appointed officials at municipalities and county councils to act as contact persons for the biosphere reserve. There is also a challenge in transferring knowledge about the biosphere reserve between different people in the organisations. The Board decided in 2021 to form a Biosphere Council consisting of officials from all municipalities. The staff of the Biosphere Association asked the county councils to appoint new contact persons for the biosphere reserve when this report was circulated.

Another challenge is to find funding to implement projects and actions. The Biosphere Association has had the opportunity to implement actions through various Leader projects, but there are desired actions within the biosphere reserve that cannot be funded through Leader, such as restoration of natural areas or major investments.

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.

All municipalities in Sweden have general plans describing long-term goals for how land, water and built environments should be used, developed and preserved. The biosphere reserve is included in the general plan for seven of the area's nine municipalities (excluding Gävle and Sala). In some cases, the biosphere reserve is mentioned only briefly, as evidence of the high natural and cultural values of the Dalälven area. In other cases, municipalities have chosen to write more about the biosphere reserve. They describe what it means to be a biosphere reserve, what the three functions (conservation, development and support) are and what impact the designation has on tourism, research and learning.

The designation of the area as a biosphere reserve is also mentioned in Leader Nedre Dalälven's latest strategy for local development. It describes repeatedly and in detail how the designation is a strength and opportunity not least for the local tourism industry. The Leader strategy also describes how all development activities in the area supported by Leader Nedre Dalälven will be sustainable from an environmental, economic and social point of view, in accordance with the Biosphere Label.

In Sweden, county councils are responsible for developing regional action plans for green infrastructure. These serve as a basis for adapting land use and planning concrete measures, for example in the field of nature conservation. Two of the four county councils that administer parts of the biosphere reserve address this in their action plans, namely Dalarna and Gävleborg.

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

The Biosphere Association cooperates with the area's municipalities and county councils on the conservation of biodiversity and sustainable development. Such cooperation includes, for example, farming, fisheries management, tourism and mosquito control. Furthermore, the Biosphere Association has representatives on, for example, the Färnebofjärden National Park Council (see 4.3) and the Dalälven Water Conservation Association's board.

Here are more examples of the results of management and cooperation plans of government agencies and other organisations in the biosphere reserve:

- The county administrative boards run several LIFE projects, some of which are implemented in the biosphere reserve. LIFE IP Rich Waters aims to improve the aquatic environment, mainly in the central Swedish waters that flow into and affect Lake Mälaren and the northern Baltic Sea. LIFE Taiga aims to conserve the Western Taiga habitat and its biodiversity through conservation burning.

- Over the ten-year period, approximately 50 new nature reserves have been created in the biosphere reserve, covering an area of almost 14,000 hectares. Färnebofjärden National Park has been assigned a new management plan.

- The project Sustainable Hydropower in the Dalälven (HÅVD), where the county administrative boards have developed a comprehensive action plan for hydropower's environmental measures, together with hydropower companies Fortum and Vattenfall.

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

The association has about twenty members consisting of municipalities, companies and non-governmental organisations. A large proportion of the members' representatives on the Board of Directors and at the Annual General Meeting are also residents of the biosphere reserve. These representatives, with local involvement and networks, all have the right to vote at the Annual General Meeting and can thus influence the direction of the work. In addition, the representatives elected to the Board also influence the day-to-day work between AGMs. See further chapter 7.

The involvement of the local community in the biosphere reserve is expressed in the various networks of the Biosphere Association for fishing, tourism and river meadow management, for example.

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.

Sweden is considered to be one of the most gender-equal countries in the world, where it is the norm to give equal consideration to the needs and interests of men and women. Swedish law prohibits gender discrimination. Although Sweden has come a long way in this area, there is of course more to be done. Within the biosphere reserve, both men and women are involved in the biosphere office, in local organisations and in decision-making processes. The board of the association currently consists of eight men and six women.

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

Core areas

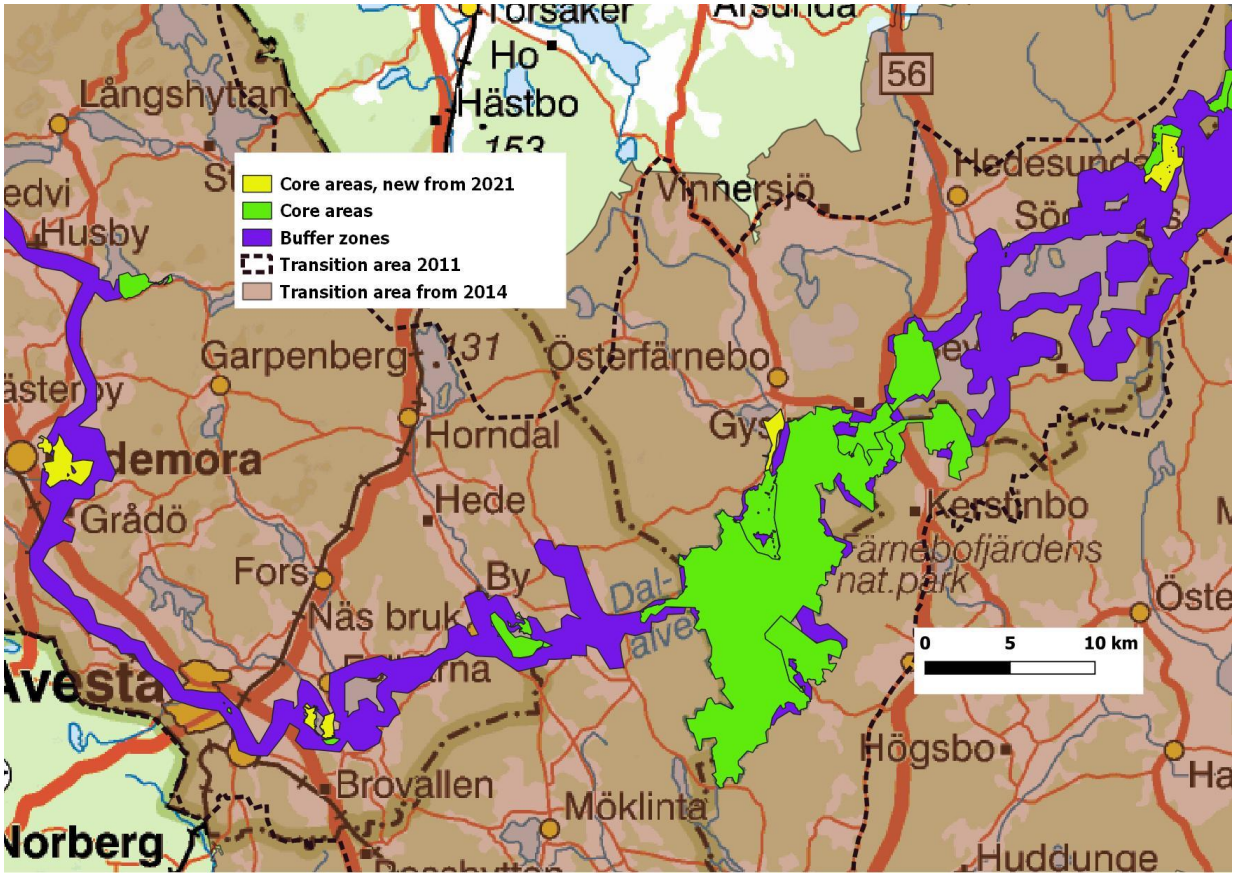
In dialogue with the relevant county administrative boards, the municipality of Hedemora and Upplandsstiftelsen, the Biosphere Association has decided to add five additional river-related nature reserves to the core areas. See table below.

Table of new core areas

Name of reserve	Area (hectares)	Municipality	County	Managing authority
Hovran	437	Hedemora	Dalarna	County Administrative Board
Stadsjön	50	Hedemora	Dalarna	The municipality
Kungsgårdsholmarna and Prostnäset	163	Avesta	Dalarna	County Administrative Board
Laggarbomyra	171	Sandviken	Gävleborg	County Administrative Board
Bredforsen	350	Tierp	Uppsala	Upplandsstiftelsen

The first four nature reserves in the table above have been created after the nomination (Hovran is still in the process of transformation, see below). In the case of the Bredforsen, which consists of two parts, it is unclear whether both were included in the 2010 application. The western part managed by the County Administrative Board of Gävleborg was included in the application, but the Biosphere Association wishes to clarify that the eastern part managed by Upplandsstiftelsen should also be included. The reason why the five reserves in the table should be part of the biosphere reserve core areas is that they are largely composed of floodplain reserves and consist of the habitats and habitat types that the biosphere reserve identified as core areas at its creation. All five reserves are surrounded by or directly adjacent to the existing buffer zones, which is in line with the zoning principle practised at the time of the application.

Map of new core areas



Two of the former 21 core areas, Lilla Älvgången and Stackharen, will be included in the new Hovran reserve. The transformation process is expected to be completed in 2021. This removes these two reserves from the list of core areas. There are now 23 core areas (both parts of Bredforsen count as one core area), one of which is a national park and the remaining 22 are nature reserves with formal protection under Swedish law. See further map and list of core areas in Chapter 9.

Buffer zones

In Sweden, there is a general ban on building close to the sea, lakes and other bodies of water. The aim is to ensure public access to shoreland and to maintain good conditions for plant and animal life. The so-called shoreland protection applies from the shoreline one hundred metres out on the water and one hundred metres up on land.

The extent of the biosphere buffer zones has not changed since the nomination. They are largely formed by the boundary of shoreline protection along the Dalälven. National legislation on protection changed in 2009-2010. Since then, special rules have been implemented for rural areas. The aim was to improve opportunities for Swedish municipalities to invest in rural development in areas covered by shoreland protection. Previously, only the county administrative boards could grant exemptions, although in some counties this right was delegated to the municipalities. After the changes ten years ago, municipal influence increased. All municipalities can now decide to grant an exemption from shoreland protection if there are specific reasons for doing so. However, if protected nature, such as nature reserves, is involved, the County Administrative Board still decides on the exemption. They also review the municipalities' exemptions. The county administrative boards also have the option to extend the shoreland protection area in individual cases to a maximum of 300 metres from the waterline,

where this is necessary to ensure that the purpose of shoreland protection regulations is fulfilled.

Sweden's largest environmental organisation, the Swedish Society for Nature Conservation, feels that shoreland protection was weakened as a result of the changes. At the moment, there is an ongoing review of shoreland protection provisions. The aim is not only to make it easier to build in certain shoreland areas throughout Sweden, but also to strengthen shoreland protection where necessary. The proposal aims to make it easier to build on shoreland where demand and development pressure are currently low. In these areas, there must not be specially designated natural values or decisions on extended shoreland protection. It is not yet clear how the buffer zones of the area will be affected.

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?

Several monitoring and research activities have been carried out in the biosphere reserve over the last ten years. The table below shows the main institutions, as well as the area(s) in which they carry out research and/or monitoring and whether it is part of local, regional, national and/or international programmes.

Overview of the main organisations conducting research and/or monitoring in the biosphere reserve.

Organisation	Activities	Focus	Programme
Swedish Environmental Protection Agency	Research and monitoring	Coordinates all environmental monitoring in Sweden. Grants and commissions research.	National
Swedish Agency for Marine and Water Management	Research and monitoring	Coordinates environmental monitoring in the marine and aquatic environment in Sweden.	National
County Administrative Boards	Monitoring	Biotic and abiotic monitoring in accordance with the county programme for monitoring the 16 environmental objectives.	Regional
Municipalities	Monitoring	Abiotic sampling, species monitoring, nature inventories and socio-economic inventories.	Local
SMHI	Research and monitoring	Research on environmentally friendly water regulation and on metal load in the Dalälven river. Monitoring weather, water flows and carbon dioxide emissions.	Regional and national
Biological Mosquito Control	Research and monitoring	Monitors the effects of mosquito control and conducts research on mosquitoes.	Local
Fishermen's associations	Monitoring	Collection of water samples in a more or less systematic fashion.	Local
Ornithological associations	Monitoring	Bird inventories and counts.	Local
The Dalälven Water Conservation Association	Monitoring	Sampling of lakes, rivers and the adjacent part of the Bothnian Sea in the Dalälven catchment area for nutrients such as phosphorus and nitrogen, oxygen, metals and other ions. Based on the concentrations, transported quantities are also calculated. In addition, the composition of plant and animal communities; plankton, bottom-dwelling animals and fish is investigated. Concentrations of metals and certain other substances are regularly monitored in fish and sediment.	Local, regional
Uppsala University	Research	Research mainly on mosquitoes and hydropower technology, but also on history and conservation.	
Swedish University of Agricultural Sciences (SLU)	Research	Research on fish, mosquitoes and post-fire changes, and on biosphere management.	
University of Gävle	Research	Waste management, the ecological impact of wild boar on the environment, the long-term population development of the osprey.	
University of Dalarna	Research	School administration	
Mälardalen University	Research	Renewable energy systems in Heby and Sala municipalities in particular.	

Chapter 6 and section 6.2 describe the main directions for research and monitoring. See also the list of bibliographical references in Chapter 9.

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?

Following the nomination, the outer boundary of the biosphere reserve has been extended to coincide with the boundaries of Leader Nedre Dalälven and, to a large extent, with the boundaries of the municipalities in the area (see 2.2.1), thus creating the conditions necessary for integrated strategies and plans. Below are some examples of new or strengthened networks:

- **The fishing network.** Recreational fishing has played a central role in the Association's work since the mid-1980s. As travel has increased and digitalisation has accelerated, the value of developing exchanges and collaboration between fishing rights holders in the area has become increasingly clear. Business owners active in fishing tourism are invited to network meetings to exchange experiences and ideas. For example, the meetings include information on developments elsewhere in the world and the importance of modern approaches when it comes to sustainability issues such as natural reproduction and precaution in fish stocking. At present there are more than 25 fishing rights holders in the area, mainly fisheries management associations. Read more about the fishing network in section 2.3.4

- **HPU (**Sustainable Product Development) was a government initiative focusing on developing new export-ready products in nature and cultural tourism. For three years, the Biosphere Association was tasked with coordinating the work in the northern part of Uppsala County, on behalf of Uppsala County Council. The work has involved bringing together a select number of companies and, through coaching, supporting them on their journey towards the international market. Through HPU, the regional network with Destination Uppsala and Visit Roslagen has been developed and strengthened, which has resulted in a joint printed product manual and a tour for specifically invited international tour operators.

- **SlowTrips**. Since 2018, Nedre Dalälven is one of nine European Leader areas, working together to develop and promote travel experiences featuring everyday and authentic elements. Read more about SlowTrips in section 5.2.

- **Cooperation with other biosphere reserves,** including through Biosphere for Forest and Biosphere for Baltic, see Chapter 8 and Section 6.6.

- **BUS in the Biosphere is** a communication project that aims to increase knowledge and awareness of the biosphere reserve and to create new and deeper contacts in the area with the intention of having broader and more potent networks. Among other things, cooperation with local nature associations has been initiated. Read more about BUS in the biosphere in section 6.5.1.

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

As mentioned earlier under question 2.4.5, all core areas have formal protection under Swedish law. In addition, new nature reserves have been created in the buffer zones and transition areas, which do not belong to the core areas but are part of the biosphere's work to promote sustainable development.

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?

- **Young in Nedre Dalälven was** a leadership project with the aim of supporting young people in the biosphere reserve and involving them in various ways in the local development work. The project was run by Leader Nedre Dalälven.

- **Academy Adventure Leader** is a transnational project in which Leader Nedre Dalälven participates. The aim is to empower young people in the Leader area by developing their entrepreneurial skills and introducing them to new opportunities, activities, cultures and people.

Read more about these two youth projects in section 5.9.

3. ECOSYSTEM SERVICES

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

(As per previous report and with reference to the Millennium Ecosystem Assessment Framework and The Economics of Ecosystems and Biodiversity (TEEB) Framework (http://millenniumassessment.org/en/Framework.html and http://www.teebweb.org/publications/teeb-study-reports/foundations/)).

Nature provides a wealth of products and services for human use. These are referred to as ecosystem services. The aim of the concept of ecosystem services is to make visible these benefits that people are not always aware of and often take for granted. There are several similar definitions of the term, but what they all have in common is that an ecosystem service is something that should ultimately be available for human use. A process in nature that does not benefit humans, directly or indirectly, is therefore not an ecosystem service. These definitions often exclude physical processes that are not due to biotic (living) factors, such as large-scale weather systems and non-renewable resources, such as oil. This report is based on TEEB's definition of ecosystem services as "the direct and indirect contribution of ecosystems to human well-being". Furthermore, the ecosystem services have been divided into the four categories of the MEA.

MEA's four categories of ecosystem services

1. *Supporting* (indirect) - contribute indirectly to human well-being by providing the underlying conditions for other ecosystem services to function. These are primary production, biogeochemical cycles, food web dynamics, soil formation, biodiversity and habitats.

2. *Provisioning* - provides goods/benefits such as food, wood fibre and bioenergy.

3. *Regulating* - influences or controls natural ecosystem processes such as water retention, air purification, pollination, decomposition rates and biological control of pests.

4. *Cultural* - providing knowledge or experiential values for recreation and beauty experiences, for example.

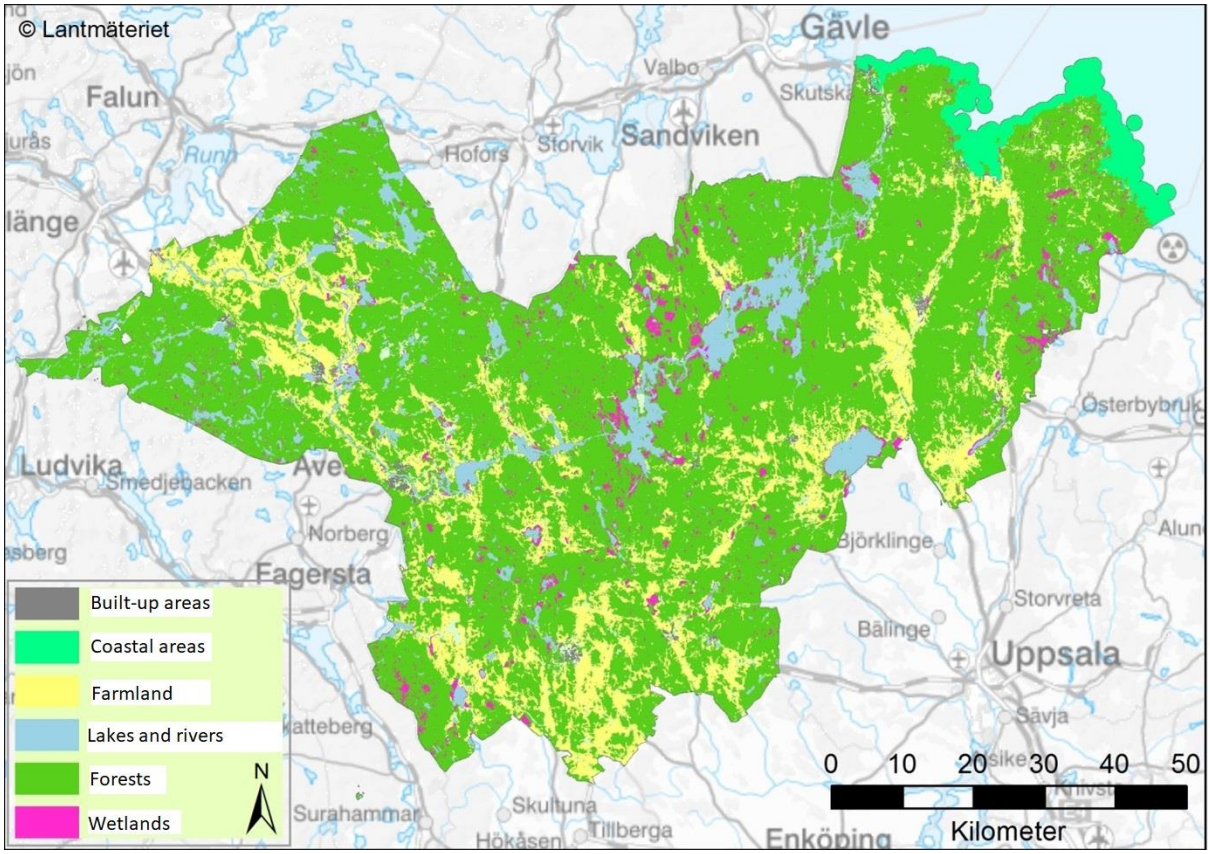
A Swedish ecosystem inventory produced by the Swedish Environmental Protection Agency has been used to support the description below (Naturvårdsverket 2017). This is based on the Common International Classification of Ecosystem Services (CICES).

No analysis of ecosystem services specific to the biosphere reserve has been done before. Instead, the available data used as a basis for the description below are more general summaries of ecosystem services in Sweden or regionally. The four county councils' action plans for green infrastructure have been used as a basis. The University of Skövde has commissioned a group of students to carry out an analysis of the biosphere's ecosystem services. The results of the analysis, which began in autumn 2020, are not yet complete, but parts of it have been used as a basis for this chapter. Read more about the county councils' action plans and the University of Skövde's analysis in section 3.4.

It should be clarified that the following description of the ecosystem services of the area is not exhaustive and that no ranking has been made between the different ecosystem services. Instead, the ecosystem services mentioned should be seen as examples of important services provided by the area's various ecosystems.

The description is based on the area's five habitat types: 1) lakes and rivers, 2) wetlands, 3) forests, 4) farmland, 5) coastal areas and 6) built-up areas. Each section begins with a brief description of the habitat. For a more detailed description, see the application to UNESCO 2010. The distribution of the different habitats is shown on the map below.

Map of the distribution of habitats in the biosphere reserve



Source: Carlquist Segell, 2021

Not all of the identified ecosystem services are included in the description. As the *supporting ecosystem services* are created in all or most habitats, they are only mentioned in connection with those habitats that are considered particularly important for the creation of the particular supporting service. *The provision of areas and species that enable research (CISES code: 3121)* and education *(3122) about nature* are two direct cultural ecosystem services. These are also found in all habitats within the biosphere reserve and are therefore not included in the descriptions under the different habitats below.

Describing who uses the area's ecosystem services is not easy. The tables mention some user groups for each service. The analysis of user groups has been kept at a global level.

It is actually useful to distinguish between an ecosystem service and the benefit it brings to humans. All direct ecosystem *services* can also be described as *utilities*. The ecosystem service "provision of recreational environment" could be expressed as the utility it provides in the form of a forest walk just as "provision of drinking water" could be expressed as the utility that is

drinking water. However, in the tables and descriptive text of the report, the two forms are mixed. This is because it is sometimes easier and takes less space to articulate the utility provided rather than the service.

Abiotic (A) and indirect (I) services are marked in the tables. The abiotic nature of a service means that it does not contain any living components and is therefore not really an ecosystem service. However, some abiotic services are included in the description below because they are, after all, of great benefit to humans and are often referred to in practice as ecosystem services. An example of such a benefit is hydropower that can be converted into electricity. However, hydropower is not an ecosystem service because it is created without requiring living components. When a service is indirect, it means that, like the supporting services, it does not provide any direct benefit to people but has an important underlying function for other ecosystem services. Some indirect services can be considered as direct under certain circumstances and have therefore been included in the description. For each service, a CICES code is also given in the tables - hopefully making it clearer what is being referred to and how the service can be classified.

Lakes and rivers

The Dalälven River is the artery of the biosphere reserve, linking the different parts into a whole. It is Sweden's second longest river and flows from the mountains on the Norwegian border to the Baltic Sea. For the last 190 kilometres from Säter to the sea, it flows through the biosphere reserve and drains the northern and western parts of the area. Between Säter and Avesta, the Dalälven can be compared to a large northern river with a calm and smooth course in a relatively even river channel. Just downstream of Avesta the river changes its character. Along its journey towards Älvkarleby and the sea, it forms a series of large lake systems (fjards) separated by rapids and currents. It is also home to a large share of Sweden's deciduous floodplain forests and river meadows, whose formation is promoted by natural water fluctuations. From Älvkarleby, the river flows almost entirely as one stream, for about 10 km out to sea. Large parts of the river are impacted by hydropower installations, which have several negative effects on the ecosystems and their species.

Some lakes, particularly in the upper catchment areas, are relatively nutrient-poor. On the other end of the spectrum, several lakes draining agricultural land have high levels of phosphorus and nitrogen. There are many lakes in the area with elevated metal concentrations due to historical and present-day mining activities. Due to the long history of various industrial activities in the area, there are also elevated levels of a number of organic pollutants in the main stream of the Dalälven River.

The area's lakes and watercourses provide several important ecosystem services. Perhaps the most important supporting services are those providing habitat for many species, contributing to water and nutrient cycling, and primary production in the form of algae and phytoplankton.

Ecosystem services of lakes and bodies of water	Examples of beneficiaries	*	CISES
Provisioning services			
Hydropower	households, workplaces, industry	A	NA
Wild fish production	hobby fishermen, food industry, households, tourism companies		1114
Water for irrigation and industrial use	agriculture, industry	A	4211
Drinking water (surface water)	households, workplaces, agriculture	A	4111
Regulating services			
Regulation of eutrophication	households, agriculture, industry, users of the Baltic Sea		2251
Water purification through filtration, encapsulation or binding	households, agriculture, industry, users of the Baltic Sea		2112
Erosion control	households, agriculture, industry		2211
Water purification through organic processes	households, agriculture, industry, users of the Baltic Sea		2251
Water regulation	households, agriculture, industry		2213
Carbon sequestration	everyone		2261
Cultural services			
Active recreational environment	residents, visitors, tourism companies		3111
Observational recreational environment	residents, visitors, tourism companies		3112
Cultural heritage	residents, visitors, tourism companies		3123
Scenic views	residents, visitors, tourism companies		3124

*A=abiotic, I=indirect

Examples of provisioning services are the production of fish and the provision of drinking water and other water for industry and agriculture. Since the 17th century, the water of the Dalälven has been an important factor in industrial development. The energy in the water could be used in mechanical processes. Today, about 7 percent of Sweden's electricity is produced from energy in the waters of the Dalälven, of which about 40 percent is produced in the biosphere reserve (per the Association of Hydropower Companies, 2020). The area's lakes and rivers are also used for industrial cooling and agricultural irrigation.

The area's lakes and rivers also provide regulating services such as water purification and nutrient regulation. Microorganisms, algae, plants and animals that break down, encapsulate, filter or bind pollutants in water and prevent eutrophication.

Examples of cultural services provided by the area's lakes and watercourses include the provision of an environment for both passive and active nature experiences. The area has excellent fishing waters and is very popular with recreational fishermen, both Swedish and international. In 2019, the total fishing volume amounted to approximately 100,000 fishing days, making it one of the most visited contiguous fishing areas in the country. Fishing for pike, perch and pike-perch is the main attraction in the whole area, as well as salmon and sea trout in Älvkarleby.

In addition to being an important environment for recreational anglers, the area's lakes and rivers provide important recreational environments for sports and outdoor activities such as boating, canoeing, swimming and birdwatching. They also offer beautiful sceneries and tranquil experiences.

Wetlands

The predominant wetland types in the biosphere reserve are bogs and marshes. Larger wetlands with high nature values are found in the eastern, flat areas of the area. Here you will find, among other things, the large bog Jordbärsmuren and the reed marshes at Hållnäshalvön, Gårdskärskusten and Tämnaren. There are also many large bogs in the coniferous forests of the area.

The area's wetlands provide several important ecosystem services. Perhaps the most important supporting service is the provision of habitats for a wide range of species. Approximately 20 percent of Sweden's red-listed species occur in various types of wetlands. The most important direct service to humans is probably the ability to store water.

Wetland ecosystem services	**Examples of beneficiaries**	*****	**CISES**
Provisioning services			
Production of plant material (not for energy use)	industry, households		1211
Production of energy crops	households, workplaces, industry		1311
Production of edible berries	households, food industry		1113
Production of wild animals for food	households, food industry		1114
Drinking water (ground water)	households, workplaces, agriculture	A	4112
Regulating services			
Regulation of eutrophication	households, agriculture, industry, users of the Baltic Sea		2251
Water purification through filtration, encapsulation or binding	households, agriculture, industry, users of the Baltic Sea		2112
Water purification through organic processes	households, agriculture, industry, users of the Baltic Sea		2251
Water regulation	households, agriculture, industry		2213
Cultural services			
Active recreational environment	residents, visitors, tourism companies		3111
Observational recreational environment	residents, visitors, tourism companies		3112
Scenic views	residents, visitors, tourism companies		3124

*A=abiotic, I=indirect

Examples of provisioning services are the production of plants, which can be used as materials or food, and the provision of drinking water. Peat from wetlands can be used as a fuel or soil improver, but peat extraction is now heavily regulated in Sweden. Berries such as cloudberries and cranberries also grow on the wetlands and are popular for picking for domestic use and sale. Wetlands can store large amounts of water and are important for the formation of groundwater. Sweden has recently experienced dry years, making it difficult for farmers to provide their animals with feed. Wetlands, which produce plants even in a dry year, could provide an important source of natural hay and in some cases grazing for farm animals, as they did until the rationalisation of agriculture.

The area's wetlands also provide regulating services such as flood protection, water purification and nutrient regulation. The ability of wetlands to absorb large amounts of water protects people from flooding. They also remove pollutants from the water, and absorb nutrients, thus reducing eutrophication. Another regulating service provided by wetlands is carbon sequestration, which counteracts the greenhouse effect and thus climate change.

Examples of cultural services provided by the area's wetlands include the provision of an environment for both passive and active nature experiences such as hunting, skiing, berry picking or bird watching.

Farmland

Continuous farmland is found mainly in the southern parts of the area where it connects to the Mälardalen plain landscape and in the areas along the river in southern Dalarna. Agricultural land in the forest-dominated landscape is mainly found around Österfärnebo and Hedesunda north of the river. The agricultural landscape is rich and varied, created by the interaction of humans and animals over thousands of years. Agricultural transformation after the post-war period has had an impact on the landscape, with larger farm units, replanting with spruce, removal of farm barriers, etc. The agricultural landscape has thus become more monotonous.

Historically, pastoral farming was extensive in the area. Animals were moved out to graze in the forests during the summer so that the more fertile land near the farms could be cultivated for crops and winter fodder. Another common feature of the district is the extensive cultivation of floodplain meadows, occurring since prehistoric times. This was particularly the case around the river, but also in other areas. With the transition to modern agriculture, the need for meadow grazing and natural pasture grazing disappeared and since then the open landscape and its habitat for many species has disappeared. Some reopening is now taking place for nature and cultural conservation reasons.

In the Nedre Dalälven region, flat land along the shores of lakes and rivers is regularly flooded, especially during the spring snowmelt. Most of these lands are found along the Dalälven river, but intermittently flooded meadows also occur elsewhere in the area, including in the Svartådalen valley. The hay from these meadows was for a long time an invaluable resource as winter fodder for livestock. In some cases, mowing was also combined with subsequent grazing. The meadows, together with the water, have created the conditions necessary to generate great natural values both in the meadows and in the adjacent forest edge zones. Due to the fact that cultivation has largely ceased and the regulation of the Dalälven has led to a change in the water flow, much of the formerly open land has become or is about to become overgrown, resulting in a loss of biodiversity and landscape values.

Today, agriculture in the area consists of relatively small farms with a diversified use. Otherwise, there are no distinctive agricultural features in the area. Conditions differ between the northern and southern parts. What is produced therefore depends to a large extent on where in the biosphere reserve production takes place.

The farmland in the area provides several important ecosystem services. Perhaps the most important supporting services are soil formation and the provision of habitats for a wide range of species. More than half of all Sweden's red-listed species are found in the agricultural landscape, and a third depend on this landscape for their survival.

