Notes taken during the excursion to Natura 2000-sites Eknön and Herrborum in Östergötland county, 2019-05-15.

Marcelle Johansson and Martin Larsson were the main guides on this field trip together with insect expert Nicklas Jansson from the county administrative board of Östergötland and tree expert Vikki Bengtsson from Pro Natura. During our walk through the reserves we stopped at different locations where Martin and Marcelle described the different practical measures taken in each site. Through the whole day there were active group discussions. On some of these sites Nicklas gave us a chance to get to know some of the interesting and exclusive insect found on Eknön and Herrborum. Vikki contributed with valuable knowledge in the different discussions and gave us a lot of interesting information about old trees in these areas.

Throughout the excursion the guides, experts and participants in the group discussed both the LIFE project, practical measures taken in the specific areas together with general and specific questions about trees, insects and habitats. Some of these discussions are presented below together with some information from Marcelle, Martin, Nicklas, Vikki or one of the participants in the group.

Eknön

Stop number one, a short introduction to Eknön.

Eknöns nature reserve is 738,9 hectares and the land areal is 227 hectares. The reserve is unique in the sense that the last owner, count Magnus Stenbock had a philosophy to not cut any trees in the area, not even for collecting firewood. This resulted in an exceptionally high number of very old trees on the island. The present landowner Solveig Stenbock was more flexible making it possible to restore these different habitats growing more and more dense and in need of restauration.

On Eknön several measures have been taken during the LIFE project, with a focus on restoring overgrown pastures, cutting away shading vegetation around old oaks and creating a mosaic of habitats as well as building new fences.

Stop number two, measures in old wooded pastures and deciduous forests.

**Nicklas** – Eknön is a unique place where you find a lot of interesting insects. One of the most interesting things about Eknön regarding the insect fauna is that not only can you find rare insects here, you find them in places you don´t expect them to be. Insects normally found only on oak can here be found on other shorter lived deciduous trees, like birch. Since oak trees can live for a long time, it is more likely they have time to develop the right living conditions for wood living insects. The more shortlived trees like birch, don´t get the chance to develop these characteristics in our modern landscape in Sweden. One of the theories why Eknön (and Herrborum) is so unique is that the different tree species have the chance to grow old and therefore have time to develop the right characteristics.

**Martin** – *Discussing the restauration measures in the sites where oak trees were surrounded by dense vegetation, mostly deciduous trees. The discussion was mainly focused on cutting around oaks and the amount of dead wood*. Instead of cutting away all shading and competing vegetation around all the individual old oaks, the cutting was in some areas done in groups by 2-3 trees. Previous studies done in UK show a good response to this method. By doing this we hope to create a variety of habitats, some with more dense areas and some with more open areas. There were other factors taken in consideration when deciding how much wood to cut down. One factor was the price. It is much more expensive to transport wood from an island to the mainland. Another factor was how much dead wood to save in the area. The participants were happy with the amount of dead wood and Nicklas pointed out that the amount is never an exact number and in this area, it was a good amount.

**Question:** *How long can an oak tree stand in the shade before it is too late to save it?*  **Vikki** – After cutting away shading vegetation around an oak new branch starts to grow on buds located around the tree. These buds can survive non- active for around 80-90 years waiting to get some sunlight. So, depending on the surrounding conditions of course, one must look at the tree and these buds to be able to see if there is still hope.

**Question:** *There is a different approach to when dealing with restorations in agricultural land. How can one think when restoring areas or making practical measures outside a nature reserve? There is a lack of thinking in a bigger perspective when it comes to practical measures in forest areas in agricultural lands, outside nature reserves.* **Marcelle** - Yes, there is more flexibility in a big project like LIFE in the nature reserves/Natura 2000-sites then it is in agricultural land outside the protective areas. The rules and procedures connected to agricultural support in some areas is a bit stiff. The trick is to not give up. If there is too little grass in a newly restored area, try again when the grass has recovered. There is also a learning process between all parties in the process and the county administrative boards are working to broaden their perspective.

Stop number three, coastal meadows.

