LIFE12 NAT/EE/000860

Conservation and restoration of petrifying springs habitats (type *7220) in Estonian Natura 2000 sites

LIFE SPRINGDAY

Planned activities after the LIFE project

Wildlife Estonia

2018

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1. BACKGROUND INFORMATION

The present paper is written as a separate part of the final report for the project *Conservation and restoration of petrifying spring habitats (code *7220) in Estonian Natura 2000 sites* (code name: LIFE Springday, henceforward the Project) financed by European Union's LIFE Programme and Estonian Environmental Investment Centre. It describes the results of the Project and presents recommendations for the protection management of petrifying spring habitats and the sustainability of the Project results at the Project sites. Collected information and the analyses of the Project could be used for writing management plans also for other protected areas and Natura 2000 sites in Estonia, but also for planning and implementing activities to improve the status of other petrifying spring habitats.

The factors endangering springs

The main factors eliminating and damaging springs have been and are:

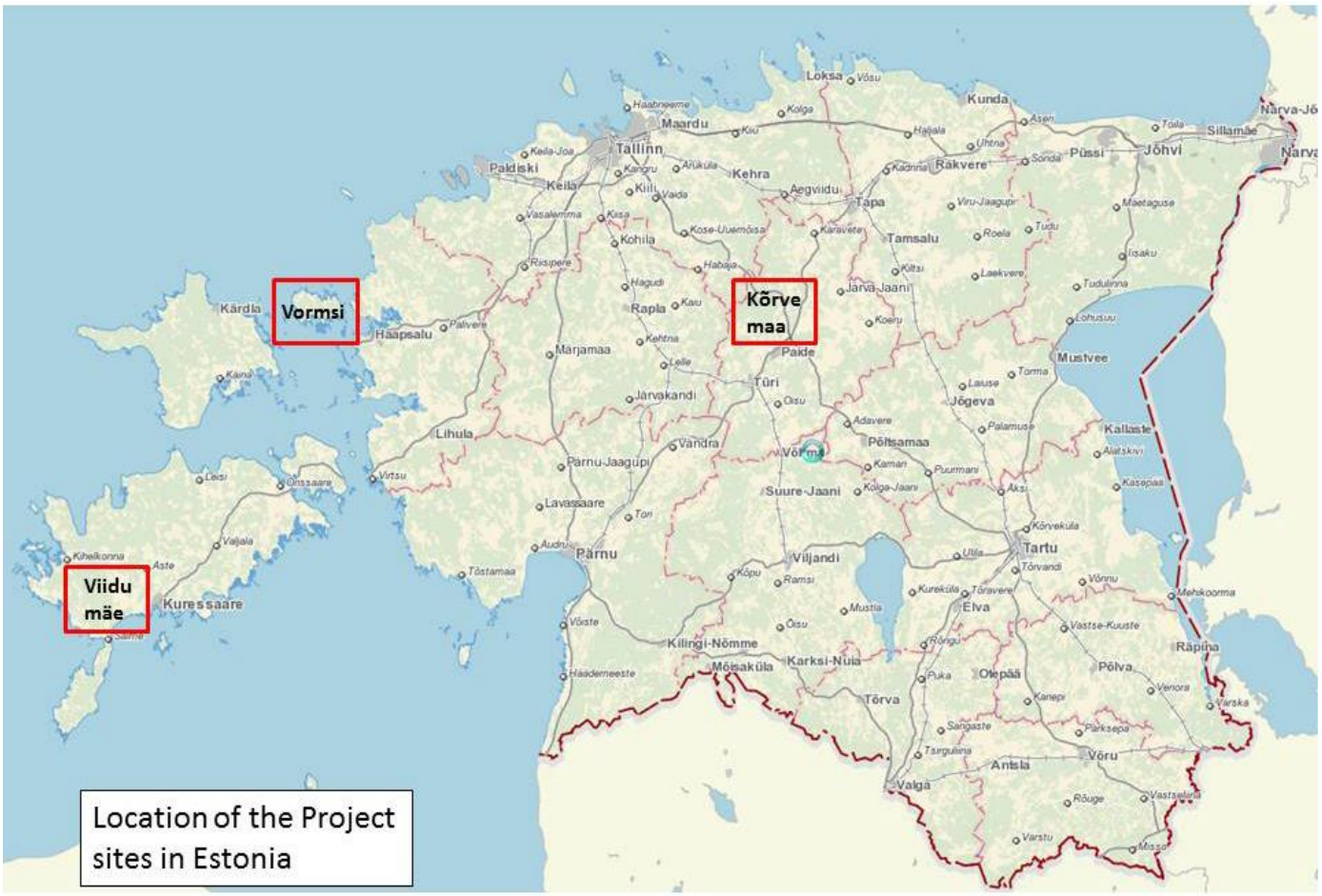
- Draining the waterlogged lands and dredging artificial recipients have lowered groundwater level, thus causing dislocation of springs into the ditches. The effect of draining was more significant around limestone elevations – this is how the majority of the springs have disappeared from Saaremaa.
- When artificial lakes were created, the natural springs were flooded.
- Dredging, enlarging and redesigning springs into ponds; building waterpoints.
- Mining the tufa has caused also draining the springs.
- Using springs for aquaculture and regulating the drainage, thus changing the water-level in the spring.
- Lowering water table for quarries and mining, and afterwards their filling with water will change the directions of groundwater flow and its trophic conditions.
- Constructing groundwater intakes may eliminate the springs.
- Large number of beavers, since beavers often build dams on natural spring streams, flooding the springs and turning the stream into a muddy pond.
- Pollution of groundwater. Polluting springs with plant nutrients is not irreversible and depends on the land-use on the feeding area. Presence of nutrients and fertilizers damage the conditions for more sensitive and thus more endangered, more rare plant and animal species in habitats subsisting on groundwater.
- Drainage ditches increase the outflow from springs and fens. Thus groundwater table will fall and water table fluctuations increase. On the areas influenced by ditching, woody plants will dominate, which means additional drainage from the soil.
- Short stay and being shaded by trees would not let the spring water to warm up, thus hindering tufa formation for petrifying spring habitats.

