

AFTER LIFE CONSERVATION PLAN

HORREBY LYNG, SANDLYNG BOG AND VERUP BOG

Guldborgsund and Sorø Municipalities



EU LIFE Raised Bog Restoration in Eastern Denmark
EU LIFE 12 NAT/DK/000183

2021



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1. Introduction

The LIFE Raised Bog Restoration in Eastern Denmark (Raised Bog) (LIFE12 NAT/DK/000183) project was implemented from 1 August 2013 to 1 March 2021.

The project, in accordance with the EC Habitats Directive, involves a number of Annex I habitat types and one Annex II species within two Danish Natura 2000 areas located on Falster and Zealand. The project covers three subprojects, divided between two partners – as shown in Table 1.

The project concerns the restoration and expansion of an area with the habitat types active raised bogs (7110*) and alkaline fens (7230). The project also focusses on improving habitat conditions for the large white-faced darter (*Leucorrhinia pectoralis*), which is listed in Annex II of the Habitats Directive.

The combined project area is approximately 429 ha.

The project comprises 21 individual actions with a focus on contributing to securing a favourable conservation status for the project's habitat types and the large white-faced darter, as well as supporting the objectives of the relevant Natura 2000 plans. The project thus covers the following activities:

- Landowner agreements for registered conservation easements (273 ha)
- Purchase of parts of the project area within one of the project areas (95 ha)
- Clearing of unwanted vegetation (75 ha) and the removal of plant litter on up to 7.2 ha
- Hydrological restoration (363 ha)
- Grazing facilities (35 ha)
- Inoculation with sphagnum mosses to kick-start the development of 7110* in specifically selected locations
- Management of habitats and creation of new habitats for the large white-faced darter in four locations
- Public information
- Biological and socio-economic monitoring

By introducing these activities, the following results are expected:

- Potential for the development of 7110* on 229 ha
- Management and restoration of 7230 on 7 ha and development of an additional 10 ha
- At least four new ponds for the large white-faced darter and management of existing biotopes for the species
- Visitor facilities (digital information, a 'nature room', signs, brochures, walking tracks)

Table 1 shows an overview of the division of sub-projects in the LIFE project.

Table 1. Subprojects in the LIFE Raised Bogs in Eastern Denmark project, with a focus on improving the conservation status of habitat types (shown with numbers) and the large white-faced darter.

| Subproject number | Subproject name | N-2000 area SAC | Habitat type and species | Area (ha) | Project manager |
|--------------------------|------------------------|------------------------|---------------------------------------|------------------|---------------------------|
| 1 | Horreby Lyng | DK006X239 | 7110*, 7230, large white-faced darter | 258 | Guldborgsund Municipality |
| 2 | Verup Bog | DK005X226 | 7110* | 61 | Sorø |
| 3 | Sandlyng Bog | DK005X226 | 7110* | 110 | Sorø |

Subproject 1 comprises of efforts to restore active raised bogs 7110* in actual Horreby Lyng, to restore alkaline fens (7230) around the raised bogs, and to protect the large white-faced darter. Subprojects 2 and 3 are part of Store Åmose and concern the restoration of active raised bogs 7110*.

The goal of the After-LIFE Conservation Plan is to determine a strategy for the operational management of the LIFE project after its formal conclusion. The plan includes:

- i) a brief status and analysis of the project at its completion in 2021,
- ii) the activities which should be implemented after the project, when and by whom, and
- iii) the financial basis.

As the project areas lie within Natura 2000 areas, the Natura 2000 plan, with its associated action plan, represents the overall strategy to achieve a favourable conservation status of the area's basis for designation as well as for monitoring. As part of the project, a management plan has been developed for each subproject (see Appendix 1) with a 10-year perspective, and the plan has been accepted as an annex to the current Natura 2000 action plan. The management plans represent the main foundation of the After-LIFE Conservation Plan.

2. Status for the project's objectives and actions

Table 2 shows an overview of the accomplished actions, realised objectives and future challenges, divided between the various subprojects.

The project covers private areas as well as a larger area, measuring approx. 95 ha, in Horreby Lyng, owned by Guldborgsund Municipality.

In the long term, management will be conducted by the municipalities and, to some extent, by private landowners. Within the privately owned areas, the municipalities – as part of the conservation easements – have the right to take-over management obligations if the owner ceases these responsibilities.