*Discussing the restorations made by the shore meadow.* We initially had planned measures on the coastal meadow but there was no need to do any milling. Although the meadow has been well grazed over a long period of time there is little birds nesting in the area. There is no clear explanation for this. One of the actions needed in this area is probably alternative grazing regimes. The vegetation would benefit from more extensive grazing, but to do this more fences would have to be put up. But that would increase the risk for higher predation pressure on the visiting birds from crows and other raptors sitting on the fence.

**Question:** (question from a land owner*). Is there any discussion between the land owner, tenant and the county administration board regarding all the different measures in the project?* **Marcelle and Martin** There is discussions and collaboration with the tenant or land owner in the matter of grazing regimes, fencing and grants, but not regarding the plans for the project. There are no discussions regarding details in the project.

Stop number four, measures in younger deciduous forests and wooded pastures.

We s*topped at an area dense in birch and alder located near the open meadow and water.* In this area cutting of trees were done with machines. The main aim was to open up small clearings and at the same time keep the microhabitat, create a lot of dead wood and a lot of variations in this relative homogeneous area. A lot of the trees are the same size and some also have multiple stems. **Tommy Ek** pointed out that a lot of these trees have multiple stems indication that they have been coppicing. If it is so, the area is potentially an important biodiversity heritage site. Martin pointed out that the history of the areas has been an important factor when planning the restauration actions. The area we stood in had been an open pasture in 1870. Trees that have signs of coppicing or had traces of impact any sort was saved together with shrubs. (a total of 300 m2 birch have been cut on the island during the project).

**Vikki-** One of many actions in the project were veteranisation. In areas where there is a lack of middle aged oaks veteranisation is a practical way of bridging the age gap. These actions are in some way meant to damage the trees and speed up the process of ether develop cavities or develop dead branches for example. This to create and mimic structures and microhabitats in much older trees.

Stop number five, lapsed pollards.

Here we stopped in an area with old and big pollard trees. These trees had earlier been pollarded 15 years ago and were now big enough to perhaps need pollarding once more.

**Marcelle** – A question to all the participants, what is the best thing to do with these pollarded trees? Vikki – These trees were cut to aggressive and as a result, the trees are now suffering. When pollarded trees are neglected for a long time the crown gets too heavy, causing the trees to sometimes brake. When in panic we try to restore this and we cut too much leaving big surface area that the tree must repair and grow back. This can sometimes be too much for the tree causing it to die or deteriorate faster than doing nothing. One strategy is to instead of trying to save the neglected pollarded tree, try to create new pollarded trees in the area. Thus, keeping the traditional going and saving the historical heritage. But, if we do want to prolong the life of one old pollarded tree in desperate need of cutting, one strategy is to use pole thinning/selective pollarding. Pole thinning – cut maximum 50 % of the branches and then wait a couple of years and then cut again. By doing this, the tree has time to grow out new branches with less risk of exhausting the tree and a higher chance saving it.

**Vikki** demonstrated a hollow tree with wood mould in it. Here we could see a younger branch growing from inside the tree down in its own wood mould. This was a nutrient recycle strategy. An old tree survival strategy!

**Nicklas** told us about a study made on wood mould boxes, revealing a higher number of *Anthrenochernes stellae* than in natural cavities. This is perhaps connected to birds nesting in these wood mould boxes more frequently than in natural cavities.

Herrborum

Stop number one, measures in wooded pastures.

Herrborum nature reserve is 122 hectares and the land areal is 80 hectares. The reserve was home to count Magnus Stenbock who had the philosophy to not cut any trees in the area. This resulted in an exceptionally high number of very old trees even in Herrborum. This also resulted in very dense forest with not a lot of grass and not a lot of shrubs. The aim for this area was to open up the dense forest and create a mosaic of habitats and restoring previous pastures. A lot of spruce were cut and taken out from the area. Some wood mould boxes were transferred from Mauritsberg and Stegeborg and were put up on trees all around the area. In the area a lot of trees were veteranisated, aspen was cut to high stumps. Nicklas told us that a rare beetle, *Saperda perforatea* was found here. Tommy Ek told us that it is a good idea to make high stumps when cutting aspen, to avoid massive growth of new aspens.