Protecting the springs. Many springs are protected as a natural object either within some protected area or as a single object; as a heritage object – a place of worship (mainly sacrificial springs), or they are listed as objects of cultural heritage or wilderness. Protection of springs is

regulated by Water Act (protection against agricultural pollution), Nature Conservation Act (protected areas, habitats, single objects, limited management zones and building exclusion zones on coastal and riparian areas), Heritage Conservation Act (monuments), Forest Act (key biotopes). The need to protect springs is also mentioned in water management plans, nature protection plans and good agricultural practices.

2. THE AIMS OF THE PROJECT

The general aim of the project was to maintain and restore petrifying springs and habitats depending on springs. The activities were carried out on three sites belonging to Natura 2000 network: Kiigumõisa springs in Kõrvemaa Landscape Protection Area in Järva County; Lake Prästvike and the springs in the northern part of the lake in Vormsi Landscape Protection Area on the island of Vormsi; and Viidumäe springs in Viidumäe Nature Reserve on the island of Saaremaa.



Specific aims of the Project were

- to create favorable conditions inside and around the springs covering the total area of 1,960 ha;
- to improve the status of 50 springs;
- to close 12.5 km of land improvement systems;
- to clear 30 ha of habitats from unsuitable vegetation;
- to reconstruct two hiking paths.

The aims of the Project were met. Table 1 gives the overview of the aims and results obtained.

Table 1. Specific aims of LIFE Springday and their implementation

Activity	Aim	Real result	Kõrvemaa	Viidumäe	Vormsi
Creating favorable hydrological status, ha	1,960	2,240	325	1,770	145.5
Improving the condition of the springs, pcs	50	Approx. 150	4	140	6
Closing land improvement systems, km	12.5	13.8	1.7	12.1	
Removing vegetation, ha	30	39	5	13	21.1
Reconstructing hiking paths, km	1,000 m	3.8 km		1.8 km	2 km

3. HAZARDS AND ACTIVITIES TO PREVENT THEM

Table 2 gives an overview of main hazards deteriorating the status of the habitats depending on groundwater. The conditions are favorable for petrifying springs habitats and tufa formation, if the spring is opened to sun, the flow of groundwater is constant, water-table is not fluctuating, and the water does not run away quickly from the springs and surrounding spring fen. Then the plants typical to this rare habitat type (mainly mosses) form a stable plant community characteristic to these sites. The character moss species, typical to petrifying springs only, are sensitive to plant protection products and excessive nutrients (nitrates and phosphates) in ground water.

It must also be considered that in addition to immediate area around the spring, also anything occurring in the catchment basin of the spring influences the flow volume and the quality of water in the spring. Limiting dredging for water pipes and mining activities, and careful planning for potential sources of pollution may be needed for the area that extends few hundred meters to few kilometers away from the spring, depending on specific hydrogeological properties. If there is a

wish for some activities that may influence the habitats dependent on the status of groundwater, competent hydrogeologists must be always consulted.