Farmland ecosystem services	Examples of beneficiaries	*	CISES
Provisioning services			
Production of food from farmed terrestrial plants	households, food industry		1111
Production of food from domestic animals	households, food industry		1112
Production of energy crops	households, workplaces, industry		1311
Production of genetic resources	industry, households, forestry, agriculture	I	1213
Production of plant material (not for energy use)	industries, households		1211
Regulating services			
Pollination	agriculture, gardens	I	2221
Pest control	households, food industry, agriculture, forestry	I	2231
Cultural services			
Cultural heritage	residents, visitors, tourism companies		3123
Observational recreational environment	residents, visitors, tourism companies		3112

*A=abiotic, I=indirect

Examples of provisioning services are the production of plants and animals for food, energy and materials, but also genetic resources. The agricultural landscape produces almost all the food and feed that humans and domestic animals eat. It also produces crops that can be used as building materials or converted into energy in the form of heat, electricity or vehicle fuel. The agricultural landscape also provides a wealth of genetic resources, particularly in the form of improved plants and animals, which are essential for high production and resilience now and in the future. The area is home to unique landraces and plant varieties such as the Hedemora-chicken and Malmberg's gylling, an apple variety from Gysinge.

The area's cultivated fields also provide regulating services such as pollination and pest control. Many food and fodder crops depend partly or entirely on pollinated insects to produce a harvest. There are many insects in the agricultural landscape which, if favoured, can control insect pests, thus securing harvests and reducing the use of environmentally hazardous plant protection products.

Examples of cultural services provided by the area's farmland include cultural heritage and recreational areas. Farming pits, groves and hewn trees show us how our ancestors worked the land. The varied agricultural landscape is also beautiful to look at and pleasant to walk around.

Forest

Forest is the predominant habitat type in the biosphere reserve, which is located on the border between the northern coniferous forest region (boreal forest) and the southern coniferous forest region (boreo-nemoral forest). On more fertile land there are deciduous and locally coniferous trees. All the forests in the area are more or less cultivated, and there are no original forests that have never been subjected to human intervention.

The area's forests provide several important ecosystem services. Examples of supply services are the production of materials, energy and food. Forests provide pulp, timber and fuel. It is also in the forest that locals and visitors alike usually pick wild berries, mushrooms and hunt. A

number of eskers cross the area's forests in a north-south or north-west-south-east direction and form a characteristic feature of the landscape. The rivers are excellent sources of groundwater and are widely used to provide high quality drinking water to the area's urban areas.

Forest ecosystem services	**Examples of beneficiaries**	*****	**CISES**
Provisioning services			
Production of edible mushrooms	households		1113
Production of edible berries	households, food industry		1113
Production of plant material (not for energy use)	industry, households		1211
Production of energy crops	households, workplaces, industry		1311
Production of wild animals	households, food industry		1114
Drinking water (ground water)	households, workplaces, agriculture	A	4112
Regulating services			
Carbon sequestration	everyone		2261
Water regulation	households, agriculture, industry		2213
Erosion control	households, forestry		2211
Pest control	households, food industry, forestry, agriculture	I	2231
Air purification	households, workplaces, industry		2112
Storm protection	households, agriculture, forestry		2214
Decomposition/binding	food industry, agriculture, forestry	I	2242
Cultural services			
Active recreational environment	residents, visitors, tourism companies		3111
Observational recreational environment	residents, visitors, tourism companies		3112
Scenic views	residents, visitors, tourism companies		3124

*A=abiotic, I=indirect

The area's forests also provide regulating services such as carbon sequestration, erosion control and air purification. Forests sequester large amounts of carbon dioxide from the air in trees and soil. Therefore, if the forest grows, it can reduce the greenhouse effect as long as the carbon is not released by, for example, cutting down and burning the trees or digging up the forest. Tree roots bind the soil and prevent collapse, and their crowns clean the air of pollutants.

An example of cultural services provided by the area's forests is that they provide an environment for sports and nature experiences.

Coastal areas

The area's coastline has a varied nature with miles of sandy beaches, large contiguous stands of sea buckthorn and bare cliffs exposed to northern storms. Parts of the coastal area are flat and there the post-glacial land uplift, at about six millimetres per year, is having a noticeable impact with the formation of flads and gloe lakes. The coastal area does not have a large archipelago but leads quickly out to sea.

The area's coasts provide several important ecosystem services. Perhaps the most important supporting services are the primary production of phytoplankton and algae and the cycle of water, oxygen, carbon and nutrients.

Coastal ecosystem services	Examples of beneficiaries	*	CISES
Provisioning services			
Production of edible wild algae and seaweed	households, food industry		1113
Production of edible wild fish and shellfish	hobby fishermen, food industry, households, tourism companies		1114
Water for industrial cooling (surface water)	industry	A	4211
Regulating services			
Carbon sequestration	everyone		2261
Water purification through filtration, encapsulation or binding	households, agriculture, industry, users of the Baltic Sea		2112
Water purification through organic processes	households, agriculture, industry, users of the Baltic Sea		2251
Regulation of eutrophication	households, agriculture, industry, users of the Baltic Sea		2251
Cultural services			
Active recreational environment	residents, visitors, tourism companies		3111
Observational recreational environment	residents, visitors, tourism companies		3112
Scenic views	residents, visitors, tourism companies		3124

*A=abiotic, I=indirect

Examples of provisioning services include not only the production of food products such as fish, shellfish, algae and seaweed, but also the provision of water for various industrial processes such as cooling.

The area's coasts also provide regulating services such as carbon sequestration, water purification and nutrient regulation. Microorganisms, algae, plants and animals that break down, encapsulate, filter or bind pollutants in water and prevent eutrophication.

Examples of cultural services provided by the area's coasts include recreational fishing, kayaking, boating and swimming, and beautiful views.

Built-up areas

The area is mostly rural. There are 43 urban areas (contiguous settlements with at least 200 inhabitants) in the area according to the 2018 delimitation. Of these, only 5 have more than 5,000 inhabitants, of which Avesta (and Krylbo) is the largest with 16,278 inhabitants (SCB, 2021). Buildings, roads, other hard surfaces and landscaped green areas predominate here. There are parks, gardens and more, which are habitats for many species of plants and animals. Some species benefit while others are disadvantaged by these environments. Along roads and railways there is grassland vegetation which is an important habitat. Allées, trees and farm environments are other species-rich environments adjacent to buildings.

Built-up areas are largely dependent on ecosystem services outside the built-up area. At the same time, there are many ecosystem services that are created within built-up areas.

Ecosystem services in built-up areas	Examples of beneficiaries	*	CISES
Provisioning services			
None of major importance			
Regulating services			
Air purification	households, workplaces, industry		2112
Noise reduction from vegetation	households, workplaces		2122
Water regulation	households, workplaces, industry		2213
Temperature and humidity regulation	households, workplaces		2262
Cultural services			
Active recreational environment	residents, visitors, tourism companies		3111
Observational recreational environment	residents, visitors, tourism companies		3112
Scenic views	residents, visitors, tourism companies		3124

*A=abiotic, I=indirect

In built-up areas, nature provides regulating services. Vegetation in gardens and parks helps to clean the air, reduce noise and regulate temperature and humidity. Unpaved surfaces absorb rainwater and reduce the risk of flooding.

Nature in and around built-up areas also provides many cultural services such as recreational space and beautiful views.

It is difficult to see any important livelihood services being created in built-up areas other than the food grown in gardens. In the biosphere reserve, where most built-up areas are surrounded by farmland, it is difficult to see that this food production is of any significance other than as recreation.

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 updates.

There has been no previous ecosystem analysis specific to the area and no indicators have been developed.

The Regional Infrastructure Action Plans described under 3.4 include measures aimed at strengthening green infrastructure and ultimately ecosystem services. These will be followed up by the county administrative boards, but as they have been developed relatively recently, no follow-up has yet been done.

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).

The biosphere reserve in general and the core areas in particular are of high biological value. It has an extremely rich and varied biodiversity. The constellation of land and water, different types of landscapes from hillsides to the sea, provides unique conditions. The combination of different water conditions, from running cold freshwater, through warm stagnant water, to brackish water, also provides very unique and rich biological conditions.

The ecosystem services in the biosphere reserve have not been sufficiently analysed to provide the description requested here. See also chapter 4 and the list of species in chapter 9.

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.

In 2018-2019, the four county councils have each developed a Green Infrastructure Action Plan. Green infrastructure is a network of natural features that contributes to the functioning of plant and animal habitats and to human well-being. The action plans identify landscape biotopes, structures, elements and natural areas in the terrestrial and aquatic environment, including in areas close to urban centres. They also outline appropriate conservation actions such as consideration, protection, management and restoration actions, which can, among other things, form the basis for review activities and physical planning. The plans have been developed in cooperation with relevant stakeholders in the landscape, such as forestry, agriculture, fisheries and civil society.

For this evaluation, a number of colleges and universities with courses in ecosystem services were contacted. The Biosphere Association proposed that they analyse the biosphere's ecosystem services as part of their training. The University of Skövde was one of those who showed interest. They commissioned a group of students to perform an inventory of the biosphere's ecosystem services using available literature and map data. The students were then asked to select three ecosystem services for further analysis. At the end of this evaluation, one of the six reports had been completed. The report (Carlquist Segell, 2021) includes a description of the function, classification and distribution of ecosystem services in the biosphere, as well as an assessment and evaluation of the importance of natural habitats for the provision of these ecosystem services. In addition to the reports, the Biosphere Association also had access to the GIS material produced by the students.

The Biosphere Association hopes that the University of Skövde will continue to be interested in having its students analyse the ecosystem services in the biosphere reserve. If this is the case, a more comprehensive and detailed knowledge of the area's ecosystem services and their condition can be built up. Such knowledge will then provide an important basis for the biosphere reserve's action plan and strategies.

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.]

As regards the conservation function, the evaluation has concentrated on the Dalälven River and the landscape near the river. Furthermore, some focus has been placed on the changes to and management of the core areas and some other protected areas close to or directly adjacent to the river. As the protection, monitoring and management of these areas is primarily carried out by the four county administrative boards in the biosphere reserve, they have helped to answer the questions in this chapter. In particular, the County Administrative Board of Gävleborg, which manages Färnebofjärden National Park, and the County Administrative Board of Dalarna.

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).

Short-term regulation of hydropower. The Dalälven ecosystem has been affected since the beginning of the 20th century by the hydropower, construction of which began at that time. In order to adapt electricity production to a lower demand at night or to match solar and wind power to weather changes, short-term regulation has been practised for some years in nearby hydropower reservoirs. This leads to rapid and irregular changes in water levels and flows, which generally have a negative impact on the ecology of a watercourse. However, there has been no study of the environmental impact of short-term regulation in the lower Dalälven.

The osprey population is declining in Färnebofjärden National Park. One species showing a clear decline is the osprey. This is shown by the annual monitoring of breeding success in Färnebofjärden and its surroundings. When the national park was established in 1998, more than 20 pairs were breeding, but in 2017 there were only 8 pairs. The variation in breeding success has fluctuated in recent years, but the trend over time is a declining population. There is uncertainty about the mechanisms behind the decline, but increased competition from sea eagles may be a contributing factor. Weather conditions with cold, rain and strong winds during breeding are also likely to have an impact, as well as predation and human disturbance around nesting sites.

The capercaillie is declining in Färnebofjärden National Park. In 2014-2016, the capercaillie and its habitat were studied in Färnebofjärden National Park. There is still a capercaillie population in the park but their mating displays are small and weakening, with only one or two roosters. Four or five new spawning sites and some previously unrecorded capercaillie habitats of good quality for capercaillie were discovered. The main reason for the decline of the capercaillie is that it has been disadvantaged by forestry changes. Suitable capercaillie habitat has been lost since the 1970s bird censuses in the area and continues to decline. The best measures to benefit the capercaillie are to take special care in the adjacent pine fields to the National Park, as the capercaillie move between the National Park and the surrounding area.

Decline of deciduous forest bird species in Färnebofjärden National Park. When the national park was established in 1998, the unique bird fauna was one of the most important motives. The most valuable bird species are associated with the park's forests, which is why

most of the bird surveys carried out in the area that is now a national park have focused primarily on forest species.

What has negatively affected the deciduous-dependent species is likely to be forest development both inside and outside the national park. Within the park, reduced spring flooding has allowed spruce to migrate into the floodplain forests, shading aspen and other deciduous trees. Thousands of mature aspen trees have also been felled since the late 1980s by the now numerous beavers in the park, while regrowth has been poor due to grazing, especially by elk.

Nevertheless, it may be thought that the National Park still has enough fine deciduous habitats to allow significantly larger populations of the inventoried bird species. However, virtually all of them have declined in the long term across the country, probably due to the shrinking habitats of many of these species. The national park alone is too small to ensure favourable conservation status for most of the designated species. It is also important that forestry in the landscape around the national park is carried out with a high level of respect for nature conservation. It is particularly important to strive for a high proportion of deciduous trees and dead wood.

New plants in Färnebofjärden National Park. The Nedre Dalälven region has long been known for its interesting vegetation with noble deciduous trees such as oak, lime, hazel and other heat-demanding species. In recent years, several new and red-listed plants have been discovered in the area. The 2013 survey was particularly fruitful as the water level was unusually low throughout the summer. This revealed species that have otherwise remained hidden. These include several small shore plants that require exposed muddy beds in undeveloped rivers. A very happy discovery was that of the knotweed *Persicaria foliosa*, which had not been seen in the national park for almost 100 years. It may even be new to the area, as the old find was probably made just outside the national park. The same applies to the endangered plants pigmyweed, the waterwort *Elatine orthosperma*, water mudwort and water-purslane. Together with other small plant species, they form their own plant community, which has now been shown to occur in some places within the national park.

Newly discovered plants also include the greater pond sedge, sweet woodruff, star duckweed, yellow pond-lily, whorled water-millfoil, saw wort and wych elm. The red-listed sand bittercress, known from the southern part of the park, has been found to be abundant with thousands of plants, but only in a limited area. Several new localities have also been found for Scirpus radicans, swamp violet and fragrant bedstraw. A total of 20 red-listed vascular plants have been found in the national park.

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.

As mentioned above, the evaluation focuses primarily on the core areas in terms of conservation function. In most cases, these are managed by the county administrative boards and, where nothing else is mentioned, the county administrative boards are the executive agencies.

The description of measures below is largely based on information from the County Administrative Board of Gävleborg and the County Administrative Board of Dalarna. Several reserves in the southern and eastern part of the biosphere reserve are managed by Västmanland

County Administrative Board and Uppsala County Administrative Board respectively, but measures in these reserves are not described below. In the case of Västmanland, this is because only a small part of the riverine nature that characterises the core of the biosphere reserve is found in the county and none of the reserves there are designated as core areas. Several of the biosphere reserve's core areas are located in Uppsala County, but the Uppsala County Administrative Board has not been able to contribute information to this chapter. In general, however, the county administrative boards work in the same way and in many cases they also cooperate with each other. The description below may therefore give an idea of what the county administrative boards have done in Västmanland and Uppsala counties as well.

Management plans or conservation plans are the basis for management and measures in the protected areas, with their purpose and objectives and descriptions of the habitats and species to be conserved. These plans also describe threats to the natural environment and the need for conservation measures, such as protection or management. The information will facilitate the management of the area and permit assessments under the Environmental Code.

CROSS-PROVINCIAL ACTIVITIES, PROGRAMMES AND MEASURES

Sustainable Hydropower in Dalälven (HÅVD)

The project ran from 2015-2018 and was a collaboration between the water regulation companies, Fortum, Vattenfall and the county councils of Gävleborg, Uppsala and Dalarna counties. The final result was the presentation of a plan for environmental measures in hydropower. Examples of possible actions within the biosphere reserve presented in the plan are tributaries for the freshwater pearl mussel, restoring stream biotopes and adjacent habitats, and restoring ecologically adapted annual flow dynamics with sustained spring floods at Bredforsen and Båtfors. At the same time, the action plan makes it clear that environmental measures in hydropower must be weighed against the energy benefits and that those measures which, from a national perspective, provide the greatest environmental benefit in relation to the impact on the energy system are to be prioritised. The results of the project are now managed by the Management Board, which consists of a steering group and working groups. The Management Board will also work to increase knowledge of the energy, natural and cultural values of the Dalälven.

Salmonids in the Nedre Dalälven area (LIV)

The aim of the LIV project has been to investigate the possibility of restoring fish migration and reproduction potential for salmonids in order to regain self-reproducing wild salmon and sea trout populations in the Dalälven River in the future.

The long-term objectives of the project are to restore viable and self-reproducing stocks of salmon, trout (migratory and stationary), grayling and other migratory fish species in the Nedre Dalälven and to achieve good ecological status or potential according to the EU Water Framework Directive (WFD). This in turn represents a potential for a positive development of sustainable sport fishing tourism and a significant promotion of local economic development in the Nedre Dalälven.

The project has investigated the potential of the Nedre Dalälven for salmonid production if free migration routes were to be restored and examined what measures are necessary to strengthen riverine populations of migratory fish species in the long term. The project area extends from downstream of the Näs power plant to the estuary in the Baltic Sea. The project has been conducted as a collaboration between the county councils of Gävleborg and Uppsala counties, and the power companies Vattenfall and Fortum.

Within the LIV project -Salmonids in the Nedre Dalälven, the need for restoration measures in potential reproduction areas for salmonids has thus been investigated. The river sections identified as priorities in LIV have since been restored. In the Nedre Dalälven area, habitats and spawning areas have been lost in previous clearings for rafting routes and as an effect of power plant regulation. The restoration measures will allow fish to regain access to them.

Two excavators restore the rapids at Gysinge.

The restorations consist of, for example, moving stones, loosening the river bed, moving boulders back into the water and laying gravel for spawning. Helicopters were used to get the spawning gravel to inaccessible areas in the streams.

Through the two Leader-funded network projects, Fiskevård i Nedre Dalälven and Samverkan mellan fiskets intressenter, the Biosphere Association has acted as a link between the LIV project and the HÅVD project, and between many of the stakeholders involved and necessary for the project's success. Read more about the Biosphere Association's networking projects in fisheries in section 2.3.4

Restoration and management of wetlands

In the agricultural landscape, large areas of wetlands have disappeared during the last century. Efforts are being made, particularly by the area's county councils, to encourage landowners to restore wetlands in agricultural landscapes. In the biosphere reserve, several such projects have been implemented with government support. In the past, there have also been large areas of mowing and grazing along lakes and rivers that have become overgrown. In protected areas, grazing and mowing are carried out on the most valuable wetlands and wetlands. Outside the protected areas, rural subsidies help to restore some of the cultivation.

The Biosphere Association has run several leader projects with the aim of inspiring the resumption of river meadow cultivation, i.e. restoration followed by annual grazing and mowing. Read more about the Biosphere Association's conservation projects in sections 2.3.4, 4.3 and 5.8.

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FÄRNEBOFJÄRDEN NATIONAL PARK AND GÄVLEBORG COUNTY

New management plan for Färnebofjärden National Park

When Färnebofjärden National Park was established in 1998, the management plan that has been in place since then was first established. The plan was revised in 2018, resulting in a more appropriate management plan that is, among other things, better adapted to current use, to the Natura 2000 regulations and to the biological values of the area. The guidelines and measures in the management plan are based on a division of Färnebofjärden National Park into zones. This zoning is different from that of the biosphere reserve as a whole. The aim of this zoning, together with the regulations, is to clarify how the national park can accommodate different conservation and accessibility needs within the overall purpose. The zoning provides an overall basis for the planning and management of the national park and provides direction on where measures and actions to facilitate public use should be taken. It is a tool for the management to prioritise resources in an efficient way to achieve the purpose of the National Park. Zoning can also make it easier for visitors to understand what to expect from their visit to different parts of the National Park, what activities are appropriate and what to expect in terms of facilities and level of accessibility or wilderness experience. The National Park has been divided into three zones with regard to outdoor facilities and accessibility for different visitors; zone 1-wilderness zone/low activity zone, zone 2 activity zone, zone 3-entry zone.

Conservation burns

In 2011, a fire plan was developed for the Färnebofjärden National Park. In 2015-2020, conservation burns were carried out as part of the Life Taiga project, under which county councils in several parts of the country carry out conservation burns in protected areas.

The County Administrative Board carries out conservation burning in Färnebofjärden National Park.

Many plants, fungi and animals are now threatened because forests burn less often than they used to. Controlled burns are carried out to provide better conditions for species that benefit from habitats such as firebreaks and dead trees and in some cases need fire for their survival. Several types of woodpeckers and unusual beetles quickly find the burnt areas and thrive there.

Annual cultivation of river meadows - for cultural and ecological values

In Färnebofjärden and in nearby nature reserves, the vegetation is shaped by the river's floods, which leave their mark on nature and make it unique. There are large areas of river meadows that were previously very important as feeding grounds. However, the introduction of hydroelectric power stations and the reduction in cultivation since the beginning of the 20th century have had a negative impact on these habitats.

Today, these culturally and biologically important lands need to continue to be cultivated so that their values are not lost. Since the national park was established, the river meadows at Åsbyvallen and Ängsövallen have been restored and cultivated annually. At Stadarna, grazing takes place on a restored river meadow. In recent years, overgrown river meadows have also been restored at Ista and in the Spjutholmen and Bredforsen nature reserves, as well as in a number of other areas in the biosphere reserve.

White-backed Woodpecker

The White-backed Woodpecker *(Dendrocopos leucotos*) used to be a common species in southern Sweden but has declined sharply in the latter part of the 20th century. Today it is one of Sweden's most endangered vertebrates, classified as acutely endangered (CR) according to the Swedish Red List.

The sharp decline of the species is largely due to the loss of its habitat to modern forestry. The white-backed woodpecker needs plenty of dead wood because it has insect larvae on which it feeds. Dead wood is often scarce in production forests, but it is plentiful in, for example, Färnebofjärden National Park and in some other riverine areas of the biosphere reserve. The Swedish Society for Nature Conservation, together with several other non-profit organisations, including Upplandsstiftelsen, is therefore conducting a project to save the species. The Swedish Environmental Protection Agency also has an action programme to save the white-backed woodpecker, together with the relevant county administrative boards, the Swedish Forest Agency, the Swedish Society for Nature Conservation and the forestry industry. Measures have focused on transplanting reared individuals and restoring habitats. In 2020, four breeding sites were confirmed in the biosphere reserve. In addition to these, four more solitary individuals have been observed. Twelve individuals have thus been observed, which is seen as a relatively good year for the species. A few individuals were also found in Värmland and along the coast of northern Sweden.

The white-backed woodpecker is an umbrella species, which means that many other threatened and red-listed plant and animal species depend on the same kind of habitats. It is therefore an indicator of the value of biodiversity in Sweden. In the case of the white-backed woodpecker, as many as 200 other red-listed species also benefit from these efforts.

DALARNA COUNTY

The heritage values of protected areas require extensive management. In several cases, contracts are drawn up with farmers who carry out the cultivation. Fields located next to ravine systems pose challenges to farming through active erosion processes, but their continued use is of great importance for the shape of the cultural landscape. In reserves along the Dal River,

restorations in the form of energy forest removal, soil milling and subsequent cattle grazing have been carried out. Overgrown meadows will be restored and grazed. Below are comments on some characteristic protected areas within the biosphere reserve:

Säterdalen, which is part of the core area, is one of Sweden's best examples of a living ravine landscape. Here, the ravines are constantly evolving through a series of natural factors. Säterdalen today has about 35 side channels and in the deepest places the river has cut 50 metres below the surrounding area. In Säterdalen there are pastures that are kept open through agreements with livestock owners. The area is a popular destination. Facilities for outdoor recreation have been developed continuously for many years.

Lilla Älvgången. The conservation area, which is part of the core area, has been restored in several stages. Energy forests have been removed and the land has been tilled. Floodplains are grazed and kept open through management agreements with farmers in the area. Outdoor recreation has developed in the area during the period 2010-2020. The County Administrative Board of Dalarna cooperates with Hedemora municipality, which manages the adjacent nature reserve Stadssjön, giving visitors a larger contiguous area with more different habitats and facilities such as birdwatching towers and resting places to visit.

Lilla Älvgången and the Stackharen nature reserve, both part of the biosphere reserve's core area, will be merged to form a new larger reserve called Hovra. Read more in the section on changes in protection below.

Kloster. The nature reserve, which is part of the core area, includes both extensive pastures in the east and mixed deciduous forest in the west. The pastures in the eastern part are grazed by agreement with the landowner. In the spring of 2020, a birding tower that had been there since the 1980s was demolished. A new tower has been erected on the same site and the path out towards it has been graveled. The aim of the western part is to preserve and increase the proportion of deciduous trees. It is hoped that it can become a good habitat for the white-backed woodpecker. The area is now being cleared of spruce and a ditch that drains the deciduous swamp forest will be closed to make the forest even wetter and prevent the resurgence of spruce.

Hässlen. An interesting nature reserve that is worth mentioning even though it does not belong to the core area. There are deciduous meadows with high nature values associated with long cultivation of the land, as well as a grove of hazel. The hazel population allows the nutcracker to nest here. Larger parts of adjacent contiguous spruce forests, which are important for the nutcracker, have been protected by the landowner (Sveaskog).

Measures that have been and are continuously being taken include: clearing of emerging spruce, control of lupines, annual mowing, annual grazing by sheep. Under LIFE Forage and Grazing 2012-2014, restorations were carried out with cutting to bring more light into the meadows.

Measures in the aquatic environment. Worth mentioning are also a couple of measures taken in bodies of water within Dalarna County. At Näckenbäck, a wetland has been created just before the river flows into Lake Bysjön. This wetland will act as a refugium for fish reproduction, such as pike, which depend on reasonably stable water conditions during spring spawning. Bjurforsbäcken, which flows into Dalälven just upstream of Avesta, is one of the few trout-bearing streams in Avesta municipality. Here, Avesta municipality has eliminated two migration barriers to increase the spawning opportunities for trout from the Dalälven River.

CHANGES IN PROTECTION

Since 2010, around 50 new nature reserves have been created in the biosphere reserve, covering an area of almost 14,000 hectares. The vast majority are set up by the state but a few by the municipalities in the area. Five of the new reserves are located near or directly adjacent to the Dalälven: Stadssjön Kungsgårdsholmarna, Prostnäset, Bjurforsbäcken, Laggarbomyran and Kerstinbomyran.

Dalarna County Administrative Board has also been working on extending two existing protected areas at Lake Hovran during this period. Hovran is part of the Dalälven river and is also part of the Ramsar area sharing the same name. The protections in question are the nature conservation area Lilla Älvgången and the nature reserve Stackharen. Once the process is complete, it is intended that these protected areas will be replaced by a new reserve called Hovran. The work is expected to be completed in 2021, by which time the Hovran nature reserve will have been extended by 334 hectares to cover an area of 437 hectares plus the adjacent Stadssjön reserve.

With the expansion, the biosphere reserve now also includes the Ramsar areas of Svartådalen in Västmanland, Sala municipality. The Hovran and Färnebofjärden Ramsar sites were already part of the area.

Since 2015, the Swedish Environmental Protection Agency has opened up the possibility of conducting commercial activities in all Swedish national parks without a permit or agreement. This is to meet a growing demand for organised outdoor and nature tourism activities in protected areas. Increased outdoor recreation is positive in many respects. Outdoor living is a means of increasing well-being and environmental awareness. It also provides livelihood opportunities in the hospitality industry. Today, many actors contribute to the development of outdoor recreation.

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)?

Throughout the period, the association has run several projects aimed at raising local awareness and commitment to the conservation of natural resources and biodiversity. This has mainly involved fisheries management and the cultivation of river meadows. Within the framework of the leader project BUS in the biosphere, the Biosphere Association has organised bioblitzes and walks in the biosphere reserve for the public. Read more about BUS in the biosphere in section 6.5.1.

Sustainable fisheries/fisheries management

Fishing in the Nedre Dalälven region has always been of crucial importance to the people and activities of the area. Up until the second half of the 20th century, fishing in the river, with its fjards and lakes, continued to be important for commercial, supplementary and subsistence fishing. Given its geographical location, the river is unusually rich in species, with around 30 naturally reproducing fish species. There are more than 25 defined management areas in the area concerned, the vast majority of which are fisheries management areas.

Today, fishing, together with the high natural values of the area, are the single most important factors in attracting visitors. Fishing is also important for the quality of life of residents and, together with other natural values, can help to attract people and influence their decision to relocate to or remain in the area. Few contiguous fishing areas have as many recreational

anglers as the Nedre Dalälven area, with around 100,000 fishing days per year. Fishing visitors come both from Sweden and abroad, mainly from countries such as Poland, the Czech Republic, Germany and the Netherlands. No precise economic valuation has been carried out of the turnover of these fishermen in the district, but it is estimated at over 5 million EUR per year. The growth of the number of fishing tourists has now levelled out and is showing a tendency to decline, despite significant marketing. Fishing tourists are becoming increasingly environmentally aware and tourism businesses need to take further advantage of this to demonstrate in their actions and marketing how they and the area are working on environmental issues and sustainability. There are thus several good reasons to support and protect the fishing habitats in the Nedre Dalälven region and further make use of the social and economic opportunities that fishing offers. Fishing is a textbook example of how working to conserve, restore and develop the environment and biodiversity can also result in socially and economically sustainable development.

In addition to the challenges mentioned above, there are other problems for fisheries in the area. The Swedish Agency for Marine and Water Management and the Swedish Environmental Protection Agency classify the river's environmental and natural values as very high, but the river and its catchment area still do not meet good status according to the EU Water Directive. The main reasons for this are obstacles to migration in the main river in the form of the large power stations, obstacles to migration in tributaries and log driving clearances that have not been restored since log driving ceased almost 50 years ago. The short-term regulation of power plants also poses problems for the reproduction of various species, including grayling, eel, asp and probably also pike. Salmon and sea trout have gradually disappeared during the 20th century as a result of the power plants. The Dalälven salmon is now acutely threatened as its continued existence is based on compensatory farming. Such cultivation is considered genetically depleting and the European Commission has therefore decided that it should be phased out. Eliminating some or all of the above problems would have positive environmental, social, business and socio-economic effects.

Both before and after the biosphere designation, the Biosphere Association has carried out continuous work on sustainable fisheries and fisheries management to address these problems and challenges (see 2.3.4).

Cultivation of river meadows

Since its nomination as a biosphere reserve, the Biosphere Association has worked to inspire the restoration of river meadows and the resumption of mowing and grazing on these lands. Important work for biodiversity and the preservation of open landscapes, carried out primarily through three Leader projects: Skörd från älvängar, Hävd av älvängar and Gnista för glöd. The projects have inspired increased use (in this case grazing and mowing) of river meadows along the Dalälven by increasing knowledge of needs and opportunities and by building networks and relationships between implementers, landowners and authorities. The Biosphere Association has identified potential areas where use can be restored and has mediated contacts between landowners, operators (machine operators and livestock owners) and the authorities that can provide permits and subsidies. The projects have also organised several meetings where stakeholders have learnt about relevant legal and economic issues, marketing and techniques to manage the harvest. As part of the project's field trips, they have had the opportunity to see and showcase successful examples of restored river meadows with restored grazing (see also 2.3.4 and 5.8).

General information on the management activities of county administrative boards

The management of the protected areas in the biosphere reserve by the county administrative boards has well-defined objectives - to promote biodiversity, sustainable social development and knowledge development through research and public education. Within the biosphere reserve, these objectives are integrated into the daily work of the county councils in management, in decisions and in future plans. Dialogue, collaboration and engagement with local actors, residents and other local stakeholders is also central to the work. Local ownership is essential for acceptance and understanding of conservation work. The work of the county administrative boards in nature conservation to promote biodiversity is concentrated mainly in the protected areas, but in collaborative projects several stakeholders are involved and the work may affect a wider geographical area outside the protected areas.