Overall, the actions undertaken have resulted in:

- Economic compensation (action B1) for 353 ha of conservation easements. This is enough to fulfil the goals for active raised bogs (7110*), but 10 ha less was compensated for than anticipated in the LIFE application.
- Protection of open natural conditions, with clearing of vegetation implemented on approx. 50 ha. Clearing was completed in locations that are anticipated to be so wet that regrowth will be minimal. There were, however, fewer areas cleared than anticipated in the application, but some areas were cleared several times.
- 7.5 ha scraped to ensure better hydrology. This is in line with the application.
- Protection of favourable hydrological conditions for habitat types within an area of 324 ha. The necessary area for developing active raised bogs (7110*) on 231 ha was fulfilled. The combined hydrological improvements have been less than anticipated (363 ha). This is mainly due to a reduced effort for restoring alkaline fens, where there was only support from landowners for minor hydrological changes.
- Inoculation of almost 2 ha with peat mosses. This is considerably more than anticipated in the application which predicted inoculation of 500 – 1000 m². Some localities were inoculated several times.
- Protection of habitat for the large white-faced darter in 17 locations by managing existing ponds and clearing or creating new ponds. This is 13 more locations than anticipated in the application.
- Ensuring grazing on 16 ha and hay cutting on 22 ha. This is 3 ha more than anticipated in the application. The majority of the area with alkaline fens (7230) was included in this management effort.
- Establishment of a 'nature room', as well as walking tracks, a brochure, information signs and digital information (a website and an app). The tracks were established in subproject 1 as they could not be established in subproject 2.

Table 2. Overview of actions and activities in the LIFE Raised Bogs of Eastern Denmark project, with nominated objectives and future challenges. Note that not all actions are necessarily relevant for all subprojects.

| Action #1: Economic compensation for landowners to offset conservation easements – see project action B1 | | | |
|---|--|--|---|
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | Acquire 95 ha in Horreby Lyng and 0.15 ha for a carpark. Compensation for 97 ha. | Acquisition 100% completed. Compensation for approx. 62 ha in Horreby Lyng. Compensation for 25 ha in alkaline fens project. Remaining agreements could not be achieved. | None |
| # 2 Verup Bog | Compensation for 61 ha. | 100% completed. | None |
| # 3 Sandlyng Bog | Compensation for 110 ha. | 100% completed. | None |
| Action #2: Protect open natural conditions with clearing – see project action C1 | | | |
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | 20 ha as well as the removal of litter on to 7.2 ha. Local management for large white-face darter. | Clearing completed on 21 ha. Re-clearing performed over several seasons. Litter removal completed where possible on 4.2 ha. Nine locations with water surfaces secured sunlight with local management. | Safeguard against regrowth and maintain open natural conditions. Also relevant for ponds. |
| # 2 Verup Bog # 3 Sandlyng Bog | Total of 55 ha for both areas combined. | Completed on approx. 31 ha, on which increased water levels hinder regrowth. In remaining areas, trees are left to decompose. Scraping completed on 3.3 ha. | Safeguard against regrowth and maintain open natural conditions. |
| Action #3: Improve the hydrological conditions – see project action C2 | | | |
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | 162 ha in Horreby Lyng and up to 30 ha | Completed on approx. 150 ha in Horreby Lyng in aid of the restoration of active | Ensure that the technical equipment is maintained and |

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| | in the alkaline fens area. | raised bogs (7110*). Completed on approx. 3 ha in the alkaline fens (7230) and potential alkaline fens. There was not support for more than this. | safeguard the project's hydrological border with neighbouring areas. |
| # 2 Verup Bog | Total of 171 ha for both areas combined. | Hydrology improved on 150 ha in aid of the restoration of raised active bogs (7110*) in a total area of 81 ha. | Ensure that the technical equipment is maintained and safeguard the project's hydrological border with neighbouring areas |
| # 3 Sandlyng Bog | | | |
| Action #4: Improve habitat for the large white-faced darter – see project action C2 | | | |
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | Establish at least two new habitats for the large white-faced darter and maintain two existing habitats. | Established six new ponds and restored two ponds. | Maintain ponds as open natural areas with an unshaded water surface. |
| Action #5: Inoculate with fragments of peat mosses – see project action C3 | | | |
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | Specifically selected locations. | Approx. 1 ha inoculated. Some areas inoculated several times. | None. |
| # 2 Verup Bog | Specifically selected locations. | Approx. 1.1 ha inoculated. Some areas inoculated several times. | None. |
| # 3 Sandlyng Bog | | | |
| Action #6: Establish grazing facilities in alkaline fens – see project action C4 | | | |
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | Grazing of 35 ha. | 16 ha fenced for grazing. An additional approx. 22 ha maintained as open natural area with hay cutting, which can be a substitute for grazing. | Maintain grazing facilities. |

| Action #7: Improve public information about the project and Natura 2000 – see project action E3 | | | |
|--|--|--|------------------------------|
| Subproject | Objectives | Status | Future challenges |
| # 1 Horreby Lyng | Two information boards and a brochure. Nature room with wheelchair ramp. Carpark. Digital information: website and app. | 100% completed. Website: www.horrebylyng.dk App: "Højmosen Horreby Lyng" Two carparks established. Extensive walking tracks have been established, financed outside of LIFE. The tracks substitute the walking track action in subproject 2. | Maintain public facilities. |
| # 2 Verup Bog | Four information boards and a brochure. A 250-metre boardwalk. | Information boards established. Brochure and boardwalk not established as the landowner did not want public access to the area. | Maintain information boards. |
| # 3 Sandlyng Bog | | | |