Measures for preserving natural hydrogeological regime in springs and spring fens:

- Limiting the changes in land use (drainage, mining, infrastructure changing the hydrogeological regime and water quality measured by hydrogeological characreristics).

- Restoring the hydrogeological regime (incl. closing the ditches) if possible, cutting down the shrub.

It is advisible to tidy the surroundings of the springs suitable for visiting, to equip them with information boards and to provide access without damaging the habitats – through creating and maintaining hiking paths.

Table 2. Hazards and activities to prevent them

Kiigumõisa Landscape Protection Area in Kõrvemaa, the springs of Kiigumõisa			
Hazard	**Reason**	**Measure**	**Anticipated outcome**
Unfavorable hydrogeological regime	Drainage, maintenance of land improvement systems, decay of barriers, formation of new, unsuitable streambeds	Limiting the maintenance works of land improvement systems. Monitoring the status of the closed streambeds.	Stable water-table close to the surface. Even functioning of the springs. Water staying as long as possible.
Polluted groundwater, loss of sensitive plant and animal species	Transmission of nutrients and pesticides through drainage ditches	Limiting the maintenance works of land improvement systems. Monitoring chemical composition of the water.	Quality of water conforms to the norms.
Overgrowing with shrubs and trees	Lowering the water table; excess of nutrients	Keeping stable water-table close to the surface. Mowing, cutting down the shrubs, if necessary.	Preserving the area and status
Trampling on the habitats	Habitats damaged by the visitors	Organizing visits to the area. Monitoring the impact of visitors, limiting the number of visitors, if necessary. In case of increased public interest: construction of necessary infrastructure.	Introducing the area and its natural heritage without damaging the habitats
Closing the spring brooks; blocking the migration routs	Managing the springs, damming, using for fishery	Protection procedure corresponding to protection aims. Changing the protection procedure, if necessary. Permitted activities planned by experts.	Bodies of water opened for the biota
Viidumäe Nature Reserve, the springs of Viidumäe			
Deteriorated hydrogeological regime	Drainage, maintenance of land improvement systems, decay of barriers, formation of new, unsuitable streambeds	Limiting the maintenance works of land improvement systems. Monitoring the status of the closed streambeds.	Stable water-table close to the surface. Even functioning of the springs. Water staying as long as possible.
Polluted groundwater, loss of sensitive plant and animal species	Transmission of nutrients and pesticides through drainage ditches	Limiting the maintenance and construction of land improvement systems. Monitoring chemical composition of the water.	Quality of water conforms to the norms.
Overgrowing with shrubs and trees	Lowering the water table; excess of nutrients	Attaining stable water-table close to the surface. Mowing, cutting down the shrubs, if necessary.	Preserving the area and status
Trampling on the habitats	Habitats damaged by the visitors	Organizing visits to the area. Monitoring the impact of visitors, limiting the number of visitors, if necessary. Maintenance of the infrastructure.	Introducing the area and its natural heritage without damaging the habitats

Kiigumõisa Landscape Protection Area in Kõrvemaa, the springs of Kiigumõisa			
Closing the spring brooks; blocking the migration routs	Managing the springs, damming, using for fishery	Protection procedure corresponding to the protection aims. Changing protection procedure, if necessary. Permitted activities planned by experts.	Bodies of water opened for the biota
Vormsi Landscape Protection Area, the springs of Prästvike			
Deteriorated hydrogeological regime	Drainage, maintenance of land improvement systems	Limiting the maintenance works of land improvement systems. Monitoring the status of the closed streambeds.	Stable water-table close to the surface. Even functioning of the springs. Water staying as long as possible.
Polluted groundwater, loss of sensitive plant and animal species	Transmission of nutrients and pesticides through drainage ditches	Limiting the maintenance and construction of land improvement systems. Monitoring chemical composition of the water.	Quality of water conforms to the norms.
Overgrowing with shrubs and trees	Lowering the water table; excess of nutrients	Attaining stable water-table close to the surface. Mowing, cutting down the shrubs, if necessary.	Keeping the area and status
Trampling on the habitats	Habitats damaged by the visitors	Organizing visits to the area. Monitoring the impact of visitors, limiting the number of visitors, if necessary. Maintenance of the infrastructure.	Introducing the area and its natural heritage without damaging the habitats

4. PLANNED MANAGEMENT ACTIVITIES

The aim of the Project is to improve the status of petrifying springs in three sites of Natura 2000 network. During the Project, detailed information was obtained concerning the location of the springs, their risk factors and present status, and measures needed for maintaining or improving the status. Corresponding activities were planned and also implemented on the Project sites. The sustainability and (if needed) continuation of the results obtained through the Project is guaranteed by the following:

1. The majority of follow-ups are included into the management plans of the Project areas. We have much better information about the springs now. Main risk factor – land improvement systems – has been eliminated, where possible.