On Eknön several measures have been taken during the LIFE project, with a focus on restoring overgrown pastures, cutting away shading vegetation around old oaks and creating a mosaic of habitats as well as building new fences.

Stop number two, edges, open grasslands and tree regeneration.

The main aim here was to create a semi open pasture, with a good variation in sun exposure. All practical measures like Self-thinning, cutting, veteranisation are adapted to the specific focus areas. In some parts work have been focused on forest edges and areas between clusters of trees. Shrubs like blackthorn (*prunus spinosa*) are important for establishment of young oaks and other trees as well as a nectar source for insects and shelter from strong winds.

Vikki pointed out the importance of variation by creating open and more closed areas, when working with restorations.

**Solveig Stenbock** told us about the reintroduction of grazing animals in this area. Earlier the area was grazed by cows belonging to a farmer producing milk. Unfortunately, his animals got salmonella which resulted in that the area could not be grazed at all under a 2-year period. After that the landowner has built up her own meat production. She started with around 20-30 animals but today around 60 cows are grazing these pastures.

The LIFE project has made it possible to look in a broader perspective, making it possible to discuss with Solveig the best options for manage these pastures in the future. A total of 10 km of fences have been put up during the project.

**Question to Solveig**: *What do you think about the project?* It was easy to work with Marcelle, all the fences and practical measures had a good quality and are over all happy about the collaboration.

Stop number three, insect monitoring, wood mould boxes.

**Nicklas** told us about the ship-timbre beetle, found in this area, it is not a fly, even though the Swedish name for the species indicates it, is a beetle. It is 1-2 cm long and are one of a few insects that can gnaw through living oak wood. In its way through the cavities the larvae grow fungi. These fungi are the larvae’s main source of food.

Stop number four, measures in younger deciduous forests and wooded pastures.

We stopped in an area with a high number of young trees. Marcelle – We wanted an area with no active management a non-intervention. This will create a lot of dead wood in the future. All the competing trees and bushes around the oaks in this area have been cleared. A new species has been found in his area in 2018, svart öronknäppare, on a high stump and this find was the second find in Östergötland.

We stopped to talk about the bracket fungi numerous on the old oaks trees and on some of the birch trees. On birch trees we can find birch bracket (*Fomitopsis betulina*). This bracket fungi cause the stem to brake creating a high stump. The insects found in this area are find on tree species these insects are not normally find in. This again indicates that the insects are less dependent on specific species of trees but rather the quality of the wood and which type of fungi inhabit the tree.

Vikki talked generally about brackets- There is only a few bracket fungi species that actually kills trees. There is a general misconception about tree vitality and the effect these brackets fungi have in these trees. The fungi species coexist with the trees, instead of thinking of the brackets as an infection, slowly killing it.

Nicklas told us about the difference between white rot and red rot rut. The withe rot consists of cellulose and ligning which makes it more soft and flexible while red rot is more brittle and stiff. The different species affect the trees in different ways like how they deteriorate over time and which species of insects will inhabit the tree during the different stages of the trees life and long after it´s dead.

Stop number five, restoration around veteran trees and infrastructure measures to make grazing possible.

Nicklas told us about the importance of wood mould for saproxylic species. You can see over a long period of time which inhabitants have been living in the mould as fragments of insect bodies and their droppings still can be found. He gave us an example of how a special ant species is used by beetle specie. As the beetle looks similar as the ant and feeds the ants with a sweet solution from its body they invite it into the stack where the beetle feeds on the ant’s offspring. By finding this ant in the area there will probably be many more species found here. Nicklas gave us a short report from a survey on saproxylic beetles in the area that was done in Herrborum during summer 2018. A lot of very rare key species where found here which makes the area very important even on a landscape level as it is relatively close to other important areas for species depending on old broadleaved trees in Söderköpings municipality like Thorönsborg and Eknön.

We took a closer look at some mould boxes that where put up comparing to the old type we looked at earlier.

Finally, Marcelle told us about the importance of other infrastructure solutions besides fencing that are needed to make grazing possible. At Herrborum there is a shortage of water for the animals. Therefore it´s important that the animal keeper has roads to be able to transport water into the pastures. Thanks to the project we were able to solve some of the issues that earlier made the area less attractive for grazing.