New management plan and National Park Council

The increasing influx of visitors poses challenges for the management of the National Park. The National Park must be kept accessible to several categories of visitors, for example by adapting it to people with disabilities and by adapting trails, certain destinations and certain information to children and visitors who are unfamiliar with protected nature. The current (2018) revision of the management plan means that Färnebofjärden National Park will have a more appropriate management plan that is, among other things, better adapted to current use, to the Natura 2000 regulations and to the biological values of the area.

There is a National Park Council for Färnebofjärdens National Park where current issues can be discussed and decided on. The National Park Council provides an opportunity for stakeholders and interested parties to contribute to the management and development of the National Park. The Council is a way of increasing local stakeholdership and widening opportunities for participation by those with an interest in the National Park. The National Park Council has a broad membership, including representatives from environmental and nature conservation and fisheries associations, hunting enthusiasts, boating clubs and contractors. The County Administrative Board convenes and chairs the Council. Previously, there was a management council with the same purpose as the National Park Council. However, this was discontinued as there was a need for restructuring. The Biosphere Association has participated in both the previous and current National Park Councils.

Commercial tourism activities in the national park

The new opportunities to conduct commercial activities in Swedish national parks were a boost for national park activities and collaboration. The administration's cooperation with private actors also fits well with the objectives of the biosphere reserve. Cooperation between organisers and management leads to better use of the national park, more satisfied visitors and less disturbance and conflict. Awareness of the important values of the National Park reaches more visitors while local involvement benefits local tourism and business. Tourism and other organised outdoor activities in the national park are conducted in a sustainable manner, without conflicting with the purpose of the national park. Activities in the National Park that may lead to conflicts of interest between practitioners, or with conservation values, are recognised and managed in such a way that the purpose of the National Park is not compromised. Several private operators in the tourism industry have cooperated with the National Park Authority and currently operate their own businesses in or close to Färnebofjärden National Park.

Naturum and various channels to reach the public

Naturum's work is a very important channel to the public by raising awareness and disseminating information about the values of the national park and biosphere reserve, but also about nature values and biodiversity in general. Naturum's activities include lectures and activities for children and families, cooperation with schools, guided tours (without competing with private operators), nature information for the general public, social media posts, renting of premises and more. This work contributes to spreading interest and knowledge about nature and the environment in various ways and goes beyond the protected areas managed by the Authority.

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

As far as the conservation function is concerned, the Biosphere Association has chosen to work primarily with communication and collaboration. As mentioned earlier, the protection and management of nature is primarily the responsibility of the county administrative boards and, in some cases, the municipalities. The Biosphere Association does not evaluate the management carried out by these authorities and it has not been possible to access their own respective evaluations in the context of this 10-year evaluation. However, considering the many new reserves that have been created in the last ten years and all the practical measures implemented by these management authorities, only a small part of which are described in this chapter, the Association considers the impact of the management measures and strategies to be good.

In 2018, 2019 and 2020, the Biosphere Association received an award from the Alsbo Ägg Baltic Sea Fund for its work with Biosphere for Baltic and the various fisheries conservation projects in the Nedre Dalälven region. The prize is awarded annually by Alsbo Ägg AB to organisations working to restore, protect and preserve the Baltic Sea environment.

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?

According to Gävleborg County Council, which manages Färnebofjärden National Park, some other parts of the core area and several other protected areas in the biosphere reserve, the following points have been important factors:

- **New management plan.** The new management plan facilitates the work considerably as it is more adapted to new conditions, such as increased visitor pressure and changed environmental conditions.

- **Dialogue and local stakeholdership.** Local stakeholdership builds trust and a more positive attitude towards nature conservation and sustainable development, which may be perceived by some as costly and abstract without concrete results. For major measures in protected areas, changes need to be carefully established with local stakeholders through information, meetings, etc. Information and facts provide greater understanding and acceptance of planned actions or changes. One such example is conservation burns, which tend to cause concern and annoyance, but also inspire wonder and curiosity. Prior to a conservation burn, the responsible Agency works with information efforts to reach the public well in advance and thus reduce concerns and misconceptions before the operation.

Where possible, actual results or impacts of nature and environment actions should be presented, not only to employees, colleagues and others within the sector, but also to the public.

- **Collaboration for biodiversity and sustainable development.** Collaboration between stakeholders provides greater viability and opportunities not only in terms of finances and resources, but also through greater visibility, the ability to spread awareness of the biosphere reserve, sustainable development and biodiversity. The LIV project's future vision of restoring fish migration and reproductive potential for salmonids in order to regain self-reproducing wild salmon and sea trout in the Nedre Dalälven has been a major collaborative project that has received a lot of attention.

- **Exchange of experience and local expertise.** All these years of managing and maintaining protected areas have generated experience, knowledge and a deeper understanding of context. Exchange of experience takes place within the County Administrative Board but also between agencies and with other expert bodies, nationally and internationally. Local expertise found in the general public is also important in the management of protected areas. For example, local expertise is used for bird surveys.

4.6 Other comments/observations from a biosphere reserve perspective.

National plan for modern environmental conditions for hydropower

In 2020, the government decided on a plan for modern environmental conditions for hydropower. This work that has just begun will involve systematic reassessment of all hydropower plants in Sweden. The aim is to ensure that hydropower is subject to environmental conditions that lead to both the greatest possible benefit for the aquatic environment and an efficient national supply of hydropower electricity.

A number of environmental measures will be implemented at various hydropower plants along the lower part of the Dalälven River that will have a positive impact on the development of fishing communities and the conservation of flood-dependent habitats and species.

The scientific work carried out in the last decade in the lower Dalälven River related to these habitats/species will be highly useful in achieving the maximum environmental benefit from future actions.

Thanks in part to the advocacy work of the fishing network of the Biosphere Association, the reassessment of the power plants in the lower parts of the Dalälven has been brought forward to 2024 instead of being carried out in 2035-2040 as originally proposed. (See 2.3.4, Focus area sustainable fisheries/fisheries management).

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]

The Biosphere Association and Leader

A basic knowledge of the relationship between the Nedre Dalälven Biosphere Association (Intresseföreningen) and Leader Nedre Dalälven (Leader) is important for understanding the development function of the biosphere reserve.

Given the existence of both good and problematic conditions in the area, the Biosphere Association was formed in 1986 by public and private stakeholders. The inclusion of the nine municipalities, as well as major land and water owners and accommodation facilities, was seen as a prerequisite for being able to work in an impactful way with the positive development of the area. A natural consequence of the association's work was the 2000 application to become one of Sweden's Leader areas, which became a reality the following year. Leader is a method of local development in which different parts of the community work together to develop the local economy. In a so-called tripartite partnership, the voluntary sector works together with the business community and the public sector to achieve common goals. The Leader approach and method were well in line with the development work that the Association had already been conducting for 15 years.

In 2004, an idea and a wish to create a biosphere reserve was also raised by the Biosphere Association. The ambition to promote sustainable ecological, economic and social development was well in harmony with the work already carried out throughout the history of the Biosphere Association, and also has strong similarities with the purpose of the Leader work. The Nedre Dalälven River Landscape was nominated as a biosphere reserve in 2011.

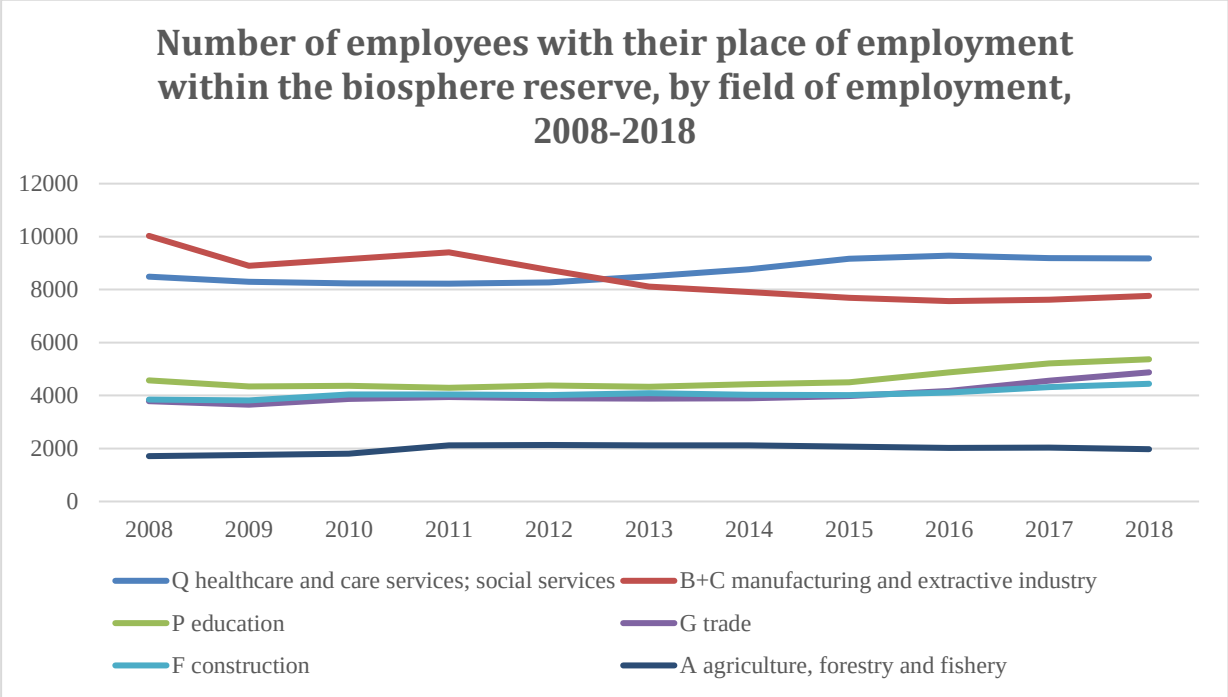
The Biosphere Association and Leader Nedre Dalälven (see 5.6) now share a secretariat, management and, to some extent, staff. In practice, the biosphere reserve and the Leader area have operated in the same geographical area since 2014. The close relationship with Leader is a strength of the biosphere reserve. The local Leader strategy is shaped by the biosphere idea, which for example enables funding for projects that promote sustainable development. However, it is important to stress that the Association and Leader are two independent organisations and that the Association applies for Leader funding on the same terms as other organisations.

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).

The five industries that employed the most people in the biosphere reserve in 2018 were:

Healthcare and care services; social services	20 %
Manufacturing and extraction	17 %
Education	12 %
Trade	11 %
Construction	10 %

Together they employ almost 3/4 of the workforce in the biosphere reserve.



No drastic changes have taken place since 2008. Perhaps the biggest change is that health care and social work has overtaken manufacturing and mining as the area's largest employer. The differences between municipalities are small, with the same five industries employing the most people. One notable exception is that trade employs the most people in Heby municipality.

Agriculture, forestry and fishing is the seventh most important industry, employing only about 4 percent of the workforce.

The statistics are taken from Statistics Sweden (SCB) and describe the number of employed people aged 16 and over with a place of work in the biosphere reserve (day population) broken down by industry according to SNI 2007. The SNI classification at this level is identical to its European counterpart NACE Rev. 2. One shortcoming of the statistics is that they do not include Österfärnebo and Hedesunda parishes. SCB reports these statistics at municipality

level, but it has not been possible to break down data for these two smaller areas. However, the two parishes represent only about 5 percent of the biosphere reserve's population.

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.

The Nedre Dalälven River Landscape is characterised by its high natural values and small-scale tourist businesses. There are very good opportunities for tourism linked to the unique natural and cultural environments of the area. The proximity to Stockholm and several medium-sized towns makes the area accessible primarily to day and weekend visitors. The proximity to Arlanda Airport, and to the ferry terminals in Stockholm and Nynäshamn makes the area accessible to visitors from Europe and the rest of the world.

It is difficult to obtain reliable statistics on the overall development of visitor numbers for the whole area and its nine municipalities, but figures from Färnebofjärden National Park, which is part of the biosphere reserve, show a strong development of nature tourism. From 2011 to 2019, the number of reported visitors to the National Park has steadily increased, from 48,000 visitors in 2011 to 84,670 visitors in 2019. Due to the corona pandemic, there was almost a doubling in 2020 with 178,400 visitors to the park.

According to an estimate based on data from one of the major tourist operators in the area, fishing tourism has increased significantly in the last five years. According to the entrepreneur's figures, the number of fishing days has increased by over 30 percent and the turnover linked to fishing tourism by over 60 percent during the period. See further section 5.4.

In 2017, Leader carried out a tourism feasibility study, which included a survey of 245 commercial operators in the area. From the 109 responses received, a large majority of businesses wanted to grow. 69.7 percent want to increase and 17.4 percent want to expand their activities. There is great potential to increase tourism turnover in the area, not least through the development of more accommodation in the form of individual cottages and so-called micro-cottage villages in attractive locations (Leader Nedre Dalälven 3, 2017).

Tourism initiatives in the area have increased following the nomination to become a biosphere reserve. Both individual and joint initiatives have been implemented with the support of Leader and other funding bodies. The tourism-related Leader projects carried out in the area have had positive effects, including the creation and preservation of jobs. Leader Nedre Dalälven's evaluation covering the years 2008 - 2014 shows that during that period 143,865 day visits and 15,282 new guest nights were added. The designation as a biosphere reserve may not be the only reason for the magnitude of these effects, but it has contributed to the fact that new day visits have been added and visitor networks built up in a spirit and development towards a more sustainable tourism.

Ever since the years of biosphere reserve candidacy, the biosphere idea has shaped Leader's work in the area and is now a central part of Leader's strategy. In particular, positive effects are achieved for the development of sustainable tourism in projects linked to nature, culture, local production, fishing and fisheries conservation. The major fisheries projects implemented since the nomination have been mainly about sustainability and have a significant impact on tourism, as one of the main reasons for travelling to the area is recreational fishing.

SlowTrips

A concrete example of the development of tourism promotion in the biosphere reserve is the European SlowTrips network. Since 2018, Nedre Dalälven is one of nine European Leader areas, working together to develop and promote travel experiences featuring everyday and authentic elements. SlowTrips connects the visitor with the visited region and enables exchanges between cultures. The traveller explores fascinating environments, strange or lost places, everyday life and local life stories. The criteria that form the framework for SlowTrips harmonise well with the biosphere concept. The project is expected to continue until 2023.

"What is most distinctive about SlowTrips is that the project targets 'Lost Places, Hidden Treasures and Backyards'.where it wants to promote small, quirky destinations where visitors can interact with the locals and preferably stay for a long time in one place. A type of tourism that fits well into our biosphere reserve!"/ Charlotta Heimersson, CEO of the Biosphere Association

SlowTrips is nominated for the EU Rural Inspiration Awards in the category "Sustainable Future, projects that contribute to strengthening the long-term sustainable competitiveness of rural areas". It is run by the EU's Directorate-General for Agriculture and Rural Development (AGRI).

Destination Nedre Dalälven

The Leader project runs from 2017 to 2022 and is run by NEDAB, a subsidiary of the Biosphere Association, with support from the Regional Fund. The aim of the project is to strengthen the attractiveness of the Nedre Dalälven area and its tourism products, mainly through digital development. The Nedre Dalälven tourist network, consisting of tourist destinations, activities, food (restaurants and local producers) and accommodation facilities, has been working together for many years in a network open to anyone who wants to participate. Over the years, issues related to development and demand both nationally and internationally, quality and service matters, packaging and marketing have been the themes of networking meetings, courses and marketing activities. There is a very strong ambition to develop the competitiveness of the network's participants and activities by making use of sustainability arguments, both economic, social and ecological, in their development. The trend in tourism in recent years has shown a steady increase in interest in experiences based on natural and cultural values, both for domestic and international tourism. The Nedre Dalälven, including Färnebofjärden National Park, with its strategic location close to the Stockholm region, can be an attractive option for both national and international visitors.

Consequences and adaptive measures during the Corona pandemic

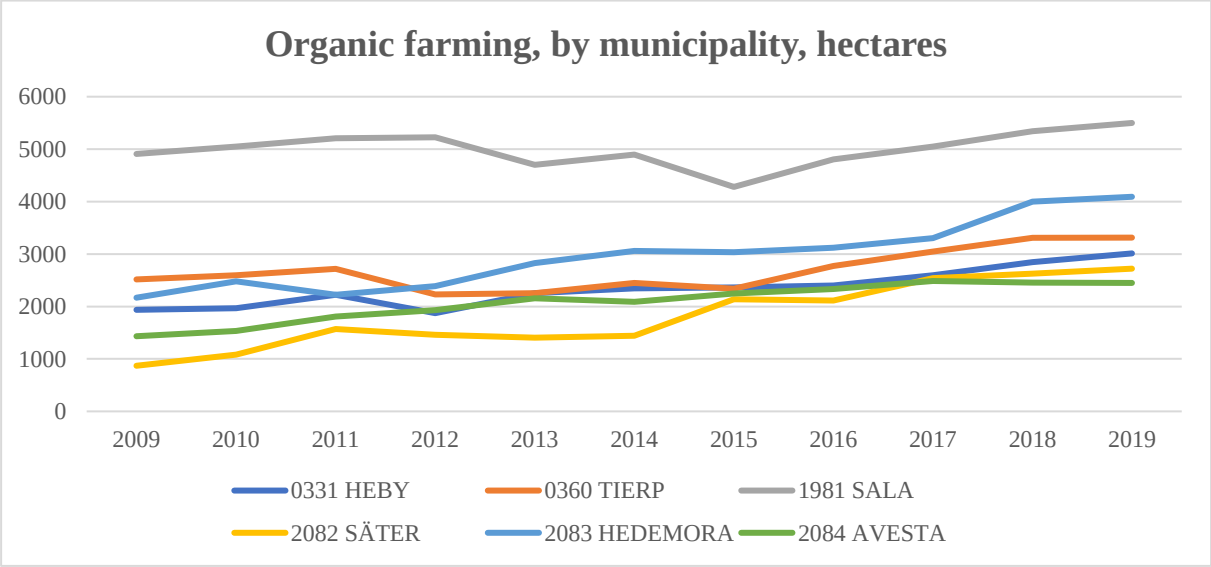
Like other tourist areas, Nedre Dalälven has clearly been affected by the pandemic situation that started at the beginning of 2020. Initially, this caused a great deal of uncertainty and concern for destinations and contractors in the area. During the spring, an increase in the number of visitors was noticed. Couples/groups of friends who had grown tired of sitting at home and wanted to make day trips of one or a few hours from home started to visit. It was often new customers who were happy to spend money on food and shopping. This trend continued over the summer and for many small businesses it meant good sales, in many cases record sales. For accommodation facilities, especially the larger ones, the situation has developed into a very difficult one over the course of the year.

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

The number of people employed in agriculture has decreased slightly in the region over the past 10 years, while turnover has increased slightly. The total area of arable land under cultivation is largely unchanged, although it also shows a slight decrease over the period.

The area of organically farmed land has increased over the period in all municipalities of the biosphere reserve. The largest percentage increase was in the municipality of Säter, which started at the lowest level. The increase was lowest in Sala, which was already at a much higher level than the other municipalities in the area. Overall, the area of organically farmed land in the region has increased by 52 percent over the period, which is in line with the rest of the country. Figures refer to both land already converted and land under conversion.



Organic livestock farming also sees a growing trend in the area, but available statistics at municipal level are, for confidentiality reasons, too incomplete to be presented here.

The statistics presented above do not include Österfärnebo and Hedesunda parishes as it was not possible to extract separate data on these, nor on Älvkarleby municipality, due to confidentiality reasons.

One trend in agriculture in the area is that it is becoming more diversified, i.e. farms are investing in several different sources of income. Producers are also increasingly processing their products, often in the form of artisanal foods, and are in closer contact with consumers. Some farmers are also approaching the tourism industry as local food has become one of the reasons to visit the area. Today, there is also greater confidence in the future among farmers and more young people are interested in entering the profession.

Compared to 10 years ago, there is a higher demand for locally produced products in the shops. Municipalities and regions have also started to explicitly favour locally produced products in public procurement.

Since its nomination as a biosphere reserve, the Biosphere Association has been working to inspire the restoration of river meadows and the resumption of grazing and mowing on them. This is important work for biodiversity and for maintaining open landscapes. The work has primarily been carried out within three Leader projects Skörd från älvängar, Hävd av älvängar and Gnista för glöd. See further sections 2.3.4, 4.3 and 5.8

Forestry

According to a representative of one of the major forestry companies in the area, the forest industry is intact, as it is a long-term, living and regulated industry. Deforestation and reforestation are constant. During the period, a couple of forestry companies were added in connection with the split-up of Bergvik Skog into several parts. The change has involved several actors in the forestry sector, which together employ slightly more people.

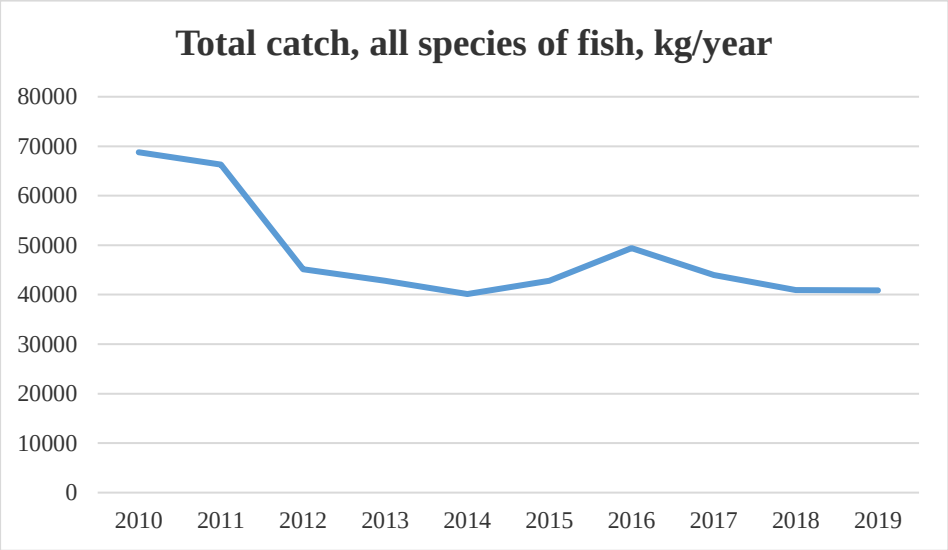
As with agriculture, there is a trend towards higher value added. One example of this is Setra, which has invested in glulam production in Långshyttan. Among other things, large wooden beams or smaller parts for windows and doors are manufactured there.

In February 2019, Plockhugget AB arranged a two-day course in the forestry form of near-natural forestry together with the Biosphere Association. About thirty forest owners and other interested people were taught the basics of forest management according to the Lübeck model. It is an ecosystem-based and forest-free form of forestry that uses harvesting and natural regeneration. Participants discussed what the method means, how it affects the environment and their wallets, and how they go about it in practice as forest owners.

In 2019, the association Skogens mångbruk was founded. The aim of the association is to promote forestry management that promotes ecologically, socially and economically sustainable multipurpose use of forests. Management and conservation that strengthens the Swedish countryside. The association is based in the biosphere reserve but is national in scope and consists of a network for exchanging information on innovative ideas and ways of using forests, as well as for joint knowledge building and marketing. The Biosphere Association plans to start a cooperation with the association in 2021.

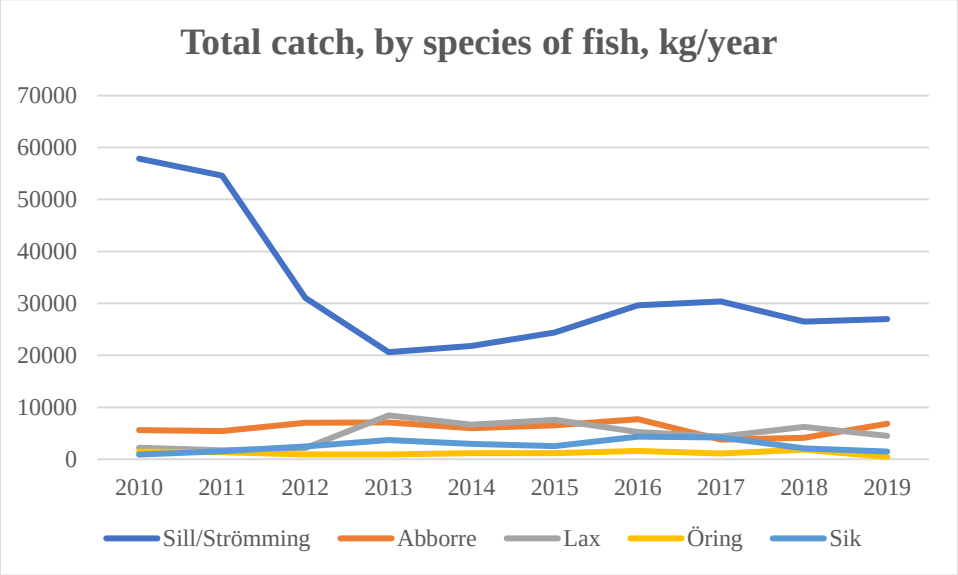
Fishing

In Tierp and Älvkarleby municipalities, coastal commercial fishing is carried out, mainly for herring. This is a small-scale fishery using nets, gillnets, trammel nets and traps. In addition to herring, a dozen other fish species are caught, including salmon and perch, totalling 40-70 tonnes/year. There is no commercial fishing in the lakes and rivers of the biosphere reserve.



Statistics for the total of five commercial fishing boats with home port in Tierp or Älvkarleby show that the total catches have decreased in the last 10 years.

A closer look at the five most fished species, in kg/year, reveals that it is mainly herring catches that have declined. According to one of the fishermen, the biggest threat to small-scale coastal fishing is industrial trawling for herring in the area. According to him, this has a negative impact on both the herring stock and the fish species that feed on the herring.



Unfortunately, there are no studies on the impact of the designation on agriculture, forestry and fisheries.

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

The most significant parts of the economy such as public activities, industries, trade etc. are of course the most important economic activities for the local community, but the question has been interpreted here as referring to income mainly from tourism activities. In general, it is difficult to determine the extent to which the designation of a biosphere reserve benefits the local community. The response below refers to outdoor and fishing tourism to the core and buffer zones of the area in particular.

The average visitor to a Swedish national park is estimated to spend around 100 EUR during their visit. The figure is based on a visitor survey in Sweden's national parks in summer 2019 (Swedish Environmental Protection Agency 2019). Of course, the amount varies from one national park to another. The corresponding survey in 2014 (Naturvårdsverket 2015), which also presented specific figures for individual national parks, showed that visitors to Färnebofjärdens National Park six years ago spent an average of around 80 EUR, which is close to the average for the different national parks in the survey. Although the surveys have some shortcomings and should be viewed with some caution, it should be reasonable to assume that a visitor to Färnebofjärden National Park today spends an average of about 100 EUR during their visit. The figure refers to expenses such as accommodation, food and shopping in the municipality where the national park is located.

Färnebofjärden National Park is about the tenth most visited national park in Sweden. According to visitor statistics compiled by Gävleborg County Administrative Board, Färnebofjärden National Park has had an average of over 80,000 visitors each year for the past five years. If these visitors spend an average of 100 EUR, this adds up to over 8 million EUR in income per year for the local community.

A large part of the tourism in the area is fishing tourism. In the context of this evaluation, one of the major tourism operators in the area was asked to provide figures for the development of their turnover in fishing tourism. Fishing tourism includes accommodation, sale of fishing tackle and petrol, and boat hire. According to their figures, the number of fishing days has increased by over 30 percent in the last 5 years. The turnover of fishing tourism increased by more than 60 percent during the same period. Each fishing day generated on average almost 50 EUR in revenue for the contractor during the period. According to statistics from SCB, a Swedish recreational fisherman spends 82 EUR per fishing day. SCB has calculated this slightly differently but it shows that 50 EUR per day of fishing is reasonable.

Each year, fishing permits are sold for around 100,000 fishing days throughout the biosphere reserve. If these fishing days generate an average of 50 EUR in revenue for the area's tourist operators, this would mean a turnover of 5 million EUR. The calculation contains several uncertain assumptions and should be seen as a possible level rather than an actual level.

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

To date, the Biosphere Office has not systematically monitored the impact of actions and strategies. Many of the projects run by the biosphere office are funded by Leader and are monitored using their indicators. Section 6.5.1 provides more information on the impact of the Biosphere Reserve's external communication and public awareness of the biosphere reserve.

Despite the lack of systematic follow-up, it is possible to say something about impact. Perhaps the most significant effect of the candidacy and subsequent nomination as a biosphere reserve is that Leader Nedre Dalälven, whose geographical scope is identical to that of the biosphere

reserve, has been weaving the biosphere reserve's objectives into its local rural development strategy since 2008. As of 2014, this is more apparent as the current Nedre Dalälven Leader Strategy has several clearly formulated links to the biosphere reserve. Over the past 10 years, Leader has implemented about 120 different projects, which have contributed significantly to sustainable development in the area. Read more about Leader in chapters 5.6 and 5.9.

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 rural areas in Sweden. The programme is part of the EU's strategy for smart and sustainable growth and is funded by the state and the European Agricultural Fund for Rural Development. The programme has objectives that guide its development. To achieve these goals, there are various subsidies and allowances for the environment, sustainability and innovation. An example of support under the Rural Development Programme is the environmental payments that can be claimed by farmers who manage pastures and hay meadows. The compensation is important for the restoration and preservation of the river meadows of the Nedre Dalälven, which are important for biodiversity and the characteristic open landscape along parts of the river. For example, the programme also provides support for conversion to organic farming or innovation projects.

Community Led Local Development through the Leader Approach (CLLD) is a development intervention partly funded by the Rural Development Programme and has been an important factor in the development of the area. The biosphere reserve is geographically identical to the Nedre Dalälven Leader area and the two organisations cooperate and share resources such as premises and staff (see fact sheet at the beginning of Chapter 5). In Sweden, in addition to the Rural Development Programme, locally-led development is also funded by the Maritime and Fisheries Programme and, from 2014 to 2020, by the Regional and Social Fund Programmes. Programming periods span seven years. The biosphere reserve was established in the previous period 2008 - 2014. This was followed by the 2014-2020 programming period. Activities and results from both periods of the programme are covered in this evaluation.

Leader has been the EU's approach to rural development for 30 years, allowing local actors to manage funds and distribute them as needed. Different parts of the community work together to develop the local economy. In a so-called three-way partnership, the voluntary sector works together with the business sector and the public sector, for example the municipality, to achieve common goals. This working method aims to create added value by combining private sector efficiency, public sector responsibility and non-profit sector involvement. The aim of Leader is to enable people living in a settlement to realise their own ideas and visions of how the settlement can develop. This is done by allowing organisations to apply for funding to carry out various development projects.

The 2008 - 2014 programme period was evaluated in 2013-2015. For the methodology and results of the evaluation, see section 5.10.

In the last 10 years, 121 Leader projects have been implemented in the biosphere reserve. During the period, these projects have generated over 6.6 million EUR in funding through various development activities in the area. At the same time, those involved in the projects themselves have contributed volunteer work worth over 3 million EUR, as well as other non-profit, public and private resources. The area's Leader strategies over the 10-year period have

allowed for projects with a wide range of objectives. It has enabled ideas on renewable energy, as well as integration, sport, culture, tourism, food production and much more to be supported and realised. However, all projects in the last programming period have been framed under the vision "An attractive area with sustainable jobs and viable businesses", which is well in line with the biosphere reserve's ambition for development work.

Local Nature Conservation Initiative (LONA)

The aim of LONA grants is to protect nature and make it accessible to all. The grant is intended to stimulate long-term commitment to nature conservation and to enable municipalities and, by extension, associations and private individuals to receive a government grant of 50 percent to implement projects that benefit nature conservation, outdoor recreation and public health. In the last 10 years, 82 projects have been approved within the biosphere reserve. Projects range from accessibility and outdoor recreation to habitat restoration and invasive species control. Some projects have been completed, others are ongoing. Some examples are:

Field studies/outdoor education in primary schools Älvkarleby municipality

Älvkarleby Municipality implemented an initiative for children in primary school up to and including grade 6 during the period 2016 - 2019 with a focus on forests, meadows, the sea and the coast. 2,400 pupils were given the opportunity to participate in excursions to the various natural environments in the municipality to carry out field studies and other activities, including investigating plants and animals. The Global Goals and sustainable development have served as the basis of the project, where all schools have also been provided with general equipment, materials and literature to enable outdoor visits to their school forests, on open-air days and the like. A "nature cart" was purchased and filled with materials, and is now available for loaning out to all municipal schools. A digital platform has also been developed where teachers can post and access materials and information.