2. In reconstructing and building hiking paths, only high-quality, weathertight materials were used. Construction surveillance was thorough. The paths are in heavy use, and persons responsible for organizing the tours, but also local municipalities are highly motivated to maintain and clean the paths.

3. Informing the public and participating in cross-sectoral workgroups (roundtable for springs, preparing water management plans, rewriting good agricultural practices, etc) will continue. Estonian citizens and public in general are well-informed about issues concerning springs, and we can also count on public support in protecting and restoring the key biotopes.

4. We have more experts on petrifying springs now, and the same could be said about their knowledge of the field. In addition to the papers written by experts from Tallinn University and Estonian University of Life Sciences, also the master's thesis titled *The vegetation of petrifying springs in Estonia and its relation with environmental conditions* was defended in the University of Tartu in 2016. Its author, Miina Rikka will continue in PhD program. Cooperation between the experts and Wildlife Estonia will continue.

During the Project, management plans for two sites – Viidumäe Nature Reserve and Vormsi Landscape Protection Area – were rewritten. The Project's team contributed in writing these plans, and they also participated in the process of writing a joint management plan for the landscape protection areas of Kõrvemaa and Kiigumetsa. At the moment the writing of the joint management plan is on pause since the Environmental Board is prioritizing rewriting the protection rules for Kõrvemaa Landscape Protection area, and only after finishing with that the work on management plan will be continued. The work on protection rules should be finished within the year 2018, and for management plan during 2019/2020. Project experts have presented their recommendations on improving the conditions of the springs situated in Kiigumetsa site for the Environmental Board.[1].

[1] Letter from Wildlife Estonia dated 21.10.2015

Environmental Board have approved the planned activities[2], and these activities have been included into the joint management plan for Kiigumõisa and Kõrvemaa. Main activities would include constructing flow obstacles into outflowing ditches in order to bring the water-table closer to the surface, thus decrease fluctuations in water levels and increase stay-time. The managements plans for Viidumäe Nature Reserve and Vormsi Landscape Protection Area reflect the main activities planned and carried out for restoring and protecting the habitats within the Project. The main hazard – land improvement and drainage systems – is pointed out in the plans, and considering and eliminating this hazard is prominent in the list of measures. Also the maintenance of hiking paths constructed within the Project has been included, as well as continuing with educational and informational activities. The paths are managed by State Forest Management Centre who will organize their maintenance. The management of Lake Prästvike (removing excessive vegetation) is included into the management plan of Vormsi Landscape Protection Area for the years 2017-2016 (see the Budget, line 4.2.27). Works planned for the period 2017/2018 have been done within the framework of the Project. The next term will be the year 2022, and then in 2016.

On the initiative of the Project new approach to eliminating hazards to spring and marsh habitats was practiced. A discussion was initiated between relevant authorities and institutions about the aims of the protected areas, and possibilities to exclude their land improvement systems from the register. Decision was made to exclude from the register those land improvement systems that do not form any part of a drainage system functioning outside the protected area. This step would get rid of the need to consider maintenance needs and responsibilities for the existing ditches. It will also make the process of closing and eliminating ditches easier, since less authorities and people will be involved, thus speeding up the decision-making process. Later, cleaning up the register of land improvement systems as the first step has also been practiced elsewhere.

Since chemical and hydrological conditions of springs inform us of the state of groundwater, and since also the surface water bodies depend on it, it is very important to have an overview of springs and the quality of their water. Since obtaining good environmental status follows the regulations set by Water Framework Directive through water management action plans, it is necessary to pay attention to the springs also in this context. In preparing water management plans for the next period (2022-2027), proposals are made to organize the protection of springs in accordance with the new information and experience obtained. We will also participate in writing the next nature protection plan (the present one is valid until 2020) with proposals for activities needed to obtain and maintain good conditions for springs and habitats dependent on groundwater.

Table 3 presents activities needed for sustainability of the results obtained by the Project, but also activities that should be considered, if new possibilities arise, to increase the value of Natura 2000

[2] Letter No HJR 14-4/15/23774-2 from Environmental Board, dated 09.11.2015.

sites. The table includes the activities from the management plans for Viidumäe Nature Reserve for the period 2015-2024, and for Vormsi Landscape Protection Area, white-tailed eagle protection site in Närsi and the Vormsi part of the special conservation area of Väinameri for the period 2017-2026. It is important to plan and implement activities that help to reach the aims set for Natura sites and other protected areas.