3. Management and maintenance with an After-LIFE perspective

The three subprojects are located within Natura 2000 areas, in the form of EC Habitat areas. The border of the habitat areas was changed by the Danish Nature Agency in 2018, but this did not affect the Natura 2000 demarcation and the activities undertaken in this project. Subproject 1 in Horreby Lyng, and subproject 3 in Sandlyng Bog were previously covered by conservation regulations.

The project is based on the Natura 2000 plans from the first plan period, which was from 2009-2015. Furthermore, the municipalities have developed Natura 2000 action plans. The action plans were coordinated with the water strategies for the respective water catchment areas, as stated in the Water Framework Directive. During the course of the project, the second generation of Natura 2000 plans were developed, covering the period of 2015-2021. Accompanying this are new Natura 2000 action plans, within which the conservation plans referred to above (see action F3) are included as annexes, which makes the conservation plans able to be legally implemented.

The Natura 2000 plan is revised every six years. The Danish Environmental Protection Agency will commence work on the third plan period, which will run from 2022-2027. Accompanying this will be a revised baseline study, after which a new Natura 2000 plan will arrive in 2022. As part of this, the project areas will be included in the Danish EPA's monitoring program NOVANA.

The management plans (see Appendix 1) establish in detail how the following actions should be conducted in the years after completion of the LIFE project:

- Management of (potential) habitat types 7110* and 7230, as well as biotopes for the large white-faced darter.
- Information dissemination.
- Operation of technical facilities, including maintenance of hydrological measures, grazing facilities, ponds, walking tracks and the nature room.

Table 3 shows the tasks which should be performed within each subproject to follow-up the actions (see actions in Table 2) which were completed in the LIFE Raised Bogs in Eastern Denmark project.

Table 3. Overview of After-LIFE activities within the subprojects of the LIFE Raised Bogs in Eastern Denmark project as a follow-up of completed actions (see table 2). Note that not all actions are relevant for all subprojects.

| Subproject #1 Horreby Lyng – Guldborgsund Municipality | |
|---|---|
| Action | After-LIFE activity |
| 1 | No further action required in regard to landowner compensation. |
| 2 | The management plan indicates mowing of the heather area (every three years, first time 2023) as well as the following: <ul style="list-style-type: none"> • Control birch growth in selected areas (annually). • Control blackberry thicket along the forest road, from the carpark to the Town Square (annually). • Protect open natural (unshaded) slopes on the turf pits for the large white-faced darter (every two years, first time 2021). • Manage areas in the cultivation-free zone. • Control willow and thicket in the alkaline fens. This is to protect the open natural areas. Clearing should be conducted every three years, first time in 2023. |
| 3 | Protect the hydrological conditions in the following ways: <ul style="list-style-type: none"> • Inspect the membrane and plugs/piles every five years, first time in 2021. • Inspect the overflow pipe and dome grate twice a year. The dome grate is located where the Spang channel leaves the project area to the east. It may be necessary to replace the grate because of corrosion from the highly acidic water. One of the checks should be conducted around 1 December – after autumn and before winter. • The marginal drain is covered by the watercourse regulations for the Spang channel, which is a public watercourse. The watercourse regulations determine the maintenance schedule. Pumps and pipes should be checked annually. • The embankment – on the slope, where a boardwalk has been built, should be inspected annually. During the inspection, the embankment should be checked for signs of erosion damage, or water overflow. The embankment should be maintained with these issues in mind. |
| 4 | Every five years, an assessment should be made to determine whether the eight ponds in the alkaline fens should be cleaned out, to ensure they don't become choked with vegetation. Despite the good reasons for including ponds in the grazing areas, experience proves that they can, nevertheless, become choked. Should be conducted for the first time in 2025. |
| 5 | No future management needed in areas where there has been inoculation with peat mosses. |