Sonnboviken

Avesta municipality and the local bird club have created better conditions for bird life around Sonnboviken by restoring the lake. A "breeding lagoon for swimming ducks" has been created in the Sonnboviken sedge marsh and a "breeding island" for black-headed gulls and seabirds, among others. A meadow has been created in cooperation with the Biosphere Association, which is cultivated through sheep grazing. To increase accessibility, a bird tower has been built, signs have been put up and a gravel walking trail has been prepared.

Biological mosquito control

Residents and visitors in parts of the biosphere reserve, downstream of Avesta, were previously plagued by large numbers of floodwater mosquitoes. Much of the area near the river consists of flood-prone meadows and floodplain forests, which are briefly covered by shallow water after the snow has melted and after periods of heavy or persistent rainfall. Floods during April-August can hatch large numbers of Aedes sticticus in particular, but also other species of floodwater mosquitoes. Huge and unbearable numbers of floodwater mosquitoes make it very difficult to stay in the area. People started to move away and the "mosquito plague" led to a lot of negative publicity in the media, which meant that few people wanted to visit the area during the summer months. Since 2002, floodwater mosquitoes have been controlled as necessary, by helicopter application of the biological control agent VectoBac G. The control carried out by Biological Mosquito Control, a unit of the Association's subsidiary NEDAB, has resulted in a significant reduction in the number of mosquitoes. This, in turn, has had a significant impact on

the area's economy and the quality of life of its residents. Biological mosquito control activities are financed by the municipalities, regions, the state and the EU.

Move here - the campaigns

The mission of the Biosphere Association is to promote immigration to the area. Until 2014, a "Move Here Campaign" was run with a number of brochures, advertisements and media articles produced. In addition, exhibitions were held almost annually at Stockholm Central Station or at one of Stockholm's major public fairs, displaying scaled-up pictures of houses that were for sale in the area at the time. The exhibitions, which were staffed by Nedre Dalälven personnel and representatives from the area's municipalities, were well attended and generated great interest in both the houses and the area in general. Visitors to the stand were drawn in by the pictures of the houses and were surprised by how much they could get for their money, in relatively close proximity to Stockholm. Discussions were held on what life in the biosphere could look like, with work, school and leisure activities. Interest in the area was then also generated for visits and short stays, both as tourist individuals and for company kick-offs and conferences.

The target area for the Move Here campaign was Uppsala/Stockholm. Experience from participation in fairs and exhibitions and contacts with brokers gave a clear picture of what the market was looking for. Older houses and farms in the countryside and in urban cultural environments were therefore highlighted in marketing. Marketing efforts have been carried out in close cooperation with the municipalities concerned and the region's real estate agents.

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?

The Future Factory – Framtidsfabriken

The Leader project runs 2018 - 2021 and is run by the Association Develop Örbyhus Tobo and Vendel. Framtidsfabriken is a meeting place and development centre at the station in Örbyhus where participants create activities related to sustainable development. During the project, needs and wishes will be identified on what is needed to make the transition to a sustainable society. The aim is to promote sustainable development through cross-border and knowledge-sharing meetings and collaboration between a diversity of people and between the non-profit, private and public sectors.

Water treatment with floating islands

Klosters Gård AB is a company in the municipality of Hedemora that, among other things, works with lake restoration. They deal with lakes that have problems such as algal blooms and other eutrophication problems. In addition to offering analyses of the causes of eutrophication and providing suggestions for solutions, they have developed a type of floating island. The islands clean the water of nutrients and provide shelter and food for zooplankton, which in turn eat the phytoplankton that otherwise lead to algal blooms.

Floating islands used to purify the water in lakes.

Treatment of pharmaceutical residues in wastewater

Tierps Energi & Miljö is one of the first wastewater treatment plants in Sweden to work with purifying wastewater of pharmaceuticals. There are indications that the release of pharmaceutical residues causes behavioural changes in animals, that fish spawning patterns may be affected, and that there are hormonal effects in fish, which may then have difficulty reproducing. A new ozone technology cleans the sewage of about 8,500 households. The new part of the treatment plant has been financed largely with funds from the Swedish Environmental Protection Agency.

Julmyra Horse Center

Julmyra Horse Center in Heby municipality is one of Sweden's largest trotting training facilities. They house about 200 horses, which leads to a high risk of nutrient leakage to the surrounding environment. In the framework of the EU project LIFE IP Rich Waters, together with the municipality of Heby, they made a number of improvements in 2017 to reduce this risk. These include drainage works and the re-routing of pastures to minimise nutrient leakage into the river that runs through the area. They are also leading in the field of manure management and collaborate with both SLU and the County Administrative Board to communicate their approach.

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.

(c.f. UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage 1972 and UNESCO Convention for the Safeguard of the Intangible Cultural Heritage 2003 (http://portal.unesco.org/en/ev.php-URL_ID=13055&URL_DO=DO_TOPIC&URL_SECTION=201.html and http://portal.unesco.org/en/ev.php-URL_ID=17716&URL_DO=DO_TOPIC&URL_SECTION=201.html)).

Tangible

The biosphere reserve contains some 25 mill sites dating from the 16th century onwards. Some are now residential areas and some still house industrial operations. Interviews were conducted with officials working with cultural heritage, especially buildings and landscapes, in the four county administrative boards. According to them, there have been no significant changes in cultural heritage in the last 10 years. Neither positive nor negative. The changes that have taken place at the Gysinge and Söderfors mills may however be worth mentioning.

Gysinge is a former ironworks with an extensive and architecturally and historically interesting mill environment with uniform 18th-century buildings. In 2009, the municipality of Sandviken sold parts of Gysinge mill to a private stakeholder. As ownership shifted from public to private, the influence of the public interest diminished, which, according to the County Administrative Board, resulted in reduced protection for the cultural heritage.

Another former ironworks is Söderfors bruk. It includes an English park with a Greek temple from the late 18th century that was renovated in 2019.

Intangible

Cultivation of river meadows

In the Nedre Dalälven area there are large areas of low-lying, intermittently flooded grasslands. Until the beginning of the 20th century, these so-called river meadows were cultivated by mowing and grazing. Then, cultivation gradually decreased and stopped completely in the middle of the 20th century. The formerly open and species-rich river meadows along the lower part of the Dalälven have since begun to grow again.

Actively cultivated river meadows not only contribute to increased biodiversity but are also of great importance for the landscape that characterises the Nedre Dalälven area, an area that otherwise consists largely of forest. The open river meadows can therefore be said to be a cultural heritage, a feature of the landscape that reminds us of a time when people in the area were dependent on the fodder and pasture produced by the river meadows. Open elements in the landscape are also considered beautiful by many. After a sharp decline in the area of cultivated river meadows in the 20th century, there has been a slight increase in recent years. It is difficult to obtain reliable statistics for the river meadows of the Nedre Dalälven. According to a self-evaluation in connection with a Leader project run by the Biosphere Association, the areas of cultivated river meadows and other meadow and pasture areas in the vicinity of the Dalälven downstream of Hedemora increased by 11 percent between 2015 and 2019 (Nedre Dalälvens Intresseförening, 2019). The calculation is based on the area for which environmental subsidies for grazing, mowing and restoration have been claimed. Read more about the Biosphere Association's work on river meadow management in sections 2.3.4 and 4.3.

Lamprey fishing in Älvkarleby

The lamprey (Petromyzontiformes) has been fished in Älvkarleby for 500 years. Until 1915, when the power station was built and put a halt to fish migration, fishing was of great importance. Lamprey can be smoked, fried, grilled or pickled and is considered a delicacy. Älvkarleby hembygdsförening keeps the tradition alive and fishes using traps. The catch is sold live on Saturdays during the season or at the sporadically held lamprey festival.

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, these types of actions and programmes are largely organised and financed by the public sector at national, regional or local level. Health services are available to all residents. The public sector is also responsible for various job preparation and skills enhancement activities. Local authorities have functions within schools and social services to identify children and young people in need of help. In addition to the public sector, there is a strong voluntary commitment to supporting and promoting the interests of vulnerable groups in society. In the Nedre Dalälven Leader area, almost 3,000 people participated in some form of skills development activity during the previous programme period 2008-2014.

Despite a relatively well-functioning publicly-funded society, there are inequalities and vulnerable groups in Sweden. The situation in the biosphere reserve is not significantly different from the rest of Sweden. Below are examples of different actions and measures specific to the biosphere reserve.

Academy Adventure Leader

The Leader project runs from 2018 to 2023 and is a transnational cooperation project between two Swedish and three Lithuanian Leader regions. The project aims to empower young people in the Leader area by developing their entrepreneurial skills and introducing them to new opportunities, activities, cultures and people. The project includes the implementation of two summer academies focusing on entrepreneurship and adventure and two evaluation conferences, one after each academy. In June 2019, the first academy was held in Sweden. It was organised by the Swedish partner areas Leader Nedre Dalälven and Leader Mälardalen. 36 young people aged 17-25 solved 35 cases for local companies, associations and other organisations. They also visited natural and cultural areas, researched visitor attractions, carried out four adventure activities including high-altitude skiing and canoeing, and held two business development workshops. The second academy will be held in Lithuania in the summer of 2021. Here are some participants' thoughts a few days into the academy:

> *"We've seen that you can run businesses in areas that I might not have thought you could make money in. Such as offering guided elk tours. You can do something based on what you are interested in, and not just start a business based on different ideas about how to make money." / Maja*

> *"For me, who has no experience of entrepreneurship, it was good to see that you don't have to be afraid to start your own business, but that it's very much a matter of making sure that you do get started." / Vilmantė*

Several young people expressed that they discovered during the Academy that you don't have to travel far to do adventurous things, such as to Gröna Lund (an amusement park in Stockholm), but that you can find them locally. Like canoeing on the Nedre Dalälven and climbing the high ropes course on Björnö in Västerås.

Leader Trails

The Leader project runs from 2018 to 2021 and is run by the Church of Sweden. The aim is to help people who are far away from the labour market back into employment, by letting them do practical work to build and restore hiking trails. The project also carries out activities such as training on the use of clearing saws, building routines, mindfulness exercises, walks and talks.

A neighbourhood cooperative for security and better integration

The Leader project runs from 2019 to 2021 and is run by the economic association Mucho. The aim is to create new pathways to entrepreneurship for newcomers and to help integrate people who, for various reasons, are far from the labour market in order to make them employable. Activities include networking with other organisations working locally, a developed multicultural meeting place, organising cultural events, working with skills development in associations and more.

Youth in Nedre Dalälven

The Leader project ran from 2017 to 2020 and was run by Leader Nedre Dalälven. The aim of the project was to empower young people in the biosphere reserve and to include them in the local development work in different ways. By providing young people with inspiration and skills development in planning and organising events, and opportunities for new contacts and networks for influence, the project has both increased young people's ability to influence their locality and their everyday lives. The project targeted the 13-25 age group. Thirty-two youth groups carried out their own projects during the project period. The groups have performed a variety of activities, including activity days, workshops, concerts, outdoor cinema, sports tournaments, galas, youth meetings, inaugurations, horseback shows celebrating Saint Lucy’s Day and short film shoots.

The project also held two inspirational evenings and two national meetings for young, engaged rural citizens, Ungagemang 2018 and 2019. Ungagemang 2019 was held in the biosphere reserve. The youth project is also part of national networks for working with young people in rural development.

A similar umbrella project, which gave young people the opportunity to turn their ideas into reality, was carried out in 2009-2014.

A skateboard ramp under construction in Älvkarleby municipality was completed thanks to the work of local youth, inspiration and assistance from an experienced carpenter and some additional project-funded materials.

Investment to build a viable association

The Leader project ran from 2016 to 2019 and was run by Avesta AIK. The aim of the project was to use the sports club as a platform to bring participants closer to the labour market. Participants were given the opportunity to develop their language skills and gain experience in and knowledge of different areas of work. They were given the opportunity to try out different tasks and chores in the association such as leading various groups, holding parent training, placing orders, helping with homework, working in catering, looking after the premises and equipment, performing janitorial work and writing documentation. Through the association's large network, participants were also given the opportunity to build networks, which can be important for future job opportunities.

Focus on integration

The Leader project, which ran from 2013 to 2014, was run by the Red Cross in Hedemora. The aim was to create growth through diversity. This was to be done by encouraging more people with non-Nordic backgrounds to stay in the area through integration. Participants were taught Swedish, informed about Swedish society and given the opportunity to try out various cultural activities. The project also provided internships and other opportunities to participate in Swedish society. To make it easier for women to participate, activities were also organised for their children. The project ended with Christmas parties in several towns in the municipality, where recent immigrants participated together with the rest of the local population.

Nature-related jobs

In 2018, a national labour market project was launched, Nature-related Jobs - a collaboration between the Swedish Forest Agency, the county administrative boards and Swedish public employment service. The aim of the project was to give the long-term unemployed an opportunity to learn forestry jobs and eventually enter the labour market. The teams worked for municipalities, non-profit organisations and county administrative boards, and some of the work was done in nature conservation areas. The work carried out under the project was meant to benefit nature and outdoor recreation.

The labour market project is not specific to the biosphere reserve, but it is worth mentioning as the teams made a great effort to clear the entire 60 km national park boundary, in sometimes hilly and wet terrain. They also helped with work on shelters, signs, footbridges, etc. In addition, they cleared out workers' barracks from the 19th century that are located on an old pastoral farm next to the Dalälven River. Entire trees and a lot of undergrowth had grown both around and on the ruins and threatened to destroy these cultural remains.

Cultivation of river meadows

The Biosphere Association has run a number of Leader projects during the period with the aim of restoring the meadows of the river in the area. Several meetings have been organised with the aim of improving the skills of local conservation contractors in areas such as public procurement, finance and law. The meeting on procurement provided an introduction to public procurement with a focus on nature conservation contracts where the target group was bidders, in this case machinery contractors. The meeting on economics and law provided an introduction to land use rights, leases, management and fencing agreements, as well as an introduction to the various farming subsidies and compensations that are involved in the restoration and management of meadows and pastures.

Accessibility in the National Park

Färnebofjärden National Park makes up most of the core area of the biosphere reserve and is administered by Gävleborg County Administrative Board. There are entrances, trails and facilities adapted for people with disabilities. This is especially true of the main entrance, which has a 300-metre-long nature trail adapted for wheelchairs and pushchairs, and a shelter with a wide opening and no threshold. At the end of the nature trail there is a wide walkway with a view over the river. It is relatively easy to get around with a wheelchair and pushchair in the entrance area.

Accessibility adaptations in Färnebofjärden National Park. Photographer: Länsstyrelsen Gävleborg

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

Sustainable development efforts are carried out by many different organisations within the biosphere reserve, some of which have their own indicators. See separate explanations below.

The role of the Biosphere Association is to inspire sustainable development and promote cooperation between the various stakeholders in the area. See section 5.5 for a discussion of the impact of measures and policies. Much of the work of the Biosphere Association is funded through Leader support and is therefore monitored in accordance with the Leader indicators, see below. The Biosphere Association has not yet developed any other indicators specific to biosphere work.

Leader

The biosphere reserve has the same geographical extent as the Nedre Dalälven Leader area. Much of the work on sustainable development is carried out through Leader projects, see section 5.6.

The 2008 - 2014 programme period was evaluated in 2013 - 2015. First, a questionnaire with open-ended questions was sent to the project owners by email. This was followed by a telephone interview, during which a questionnaire was filled in with answers to questions directly linked to the indicators in the development plan. The indicators used were: new and retained full-time jobs, permanent residents moving in, businesses moving in, new businesses established, goods, services or other business activities, and new networks, meeting places, brands and markets.

The Nedre Dalälven Leader area consists of nine municipalities in four counties. During the seven-year period 2008-2014, 90 Leader projects were implemented, including 72 local projects and 18 covering the whole Leader area. Four of the local projects were youth projects. In addition, young people carried out 20 mini-projects within the framework of an umbrella project. More than 5 million EUR of Leader support funds have been used, which is almost four times as much as the municipalities' total contribution to the shared funds. The total project resources, including free resources and volunteer work, amount to more than 8.1 million EUR. Of this, the value of reported voluntary work is close to 1.9 million EUR.

During the programme period, a total of 3,826 people, 889 companies and 591 other organisations participated in the 90 Leader projects carried out. The median number per project is five participating companies and five other organisations. Several projects managed to involve a large number of companies, more than 30, in their work.

The results of the evaluation of the 2008-2014 programme showed that overall, over the seven-year period, the projects contributed to 111 new and 125 retained full-time jobs, 154 new permanent residents and ten businesses moving into the area. At the same time, a large number of resources have been built up that are valuable in the ongoing development work. These include new companies, goods, services or other business activities. Other examples are new networks, meeting places, brands and markets (Leader Nedre Dalälven 3, 2016).

The 2014-2020 programming period has not yet been evaluated. In addition to the indicators monitored in the previous period, indicators now include: gender equality and non-discrimination, environmental issues and sustainable development, as well as inclusion and diversity.

Authorities

In addition to the national authorities, the public administration is divided into four county administrative boards, four regions and nine municipalities. It is these authorities that have the power to regulate and control how natural resources are used and nature is protected. They are also the ones who have the resources to work broadly with sustainable development in society. The authorities' indicators are described in part below.

Since 1999, Sweden has had a national system of environmental objectives consisting of a generational objective, 16 environmental quality objectives and a number of interim objectives in the areas of waste, biodiversity, hazardous substances, sustainable urban development, air pollution and climate. The Swedish Environmental Goals are the national implementation of the ecological dimension of the Sustainable Development Goals.

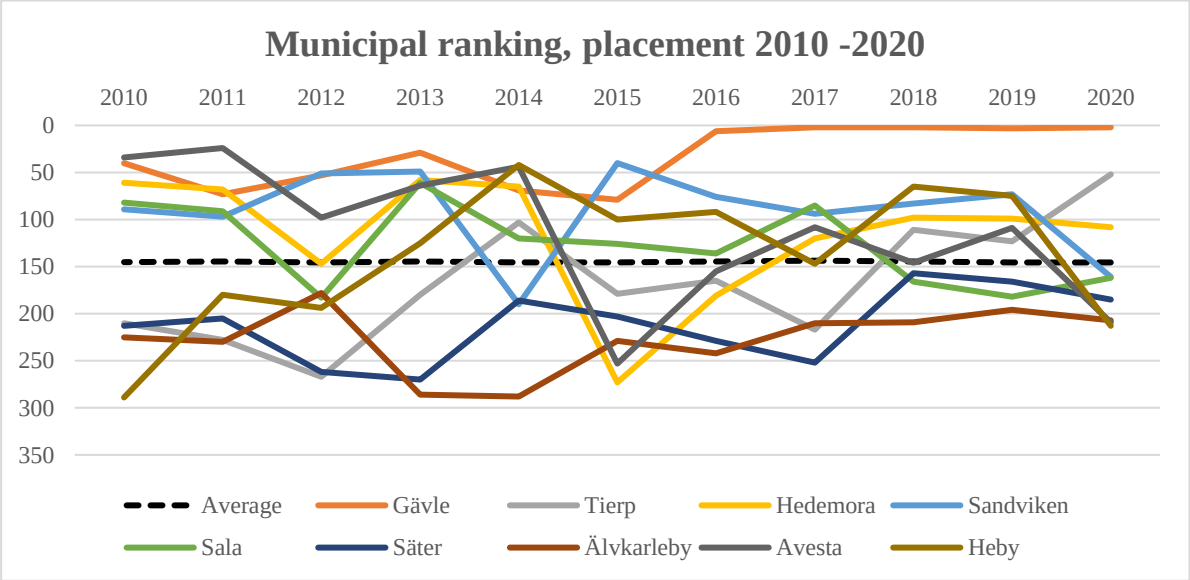
The role of the county administrative boards is to coordinate regional work on environmental objectives. They work together with municipalities, businesses, voluntary organisations and other stakeholders to ensure that the environmental goals are implemented in the county and that the environment is improved. They also monitor the progress of environmental work.

Municipalities are very important in achieving the environmental objectives. By translating national and regional environmental objectives into local targets and actions, environmental objectives become tools for local policy. In addition to annual national and regional monitoring, many municipalities carry out their own monitoring with their own indicators.

In the context of this evaluation, the nine municipalities that are part of the biosphere reserve were contacted. It was found that two thirds of the municipalities in the area are working on the Agenda 2030 and the global goals. This work is monitored and publicly reported.

However, no comprehensive compilation of the municipalities' follow-up has been found. Some of their work is reported into different systems. In the context of this evaluation, we have not had the resources needed to summarise this reporting.

Every year, the organisation Aktuell Hållbarhet ranks Sweden's best municipality in terms of environmental performance. The survey is based on a questionnaire and statistics such as climate emissions, waste, organic food and protected nature. Sweden has a total of 290 municipalities. The graph below shows how the biosphere region's municipalities have fared over the past 10 years. Most perform on average, however, there is considerable variation from year to year. Gävle stands out as a municipality that has been placed second and third in recent years.



Companies and non-profit associations

In addition to public authorities, sustainable development work is carried out by companies and various non-profit associations in the field. There was no room in this evaluation to explain what indicators, if any, they use.

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 main positive factors for the development efforts in the biosphere reserve are:

- *Sharing geographical boundaries and office facilities with the Leader project.* See box at the beginning of this chapter and section 5.10. The fact that the Biosphere Association and Leader operate in the same area, have similar objectives and close

communication means a lot for the development efforts in the area. This close communication also means that the biosphere office is aware of all the amazing development work that happens within Leader and is thus able to communicate this further and establish contacts with and between the various stakeholders.

- *Networking.* Long before the biosphere reserve was created, the Biosphere Association had been working on building networks in the area. Right from the start, the association managed to find and involve enthusiasts, which has been crucial for the biosphere work. The association's large network also enables the Biosphere Association to connect actors and disseminate good practice. Last but not least, it has enabled the association to spread its commitment across many different actors, thus securing it for the long term.
- *Co-arrangements.* The Biosphere Association usually organises events together with others, which leads to more and larger events with more participants.

The main negative factors for development efforts in the biosphere reserve are:

- *Low awareness.* Despite the large network of the Biosphere Association and the many sustainable development activities carried out in the area, public awareness of the biosphere reserve is low. This is due to the failure of the association to communicate the concept of "biosphere reserve". However, the Biosphere Association and its activities is something well known in the area. The failure of the association to communicate that its area of operation is a biosphere reserve, what this means and everything that is done because of it has been a negative factor for the development efforts of the Biosphere Association in the area. Greater awareness would contribute to the establishment of a common identity, pride and inspiration for all those working on sustainable development in the area. In the last two years, we have therefore placed a strong focus on communicating the biosphere concept, which will hopefully bear fruit in the near future.

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.

Monitoring in the biosphere reserve follows the Swedish model of long-term and regular environmental monitoring, which has generated an extensive series of measurements. National environmental monitoring is coordinated by the Swedish Environmental Protection Agency and the Swedish Agency for Marine and Water Management and is carried out in ten different programme areas. At the regional level, the county administrative boards and the Swedish Forest Agency are responsible for and coordinate monitoring, while municipalities are responsible for local monitoring. The administration of the area is shared by several authorities at different levels, four county administrative boards and nine municipalities. Environmental monitoring is also carried out by non-profit organisations, universities and colleges.

Research in the area takes place in a wide range of disciplines and is carried out by colleges, universities and government institutions.

Section 2.4.6 lists the main organisations and the orientations of their research or monitoring.

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).

An updated list of bibliographic references is provided in Chapter 9.

Biodiversity

Much of the research and monitoring in the area is concerned with describing biodiversity and measures to conserve it. Over the past ten years, a series of nature surveys have been carried out, including insect fauna, fish fauna, sea eagles, cryptogams, shore lichens, vascular plants and brook trout. In Färnebofjärden National Park, which makes up most of the core area, inventories have been made of beaver, osprey, capercaillie, waterfowl, beetle fauna, alluvial forest and benthic fauna, among others.

Ecologically adapted regulation of hydropower

Much of the biodiversity in the area is found in the floodplain forests and river meadows along the Dalälven. These are areas that used to be periodically affected by heavy spring floods due to the melting of snow. With hydropower regulating flows and the reduction of snowfall due to climate change, these large-scale and long-lasting floods have become much rarer. This change threatens such biotopes and the biodiversity they support. Research has therefore been carried out into the possibility of creating periodic, widespread and long-lasting spring floods in these areas using hydropower dams. See, for example, the Sustainable Hydropower in the Dalälven (HÅVD) project , *section 4.2*.

What happens in nature after a forest fire?

In 2014, a large forest fire ravaged the southern part of the biosphere reserve, namely Sala municipality and adjacent areas south of the biosphere reserve. Since the fire, a lot of research has been going on in the 13,000 hectare area, on the consequences of the fire and how nature is recovering. 8,000 hectares have also been protected as the Hälleskogsbrännan nature reserve, which means that the natural evolution after the fire will be monitored for a long time to come. Research has been carried out on insects, birds, fire-prone vascular plants and fungi, and changes in soil and watercourses.

Biosfärum Gröna kunskapshusets Research Network

The Biosphere Association was on the board of the Biosfärum Gröna kunskapshuset (see 6.4), to which a research network was also linked. Among other things, Biosfärum Gröna kunskapshuset launched a bird house project in 2013 together with the University of Gävle and Upplandsstiftelsen. Fifty birdhouses were set up to allow for small bird studies. Within the project there was a focus on starlings.

Fish

Research and monitoring of fish populations is extensive in the area and warrants a separate section. Below are some examples of research projects and facilities in the area.

LIV - (Laxfisk i nedre Dalälven) Salmonids in the Nedre Dalälven

The aim of the LIV project, which ran from 2016 to 2018, was to investigate the possibility of restoring fish migration and reproduction potential for salmonids in order to reintroduce self-reproducing wild salmon and sea trout into the Dalälven in the future.

The project has conducted an overall analysis of the Dalälven's potential and need for action, and then investigated the potential for salmonids in the area from the coast up to the Näs power plant downstream of Avesta. The measures concern both the environment in the river and the design of migration routes for fish, as well as changes to the flow regime. This involves rebuilding self-reproducing stocks by, among other things, locating potential spawning and nursery areas, compiling lists of required actions for these and investigating the need and location of migration routes for fish past power stations and regulation dams.

The LIV project was a collaboration between the county administrative boards of Gävleborg and Uppsala counties, Vattenfall and Fortum. The project has been financed mainly by Vattenfall's and Fortum's environmental funds. The Biosphere Association is represented in the project's reference group and has cooperated with the LIV project through the Leader project "Fishing management in the Nedre Dalälven region" and the subsequent project "Interaction with fishing stakeholders". Read more about these in section 2.3.4.

Short- and long-term survival of released salmon (Salmo salar) in fisheries using PushUp traps.

The Department of Aquatic Resources at the Swedish University of Agricultural Sciences has studied how salmon caught in commercial fisheries cope with release after capture. In the project, which was carried out in the river Dalälven, salmon were tagged with radio transmitters, released and monitored for about a year. The project has been funded by the Swedish Agency for Marine and Water Management and the Baltic Salmon Foundation.

Fisheries research station in Älvkarleby

The fisheries research station in Älvkarlebys is run by the Department of Aquatic Resources at SLU (Swedish University of Agricultural Sciences). It includes a stream with adjustable flow and a stream aquarium that is ideal for behavioural studies. Guest researchers from other institutions and companies are also welcome.

The salmon accelerator in Älvkarleby

Vattenfall's Älvkarleby facility, which opened in 2019, is used to study the behaviour of fish in flowing water and at power stations. The building, located immediately adjacent to the river Dalälven, contains two identical 24 meters long and 4 meters wide test basins with a depth of 2 meters, with the possibility to regulate the flow velocity and test different technical solutions that can be used to guide fish past power plants. It aims to serve as a national research and experimentation resource for fish passage solutions, as part of meeting the requirements and implementing the EU Water Framework Directive.

Forest

Biosphere Forests for the Future

The Nedre Dalälven River Landscape participates in Biosphere Forests for the Future, an initiative that brings together biosphere reserves from northern to southern Europe in an international exchange of knowledge. The initiative will lead to increased awareness of the vulnerability of forest landscapes due to climate change, increased collaboration within UNESCO's Biosphere Programme and increased knowledge of research needs linked to local practice.

Renewable energy

Hydropower

Along the river's many power plants and dams, research is being conducted on traditional hydropower and its consequences. This could include the impact of regulation on biodiversity, flooding and floodwater mosquito problems. Research has also been carried out on a new technology for converting flowing water into electricity in Söderfors. Here, Uppsala University has tested a turbine, placed at the bottom of the river, which rotates around a vertical axis connected to the generator. The power plant is designed to produce electricity from slow-flowing water in rivers, straits and seas.

Bioenergy system

Mälardalen University has done a lot of research on bioenergy systems and their efficiency, for example in Sala. In Sala there is a cogeneration plant that is fuelled by regionally produced biofuels, and in Sala and Heby there are also large solar power plants. Mälardalen University has done case studies where regional energy systems have been evaluated and optimised. They have also explored the possibilities of co-producing bioethanol as a transport fuel in the CHP plant and harnessing the energy of local waste. Mälardalen University has also investigated different energy conversion processes and energy use in homes where companies and users in the area have participated.

Mosquitoes and mosquito control

Along the river Dalälven from Avesta to the sea, there are significant areas of river meadows and floodplain forests that are repeatedly flooded when flows increase. In these lands and the surrounding areas, there are six species of floodwater mosquitoes. One of these species, Aedes sticticus, has been controlled for 20 years using the biological agent VectoBac G, containing Bti. Read more about mosquito control in sections 2.3.4, 5.6 and 6.3

There is a lot of research and monitoring in the area on floodwater mosquitoes and the efforts to control them. Some of the research concerns various mosquito-borne diseases and the distribution of different mosquito species. Other parts focus on the effects of Bti control on floodwater mosquitoes, other species and entire ecosystems or alternative methods of mosquito control such as mowing and grazing.

Biological Mosquito Control, a unit of the Biosphere Association, conducts extensive research and surveillance in the area, focusing primarily on mosquitoes and mosquito control, non-biting midges as risk organisms in mosquito control, and mosquito-borne viral infections. Significant parts of the material and information used in this research are generated within Biological Mosquito Control's two long-term inventory programmes for insects - the monitoring programme *for mosquitoes* and the self-monitoring programme *for wetland insects.* Since spring 2001, the monitoring programme has carried out annual surveys of the mosquito fauna in seven municipalities in the biosphere reserve to monitor changes in abundance and species composition. Since spring 2002, the self-monitoring programme has carried out annual surveys of mosquitoes and other insects produced in flooded grasslands to detect whether they are affected by control measures. A slight increase was observed in a subfamily of non-biting midges in areas without control during 2016-2019, but no corresponding increase was observed in areas with control. At present, there is no indication that this poses any threat to such species.

The self-control programme is unique in that no other mosquito control organisation in Europe or elsewhere in the world has anything like it. Additionally, since spring 2005, annual surveys of breeding sea eagles, ospreys, whooper swans, cranes and black-throated divers have been carried out as an environmental safeguard.

In addition, Biological Mosquito Control also collaborates with researchers at several institutions and in some cases shares collected biological material that others then have the opportunity to study and publish. The research carried out in recent years by Biological Mosquito Control or by collaborating research groups is mainly concerned with issues related in some way to mosquitoes and mosquito control. In addition to traditional publication in scientific journals, they make their results available to the public and to authorities via their website, in the form of reports in English, through lectures and posters at international scientific meetings.