First priority (I) – absolutely necessary activity without which it is nor possible to meet the protection aims within the set timeframe; this is an activity directed towards preserving the valuable and eliminating hazards; activity needed for evaluating the success of the management plan. Second priority (II) – necessary activity directed towards restoring the valuable, exhibiting the valuable, and eliminating potential hazards. Third priority (III) – recommended activity or something that would indirectly help to preserve or restore the valuable and remove hazards.

TABLE 3 BUDGET OF THE ACTION PLAN

No	Name of the activity[3]	Kõrvemaa (KÕ), Kiigumõisa (KI), Viidumäe (VI), Vormsi (VO)	Organizer	Priority	Period, frequency	Possible sources of financing	Provisional amount, comments
1. Inventories, monitoring activities, surveys							
1.1	Monitoring the number of visits, visitor survey, 4.1.9	VO	RMK	III	2018, 2021, 2024	RE	RE
1.2	Monitoring the number of visits, visitor survey	VI	RMK	III	Continuous	RE	RE
1.3	Inventory of protected species, 4.1.3	VO	KA	II	2020, 2021	KA	4,000
1.4	Monitoring endangered plant communities, 4.1.1	VI	KAUR	II	2020	RE	RE
1.5	Monitoring endangered vascular plant and moss species, 4.1.1	VI	KAUR	II	Continuous	RE	RE
1.6	Inventory of the habitats listed in Habitats Directive, 4.1.5	VO	KA	II	2018, 2019	KA	3,000
1.7	Specifying distribution data for the protected moss species	VI	KA	II	2018	KA	700
1.8	Appraisal of the status of protected species	VI	KA	II	2023, 2024	RE	RE
2. Maintenance, restoring and restricting activities							
2.1	Improving the ecological status of Lake Prästvike, 4.2.27	VO	KA	II	2017, 2018, 2022, 2026	KA	6000
2.2	Maintenance of the hiking path of Allika, 4.3.7	VO	RMK	II	Continuous	RMK	1,000 per year
2.3	Maintenance of the hiking path of Allikasoo, 4.1.19	VI	RMK	II	Continuous	RMK	2,500 per year

[3] The number corresponds to the line number in the budget for the management plan for the site.

2.4	Aftercare of the restored marsh habitat in Kõrvamaa Landscape Protection Area[4]	KÕ	KA, LHK	II	2019	KA	500
3. Popularization of the protected areas and environmental education							
3.1	Educational programs about the nature of Vormsi, 4.5.1	VO	Huvilised, KA	III	2022	KA	500, RE
3.2	Map-booklet of Vormsi, 4.5.5	VO	KA	II	2021	KA	300
3.4	E-book about the nature of Vormsi, 4.5.6	VO	KA	III	2021, 2022	KA	600
3.5	Developing the nature education centre, offering educational programs	VI	KA	III	Continuous	KA	1,000 per year
4. Plans, rules							
4.1	Rewriting the protection rules for the landscape protection area, changing the regulation for the special conservation area, 4.4.1	VO	KA	I	2018, 2019	RE	RE
4.2	Mid-term appraisal and rewriting of the management plan for the landscape protection area, 4.4.2	VO	KA	I	2021, 2026	RE	RE
4.3	Performance evaluation of the management plan for the landscape protection area, writing the plan for the period 2025-2034, 4.1.28, 4.1.29	VI	KA	I	2019, 2024	KA	20,000
4.4	Rewriting protection rules for the landscape protection area, 4.1.30	VI	KA	I	2018	KA	RE
4.5	Rewriting protection rules for the landscape protection area	KÕ	KA	I	2018	RE	RE
4.6	Developing joint management plan	KÕ, KI	KA	I	2019, 2020	RE	RE

Implementors: KAUR- Environmental Agency, KA- Environmental Board, RMK- State Forest Management Centre, LHK - Wildlife Estonia
Sources of financing: RE- state budget

[4] The restored area will be checked in 2019, repeating the shrub-cutting, if necessary.

SOURCES:

Viidumäe looduskaitseala kaitsekorralduskava 2015-2024 (Management plan for Vidumäe Nature Reserve)

Vormsi maastikukaitseala, Näsi merikotka püsielupaiga ja Väinamere hoiuala Vormsi saarele jääva osa kaitsekorralduskava 2017–2026 (Management plan for Vormsi Landscape Protection Area, white-tailed eagle protection site in Närsi, and the Vormsi part of the special conservation area of Väinameri for the period 2017-2026)