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| 6 | Ongoing management and maintenance of the erected livestock fence. The livestock fence is considered to have a lifespan of about 10 years. Planning for replacing the fence should begin in 2031. Hay cutting areas should be kept open natural. |
| 7 | Public facilities should be maintained as follows: <ul style="list-style-type: none"> • The nature room should be inspected weekly, the toilet cleaned, posters wiped, and exhibition room cleaned, etc. The septic tank should be emptied annually. The nature room building should be renovated and maintained regularly. • The visitor counter should be maintained and read at least once every three months. • The boardwalk, tracks and forest roads should be mowed 2-3 times a year. The boardwalk should be maintained regularly. • The information boards, posters at the entrance and the benches should be cleaned twice a year. • Faded boards/posters and weathered board stands should be replaced when necessary. • Walking track posts should be replaced as required. Benches should be repaired and replaced as required. • Roads and carparks should be inspected and maintained annually. Rubbish bins should be emptied regularly - weekly in the Nature Room. The bin at the southern carpark should be emptied regularly. |

Subproject #2 Verup Bog – Sorø Municipality

| Action | After-LIFE activity |
|--------|--|
| 1 | No further action required in regard to landowner compensation. |
| 2 | Ensure the control of unwanted plant species. |
| 3 | Ensure the functionality of established hydrological measures and precautionary measures. This includes collecting data from water level data loggers and maintaining these loggers. |
| 5 | No future management needed in areas where there has been inoculation with peat mosses. |
| 7 | Maintain the information boards. |

Subproject #3 Sandlyng Bog – Sorø Municipality

| Action | After-LIFE activity |
|--------|--|
| 1 | No further action required in regard to landowner compensation. |
| 2 | Ensure the control of unwanted plant species. |
| 3 | Ensure the functionality of the established hydrological measures and precautionary measures. This includes collecting data from water level data loggers and maintaining these loggers. |
| 5 | No future management needed in areas where there has been inoculation with peat mosses. |
| 7 | Maintain the information boards. |

4. Future operational costs

In regard to the privately owned areas, the municipalities have entered landowner agreements concerning the future operational costs of the project areas. The municipalities have accepted some economic responsibility for the execution of the management plans.

Table 4 shows the follow-up activities the project partners will implement, with regard to executing the management plans.

Table 4: Reservation of resources for executing the management plans in the LIFE Raised Bogs in Eastern Denmark project.

| Subproject #1 Horreby Lyng – Guldborgsund Municipality | |
|---|--|
| Action | After-LIFE activity |
| 1 | No further action required in regard to landowner compensation. |
| 2 | The municipality has allocated resources for maintenance costs related to the control of unwanted vegetation. |
| 3 | The municipality has allocated resources for the maintenance of hydrological measures. Part of this maintenance will be conducted as part of the municipality's regular watercourse maintenance. |
| 4 | The municipality has allocated resources for follow-up inspections of large white-faced darter habitats. This will be done in cooperation with the relevant landowners. |
| 5 | The areas inoculated with peat mosses are expected to be left to natural succession in the growth of the mosses. |
| 6 | The owners of the areas where livestock fencing has been erected are responsible for the future maintenance of the fence. |
| 7 | The municipality has allocated resources for the maintenance of public facilities. |
| Subproject #2 Verup Bog – Sorø Municipality | |
| Action | After-LIFE activity |
| 1 | No further action required in regard to landowner compensation. |
| 2 | The municipality has allocated resources for maintenance costs related to the control of unwanted vegetation. |
| 3 | The municipality has allocated resources for the maintenance of hydrological measures. |
| 5 | The areas inoculated with peat mosses are expected to be left to natural succession in the growth of the mosses. |

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|---|--|
| 7 | The municipality has allocated resources for the maintenance of information boards. |
| Subproject #3 Sandlyng Bog – Sorø Municipality | |
| Action | After-LIFE activity |
| 1 | No further action required in regard to landowner compensation. |
| 2 | The municipality has allocated resources for maintenance costs related to the control of unwanted vegetation. |
| 3 | The municipality has allocated resources for the maintenance of hydrological measures. |
| 5 | The areas inoculated with peat mosses are expected to be left to natural succession in the growth of the mosses. |
| 7 | The municipality has allocated resources for the maintenance of information boards. |

Appendix 1

Management plans for the three subprojects in LIFE Raised Bogs in Eastern Denmark.

| Subproject | Subproject name | Link to N-2000 management plan with legal operational management plan |
|-------------------|------------------------|---|
| 1 | Horreby Lyng | https://www.guldborgsund.dk/media/0esfp3gg/forvaltningsplan-for-hoejmosen-horreby-lyng-2021-2031_samlet.pdf |
| 2 | Verup Bog | https://soroe.dk/media/2604673/Forvaltningsplan-Verup-Mose-og-Sandlyng-Mose.pdf |
| 3 | Sandlyng Bog | |

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