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 coordinating role of the Biosphere Association includes disseminating information and knowledge about actions and activities to various stakeholders. Cooperation with Leader (see

chapter 5) means that knowledge from Leader projects can also be disseminated to different actors in this way.

Cultivation of river meadows

Within the work of the Biosphere Association to promote the restoration of river meadows, various types of educational activities have been carried out based on local knowledge. For example, the Biosphere Association has organised seminars and inspirational trips for entrepreneurs, animal owners and landowners to parts of the area that have been particularly successful in restoring river meadows and rehabilitating pastures. During these trips and seminars, participants were trained in subjects such as biology, law, economics and the technology of restoration, grazing and mowing. The association's work on the cultivation of river meadows has also resulted in a number of reports.

Mosquito control

For 18 years, Biological Mosquito Control has been combating the large numbers of floodwater mosquitoes that have plagued the population of the area. It took about 10 years to build up the operational capacity to deal with the mosquito problem in the most affected areas. The activities have not only been important in enabling people to live and work in the area, but have also generated a lot of knowledge about floodwater mosquitoes and how they can be controlled in a sufficiently effective and sustainable way. Biological Mosquito Control, a unit of the Biosphere Association, has shared this knowledge through various reports, scientific publications and participation in conferences around the world. Since 2020, they are also responsible for floodwater mosquito control in the municipality of Forshaga in southwestern Sweden.

Building maintenance

Gysinge centrum för byggnadsvård AB is a company that manufactures and sells vintage materials and interiors for homes, based on products created in the 18th century and onwards. These include quality products for renovation, maintenance and new construction of houses. They have also accumulated a lot of knowledge about building conservation and provide advice, sell books and organise thematic events. The company was founded in the early 1990s by the Biosphere Association, among others, as a kind of counter-movement against the dismantling of Sweden's old buildings. Today, they are one of Sweden's most well-known companies in the building maintenance industry. There are also many other shops and craftsmen in the area offering products and knowledge of traditional building techniques.

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.

In the area lies the Tierps Naturskola, which is based on the scenic Hållnäs peninsula but has a peripatetic operation and visits all the municipality's schools. It was started in 2010 by Tierp municipality with the support of Upplandsstiftelsen and LONA and is now run by the municipality. The nature school provides inspiration through courses and meetings, spreading ideas, methods and materials that make it easier to take the step out with your group of

children. The aim is for outdoor education to become a natural part of preschool activities and to develop ideas on how the school and preschool grounds can be designed to promote play, movement and education in nature.

In the biosphere reserve, as in the rest of Sweden, there are courses on sustainable development in social and natural science secondary school programmes. The Ösby Upper Secondary School in Sala municipality has programmes on agriculture, forestry, horses and animal care.

Folk high schools are located in Sjövik, Gysinge and Österfärnebo. Sjövik Folk High School offers courses in outdoor life, traditional crafts, folk music, recycling and organic farming. The National Pensioners' Organisation, PRO, runs a folk high school in Gysinge that is primarily aimed at the elderly. Among other things, there is a course on being climate smart in everyday life. Färnebo Folk High School offers courses on environment and climate, feminism and global justice, farming and local development.

The nearby universities in Borlänge, Gävle, Västerås, Uppsala and Stockholm, as well as non-profit associations in the area, organise excursions and field study courses in the area, because of its rich diversity of plants, fungi and insects. Animals like the otter also spur interest. Dalarna University has an education in sustainable construction and housing in Stjärnsund. There is a wide range of distance-based higher education opportunities in Sweden, which means that residents of the biosphere can take advantage of many of the country's educational opportunities.

As in the rest of Sweden, all municipalities in the area offer free energy and climate advice to households, businesses and other organisations.

Hyttö Nature School (Älvkarleby municipality) ended its operations in 2013. The activities carried out by Älvkarleby municipality consisted, like those at the Tierp Nature School (see above), of outdoor education for primary school pupils and constituted an important resource for schools and preschools.

Biosfärum Gröna kunskapshuset was a learning and visitor centre on the Östa Peninsula west of Tärnsjö (Heby municipality) from 2009 to 2018. The facility was a field station operating under the motto "A meeting place for sustainable development in practice". All fourth graders from Heby municipality came here for an opportunity to learn outdoors. Inside, visitors encountered typical natural environments from the area. Outside, practical examples of biodiversity were on display. The activities were broad, but consisted mainly of practical training in the field of sustainable development. Other activities included guided walks, continuing education in the natural sciences and experiential learning for the public. Part of the activity was a nature school run as a LONA project with Heby municipality, the University of Gävle, Uppsala University and Upplandsstiftelsen. There was also a research network around the Biosfärum Gröna kunskapshuset (see 6.2).

The Biosphere Association had a representative on the board of the Biosfärum Gröna kunskapshuset. Other organisations and companies in the Biosfärum Gröna kunskapshuset network were: University of Gävle, Uppsala University, SLU (Swedish University of Agricultural Sciences), Royal Museum of Natural History, Upplandsstiftelsen, Swedish Society for Nature Conservation, Swedish Federation of Farmers (Heby), Sala-Heby energi, Färnebofjärden Nature Centre, Heby Municipality and Sala Municipality. The operation was closed in 2018. The Biosphere Office has taken over the display walls for exhibitions as well as photos, photo boards and other materials.

Färnebofjärden Nature Centre

Naturum in Gysinge offers experiences for all the senses and learning for all ages about Färnebofjärden National Park. The Naturum was opened in 2005 and serves as the gateway to the National Park. The main body is the County Administrative Board of Gävleborg. Here visitors can learn about the animals, plants, geology and cultural history that have shaped the area. In addition to exhibitions, the Naturum offers guided tours, theme evenings and nature trails. During the 2020 Corona pandemic, the operating conditions for the Naturum were impacted. In order to limit the spread of infection, they had to remain closed this season. Instead, the nature guides worked at information desks at the main entrance to the national park. According to the County Administrative Board, this has been very successful, as they have managed to directly reach visitors who are interested in experiencing the national park and surrounding environment. It is therefore likely that the nature guides will continue to meet visitors at the national park entrance to some extent even after the pandemic.

Pupils in Österfärnebo School, in cooperation with the Nature Centre and the Biosphere Association, will try guiding in Färnebofjärden National Park. The basic idea comes from Hamra National Park, where the older students guide the younger ones, once a year. Färnebofjärden National Park and Österfärnebo School wanted to see whether the concept could work here too. And when the students themselves wanted to try it too, it was just a matter of getting started. If successful, more schools in the area could be offered the same opportunity. The initiative is part of Sweden's outdoor goal "A rich outdoor life in schools". The students have been out in the national park looking for suitable guide stations, taking photos and making notes. Once back in the classroom, they have been looking for facts and writing notes. In spring 2020, the students were ready for a guided tour with invited families, relatives and the public. However, this was cancelled due to the corona pandemic.

Schools and groups with a foreign background have asked for a presentation on the various levels of the right of public access. Naturum has therefore arranged lectures, as well as guided tours with a focus on the right of public access, which have been appreciated.

Cooperation partners for Färnebofjärden National Park

In 2018, Gävleborg County Administrative Board started cooperation training for private actors who wish to conduct activities in or in close proximity to Färnebofjärden National Park. The training is organised at a national level but has local adaptations. Participation is not compulsory for those wishing to operate in the park, but it still brings major benefits to enter into a so-called partnership with the national park, voluntarily and free of charge. For the stakeholders, this means that, in addition to their own expertise, they also gain a broader knowledge of the area and how the administration works in the park.

After the training, the operator can sign a cooperation agreement with the national park and use the shared cooperation logo. It gives the operator a "seal of quality" on its activities and operations, showing that they know the area, its values, destinations, etc. A trained operator at Färnebofjärden may promote their activities on the website of the Swedish National Parks, may communicate events through Naturum's marketing channels and may use Naturum's premises for cooperation on an activity. The Biosphere Association and several other stakeholders have entered into partnerships with Färnebofjärden National Park.

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

In terms of the support function, the Association's work over the past ten years has focused on disseminating knowledge about sustainable development and showcasing inspiring examples. There are no defined indicators, but below are some examples of high-impact measures and actions:

- 61 posts were made on Facebook in 2020, reaching approximately 184,000 people.
- The Facebook page gained 543 new followers in 2020, an increase of 25 percent (see 6.5 .1.).
- 2 newsletters were published in 2020. The newsletter received 216 new subscribers during the year (the number rose from 285 to 501, an increase of 76 percent).
- New website in 2020 with an average of about 85 unique visits per day.
- Skills development within the tourism network (see 2.2.5).
- Skills development in the field of river meadow management for contractors and landowners. The meetings covered topics such as legal, financial and management issues (see 2.3.4).
- Digital lecture series in 2021 on topics such as: Flowering Roadsides, Beekeeping and Invasive Species with up to 388 participants.
- Digital Bioblitz event with 330 participants (see 6.5.1).
- Biosfärum Gröna kunskapshuset in Heby municipality (see 6.4).

The Association's communication about the biosphere reserve and its cooperation at regional, national and international level is described below and in Chapter 2.

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

Internal communication systems

The Board of the Biosphere Association and its staff form the basis of the biosphere reserve's internal communication system. The board consists of representatives from the business community, land and water owners, NGOs and elected politicians from each biosphere municipality. The Board meets four or five times a year and the staff has follow-up meetings two or three times a month.

The Biosphere Reserve Development Council and the Biosphere Reserve Ambassadors are also available to help spread knowledge and identify needs in the biosphere reserve. The Biosphere Reserve Development Council was established in 2013 and has met every two years since then. During the meetings, the Council provides feedback on the work carried out by the organisation and suggests improvements and changes for future work. The council consists of representatives from municipalities, the Swedish Forest Agency, Upplandsstiftelsen, the Association for Nature Conservation, forestry companies, universities, local contractors and others.

During the 2019 meeting of the Development Council, the Council endorsed, among other things, the Biosphere Association's proposal to submit a written response to the Swedish Agency for Marine and Water Management and other authorities' consultation proposal on the timetable for the reassessment of water-related operations in Sweden. A response that contributed to a change in the official proposal (see further 2.3.4).

External communication systems

The most important communication tools over the years have been all the development projects for which the Biosphere Association has applied for funding. Both those that have already concluded and those that are ongoing. It is in these projects that the Association has had the financial power to employ staff to work on communication and development. To a large extent, these projects have been made possible through funding from Leader Nedre Dalälven. At the time of writing, the Biosphere Association has three ongoing projects in biosphere communication (BUS in the biosphere, see section 2.3.3.), destination development (visitor industry) and fisheries conservation with a total budget of about 830,000 EUR. Since the biosphere reserve was established, the Biosphere Association has carried out ten development projects in the area with a total budget of more than 2.1 million EUR. The projects have mainly been funded through Leader support. Read more about these development projects in chapter 5.

The Association values personal meetings and good relations. Over the years, the Association has therefore organised and invited people to attend a number of networking trips, sightseeing tours, study tours, lectures and study days, and also hosted study visits. The purpose has always been to combine knowledge of the area with knowledge of one another. The trips and days have been highly appreciated by both participants and the Association as organiser and have been very important communication tools.

For example, over the years the Association has toured, lectured and organised activities for German fishing journalists, senior citizen associations, master's students with international backgrounds from Uppsala University, agronomy students from the Swedish University of Agricultural Sciences (SLU), NAMSA (Natural History Museums), delegations from candidate areas in Canada, South Korea and England, but also from existing biosphere reserves. The association has been visited by a delegation from GoChang in South Korea, who wanted to learn more about how natural and cultural environments can contribute to sustainable development in a biosphere reserve. Another visit was by a group of officials from Tyrol in Austria, representing a Leader region, who wanted to look at successful development projects. Over the years, the Biosphere Association has participated in many fairs, addressed the press/media, written articles, produced video, summarised each year in an activity report and produced printed material in the form of brochures and information boards that have been distributed and put on display in the biosphere reserve.

The website, social media and activity reports are important tools for the Association to reach out with knowledge, events, inspiration and to establish new contacts. Attending and participating in the activities of others has also been important for getting to know those involved in the area and for building relationships.

An annual communication event is the National Biosphere Day, which takes place on June 2. The Biosphere Association first participated with its own event in 2013 and has continued to do so since then. Naturum Färnebofjärden and the National Park have been a collaborative partner in various ways since the very beginning. For several years, the Biosphere Association has chosen to celebrate Biosphere Reserve Day in conjunction with National Parks Day on 24 May, in order to collaborate and benefit from the attractiveness of the National Park.

The BUS (Bevara, Utveckla, Stödja. Swedish for Preserve, Develop, Support) communication project in the biosphere

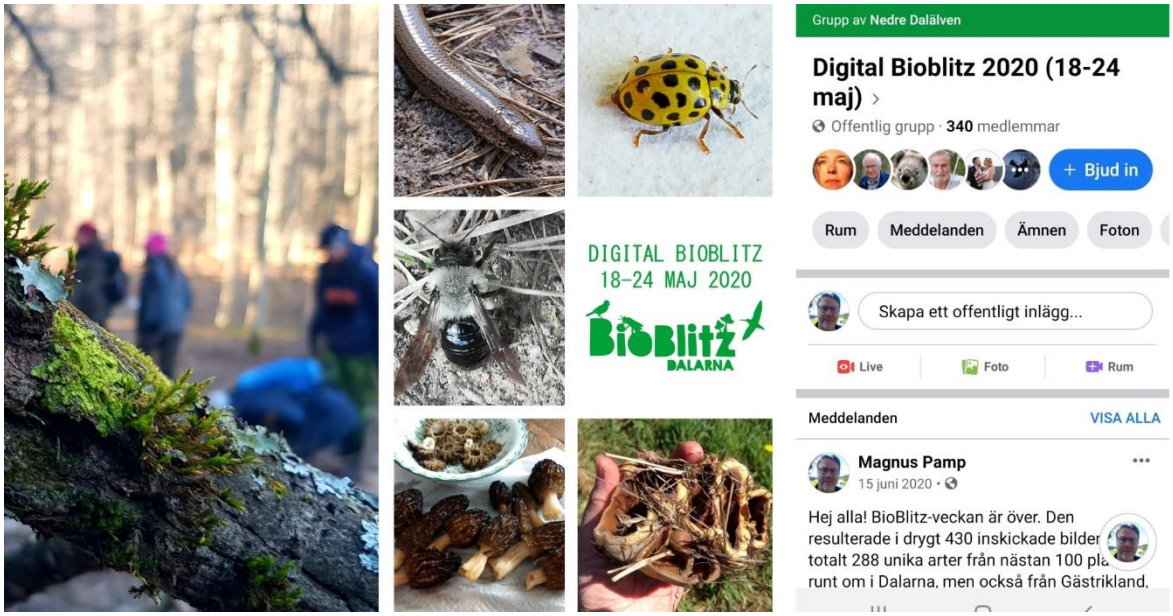
The communication project "BUS in the Biosphere" is one of three information initiatives undertaken by the Biosphere Association during the evaluation period. The aim of the project is to increase public awareness of the biosphere reserve, build networks and establish contacts on sustainable development and to inspire by highlighting good examples of sustainable development. The project is supported with 360,000 EUR from Leader Nedre Dalälven and is expected to run from 2017 to 2022.

A variety of activities are included in the project. For example, through the project, the Biosphere Association has participated and engaged in networking in many local workshops, conferences and lectures on topics such as local development, outdoor recreation, cultural environments, climate, social media and local energy. Furthermore, the project has co-organised courses such as Natural Forestry and Forest Gardens, attended an Italian expo on tourism, participated in a local expo and undertaken a tour with a documentary filmmaker to highlight the biosphere's natural environment, conditions and challenges. As part of the project, a large number of entrepreneurs have received visits, with the aim of sharing information about the biosphere reserve. During the visits, interviews were also conducted on the sustainability work done by the entrepreneurs, which could later be communicated to others. Through the project, the Biosphere Association has also participated in MAB-related activities such as EuroMAB 2017 and 2019 and a national workshop for Biosafety Ambassadors. The Biosphere Day was organised by the project in 2017-2019. Many of the activities mentioned above have been promoted, including on the web and in social media in the form of pictures, videos, interviews and reports. The project has also produced information signs that have been put on display in about 25 locations in the biosphere reserve.

"Outdoor Life in the Biosphere" is a series of outdoor events where the public can participate in guided walks around the biosphere reserve. The aim is to showcase local hiking trails, contribute to health, communicate information about the biosphere reserve and also to inspire guides to organise more hikes. The idea is that the outdoor activities will be annual after the project period.

The feedback from participants in the hiking activities shows that a guide with local knowledge and expertise in, for example, the natural environment, outdoor recreation or cultural heritage, can provide great added value for visitors to the biosphere reserve's natural areas.

Another example of activity is the bioblitz organised by the Biosphere Association together with six local nature associations. A bioblitz is an intensive period of biological inventory in a specific geographical area over a 24-hour period, where interested members of the public are invited to learn and experience nature together with local nature and species experts. The bioblitz was organised during the pandemic, which meant it was converted from a physical day-long event to a digital week-long activity. The bioblitz involved more than 340 people in and around the biosphere reserve. The feedback from participants was generally very positive and they reported that the digital version had motivated them to go out into nature more often.



Left; Representatives from five local nature associations inventory the area where the bioblitz will be held. This happened before the pandemic hit and the event went digital. Centre; Some of the 430 photos submitted by the 340 participants of the bioblitz via social media. Right; the Facebook group where experts from the nature associations identified the plants, birds, insects,

etc. that the participants had photographed in the biosphere reserve during the week of the bioblitz.

Social media- example Facebook

Through the "BUS in the Biosphere" communication project, described above, in 2019-2020 the Biosphere Association has focused on more frequent posting of content on its Facebook and Instagram accounts. These accounts were launched back in 2013. Through these, the Biosphere Association disseminates, among other things, tips on events and activities, good examples of sustainable development in the area and news related to the biosphere reserve. Another important use is to showcase the biosphere's unique and beautiful natural environment, both to locals and visitors. The Biosphere Association also uses social media to disseminate information and invite people to self-organised activities. An example of this is three outdoor activities in 2019 that attracted about 130 participants via posts on Facebook, which was also the maximum number of participants.

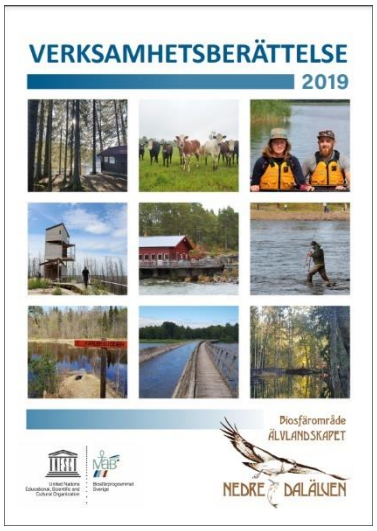
The Facebook account was created in 2013. In 2014, the Facebook page gained 1000 new likes. In December 2016, the page had 1,396 likes, in December 2018, the page had 1,453 likes, and two years later, in December 2020, the number of likes had increased to 2,682.

The number of Facebook users "liking" the biosphere reserve website increased by 85 percent from December 2018 to November 2020. A result of the BUS project's efforts to increase its presence on social media.

Operating report

The operating report is a key element in disseminating information about the work of the Biosphere Association and what is going on in the four focus areas (see section 2.3.4). The target group is primarily the biosphere municipalities, members of the Biosphere Association, biosphere ambassadors, the Swedish Environmental Protection Agency and other stakeholders.

The operating report contains information on the activities and work carried out by the Biosphere Association during the year. Biosphere-related projects run by Leader Nedre Dalälven are also presented. The operating report is published on the website and emailed to the members of the Biosphere Association and the board, biosphere reserve ambassadors, contact persons at municipalities and others. It is also printed and distributed throughout the year, for example by mail, during visits to the biosphere reserve, at trade fairs and at the offices of the Biosphere Association.

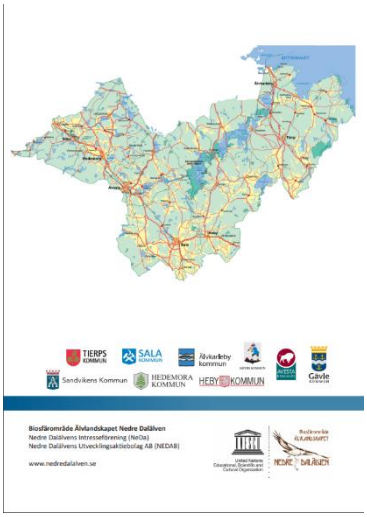

VERKSAMHETSBERÄTTELSE
2019
Biosfärområde
ÄLVLANDSKAPET
NEDRE DALÄLVEN


EUROMAB, 1 - 5 APRIL
DOKUMENTÄRFILM FÖR UNESCO:S RÄKNING


KURS I NATURNÄRA SKOGSBRUK, 2 - 3 FEBRUARI

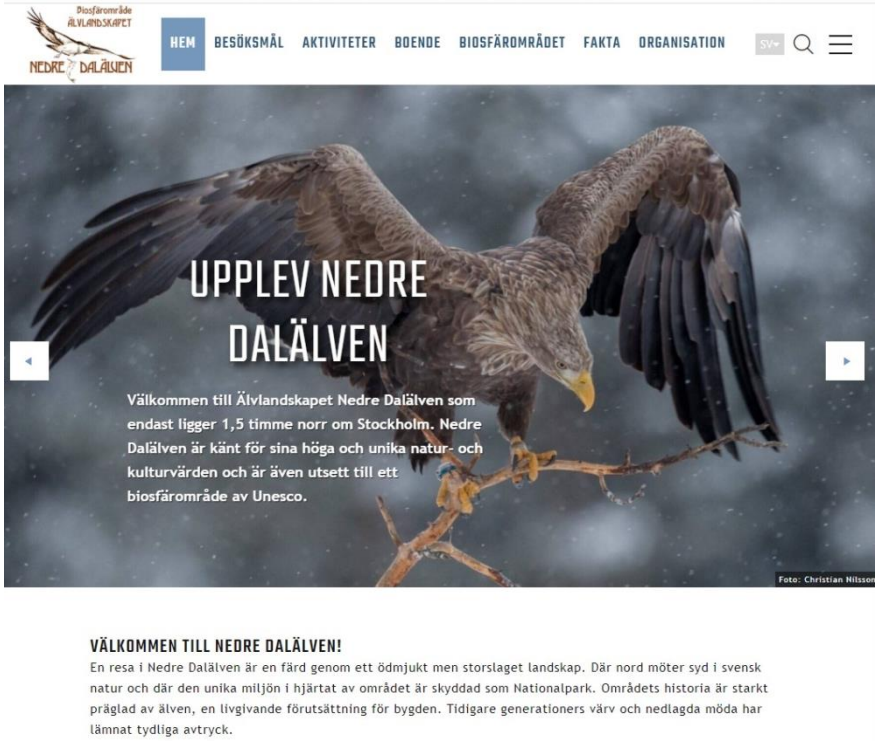

MÄSSA EFTERFEST I HEBY, 27 SEPTEMBER
BESÖK FRÅN GYEONGGI-PROVINSEN I SYDKOREA, 2 OKTOBER


NEDA:S BIOSFÄRKOORDINATOR CRISTINA ERICSON I PENSION


Biosfärområde Älvlandskapet Nedre Dalälven
Nedre Dalälvens Intresseförening (NeDa)
Nedre Dalälvens Utvecklingsaktiebolag AB (NEDAB)
www.nedredalalven.se

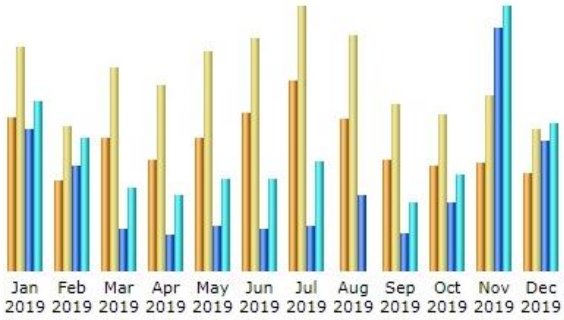
6.5.2 Is there a biosphere reserve website? If so, provide the link.

www.nedredalalven.se



Over the years, strong focus has been placed on, and considerable resources have been put into ensuring that the Biosphere Association, the tourism network and the biosphere reserve have a modern, inspiring and rich website. An important and significant part of the website is directed at those visiting the area. The website highlights tourism entrepreneurs, destinations and activities in the area. The biosphere municipalities are also presented and you get an insight into their sustainability work. The website includes general information about the biosphere reserve, a section with questions and answers, upcoming and completed activities, news and project information. It also highlights good examples of sustainable development in the biosphere, such as entrepreneurs in the tourism industry. Projects run under the direction of the Biosphere Association are described here as well as ongoing events within projects.

The target groups for the website are mainly visitors and residents of the area, stakeholders in the projects that the Biosphere Association runs or participates in, and those seeking information about the biosphere reserve and/or wanting to get involved in sustainable development. The website has been renewed and developed in depth on two occasions, in 2015 and 2020.



Month	Unique visitors	Number of visits	Pages	Hits
Jan 2019	2,784	4,055	189,690	227,208
Feb 2019	1,649	2,630	140,349	178,044
Mar 2019	2,413	3,688	56,098	110,889
Apr 2019	2,008	3,371	48,424	100,679
May 2019	2,401	3,993	60,078	122,780
Jun 2019	2,872	4,226	55,370	122,569
Jul 2019	3,437	4,795	59,994	145,739
Aug 2019	2,758	4,263	100,739	160,730
Sep 2019	2,017	3,013	50,773	92,357
Oct 2019	1,908	2,830	91,810	128,302
Nov 2019	1,956	3,196	325,203	354,362
Dec 2019	1,771	2,579	173,281	198,583
Total	27,974	42,639	1,351,809	1,942,242

The website had around 28 000 unique visitors in 2019. On average, two thirds of these revisited the website. In total, the various pages of the website were viewed about 1.3 million times.

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

A digital newsletter has been available since 2014. The newsletter is sent out twice a year on average. In December 2020, 500 people were on the mailing list.

Link to newsletter:
https://public.paloma.se/webversion?cid=7821&mid=599669&emailkey=f3aeaf21-e478-47c6-83a7-027c6089ae97

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

Facebook

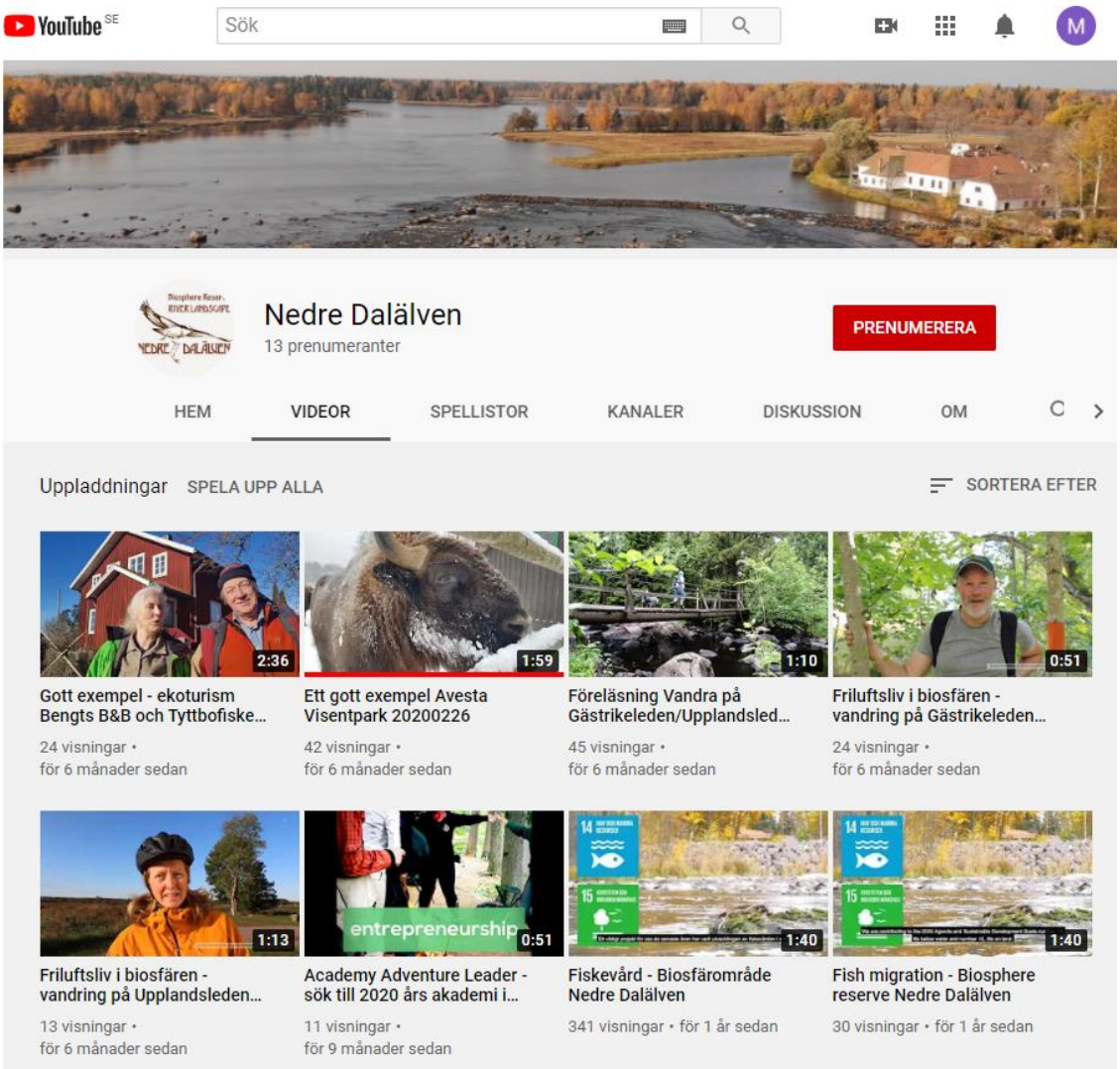
www.facebook.com/nedredalalven

Instagram

www.instagram.com/nedredalalven

YouTube

www.youtube.com/channel/UCEmptG-zqkZWUjGj1awbqoQ



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

In the networks that the Biosphere Association has built up in the biosphere reserve, there are several modes of contact, including through email circulars widely distributed in the networks, network meetings and personal interaction with representatives of various associations and organisations. Section 2.3.4 describes the networks under the focus areas Sustainable Fisheries, Open Landscapes, Sustainable Tourism Industry and Biological Mosquito Control.

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

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

At a national level

The Biosphere Coordinator participates in the monthly digital meetings of the coordinators of the Swedish Biosphere Reserves and the national coordinator of the Swedish Biosphere Programme. This is an appreciated forum for sharing experiences. Networking between the coordinators has led to cooperation between the seven Swedish biosphere reserves. The various areas have jointly applied for funding for an education initiative on Agenda 2030 aimed at schoolchildren. Others have also been invited to the monthly meetings to share information, such as representatives from the Swedish Environmental Protection Agency, the Lake Vänern Museum and the Swedish University of Agricultural Sciences (SLU).

At the end of the 10-year period, all Swedish and several other biosphere reserves within NordMAB, led by the Swedish University of Agricultural Sciences (SLU), were involved in application processes for two research projects. Applications have involved face-to-face meetings, participation in online conferences and online information and dialogue sessions.

On two occasions, the Biosphere Association has hosted the annual meeting of Sweden's biosphere coordinators. At these meetings, topics such as "Training materials for Biosphere Reserves Ambassadors", "National adaptation of the Lima Action Plan" and "Global Strategy for the MAB Programme" have been discussed. Furthermore, the Biosphere Association has conducted a study tour for about twenty of its own biosphere ambassadors and two other Swedish biosphere reserves and participated in national workshops and seminars on biosphere work and for biosphere ambassadors. The Biosphere Association hosted the Swedish Biosphere Programme's workshop in Söderfors in 2013 with nearly 40 participants. The theme was economic and ecological opportunities in biosphere reserves. Representatives from the Biosphere Association have also participated in in-depth conferences organised by other Swedish biosphere reserves, with themes such as "In-depth knowledge of how the various boards work" and "Biosphere reserves as identity and brand". The biosphere coordinator, together with a municipal representative, has participated in a conference for biosphere municipalities with about 60 participants.

At a regional level

There are no regional collaborations yet, but the Voxnadalen Biosphere Reserve was established in 2019, which creates opportunities for future collaborations. The Voxnadalen biosphere reserve and the Nedre Dalälven River Landscape are partly or entirely in the same county, which may lead to future collaboration, for example in research.

In the framework of regional and bilateral agreements

Not applicable.

At an international level

The designation as a biosphere reserve is accompanied by membership of the global biosphere reserve network WNBR, the European network EuroMAB and the Nordic network NordMAB. EuroMAB meets every two years and NordMAB every year. The Association normally participates in the international conferences NordMAB and EuroMAB.

The Nedre Dalälven River Landscape is part of the "Biosphere for Baltic" thematic network, which includes nine biosphere reserves in seven countries around the Baltic Sea. The project aims to gather and disseminate experiences from biosphere reserves in the Baltic Sea region and to create opportunities for exchange between biosphere reserves and organisations with a Baltic Sea focus. The project also aims to make visible the role of biosphere reserves in contributing to the Agenda 2030 and to communicate good examples that contribute to the global goals.

> *Biosphere for Baltic, September 2019; "An important issue we worked on at the networking meeting at Hiiumaa in the Western Estonian archipelago was how entrepreneurs and stakeholders in the biosphere reserves package and market services and products to tourists. An important part is to tell people that when they choose the "biosphere-related" experiences, services and products, they are actively contributing to sustainable development." / Henrik Thomke, Project Manager*

The Nedre Dalälven River Landscape is part of the "Biosphere Forests for the Future" thematic network. The network brings together biosphere reserves from northern to southern Europe in an international exchange of knowledge. The initiative is expected to lead to increased awareness of the vulnerability of forest landscapes to climate change, increased collaboration within the UNESCO Biosphere Programme and increased knowledge of research needs linked to local practice. All Swedish biosphere reserves are part of the cooperative effort, as well as biosphere reserves from Finland, Italy, Poland, the UK and the Czech Republic. Biosphere Forests for the Future aims to provide a forum for collaboration, exchange and inspiration, focusing on the development of biosphere reserves as model areas for climate adaptation of forest landscapes and how biosphere reserves contribute to the implementation of the 2030 Agenda, specifically Goal 13. Within the framework of "Biosphere Forests for the Future", applications were initiated in 2019-2020 for two SLU-led research projects in Swedish and European biosphere reserves.

Representatives of the Biosphere Association have also participated in a global board meeting of the UNESCO Man and the Biosphere (MAB ICC) scientific programme and in study tours to the Italian biosphere reserve Appennino Tosco Emiliano.

In the Swedish biosphere reserves' collaborative project "Biosphere Challenge", which is aimed at school students, the intention is to invite schools from foreign biosphere reserves.

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

Current benefits of international cooperation

Through EuroMAB and NordMAB, the Biosphere Association gains insights into what other biosphere reserves are working on and how they do it. Through the study tours, representatives from the Biosphere Association and other stakeholders from the biosphere reserve have seen concrete examples of local cooperation and solutions that have inspired and provided ideas for the development of the Nedre Dalälven River Landscape.

"For me, the cooperation in the MAB networks has been very important over the years. It has provided inspiration and ideas for the development of our biosphere reserve. As a biosphere coordinator, you are alone in your professional role, but in these networks, coordinators have met with and received important support from each other, working in a positive spirit and finding common solutions. I also see great value in the thematic networks that emerge as we meet and recognise that we share challenges in certain areas. For example, we can apply for research grants for joint projects" / Cristina Ericson, Biosphere Coordinator 2011-2019.

Cristina Ericson, quoted above, also worked on the application to UNESCO for the nomination of Nedre Dalälven as a biosphere reserve.

Through cooperation in the "Biosphere for Baltic" network, the Biosphere Association has, among other things, exchanged experiences on sustainable tourism. This is how the project manager of the Biosphere Association in Sustainable Tourism describes his experience of the benefits of the network;

"Being given the opportunity to be part of a network like Biosphere for Baltic has provided us with very valuable networking contacts on both an organisational and personal level, as well as inspiration for concrete action. We have also been able to learn about the various projects and initiatives carried out by participating biosphere reserves and the lessons learned from these. Examples include efforts to restore watercourses using simple methods and local involvement in Lithuania, as well as renowned and well-publicised measures taken to restore pike stocks in the Danish biosphere reserve of Mön. We have learned about the development of an educational plan to educate children on water-related issues and the development of small-scale logistics solutions with a focus on natural values and sustainability in a Finnish biosphere reserve. We have seen examples of how Estonia has developed a tourism focus on the international market with high quality accommodation in full service hotels with a range of activities. A further example is the differences in how the predation situation related to seals and cormorants is viewed in the sea around a German biosphere reserve, which is an issue similar to the one we have in our own marine environment." / Henrik Thomke, Project Manager

Expected benefits of international cooperation

The association sees it as important to have contact with biosphere reserves in other countries for knowledge exchange and inspiration. The meetings organised through NordMAB and EuroMAB are good platforms for this and provide opportunities for personal meetings with representatives from biosphere reserves that share the same challenges, but may have encountered them in different ways.

The continuation of collaborative efforts such as "Biosphere Forests for the Future" and "Biosphere for Baltic" would be valuable as they provide an opportunity to exchange experiences with biosphere reserves facing similar challenges and to plan, act and gain knowledge together. It is also hoped that the biosphere reserve will be included in research projects that span several disciplines, to share research findings, ideas and experiences from research projects and collaborations that would otherwise be difficult to access.

Since the biosphere reserve is geographically equivalent to the Leader area following its extension, the Biosphere Association will in the future also seek cooperation with areas in Europe that have similar conditions. This is done for the purpose of exchanging experience on issues of locally led development linked to natural resource issues and climate.

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?

Nedre Dalälven River Landscape will continue to participate in international networks such as EuroMAB, NordMAB and "Biosphere for Baltic" in order to be inspired, learn best practices and share good examples. The Biosphere Association also wants the biosphere reserve to participate in international research and development partnerships such as "Biosphere Forests for the Future". With its unique expertise in Biological Mosquito Control in protected areas, the Biosphere Association is happy to participate in international fora to share and gain new experiences. In Biological Mosquito Control, international studies and collaborations may be important, especially in the current climate change and with the changing conditions that are emerging.

With the biosphere reserve's unique ability to work with the local community on sustainable development issues together with the Leader area, the Biosphere Association wants to develop cooperation with other biosphere reserves in the world on these issues 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 favored as being most effective?

The Biosphere Association has learned that it is important to take every opportunity to talk about the biosphere concept, the biosphere reserve and all the good examples of activities. This was to some extent neglected in the early years. Many activities carried out by the Biosphere Association, or by other actors active in the biosphere reserve, were not communicated as being part of the biosphere reserve's activities, even though they were. The consequence is that awareness of the biosphere reserve and what is going on inside it is relatively low. In recent years, the Biosphere Association has reviewed its procedures and takes great care to communicate what is part of the biosphere reserve's activities. It is hoped that this will increase awareness of the area.

Biosfärum Gröna kunskapshuset (see 6.4) was a success factor for the support function. Unfortunately, this project was discontinued due to lack of funding. Hopefully something similar can be built up again. A training and visitor centre is important for providing information about the biosphere reserve and learning about sustainable development in practice. The Gävleborg County Administrative Board nature centre (see 6.4) at Färnebofjärden National Park partly fulfils this function but focuses largely on the park.

The Biosphere Association's website, social media (Facebook, Instagram) and newsletters are important for the support function. The Association's communication about the biosphere reserve and its cooperation at regional, national and international level is described in sections 6.5.1 - 6.6.3 and in Chapter 2.

6.8 Other comments/observations from a biosphere reserve perspective.

No comments.

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?

Nedre Dalälvens Intresseförening (the Nedre Dalälven Biosphere Association) is the coordinator of the biosphere reserve and has an office in Gysinge, a town in the middle of the biosphere reserve, directly adjacent to the core area Färnebofjärden National Park. The office has a work room and a meeting room as well as modern documentation and communication equipment connected to broadband. Transport is mostly by car as public transport is poorly developed in the area. The association also owns boats that are used to showcase the area and for mosquito control monitoring.

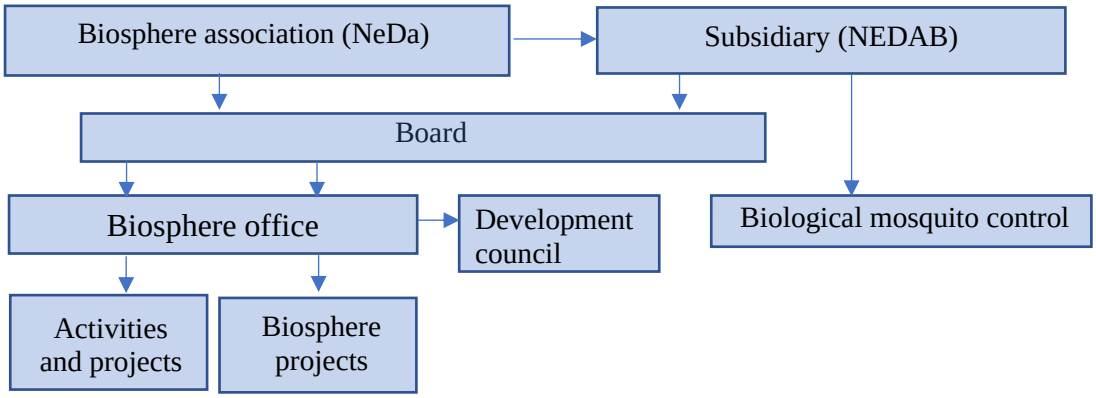
7.2 What is the overall framework for governance in the area of the biosphere reserve? Identify the main components and their contributions to the biosphere reserve.

The Biosphere Association, which is the principal administrative body of the biosphere reserve, is a non-profit association founded in 1986. The association consists of members of various organisations with interests in the area. Its members are the nine municipalities in the area, six small companies in the tourism sector, two large forestry companies, two large power companies and two NGOs. The composition of the board is regulated in the association's statutes. The board includes, as full or deputy members, representatives of all municipalities in the area, member companies in the business sector and the Swedish Farmers' Union (LRF). A Nomination Committee makes proposals for the members of the Board and the Chairman, who are then appointed at the Annual General Meeting. The Board is responsible for the biosphere reserve's activities and finances. A business plan exists for the work being done. See section 7.7.

In addition to the Board, there is a Development Council for the biosphere reserve's development work, consisting of officials from the municipalities and representatives from the Swedish Forest Agency, the County Administrative Board of Gävleborg, universities and non-profit organisations (see 6.5.1).

The Biosphere Association runs a biosphere office with employed staff. In 2020, the biosphere specific work comprised two annual jobs distributed among five employees, including a biosphere coordinator/communicator, two project managers, an accountant and the CEO. The biosphere office is financed by funds from the Swedish Environmental Protection Agency and other funding of at least the same amount each year. Other funding may consist of membership fees and support from various forms of projects, mainly Leader projects. The number of employees in the Biosphere Association and the subsidiary Nedre Dalälvens Utvecklings AB at the end of 2020 amounted to ten full-time equivalents distributed among twelve employees, of which two full-time equivalents in the group and eight in the company. The work directly related to the biosphere office involves two years of work for five staff members. The Biosphere Association works closely with Leader Nedre Dalälven. This cooperation is described in more detail in Chapter 5.

Organisational chart



The association works to fulfil the three functions of a biosphere reserve, conservation, development and support, and coordinates the actors involved. This is done by initiating, supporting, monitoring and communicating activities in the area related to sustainable development, particularly in the focus areas relevant to the biosphere reserve, among other things. The Biosphere Association does not exercise any formal authority. Instead, the work is done through close dialogue with authorities, associations, landowners and other stakeholders.

The county administrative boards manage the core areas through protection and other management activities. One exception is Östa nature reserve, which is managed by Heby municipality. The county administrative boards and municipalities are also responsible for a large part of the work on sustainable development and for regional and local environmental monitoring.

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.).

This question is not relevant to the biosphere reserve. There are no indigenous peoples in the area.

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

The Biosphere Association has had difficulties in communicating what a biosphere reserve is, and in getting residents, businesses, municipalities and county administrative boards to see the benefits of it. Since 2016, the Biosphere Association has therefore been running the BUS in the Biosphere leadership project (see 6.5.1), which aims, among other things, to increase public awareness of the biosphere reserve and its benefits. It is hoped that surveys will show that public awareness of the biosphere reserve is increasing.

During the candidacy and in the first years after designation, there was concern among landowners and other users of nature that the designation of a biosphere reserve would impose new rules and restrictions on land use. Now that those who were initially concerned have understood that no restrictions have been added as a result of the appointment, this is no longer a major problem.

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 natural environment of the area is used in different ways and by different actors with partly different interests. There is also a certain level of competition over resources between urban and rural environments. The area is largely rural and there is a widespread perception that publicly funded services have been deteriorating for some time. A common view is that the state, based in the big city, both sucks the natural resources of the countryside and then imposes restrictions on their management and use. In the light of the above, the following is a brief description of some examples of conflicts in the area, most of which are not specific to the area but can be found in large parts of Sweden.

Commercial berry picking

In Sweden, the right of public access gives everyone the right to access privately land in the countryside, to stay there temporarily and to pick berries, mushrooms and certain other plants, for example. With this right also comes a requirement for consideration and care for nature and wildlife, for landowners and for other people. Conflicts between landowners and other users sometimes arise, related to the right of public access. These include berry picking and, in recent years, commercial tourist activities on land owned by a third party. As in much of Sweden, huge amounts of blueberries and lingonberries ripen in the autumn, in the forests of the biosphere reserve. Although availability varies from year to year, it is a resource that is only marginally used. The berries are picked both for domestic and commercial use. There is organised commercial berry picking that occurs without conflict. It is the unorganised commercial berry picking that has led to conflicts. The conflict has partly concerned the conditions of berry-pickers and partly been about the obligations and rights that the right of public access entails. The berry-pickers, who travel here mainly from Eastern Europe and South-East Asia, often have to live and work in poor conditions. There have also been problems with rogue companies cheating berry pickers out of their wages. Landowners sometimes have to put up with littering and destruction from large tent camps and there have been cases of landowners objecting to the right to commercial berry picking on their land.

The conflict was particularly severe in the biosphere reserve in the summer and autumn of 2012. At the time, over 500 berry-pickers from Bulgaria were living in makeshift campsites on the outskirts of Mehedeby, a small town of just under 500 inhabitants in the eastern part of the biosphere reserve. Problems arose when no one wanted to take responsibility for the activities of the berry-pickers and this caused great concern among the residents of Mehedeby and surrounding villages. It was a difficult situation even for the berry pickers, who lacked knowledge of applicable rules, laws and rights. Conflicts also occurred in other parts of the biosphere reserve during this season.

Before the following berry season, 2013, the Biosphere Association arranged a seminar on commercial berry picking in close cooperation with Bergvik Skog AB at Söderfors Manor with just over 50 participants. The conclusions of the seminar were that a national coordinator is needed, that rogue traders must be removed and that information on the rules that apply in Sweden is necessary for those travelling here before departure and also on arrival. Since then, conflicts seem to have decreased.

Hydropower

Since the beginning of the 20th century, hydropower on the river Dalälven has been expanded significantly. Hydropower is a renewable energy source and accounts for a significant share of Sweden's electricity production, but it negatively affects several other interests. To harness the power of the water and convert it into electricity, large dams were built, causing some areas to be intermittently submerged or laid dry. This is largely regulated by the demand for electricity and the availability of water in the reservoirs. The water level fluctuates throughout the year and day in a way that is not natural. This has consequences for the natural environment, not only for individual species and entire ecosystems, but also for people who use the land near the river, such as residents, farmers and tourism businesses. Another consequence of hydropower is that it constitutes a barrier to fish migration. Fish cannot migrate up and down rivers to reproduce and several species have therefore declined or become locally extinct.

The conflicts of interest described above have been further complicated and cemented by the absence of a common forum for dialogue between the various parties. The project "Fishing in the Nedre Dalälven", which started in 2016, aimed to increase communication between the two major environmental projects Sustainable Hydropower in the Dalälven and Salmonids in the Nedre Dalälven (see 4.2) as well as with water owners, power companies, municipalities and tourist operators and others, so that everyone could have their say and be brought closer together. A number of broader networking meetings and local meetings organised by the project have allowed the different stakeholders to express their views on the impact of hydropower and discuss other water and fisheries related issues. At the end of the project, the interest and need for collaboration had proved so great that a further project "Collaboration between fisheries stakeholders in the Nedre Dalälven" was launched in 2018. One of the objectives of the new project was to address how to meet expectations for the long-term sustainable management of the fishery stock, consisting mainly of sea trout and salmon, which is being restocked into the area from the mouth of the Dalälven to Lake Bysjön, by making use of environmentally adapted passage solutions for upstream and downstream migrating fish that are planned in conjunction with the hydropower reassessment work (see 4.6).

Mosquito control

Since 2002, floodwater mosquitoes have been controlled with VectoBac G in small parts of the biosphere reserve on behalf of the municipalities. The biological control agent contains the active ingredient Bti and is sprayed from helicopters in certain areas near the river. Control, self-monitoring and permit applications are carried out by Biological Mosquito Control, a unit of the Biosphere Association's subsidiary. Read more about mosquito control in sections 2.3.4 and 5.6. There is a conflict between the local population and the licensing authorities on mosquito control. The conflict is long-standing, complex and difficult to describe in an objective fashion, but an attempt is made below.

Residents and businesses in the area, which was affected by the previous large numbers of floodwater mosquitoes, believe that the control is a necessity. The Biosphere Association is partly representing them and applying for permission to engage in control activities. The authorities, in this case the Swedish Environmental Protection Agency and the county administrative boards, are responsible for evaluating the permit. The annual review so far has largely resulted in the approval of control measures, although some minor areas are exempted.

There seems to be little disagreement about the potential environmental impact of the use of the biological pesticide VectoBacG and its active ingredient Bti. Bti has been used for a long time in Sweden and in the rest of the world without any significant negative consequences having

been demonstrated. The authorities also recognise the need for control, but invoke the precautionary principle and demand that the use of Bti be reduced and that Biological Mosquito Control investigate the possibilities for alternative methods such as grazing and mowing. However, the question of whether these measures can also be used to reduce the amount of Aedes sticticus to acceptable levels, is hotly debated. There is considerable disagreement among experts and widespread concern among the local population that the currently well-functioning Bti control will be replaced by alternative methods that do not work as well.

The authorisation process, which has so far consisted of an annual application, has sometimes been delayed, preventing timely control measures from being taken, as the floodwater mosquito larvae hatch in late spring or summer. The areas excluded from control are considered by Biological Mosquito Control and local residents to be a non-negligible source of mosquito production. The consequence of this is that, despite generally successful control, some areas can produce unbearable numbers of Aedes sticticus whose bloodsucking affects people's ability to engage in outdoor recreation during the summer season. The annual permit process has often been uncertain up until the last minute, causing concern among the local population and those who will carry out the control.

The tone has sometimes been scathing, from the affected local population in their communication with supervising authorities. On the other hand, communication from the authorities to those affected by the mosquitos is sometimes perceived as insufficient and unengaged.

From 2020 onwards, Biological Mosquito Control will be allowed to apply for a permit for three years at a time, which will facilitate operations, reduce uncertainty around control measures and hopefully reduce the level of conflict.

Biological Mosquito Control has held countless information meetings, both for the population and for the authorities, and sometimes for both together. Being well informed about what is going on is important for the affected population. It is important to communicate information on new knowledge and research in the field of mosquito control to the authorities. Biological Mosquito Control currently has a good dialogue with the Swedish Environmental Protection Agency and the county administrative boards, which is brought forward at meetings with the local population. This helps to mitigate the conflict between the population and the authorities.

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

In terms of area protection, the responsibility lies primarily with the county administrative boards. According to two representatives of one of the four county administrative boards in the area, there are no conflicts in competence in the area of area protection. The legislation is clear and there is a continuous dialogue with other relevant authorities.

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?

There are no known conflicts in competence in the area related to the functions of the biosphere reserve.

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

The board of the association consists largely of elected local politicians, who represent the local population. The Biosphere Reserve also has a Development Council (see 6.5.1).

The work of the Biosphere Association on the biosphere reserve is largely in the form of projects, often within one of the biosphere reserve's focus areas. These project groups hold working meetings and organise meetings with the general public when necessary.

The Biosphere Association does not exercise formal authority. As far as nature protection and the resulting restrictions are concerned, this is mainly handled by the four county administrative boards in the area. In the case of area protection, such as the establishment of nature reserves and the removal or extension of shoreland protection, the county administrative boards engage in dialogue with the landowners concerned at an early stage and throughout the process. The aim is to reach agreement, and this succeeds in most cases. The County Administrative Board sometimes also engages in dialogue with other stakeholders who use the land, for example for various forms of outdoor recreation or sporting activities. Boundaries and management plans are designed according to the wishes of landowners and other stakeholders, to whatever extent possible. The top priority is environmental protection, which means that landowners and other users sometimes have their options restricted. Landowners have the right to compensation and legal assistance in the establishment of reserves.

Sweden is one of the world's most equal countries and men and women have equal opportunities to participate in the biosphere reserve's activities. There are no indigenous peoples whose interests would require special consideration, within the biosphere reserve.

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

THE BIOSPHERE ASSOCIATION

The Biosphere Association is run as a non-profit association and has a broad geographical representation with members from the public, voluntary and private sectors. Below is a list of members as of 2020. Members represented on the board are marked with an asterisk.

Municipalities

Avesta municipality *

Gävle municipality *

Heby municipality *

Hedemora municipality *

Sala municipality *

Sandviken municipality*

Säter municipality *

Tierp municipality *

Älvkarleby municipality *

Companies

Bengts & Tyttbo Forsfiske *

Hedesunda Camping *

Fortum Sverige AB *

Stora Enso *

Billerud Korsnäs

Dalagård

Gysinge Herrgård

Vattenfall

Äventyrarna

Östa Fishing

Non-governmental organisations

The Federation of Swedish Farmers (LRF) Dalarna / Gävleborg *

Upplandsstiftelsen

DEVELOPMENT COUNCIL

In addition to the Board, which decides on the activities of the Biosphere Office, there is a Development Council. The council is more loosely composed and has over the years consisted of some 30 representatives, including from the organisations listed below and the area's Biosphere Ambassadors (see 6.5.1).

Gävle University and Dalarna University

Municipal officials working in fields such as nature and the environment, business and tourism.

The Swedish Forest Agency

Färnebofjärden National Park Management (Gävleborg County Administrative Board)

The Swedish Society for Nature Conservation

Upplandsstiftelsen

The Swedish Museum of Natural History

Biosphere ambassadors

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 purpose of the Association, going back to before the area was designated a biosphere reserve, has always been to represent the local interests of the area, as reflected by the representation among its members and in the Board of Directors, which is elected by the members. See section 7.5.2. In addition to this formal representation, work is constantly being done to monitor current and local areas of interest, issues, projects, conflicts and more related to the biosphere reserve. This is done actively in the association's own forums and in others in which the Biosphere Association participates, in collaborations and through analysis of the world around us. Individuals and organisations often approach the Biosphere Association and suggest that the group should get involved in a particular issue. The strength of being a non-profit association is that the association, with its coordination, becomes a neutral party that can bring together different actors from different sectors to discuss sustainability. As the biosphere reserve spans four counties and nine municipalities, the Biosphere Association also often takes a geographically coordinating role.

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 Association is held once a year. If necessary, the Board or the members may request an extraordinary general meeting. The Board of the Biosphere Association must meet at least twice a year, but usually meets four times a year. In between those meetings, the presidium and the CEO meet to discuss urgent matters.

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

The General Meetings and the Board meetings are decision-making. Meetings of the Development Board have an advisory function. Information sessions are held for specific groups or the general public as needed.

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.

During the formation process, the public was involved with the goal of securing popular support for the design of the proposed biosphere reserve. In the following two years (2011-2012), several future seminars were held with stakeholders and the public. Since then, meetings with the public have taken place in each focus area, with stakeholders in a particular focus area such as fisheries, tourism or mosquito control participating. In 2021, the Biosphere Office started a major participatory process involving the public to lay the groundwork for a new action plan for the next 3-5 years (see 7.7).

7.6 Update on management and coordination structure:

7.6.1 Describe any changes regarding administrative authorities that have jurisdiction 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.

Bergvik Skog AB, one of the major landowners in the area, was restructured in 2019. The land is now owned by BillerudKorsnäs and seven other companies. Otherwise, there have been no significant changes.

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

The coordinator is hired by the CEO of the Biosphere Association. Cristina Ericson was the coordinator until June 2019 when she retired. The new coordinator, since March 2020, is Magnus Pamp, who is also the project manager for the Leader project BUS and the communicator for the Biosphere Association and Leader Nedre Dalälven. During the period, the position of CEO has been held by:

Kalle Hedin from the start up until 2014

Katarina Olofsdotter 2015-2016

Charlotta Heimersson 2016-present

7.6.3 Are there any changes with regard to the coordination structure of the biosphere reserve? (if yes, describe in detail 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?)

No changes since the nomination. The Biosphere Association has always been the principal administrative body and coordinator of the biosphere reserve. The form of association is self-governing and the annual general meeting of the association is its highest decision-making body. The association is governed by statutes decided by its members. See further under section 7.2.

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

The administration/management of the area is shared between four county administrative boards and nine municipalities. When a group of scientists and educators came up with the idea of establishing a biosphere reserve, it was natural for them to present it to the Biosphere Association, which has long been active in rural development and nature conservation in the area. The Biosphere Association already played an important role in coordinating these issues between the many authorities and other actors. For example, all municipalities are represented on the association's board. Since the nomination, the outer boundary of the transition area has been extended to better match the administrative boundaries of the municipalities and the Leader Nedre Dalälven area. Read more about extension in section 2.2.1.

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

The Biosphere Association has not carried out any evaluation of its own on the effectiveness of management. However, evaluations of the biosphere coordination activities of the Biosphere Association have been carried out by others on a few occasions:

In 2020, a group of students from the Swedish University of Agricultural Sciences (SLU) agronomy programme with a focus on rural development wrote a thesis entitled *"Nedre Dalälvens biosfärområde – pilotområde för hållbar utveckling?"* The thesis is based on interviews with employees and board members of the Biosphere Association and Leader and small-scale surveys in a number of locations in the biosphere reserve. Two conclusions of the paper are that those working with the biosphere reserve feel that it is a difficult concept to communicate and that public awareness is low. Together, these constitute a barrier to biosphere work and affect the legitimacy of biosphere work and how well the organisation is governed from a bottom-up perspective.

On behalf of the Swedish Environmental Protection Agency, researchers from the Swedish University of Agricultural Sciences (SLU) have investigated organisational forms and collaboration processes in Sweden's biosphere reserves (Swedish Environmental Protection Agency 2020). The study is based on interviews with key people within the organisations and a review of documentation. One conclusion of the study on the Älvlandskapet Nedre Dalälven is that the Association's long history of carrying out development work in the area, as well the close cooperation with Leader Nedre Dalälven, are important success factors in finding funding and synergies for the biosphere initiatives. Furthermore, it appears that the biosphere reserve experiences, and can demonstrate, major advantages of the current organisational form. It enables the organisation to pool both resources and skills across its different activities.

Another conclusion of the Swedish Environmental Protection Agency's study is that one of Älvlandskapet Nedre Dalälven's challenges is to consolidate a "biosphere identity" both within the organisation's board and among the general public. According to the study, the challenge of consolidating an identity is made more difficult by the fact that the boundaries of the area have been redrawn, and that this change happened without significant prior communication to the local community. It should be added, however, that the geographical extension was decided by the Board and can therefore be seen as having the support of all the municipal governments involved (Comment from the Association). Read more about extension in section 2.2.1.

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 the process for involvement of stakeholders, adoption and revision of the plan.

For the years 2012, 2013-2014 and 2014-2015, activity plans have been developed for the Älvlandskapet Nedre Dalälven. These have described the activities to be carried out during the year and the objectives to be worked towards. The business plan of the association has been the overarching policy document for the biosphere reserve work in 2011-2020. The 2014-2016 business plan stated that the biosphere concept should permeate all aspects of the work done by the Biosphere Association. The business plan as well as the activity plans have been approved by the Board of the Biosphere Association. The board includes representatives from all nine municipalities in the biosphere reserve, the business community and local land and water owners.

The Board has decided that a new action plan for the Association's work with the biosphere reserve will be developed. The work began at the end of 2020 and will be completed by the end of 2021. Stakeholders in the biosphere reserve, for example, the biosphere reserve development council, members of the Biosphere Association, biosphere ambassadors and representatives of the networks for each focus area. will be offered the opportunity to participate in the process. The dialogue on the action plan is meant to be organised as a series of small workshops. At the end of 2020, the Biosphere Association conducted a survey, asking questions about challenges, opportunities, thoughts on renewal and the work done so far. Around 100 people linked to initiatives within the biosphere reserve were invited. About 40 of them responded. The results of the survey will provide a basis for further work on the action plan. It emerged, among other things, that most people believe that the existing focus areas should be retained, but that they envisioned them being developed further. For example, one respondent suggested that the promotion of locally produced food could be an objective within the focus area of sustainable tourism. Others propose investments in new focus areas such as sustainable energy supply and sustainable forestry. Opportunities for the biosphere reserve include increased interest in outdoor recreation, proximity to metropolitan areas, increased domestic tourism, and upcoming changes in the national hydropower plan. Challenges include the need for communication at different levels and the continued further establishment of the biosphere concept in the area. Many see the impact of hydropower on the river as a challenge. Other challenges include climate change, accessibility in the area and the need for more beds in the hospitality industry.

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?

During the period 2011-2020, the Biosphere Association's work with the biosphere reserve has had the following four focus areas; Open Landscapes, Sustainable Fisheries/Fisheries management, Sustainable Tourism Industry and Biological Mosquito Control. During this period, the Board of the Biosphere Association decided that these focus areas should be prioritised. The board consists of representatives from all nine municipalities in the biosphere, the business community and local land and water owners.

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 the Biosphere Association includes representatives from all nine municipalities in the biosphere reserve. They have approved the business plan, the activity plan and the activity report. No institutional changes of significance to the biosphere reserve have occurred since the nomination.

7.7.4 Indicate how the management plan addresses the objectives of the biosphere reserve.

The association's business plans have been in line with the action programme. The business plans 2012-2015 describe the activities to be carried out and prioritised under the functions Preserve, Develop and Support.

The forthcoming action plan, to be completed by the end of 2021, will include and be designed based on the objectives of the biosphere reserve. Agenda 2030 and the Lima Action Plan will guide this work.

7.7.5 What are the progresses with regard to the guidelines of the management/cooperation plan/policy?

Local networks for each focus area have been established. The prioritisation of these focus areas has led to dozens of projects being carried out by the Biosphere Association in the area, for example on biosphere communication, river meadow management, fisheries conservation and destination development.

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 ambition to create and actively work in broad networks within each focus area has been a success factor for the implementation of the various projects of the Biosphere Association. The projects have been anchored in the Association's business plans and operational plans.

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).

All nine municipalities in the biosphere region have elected representatives on the Board of the Association. In 2015-2016, the Association visited each municipal council as part of the project "The Biosphere Reserve as an identity and brand platform". Furthermore, the Biosphere Association is represented in organisations such as the National Park Council for Färnebofjärden National Park (see 4.3). The Biosphere Association is also represented on the board of the Dalälven Water Protection Association (DVVF), which is responsible for the control of the river's recipients, and on the Dalälven Water Council. Since the nomination, the outer boundary of the biosphere reserve has been extended to more closely match the boundaries of the municipalities in the area and with the Leader Nedre Dalälven area (see 2.2.1), thus creating the conditions for integrated strategies and plans.

All municipalities in Sweden have general plans describing long-term goals for how land, water and built environments should be used, developed and preserved. The biosphere reserve is included in the general plan for seven of the area's nine municipalities (excluding Gävle and Sala). In some cases, the biosphere reserve is mentioned only briefly, as evidence of the high natural and cultural values of the Dalälven area. In other cases, municipalities have chosen to write more about the biosphere reserve. They describe what a biosphere reserve designation entails, what the three functions (conservation, development and support) are and what impact the designation has on tourism, research and learning.

The designation of the area as a biosphere reserve is also mentioned in Leader Nedre Dalälven's latest strategy for local development. It describes repeatedly and in detail how the designation is a strength and opportunity not least for the local tourism industry. The Leader strategy also describes how all development activities in the area supported by Leader Nedre Dalälven will be sustainable from an environmental, economic and social point of view, in accordance with the Biosphere Label.

In Sweden, county administrative boards are responsible for developing regional action plans for green infrastructure. These serve as a basis for adapting land use and planning concrete measures, for example in the field of nature conservation. Two of the four county

administrative boards that administer parts of the biosphere reserve address this in their action plans, namely Dalarna and Gävleborg.

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 fulfill 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 fulfills 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 interventions" (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 Nedre Dalälven region has a varied landscape with different ecosystems linked to local habitats. Habitat types include a large river with fjards, but also lakes, rivers and streams, rapids, ravines, small biotopes in the agricultural landscape, river meadows, riparian meadows, production forests, old-growth forests, swamp forests, deciduous forests and pasture land. The area is located in the borderland between the northern coniferous forest (boreal forest) and the southern coniferous forest (boreo-nemoral forest). This is the Limes Norrlandicus (the biological border of the north), where the northern taiga meets the outermost reaches of the European deciduous forest, and the area has an unusually high proportion of noble deciduous trees for the latitude. The blend of northern and southern environments is more clearly visible here than anywhere else in the country. The level of biodiversity is very high.

In 2013, the transition area and the outer boundary of the biosphere reserve were extended. Within the original area, there have been no major changes in ecosystems, habitats or human impacts. The new parts added since 2013 consist primarily of forests, agricultural landscapes and settlements. Compared to the original transition area, the new parts in the north consist of a relatively high proportion of forest and the new parts in the south consist of a relatively high proportion of agricultural landscape. See ground cover map in chapter 9. Read more about the biosphere reserve's different habitats and ecosystem services in section 3.1

2. “Be of Significance for biological diversity conservation”.

Färnebofjärden National Park makes up a large part of the core area and is known for its high species diversity. There is clear variety in vegetation between the different parts of the national park. In the south there are coniferous forests and marshes of a character typical of Sweden's northern regions, while in the north the vegetation is more lush, with rich elements of noble deciduous trees, especially oak and lime. Wildlife is rich and Färnebofjärden is known for its abundance of birds. More than a hundred species regularly nest here, including all eight Swedish species of woodpecker, the Ural owl, the osprey and the whooper swan. Mammals include strong populations of elk, roe deer, hare, beaver and marten. Additionally, lynx, otters, wolves and bears are found in the area.

There are 744 red-listed species in the biosphere reserve. Some of these species have their strongest Swedish footholds within the biosphere, and in some cases the populations here are the strongest in the whole of Europe. For example, the beetle *Platynus longiventris* (EN) and the flooded jellyskin lichen *Leptogium rivulare (EN), which* are strongly associated with floodplain habitats along the river.

Several rare and endangered insect species live in dead and dying trees, such as the flat bark beetle *Cucujus cinnaberinus (EN) and the* beetle *Ceruchus chrysomelinus (EN).*

70 species are listed in Annex 1 of the EU Birds Directive, including the White-backed Woodpecker *Dendrocopos leucotos (CR) and 42* species in Annex 2 of the EU Habitats Directive, including the moss Dicranum viride *(EN).*

3. "Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale".
(Including examples or learning experiences from putting sustainable development into practice).

Below are some examples of projects in the three dimensions of sustainable development that have been implemented in the biosphere reserve.

Salmonids in the Nedre Dalälven (LIV)

The aim of the project, which ran from 2016 to 2018, was to investigate the possibility of restoring fish migration and reproduction potential for salmonids in order to regain self-reproducing wild salmon and sea trout in the Dalälven in the future. The project area extends from downstream of the Näs power plant via the Tyttbo rapids down to the estuary in the Baltic Sea at Älvkarleby. The project has been carried out in collaboration between the county administrative boards of Gävleborg and Uppsala and the power companies Vattenfall and Fortum.

The project has investigated the potential of the Nedre Dalälven for salmonid production, if free migration routes were to be restored today, and examined what measures are necessary to strengthen riverine populations of migratory fish species in the long term. The river sections identified as priorities in LIV have since been restored. The restorations consist of, for example, moving stones, loosening the river bed, moving boulders back into the water and laying gravel for spawning.

The Biosphere Association has been represented in the project's reference group and has cooperated with the LIV project through the Leader project "Fishing management in the Nedre Dalälven region" and the subsequent project "Interaction with fishing stakeholders". The two projects of the Biosphere Association have acted as a link between the LIV project and many of the stakeholders involved and are important for the success of the project's intentions, see further 2.3.4 and 4.2

Youth in Nedre Dalälven

The project ran from 2017-2020 and was run by Leader Nedre Dalälven. The aim of the project was to empower young people in the biosphere reserve and to include them in the local development work in different ways. By providing young people with inspiration and skills development to plan and implement events and the opportunity to make new contacts and networks for influence, the project has both increased young people's ability to influence their locality and their everyday lives. The project targeted ages 13-25. During the project period, 33 youth groups carried out projects of their own. The groups have organised a wide range of activities, including activity days, workshops, concerts, outdoor cinema, sports tournaments, galas, youth meetings, grand openings and short film shoots. The project was also represented at the MAB Youth Forum in Italy in 2017. A similar Leader project, which gave young people

the opportunity to turn their ideas into reality, ran from 2009 to 2014. The youth projects received a lot of media attention.

Destination Nedre Dalälven and other Leader projects in sustainable tourism

The high natural and cultural values of the biosphere reserve, together with the living cultural landscape, have been at the heart of attracting visitors to the area since the creation of the Biosphere Association. The tourism industry is important for livelihoods in the area and the Biosphere Association works to strengthen the destination's activities through awareness-raising activities.

In order to strengthen the attractiveness of Nedre Dalälven as a destination and of the area's tourism activities (activities, accommodation, visitor destinations and locally produced products), the work has focused on, among other things, increased collaboration between the actors, product development and strengthened skills and knowledge about digital development. The work has mainly been project-based and funded with Leader support (see 5.2). The platform for the development work has been "Turismnätverket", an informal network open to tourism businesses, officials and politicians. In addition to networking meetings, inspirational trips have been arranged in the area, in other parts of Sweden and in other countries. The work of the network is sometimes also more individually tailored to the needs of entrepreneurs and businesses.

4. “Have an appropriate size to serve the three functions of biosphere reserves”.

In 2013, the biosphere reserve was extended to correspond to the Leader area and include all municipalities in its entirety, except Gävle and Sandviken where only the southernmost parishes are included. The rationale for the extension was primarily to increase the potential for significant and impactful work on sustainability, drawing on the engagement of already established partnerships and networks across the region. Read more about extension in section 2.2.1. The biosphere reserve has an area of 740,676 hectares following the extension. The Biosphere Association considers that the size of the area and its zoning are sufficient to fulfil the functions of conservation, development and support.

5. Appropriate zonation to serve the three functions

In accordance with UNESCO criteria, the biosphere reserve is divided into three zones - core area, buffer zone and transition area.

The **core areas, with** a total area of 20,582 hectares, consist of Färnebofjärden National Park and 22 nature reserves. The core area includes the nature reserves close to the river. All of them are protected under Swedish law. Some parts are also designated as Ramsar sites (the National Park and the Hovran area) and several are also Natura 2000 sites. The core areas are linked by the buffer zones.

The buffer zones amount to 35,294 hectares and are largely equal to the protected area along the river Dalälven. They are therefore protective under Swedish law. Shoreland protection extends between 100 metres and 300 metres from the shoreline, up on land and out into the water. These are areas where special consideration is given to natural and cultural environments, outdoor recreation and public access to the shoreland. Both agriculture and forestry are practised in the buffer zones.

The **transition area is** 684,237 hectares and consists largely of forest, agricultural land and built-up areas in the form of a few towns and many smaller villages.

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 Biosphere Association is made up of member organisations from different parts of society. These currently include all nine municipalities in the area, six small businesses in the tourism sector, two large forestry companies, two large power companies and two NGOs. In addition to the Biosphere Association, there is a development council for the biosphere reserve development work, consisting of officials from the municipalities and representatives from the Swedish Forest Agency, the County Administrative Board of Gävleborg, universities and non-profit organisations. Read more about the organisation of the biosphere reserve in Chapter 7.

7. Mechanisms for implementation:

a) Mechanisms to manage people's use and activities

Activities that affect the environment are regulated by existing national laws and by municipal plans. Core areas and buffer zones are regulated by nature protection legislation. In addition, specific regulations and management plans exist for the core areas, which consist of national parks and nature reserves. Furthermore, EU environmental support for the management of valuable pastures and grazing land is an important steering mechanism for nature conservation in the area.

b) Action programme or policy

The action plan is developed by the Biosphere Association together with other stakeholders in the biosphere reserve. Municipalities produce general and comprehensive plans which regulate the long-term development of the physical environment. The county administrative boards produce management plans for the protected areas they manage. Read more in chapter 7.

c) Authority or mechanism to implement the policy or plan

The Biosphere Association has no formal, public authority. Instead, the work is done through close dialogue with authorities, associations, landowners and other stakeholders. In this way, the association works to fulfil the three functions of the biosphere reserve and coordinates the actors. This is done by initiating, supporting, monitoring and communicating activities in the area related to sustainable development, particularly in the focus areas relevant to the biosphere reserve, among other things.

d) Research, monitoring, education and training programmes

The biosphere reserve does not have its own research, monitoring, education and training programme. The Biosphere Association and Biological Mosquito Control have some activities of their own within the support function (see Chapter 6), but research, monitoring and training in the area are primarily organised by universities and government agencies. The Biosphere Association has identified research and education as two important areas where more work can be done. The aim is to initiate more research projects directly related to the biosphere in the future.

Does the biosphere reserve cooperate with other biosphere reserves (exchange of information and staff, joint programmes, etc.)?

At the national level

See chapter 6.6.1, section "National level".

At the regional level

No cooperation yet.

Through twinning and/or transnational biosphere reserves

No cooperation yet but probably in the future.

Within the World Network

The Biosphere Coordinator has attended all five EuroMAB conferences held since 2011. Sometimes together with staff from the Biosphere Association, entrepreneurs and other actors from the biosphere reserve. The biosphere coordinator has participated in several study visits, including to biosphere sites in Switzerland, Scotland and Italy. Other staff or representatives from the biosphere reserve have also participated.

The Nedre Dalälven River Landscape hosted NordMAB 2015. The Biosphere Coordinator and/or a representative of the Biosphere Association has also participated in other NordMAB annual conferences since 2011.

The biosphere reserve sent a representative, in the form of a youth coach from Leader Nedre Dalälven, to YouthMAB in Italy. Three hundred participants from almost a hundred countries participated. The youth coach was there in his role as project manager for a Leader project aimed at helping young people in the area to run their own local youth work. As the Leader area coincides with the Nedre Dalälven River Landscape, the project also involves active work with young people in the biosphere reserve.

> *"Although many other participants were working with young people, I was quite alone in my type of project, which focuses on the social rather than the ecological environment. I myself as well as other participants would have liked more time for networking and the chance to discuss our work in our biosphere reserves with each other. On the other hand, I met an incredible number of inspiring and friendly people, meetings which in the long run may lead to both collaboration and exchange of experience. When I set foot on Swedish soil again, I did so with a number of new business cards, Facebook contacts and a smile on my face." / Sofia Carlfjord, project manager/youth coach*

During 2018-2020, the Biosphere Association has participated in study tours, workshops, digital meetings, etc. in the Biosphere for Baltic thematic network. The network is designed to share experiences and develop work with nine biosphere reserves around the Baltic Sea.

Difficulties encountered, actions to be taken and, where applicable, expected assistance from the Secretariat

The national coordinator, who can be considered as a link to and from the Secretariat, has provided important support during the journey, as many issues have been discussed and clarified through him. In addition, the national coordinator has conveyed information, requests, inquiries, etc. from the various MAB networks, which has greatly facilitated the Association's

contact with the networks and other biosphere reserves. Thanks to the national coordinator and the Biosphere Programme Sweden, the interests and needs of individual biosphere reserves, such as Agenda 2030, the Lima Action Plan, the role of the biosphere ambassador and research, have been raised to the level of national dialogue and activities.

Overall objectives of the biosphere reserve

In 2021, the Biosphere Association will work on a new action plan. Until this plan is ratified, the aim is to continue to work in the four focus areas: sustainable fishing/fisheries management, open landscapes, sustainable tourism and biological mosquito control. The Board of the Biosphere Association has also decided to prioritise the development of collaborative research. In the forthcoming process of developing a new action plan, the idea is to concretise new objectives within each focus area, and to review the willingness, ambition, needs and resources available to establish one or more new focus areas.

Describe the overall objectives of the biosphere reserve, integrating the three functions and the sustainable development objectives for the coming years.

In 2021, the Biosphere Association intends to develop a new action plan. This will describe how the three functions and the overarching Sustainable Development Goals are integrated.

List of references

Carlquist Segell, M (2021), *Älvlandskapet Nedre Dalälvens Ekosystemtjänster - En analys av naturens förmåga att tillhandahålla tre reglerande ekosystemtjänster i biosfärområdet*, studentrapport, Högskolan i Skövde.

Leader Nedre Dalälven 3 (2016), *UTVÄRDERING 2008 – 2014*, http://www.leadernedredalalven.se/Content/89115/Utvardering-Leader-Nedre-Dalalven.pdf

Leader Nedre Dalälven 3 (2017), *Förstudie för turistprojekt i Nedre Dalälvsområdet,* http://www.leadernedredalalven.se/Content/109437/ForstudierapportNedreDalalvsomradet.pdf

Naturvårdsverket (2015), *Besökarundersökning I Sveriges nationalparker*, rapport 6687

Naturvårdsverket (2017), *Ekosystemtjänstförteckning med inventering av dataunderlag*, rapport 6797.

Naturvårdsverket (2019), *Besökarundersökning I Sveriges nationalparker*, rapport 6899

Naturvårdsverket (nov 2020), *Utveckling av modellområden för hållbar samhällsförändring - en studie om organisationsformer och samverkansprocesser i Sveriges biosfärsområden*, Rapport 6941

Nedre Dalälvens Intresseförening (2019), *Ansökan om slututbetalning Gnista för Glöd, journalnr 2016-727-7.*

SCB, www.scb.se/MI0810 . Publicerad 2021-03-23

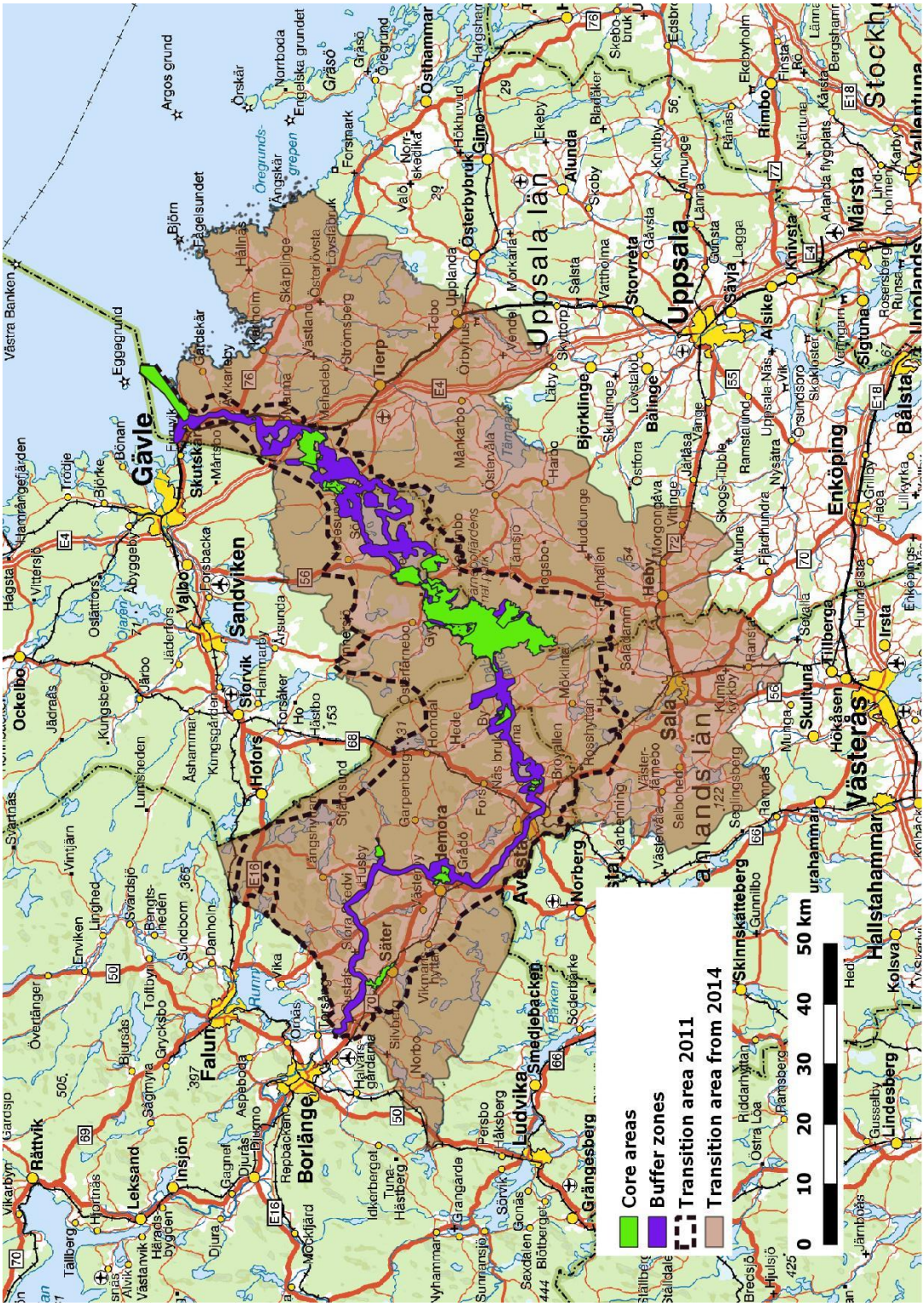
Vattenregleringsföretagen (2020), email correspondence 2020-05-20.

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…).]

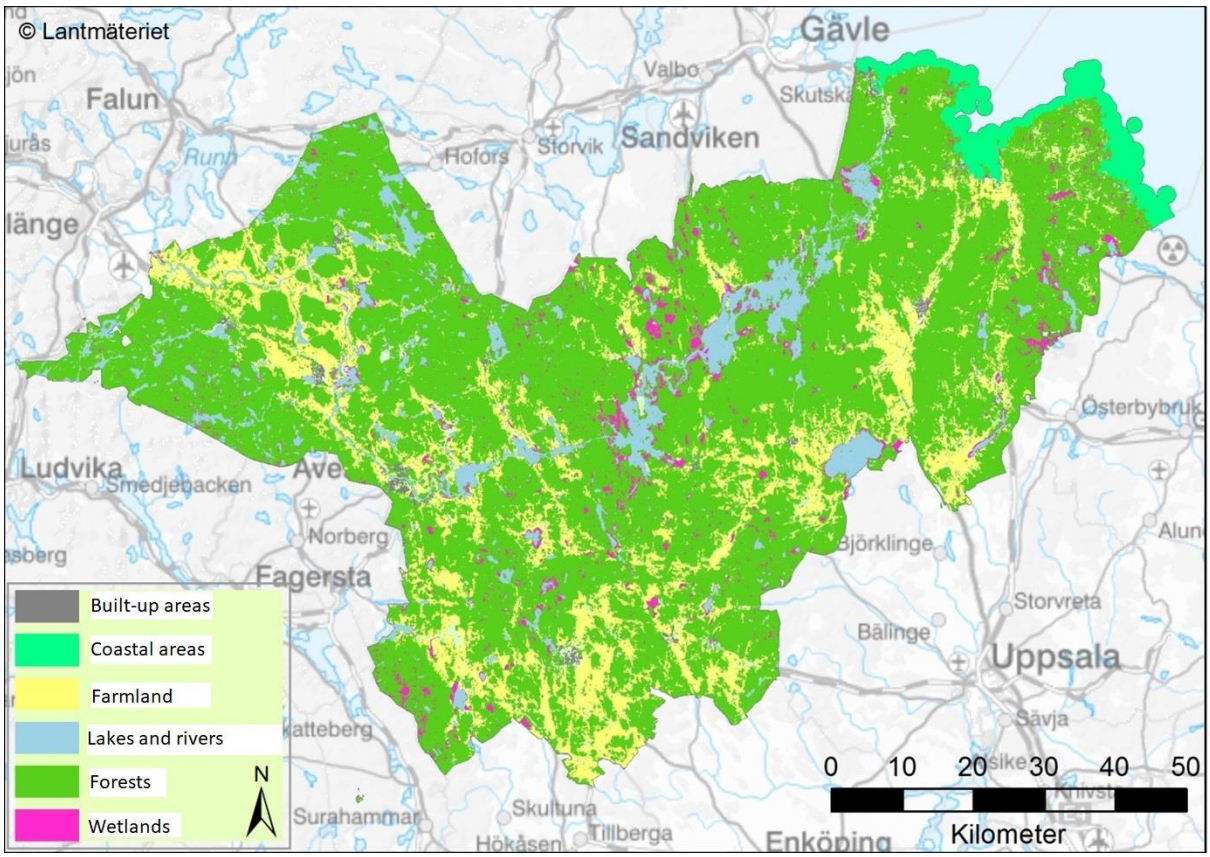


Coordinates:	Latitude	Longitude
Most central point:	60° 13’ 47’’ N	16° 39’ 49’’ E
Northernmost point:	60° 42’ 16’’ N	17° 35’ 14’’ E
Southernmost point:	59° 45’ 19’’ N	16° 39’ 18’’ E
Westernmost point:	60° 18’ 16’’ N	15° 12’ 31’’ E
Easternmost point:	60° 28’ 28’’ N	18° 09’ 43’’ E

(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 <u>should</u> be provided, if available.]

Map of the distribution of habitat types within the biosphere reserve



Source: Carlquist Segell, 2021

(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.]

The biosphere reserve has many protected areas: including a national park, two framework areas, 146 nature reserves and 170 sites included in the EU network of protected areas (Natura 2000, around 130 under the EU Habitats Directive (SCI) and around 40 under the EU Birds Directive (SPA).

Only the core areas of the biosphere reserve are listed below. They are protected as national parks or nature reserves under Swedish law (Chapter 7 of the Swedish Environmental Code, 1998:808). New areas are marked in bold. Färnebofjärden National Park has a new management plan since 2018:

https://www.lansstyrelsen.se/download/18.52ea1660172a20ba65c321de/1600165018956/Sk%C3%B6tselplan_F%C3%A4rnebofj%C3%A4rden.pdf

Other decisions, reserve regulations and management plans can be provided on request.

Name	**Date of decision**	**Managing authority**	**Area (ha)**	**Registration number**
Färnebofjärdens Nationalpark	1998-05-07	Gävleborg*	10464	SNFS 1998:6, Prop. 1997/98:91
Billudden	1979-09-26	Uppsala*	1905	511-1775-2017 (Uppsala), 511-2311-19 (Gävleborg)
Bredforsen	1999-03-15	Gävleborg*	222	511-7011-10, 80-213
Bredforsen	**1999-03-26**	**Upplandsstiftelsen**	**350**	**511-6004-11**
Bysjöholmarna	1976-08-23	Dalarna*	298	11.111-1413-71
Bysjöholmarna	1976-08-18	Västmanland*	11	11.121-898-76
Båtfors	1990-08-31	Uppsala*	1582	511-1074-17
Fullsta	1984-05-22	Dalarna*	57	11.1211-1982-82
Gropholmarna	1997-11-28	Uppsala*	16	231-5176-95
Gysinge	1975-06-02	Gävleborg*	455	511-5432-11
Hedesundafjärden	1998-11-20	Uppsala*	931	231-7068-96
Herrön	1990-01-22	Avesta Municipality	25	2311-7309-89
Hovran	**2021-XX-XX**	**Dalarna***	**437**	**Reserve formation in progress**
Ista	2000-04-20	Gävleborg*	728	231-1221-98, 81-203
Jordbärsmuren - Ålbo	1990-03-12	Gävleborg*	988	511-5524-11
Kloster	1992-03-16	Dalarna*	227	2311-1256-89
Kungsgårdsholmarna and Prostnäset	**2015-04-07**	**Dalarna***	**163**	**511-2095-2017**
Kvillanudden	1973-10-15	Gävleborg*	2	511-4229-06, 80-203
Laggarbomyran	**2016-12-14**	**Gävleborg***	**171**	**511-6551-11**
Landa	1971-04-16	Gävleborg*	3	511-4232-06, 80-205
Spjutholmen	1992-06-15	Gävleborg*	154	231-3495-91, 80214
Stadssjön	**2011-02-15**	**Hedemora Municipality**	**50**	**511-4960-10**
Säterdalen	2001-12-17	Dalarna*	534	231-12-17
Åsboholmen-Isaksboholmen	1986-12-15	Avesta Municipality	6	11.1211-1492-81
Östa	2006-12-18	Heby Municipality	911	KS 2006/97

*County Administrative Board

(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 for each municipality can be downloaded via the links below

Säter municipality: https://www.sater.se/trafik-stadsplanering/stadsplanering/strategiska-dokument/kommunens-oversiktsplan/
Hedemora municipality: https://www.hedemora.se/
Avesta municipality: https://avesta.se/bygga-bo-och-miljo/planering-byggande-och-boende/kommunens-planarbete/gallande-oversiktsplaner-och-program/avestas-oversiktsplan/
Sandviken municipality: https://sandviken.se/byggabomiljo/samhallsplanering/oversiktsplanering/oversiktsplansandvikenskommun.4.39e0d8d61380abfc4e3a4b2.html
Gävle municipality: https://www.gavle.se/kommunens-service/bygga-trafik-och-miljo/planer-och-samhallsbyggnadsprojekt-i-gavle/oversiktsplanering/las-oversiktsplaner-och-strategiska-dokument/
Sala municipality: https://www.sala.se/category/3897
Heby municipality: https://heby.se/kommun-politik/kommunplan/
Tierp municipality: https://www.tierp.se/tierp.se/kommun-och-inflytande/tierp---en-kommun-som-vaxer/oversiktliga-planer/oversiktsplan.html

Regional Green Infrastructure Action Plans are available via the links below

Dalarna County Administrative Board: https://www.lansstyrelsen.se/dalarna/tjanster/publikationer/2018/201811-regional-handlingsplan-for--gron-infrastruktur-i-dalarnas-lan.html
Gävleborg County Administrative Board: https: //www.lansstyrelsen.se/gavleborg/samhalle/planering-och-byggande/gron-infrastruktur/regional-handlingsplan.html
Västmanland County Administrative Board: https //www.lansstyrelsen.se/vastmanland/samhalle/planering-och-byggande/gron-infrastruktur/regional-handlingsplan.html
Uppsala County Administrative Board: https://www.lansstyrelsen.se/uppsala/tjanster/publikationer/gron-infrastruktur-i-uppsala-lan.html

(5) Updated species list (to be annexed)

[Provide a list of important species occurring within the proposed biosphere reserve, including common names, wherever possible.]

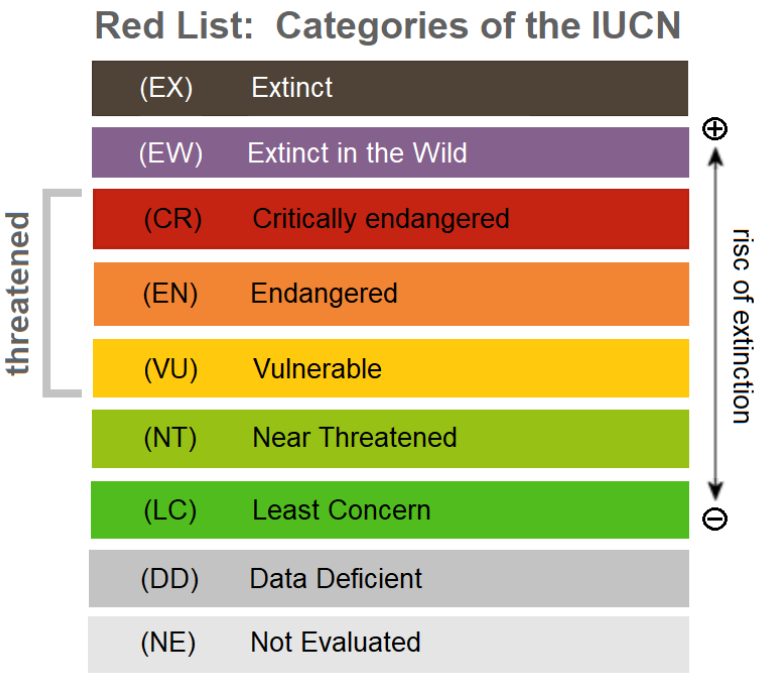
The attached lists include nationally red-listed species as well as EU-listed species that occur within the biosphere reserve. In Sweden, the Swedish Species Data Bank has the task of collecting knowledge about Sweden's fauna and flora and of continuously updating the red lists according to the guidelines of the International Union for Conservation of Nature (IUCN).

The compilation of nationally red-listed species below is based on information taken from Artportalen (www.artportalen.se), which is a searchable website for observations of Sweden's plants, animals and fungi. Individuals as well as conservation professionals and researchers can contribute to the portal by reporting species they have seen in the wild.

The searches have been carried out using a polygon representing the outer boundary of the biosphere reserve as proposed in the extended proposal. The lists consist of finds made in the last ten years.

Nationally red-listed species

In Sweden, the current Red List follows the IUCN categorisation.



Species categorised as Regionally Extinct (RE), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) and Data Deficient (DD), are referred to as Red Listed. Red-listed species categorised as Critically Endangered (CR), Endangered (EN) or Vulnerable (VU) are referred to as threatened. When abbreviating the categories, the English designations are used to facilitate comparisons between countries.

The biosphere reserve contains a total of 744 red-listed species, divided into the categories listed below.

Red list category	**Number**
RE	4
CR	14
EN	74
VU	213
NT	432
DD	7

Nationally red-listed species in the category Critically Endangered (CR)

Scientific name	Number of reported observations	Name in English
Ajuga genevensis	2	
Anguilla anguilla	2	
Anser erythropus	222	Lesser White-fronted Goose
Aurantiporus croceus	1	
Bubo scandiacus	2	Snowy Owl
Calidris alpina schinzii	3	
Dendrocopos leucotos	1	White-backed Woodpecker
Emberiza hortulana	71	Ortolan Bunting
Physcomitrium sphaericum	3	
Reichlingia zwackhii	1	
Remiz pendulinus	49	Eurasian Penduline Tit
Tilia platyphyllos	1	
Ulmus glabra	180	Wych Elm
Ulmus glabra subsp. glabra	10	

Nationally red-listed species in the category Endangered (EN)

Scientific name	Number of reported observations	Name in English
Anacampsis fuscella	18	
Anomoporia bombycina	1	
Anthus campestris	3	Tawny Pipit
Apus apus	4902	Common Swift
Arachnospila alvarabnormis	14	
Arenaria interpres	620	Ruddy Turnstone
Arhopalus ferus	1	
Aristolochia clematitis	1	
Aythya ferina	1711	Common Pochard
Aythya marila	860	Greater Scaup
Bactrospora dryina	2	
Bryum funkii	7	
Calicium notarisii	2	
Calyptra thalictri	20	
Centaurea phrygia subsp. phrygia	20	
Centaurea phrygia subsp. pseudophrygia	1	
Ceruchus chrysomelinus	29	
Chaenotheca cinerea	1	
Chamaemyces fracidus	2	
Chimaphila umbellata	129	
Chloris chloris	7558	European Greenfinch
Ciconia ciconia	37	White Stork

Circus pygargus	250	Montagu's Harrier
Cucujus cinnaberinus	28	
Cydia cornucopiae	7	
Cydia leguminana	1	
Dicranum viride	182	
Epirrhoe pupillata	2	
Euphrasia officinalis subsp. officinalis	35	
Falco rusticolus	6	Gyrfalcon
Fraxinus excelsior	789	European ash
Gentianella campestris	56	
Gentianella campestris subsp. campestris	347	
Gentianella campestris var. campestris	113	
Gentianella campestris var. suecica	403	
Geoglossum difforme	1	
Geranium lanuginosum	4	
Hydnellum cumulatum	5	
Hydnellum fuligineoviolaceum	95	
Hydnellum mirabile	8	
Hygrophorus arbustivus	1	
Hymenochaete ulmicola	6	
Leptogium cyanescens	68	
Leptogium rivulare	104	
Lepturalia nigripes	1	
Limosa limosa	261	Black-tailed Godwit
Limosa limosa islandica	88	
Limosa limosa limosa	33	
Lycaena helle	1	Violet Copper
Megalaria grossa	8	
Milvus migrans	185	Black Kite
Mycosphaerella chimaphilae	1	
Nepeta cataria	1	
Numenius arquata	5389	Eurasian Curlew
Oriolus oriolus	26	Eurasian Golden Oriole
Pectenia plumbea	1	
Pelloporus triqueter	1	
Pimpinella major	11	
Plagionotus detritus	1	
Priocnemis confusor	1	
Pulsatilla vernalis	1529	
Ramaria fennica	5	
Rinodina colobina	2	
Rissa tridactyla	61	Black-legged Kittiwake
Sarcodon leucopus	27	
Scapania apiculata	14	
Scapania carinthiaca	6	
Somateria mollissima	1860	Common Eider

Spatula querquedula	1828	Garganey
Steccherinum robustius	1	
Tarsiger cyanurus	3	Red-flanked Bluetail
Tritomaria exsecta	4	
Urnula craterium	35	
Weissia rostellata	1	Beaked Beardless-moss

Nationally red-listed species in the category Vulnerable (VU)

Scientific name	Number of reported observations	Name in English
Acaulon muticum	2	
Agonopterix bipunctosa	11	
Albatrellus citrinus	21	
Albatrellus subrubescens	66	
Alcedo atthis	461	Common Kingfisher
Alchemilla plicata	7	
Alchemilla samuelssonii	4	
Alcis jubata	14	
Ampedus suecicus	2	
Anas acuta	3823	Northern Pintail
Anas crecca	12361	Eurasian Teal
Anisoxya fuscula	1	
Anser fabalis fabalis	422	
Anthus cervinus	251	Red-throated Pipit
Aphroditeola olida	7	
Aricia nicias	60	Silvery Argus
Arnica montana	6	
Astragalus penduliflorus	44	
Aurantiporus fissilis	1	
Biatoridium monasteriense	10	
Biscogniauxia cinereolilacina	7	
Blitum bonus-henricus	8	
Blysmus compressus	10	
Boletopsis grisea	52	
Boletopsis leucomelaena	68	
Boros schneideri	18	
Botrychium matricariifolium	1	
Botrychium virginianum	68	
Brachyopa cinerea	1	
Bubo bubo	104	Eurasian Eagle-Owl
Calcarius lapponicus	291	Lapland Longspur
Calidris pugnax	7677	Ruff
Caloptilia cuculipennella	1	
Calypogeia azurea	1	

Calypogeia suecica	13	
Cardamine parviflora	16	
Carex glareosa	11	
Carex hartmanii	26	
Carex pallidula	33	
Carex pediformis	1	
Cephaloziella dentata	1	
Cerylon impressum	3	
Chaenotheca gracilenta	1	
Chlaenius quadrisulcatus	4	
Chlidonias niger	1684	Black Tern
Clavaria amoenoides	3	
Clavaria greletii	2	
Clavaria zollingeri	2	
Clitopaxillus fibulatus	1	
Coleophora scabrida	33	
Collema nigrescens	2	
Collema subnigrescens	12	
Corticeus fraxini	1	
Cortinarius aureofulvus	31	
Cortinarius barbaricus s. str.	9	
Cortinarius caesiocanescens	46	
Cortinarius cedretorum	4	
Cortinarius corrosus	12	
Cortinarius cumatilis	11	
Cortinarius cupreorufus	113	
Cortinarius dalecarlicus	1	
Cortinarius fraudulosus	20	
Cortinarius metarius	8	
Cortinarius mussivus	14	
Cortinarius pseudoglaucopus	8	
Cortinarius russus	1	
Cortinarius violaceomaculatus	4	
Cortinarius xanthophyllus	1	
Crustoderma dryinum	1	
Cuphophyllus lacmus s.str.	1	
Curruca nisoria	11	Barred Warbler
Cystolepiota adulterina	5	
Danosoma conspersum	11	
Delichon urbicum	3362	Common House Martin
Dicerca moesta	1	
Dorcatoma minor	1	
Draba nemorosa	197	
Drapetes mordelloides	2	
Ecliptopera capitata	8	
Elatobia fuliginosella	1	

Emberiza pusilla	9	Little Bunting
Entosthodon obtusus	2	Blunt Cord-moss
Ephemerum sessile	2	
Eremophila alpestris	14	Common Horned Lark
Euphydryas aurinia	7519	Marsh Fritillary
Eupithecia immundata	3	
Eustroma reticulata	10	
Evernia divaricata	2	
Favolus pseudobetulinus	4	
Flavidoporia mellita	2	
Fuscocephaloziopsis affinis	1	
Geastrum granulosum	1	
Geastrum minimum s. lat.	1	
Gloeoporus pannocinctus	1	
Gloiodon strigosus	3	
Gomphus clavatus	168	
Goodyera repens	942	
Gyalecta flotowii	3	
Gyalecta ulmi	20	
Hadena perplexa	1	
Hamatocaulis vernicosus, southern cryptic species	3	
Heterothera serraria	2	
Hordelymus europaeus	135	
Hydnellum auratile	22	
Hydnellum fennicum	18	
Hydnellum glaucopus s.str.	12	
Hydnellum illudens nom. prov.	151	
Hydnellum lundellii	47	
Hydnellum versipelle	3	
Hygrocybe spadicea	1	
Hygrophorus atramentosus	3	
Hygrophorus gliocyclus	1	
Hygrophorus subviscifer	2	
Hypoxystis pluviaria	27	
Inocutis dryophila	4	
Inoderma byssaceum	11	
Inonotus ulmicola	40	
Lacerta agilis	1	
Larus argentatus	6864	European Herring Gull
Larus fuscus fuscus	253	
Larus marinus	4771	Great Black-backed Gull
Lecanora impudens	7	
Leiopus punctulatus	22	
Lemonia dumi	1	
Leopoldius signatus	2	
Lepiota grangei	1	

Limosa lapponica	1662	Bar-tailed Godwit
Linaria flavirostris	637	Twite
Locustella luscinioides	120	Savi's Warbler
Lopheros rubens	1	
Lophozia ascendens	20	
Lota lota	4	
Lycoperdon mammiforme	1	
Lycopodium zeilleri	51	
Mareca penelope	9635	Eurasian Wigeon
Melanitta fusca	2090	Velvet Scoter
Menegazzia terebrata	4	
Microglossum atropurpureum	2	
Multiclavula mucida	2	
Nebria livida	6	
Neckera pennata	258	
Nehalennia speciosa	77	
Nemophora cupriacella	1	
Neohygrocybe ingrata	2	
Neohygrocybe ovina	1	
Nephroma laevigatum	3	
Osmoporus protractus	2	
Osteina undosa	19	
Pelophylax lessonae	371	
Perenniporia subacida	9	
Phlebia centrifuga	106	
Pholiota squarrosoides	1	
Pinicola enucleator	617	Pine Grosbeak
Pipistrellus pipistrellus	2	
Plectocarpon lichenum	17	
Polygala comosa	123	
Porpoloma metapodium	2	
Porzana porzana	304	Spotted Crake
Postia floriformis	1	
Potamogeton acutifolius	5	
Potamogeton compressus	9	
Pulsatilla vulgaris	3	
Pyrausta porphyralis	1	
Pyrgus alveus	66	Large Grizzled Skipper
Ramaria boreimaxima	7	
Ramaria brunneicontusa	37	
Ramaria flava var. pinicola	2	
Ramaria karstenii	21	
Ramaria rufescens	1	
Ramaria safraniolens	9	
Ramaria sanguinea	20	
Ramaria schildii	4	

Ramariopsis crocea	7	
Raphanus raphanistrum	1	
Rhodonia placenta	2	
Riccardia multifida	1	
Rinodina pityrea	2	
Riparia riparia	1085	Sand Martin
Salvia pratensis	16	
Sarcosoma globosum	57	
Saxicola rubicola	1	European Stonechat
Saxifraga osloënsis	136	
Sclerophora farinacea	4	
Sclerophora pallida	96	
Sclerophora peronella	25	
Serinus serinus	137	European Serin
Sidera lenis s. str.	1	
Silvanus unidentatus	2	
Skeletocutis brevispora	2	
Skeletocutis odora	5	
Sparganium gramineum	1	
Steccherinum collabens	4	
Stereopsis vitellina	3	
Strix nebulosa	269	Great Grey Owl
Sturnus vulgaris	9308	Common Starling
Suillellus queletii	1	
Taraxacum maculigerum	7	
Taraxacum praestans	6	
Thelotrema suecicum	7	
Thymus pulegioides	8	
Tragosoma depsarium	43	
Trichoglossum walteri	3	
Tricholoma apium	13	
Tricholoma atrosquamosum	28	
Tricholoma colossus	1	
Tricholoma ilkkae	2	
Tricholoma matsutake	2	
Tricholoma orirubens	1	
Usnea barbata	1	
Vanellus vanellus	14536	Northern Lapwing
Verbascum lychnitis	4	
Viola stagnina	40	
Volvariella bombycina	2	

EU listed species

The EU Habitats and Birds Directives list over 1,000 plant and animal species and more than 200 habitats as threatened or unique from a European perspective. The species present in the biosphere reserve and belonging to Annex 1 of the Birds Directive and Annex 2 of the Habitats Directive are listed below

Species within the biosphere reserve listed in the EU Birds Directive, Annex 1.

Scientific name	IUCN cat.	Number of reported observations	Name in English
Aegolius funereus		867	Boreal Owl
Alcedo atthis	VU	461	Common Kingfisher
Anser erythropus	CR	222	Lesser White-fronted Goose
Anthus campestris	EN	3	Tawny Pipit
Aquila chrysaetos	NT	873	Golden Eagle
Asio flammeus		503	Short-eared Owl
Botaurus stellaris	NT	2391	Eurasian Bittern
Branta leucopsis		3301	Barnacle Goose
Bubo bubo	VU	104	Eurasian Eagle-Owl
Bubo scandiacus	CR	2	Snowy Owl
Calidris alpina schinzii	CR	3	
Calidris pugnax	VU	7680	Ruff
Caprimulgus europaeus		711	European Nightjar
Charadrius alexandrinus	RE	2	Kentish Plover
Charadrius morinellus		173	Eurasian Dotterel
Chlidonias niger	VU	1684	Black Tern
Ciconia ciconia	EN	37	White Stork
Ciconia nigra	RE	35	Black Stork
Circus aeruginosus		9058	Western Marsh Harrier
Circus cyaneus	NT	2190	Hen Harrier
Circus pygargus	EN	250	Montagu's Harrier
Clanga clanga		11	Greater Spotted Eagle
Crex crex	NT	1376	Corncrake
Curruca nisoria	VU	11	Barred Warbler
Cygnus columbianus		505	Tundra Swan
Cygnus cygnus		22143	Whooper Swan
Dendrocopos leucotos	CR	1	White-backed Woodpecker
Dryocopus martius	NT	5411	Black Woodpecker
Emberiza hortulana	CR	71	Ortolan Bunting
Falco columbarius	NT	1050	Merlin
Falco peregrinus	NT	1249	Peregrine Falcon
Falco rusticolus	EN	6	Gyrfalcon
Ficedula albicollis		1	Collared Flycatcher
Ficedula parva		386	Red-breasted Flycatcher
Gallinago media	NT	48	Great Snipe

Gavia arctica		4770	Black-throated Loon
Gavia stellata	NT	1969	Red-throated Loon
Glaucidium passerinum		1414	Eurasian Pygmy Owl
Grus grus		15350	Common Crane
Haliaeetus albicilla	NT	15491	White-tailed Eagle
Hydrocoloeus minutus		5272	Little Gull
Hydroprogne caspia	NT	6407	Caspian Tern
Lanius collurio		2234	Red-backed Shrike
Limosa lapponica	VU	1662	Bar-tailed Godwit
Lullula arborea		818	Woodlark
Luscinia svecica		613	Bluethroat
Lyrurus tetrix		4731	Black Grouse
Mergellus albellus		4454	Smew
Milvus migrans	EN	185	Black Kite
Milvus milvus		276	Red Kite
Pandion haliaetus		4696	Osprey
Pernis apivorus		1320	European Honey Buzzard
Phalaropus lobatus		140	Red-necked Phalarope
Picoides tridactylus	NT	651	Eurasian Three-toed Woodpecker
Picus canus		1825	Grey-headed Woodpecker
Pluvialis apricaria		3055	European Golden Plover
Podiceps auritus		873	Horned Grebe
Porzana porzana	VU	306	Spotted Crake
Recurvirostra avosetta		10	Pied Avocet
Sterna hirundo		8279	Common Tern
Sterna paradisaea		2591	Arctic Tern
Sternula albifrons	NT	27	Little Tern
Strix nebulosa	VU	269	Great Grey Owl
Strix uralensis	NT	1145	Ural Owl
Surnia ulula		507	Northern Hawk-Owl
Tetrao urogallus		1565	Western Capercaillie
Tetrastes bonasia	NT	850	Hazel Grouse
Thalasseus sandvicensis	NT	18	Sandwich Tern
Tringa glareola		6038	Wood Sandpiper
Zapornia parva		3	Little Crake

Species within the biosphere reserve listed in the EU Habitats Directive, Annex 2.

Scientific name	IUCN cat.	Number of reported observations	Name in English
Barbastella barbastellus	NT	1	
Boros schneideri	VU	18	
Buxbaumia viridis		86	
Cinna latifolia	NT	2	
Cottus gobio		7	

Cucujus cinnaberinus	EN	28	
Cynodontium suecicum		3	
Dichelyma capillaceum		324	
Dicranum viride	EN	182	
Dytiscus latissimus		3	
Eptesicus nilssonii	NT	222	
Eptesicus serotinus	NT	1	
Euphydryas aurinia	VU	7519	Marsh Fritillary
Halichoerus grypus		25	
Hamatocaulis vernicosus		46	
Herzogiella turfacea	NT	80	
Lampetra fluviatilis		2	
Lampetra planeri		1	
Leuciscus aspius	NT	4	
Leucorrhinia pectoralis		43	
Lutra lutra	NT	343	
Lycaena helle	EN	1	Violet Copper
Myotis brandtii		1	
Myotis dasycneme	NT	3	
Myotis daubentonii		66	
Myotis nattereri	NT	10	
Nyctalus noctula		25	
Persicaria foliosa	NT	94	
Pipistrellus nathusii		14	
Pipistrellus pipistrellus	VU	2	
Pipistrellus pygmaeus		89	
Plecotus auritus	NT	81	
Pusa hispida		14	
Salmo salar		10	
Saxifraga osloënsis	VU	143	
Scapania carinthiaca	EN	6	
Stephanopachys linearis	NT	6	
Triturus cristatus		81	
Vertigo angustior		2	
Vertigo geyeri	NT	2	
Vespertilio murinus		27	
Xyletinus tremulicola	NT	25	

(6) Updated list of main bibliographic references (to be annexed)

[Provide a list of the main publications and articles of relevance to the proposed biosphere reserve.]

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(7) Further supporting documents.

No further supporting documents

10. ADRESSES

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: Nedre Dalälven River Landscape
Street or P.O. Box: Kölnavägen 25
City with postal code: 81197, Gysinge
Country: Sweden
Telephone: +46(0)29121180
E-mail: info@nedredalalven.se
Web site: www.nedredalalven.se

10.2. Administering entity of the core area(s):

Dalarna County Administrative Board: www.lansstyrelsen.se/dalarna.html
Gävleborg County Administrative Board: www.lansstyrelsen.se/gavleborg.html
Västmanland County Administrative Board: www.lansstyrelsen.se/vastmanland.html
Uppsala County Administrative Board: www.lansstyrelsen.se/uppsala.html
Upplandsstiftelsen: www.upplandsstiftelsen.se/
Hedemora municipality: www.hedemora.se/
Heby municipality: https://heby.se/

10.3. and 10.4. Administering entity of the buffer zone(s) and transition area(s):

Dalarna County Administrative Board: www.lansstyrelsen.se/dalarna.html
Gävleborg County Administrative Board: www.lansstyrelsen.se/gavleborg.html
Västmanland County Administrative Board: www.lansstyrelsen.se/vastmanland.html
Uppsala County Administrative Board: www.lansstyrelsen.se/uppsala.html
Municipality of Säter: www.sater.se
Hedemora municipality: www.hedemora.se/
Municipality of Avesta: https://avesta.se/
Sandviken municipality: https://sandviken.se/
Gävle municipality: www.gavle.se/
Municipality of Sala: www.sala.se/
Heby municipality: https://heby.se/
Tierp municipality: www.tierp.se/

Annex I: MABnet Directory of Biosphere Reserves

Administrative details

Country: Sweden
Name of BR: Nedre Dalälven River Landscape Biosphere Reserve
Year designated: 2011
Administrative authorities: the Nedre Dalälven Biosphere Association, which is responsible for the biosphere reserve, is a non-profit association. The following regional and local authorities manage parts of the area:

Dalarna County Administrative Board
Gävleborg County Administrative Board
Västmanland County Administrative Board
Uppsala County Administrative Board

Avesta municipality
Gävle municipality
Heby municipality
Hedemora municipality
Sala municipality
Sandviken municipality
Säter municipality
Tierp municipality
Älvkarleby municipality

Contact person: Lotta Heimersson, CEO
Contact address: Nedre Dalälvens intresseförening, Kölnavägen 25, 811 97 Gysinge
+ 46(0)291-211 80 (switchboard), info@nedredalalven.se
Related links: www.nedredalalven.se/sv/biosfaromradet

Social networks: (6.5.4)

Description

General description:

The Nedre Dalälven river landscape, located in the central parts of Sweden, has a unique natural and cultural landscape. The area is largely covered by forest, but there are also open agricultural landscapes, wetlands, coastal areas, lakes and waterways. One of Sweden's largest rivers, the Dalälven River, flows through the area on its way to the Baltic Sea. The river consists of wide fjards separated by rapids and delta areas. In the area, northern and southern habitats meet, which together with the regular flooding of the river gives rise to a very high species diversity, 744 red-listed species. This wealth of species is protected by several nature reserves and the Färnebofjärden National Park, which is also a popular recreational area. Several of the nationally protected areas are also designated as Natura 2000 sites, 130 under the EU Habitats Directive (SCI) and around 40 under the EU Birds Directive (SPA). There are also 2 Ramsar areas in the area.

The history of the area is strongly influenced by the river, a vital factor for the settlement. The work and efforts of previous generations have left their mark in the form of several well-preserved ironworks and company towns along the river. Large parts of the area are considered rural. There are a few small towns and a number of smaller localities in the area.

The outer boundary of the biosphere reserve coincides with the local Leader area. Administratively, the area is shared by four counties and nine municipalities, which enables collaboration and knowledge sharing.

Major ecosystem type: forest, farmland, lakes and rivers, wetlands, coastal and built-up areas.
Major habitats & land cover types: forest, farmland, lakes and streams, wetlands, coastal and built-up areas.
Bioclimatic zone: cold temperate
Location (latitude & longitude): 60°13’47’’N, 16°39’49’ E
Total Area (ha): 740 676
Core area*(s)*: 20 582

Buffer zone*(s):*35 294
Transition area*(s):*684 237
Different existing zonation: northern coniferous forest region (boreal forest) and the southern coniferous forest region (boreo-nemoral forest)
Altitudinal range *(*metres above sea level): 0 - 355
Zonation map(s): see 2.2.2.

Main objectives of the biosphere reserve

Brief description

The biosphere reserve currently has four focus areas: sustainable tourism, sustainable fisheries, open landscapes and biological mosquito control. A clear objective of the Biosphere Association is to promote the emergence of active and agile networks of stakeholders representing different interests within these focus areas. An overall objective is to provide and lead forums for dialogue, consensus, development, learning and sharing of knowledge and challenges. Another overall objective is to initiate projects, participate in projects and pool knowledge between different projects related to sustainable development within the various focus areas.

Research

Brief description

The biosphere reserve is the subject of research done by several universities and other organisations. Some examples of research areas are:

- Development of hydropower and how its negative environmental impact on, for example, fish migration and spawning habitats can be reduced.
- Changes in the natural environment after a major forest fire in the southern part of the area in 2014.

Mosquitoes and mosquito control.

Monitoring

Brief description

In biosphere related work, monitoring and surveillance are carried out by several actors and for different purposes. Some examples are:

- Ongoing monitoring of the limnic environment through test fishing and water chemistry sampling.
- Periodic inventories of birds and insects as well as mosses and lichens.

Monitoring the number of visitors to the activities of the Naturum and the Färnebofjärden National Park.

Specific variables (fill in the table below and tick the relevant parameters)

Abiotic		Biodiversity	
Abiotic factors	x	Afforestation/Reforestation	x
Acidic deposition/Atmospheric factors		Algae	
Air quality		Alien and/or invasive species	x
Air temperature	x	Amphibians	x
Climate, climatology	x	Arid and semi-arid systems	
Contaminants	x	Autoecology	
Drought		Beach/soft bottom systems	x
Erosion		Benthos	x
Geology	x	Biodiversity aspects	x
Geomorphology	x	Biogeography	x
Geophysics	x	Biology	x
Glaciology		Biotechnology	
Global change		Birds	x
Groundwater	x	Boreal forest systems	x
Habitat issues	x	Breeding	
Heavy metals	x	Coastal/marine systems	
Hydrology	x	Community studies	x
Indicators		Conservation	x
Meteorology	x	Coral reefs	
Modeling		Degraded areas	
Monitoring/methodologies	x	Desertification	
Nutrients	x	Dune systems	
Physical oceanography		Ecology	x
Pollution, pollutants	x	Ecosystem assessment	x
Siltation/sedimentation	x	Ecosystem functioning/structure	x
Soil	x	Ecosystem services	x
Speleology		Ecotones	
Topography	x	Endemic species	x
Toxicology		Ethology	
UV radiation	x	Evapotranspiration	
		Evolutionary studies/Palaeoecology	
		Fauna	x
		Fires/fire ecology	x
		Fishes	x
		Flora	x
		Forest systems	x
		Freshwater systems	x
		Fungi	x
		Genetic resources	
		Genetically modified organisms	
		Home gardens	
		Indicators	
		Invertebrates	x
		Island systems/studies	
		Lagoon systems	
		Lichens	x
		Mammals	x
		Mangrove systems	
		Mediterranean type systems	
		Microorganisms	x
		Migrating populations	x

		Modeling	
		Monitoring/methodologies	x
		Mountain and highland systems	
		Natural and other resources	x
		Natural medicinal products	
		Perturbations and resilience	x
		Pests/Diseases	x
		Phenology	x
		Phytosociology/Succession	
		Plankton	x
		Plants	x
		Polar systems	
		Pollination	
		Population genetics/dynamics	x
		Productivity	x
		Rare/Endangered species	x
		Reptiles	x
		Restoration/Rehabilitation	x
		Species (re) introduction	
		Species inventorying	x
		Sub-tropical and temperate rainforest systems	
		Taxonomy	x
		Temperate forest systems	x
		Temperate grassland systems	
		Tropical dry forest systems	
		Tropical grassland and savannah systems	
		Tropical humid forest systems	
		Tundra systems	
		Vegetation studies	x
		Volcanic/Geothermal systems	
		Wetland systems	x
		Wildlife	x

		Integrated monitoring	
Agriculture/Other production systems	x	Biogeochemical studies	x
Agroforestry		Carrying capacity	x
Anthropological studies		Climate change	x
Aquaculture	x	Conflict analysis/resolution	
Archaeology	x	Ecosystem approach	
Bioprospecting		Education and public awareness	x
Capacity building	x	Environmental changes	x
Cottage (home-based) industry	x	Geographic Information System (GIS)	x
Cultural aspects	x	Impact and risk studies	
Demography	x	Indicators	
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		Integrated studies	
Firewood cutting		Interdisciplinary studies	x
Fishery	x	Land tenure	x
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		Modeling	
Indicators of sustainability	x	Monitoring/methodologies	
Indigenous people's issues		Planning and zoning measures	
Industry	x	Policy issues	
Livelihood measures	x	Remote sensing	x
Livestock and related impacts	x	Rural systems	x
Local participation	x	Sustainable development/use	x
Micro-credits		Transboundary issues/measures	x
Mining		Urban systems	x
Modeling		Watershed studies/monitoring	x
Monitoring/methodologies	x		
Natural hazards	x		
Non-timber forest products	x		
Pastoralism			
People-Nature relations	x		
Poverty	x		
Quality economies/marketing	x		
Recreation	x		
Resource use			
Role of women	x		
Sacred sites			
Small business initiatives	x		
Social/Socio-economic aspects	x		
Stakeholders' interests	x		
Tourism	x		
Transports	x		

Annex II: 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.

The following pictures and video can be downloaded in high resolution formats via this link:

https://nedredalalven.se/en/biosfaromradet/biosfar-utvaerdering-10-ar/kommunikationsmaterial-foer-unesco


AV OCH MARINA
ESURSER
KOSYSTEM OCH
OLOGISK MÅNGFALD
We are contributing to the 2030 Agenda and Sustainable Development Goals number 1
life below water and number 15, life on land.

United Nations Educational, Scientific and Cultural Organization
Organisation des Nations Unies pour l'éducation, la science et la culture
Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura
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Name and Address: Charlotta Heimersson
Kolnavägen 25, 811 97 GÄVLE, SWEDEN

Signature :  Date: 2021-08-17

(Sign, return to UNESCO two copies of the Agreement and retain the original for yourself)

Mailing address: 7 Place Fontenoy, 75352 Paris 07 SP, Direct Telephone: 00331 – 45681687

Direct Fax: 00331 – 45685655; e-mail: photobank@unesco.org; m.ravassard@unesco.org

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Name and Address: Charlotta Heimersson
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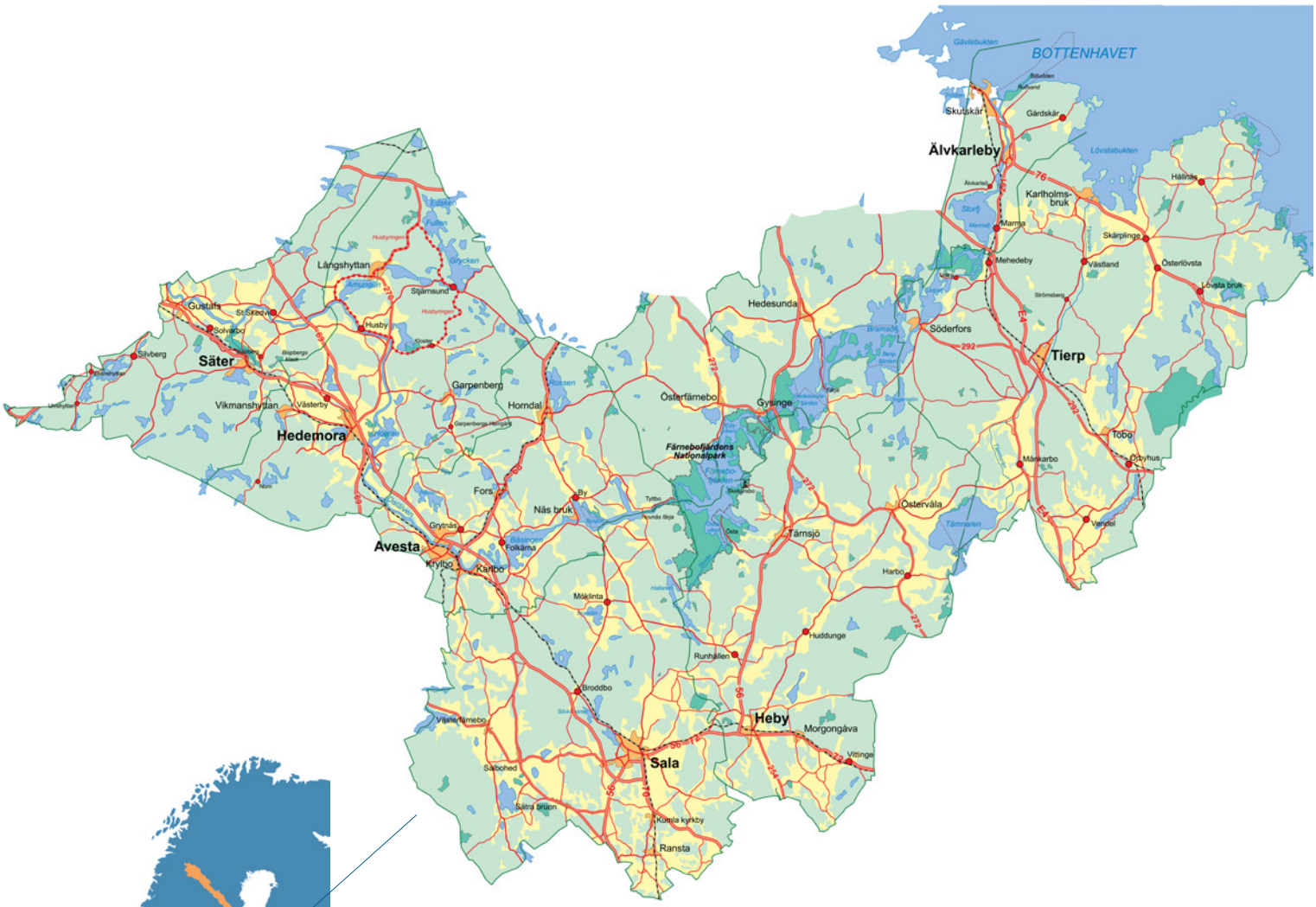

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SALA KOMMUN

HEBY KOMMUN

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Älvkarleby kommun

Nedre Dalälvens Intresseförening | coordinator of
Nedre Dalälven River Landscape Biosphere Reserve

www.nedredalalven.se, info@nedredalalven.se

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