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MANAGEMENT PLANNING aimed at developing a beef farm based on high natural value grazing -suggestions of topics and measures in the management plan

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PHOTO

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MAP

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PRODUCTION AND LAYOUT

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MANAGEMENT PLANNING AIMED AT DEVELOPING A BEEF FARM BASED ON HIGH NATURAL VALUE GRAZING

– SUGGESTIONS OF TOPICS AND MEASURES IN THE MANAGEMENT PLAN

BACKGROUND

Beef production based on semi-natural grasslands can be the most profitable beef production form, if it is carried out in the right way. The cattle grow slower which gives high quality tasty meat with healthy fatty acids. The production method leads to less nutrient runoff from arable fields as the winter fodder is taken from grass leys that are ploughed less often than fields with grain.

The grazing also produces wild plants and animals, and gives a high biodiversity. Meadows and pastures of semi-natural grasslands are the habitats that host the most species. A lot of semi-natural grasslands have grown over due to less grazing cattle as there are less cattle farms and a more intensified agricultural production. When these grasslands grow over species and the distribution of species is reduced, some become endangered. These grasslands have to be grazed or mowed to ensure that a lot of species can survive in these habitats.

The aim of this plan is to show how a beef farm based on grazing semi-natural grasslands can improve the farms profit at the same time as biodiversity and the environment is improved.

In this example a farm in the coastal area of eastern Sweden has been used as an example. The reasoning is based on this example but should be applicable, to a large extent, all around the Baltic Sea and other areas where grazing and mowing has been carried out historically during centuries.

INVENTORY OF GRASSLANDS

Do the cattle graze semi-natural grasslands, or do they graze arable fields? If they graze grasslands, are these the grasslands with the highest biodiversity? Are there grasslands with a high biodiversity on the farm that are not grazed or are growing over?

Which vegetation dominates in the pastures? Is it mainly species with low vegetation or is it for example a lot of annual meadow species that need to seed to be able to spread? Does there exist threatened species in the pasture or adjacent to the area? How has the management of the grasslands been the past years, intensive grazing or a lower grazing pressure? Are there unwanted species in the pasture?

A general inventory of the farms pastures and former pastures should be done on the farm to get a picture of which natural values there are on the farm. All available information about the areas should be collected. Data from previous inventories, lists of species if they exist, eventual earlier management plans or other plans that may exist.



Corydalis species are host species for the endangered Clouded Apollo (*Parnassius mnemosyne*). *Corydalis* ssp should be inventoried in April to early May during flowering. Photo: Maria Hoflin.

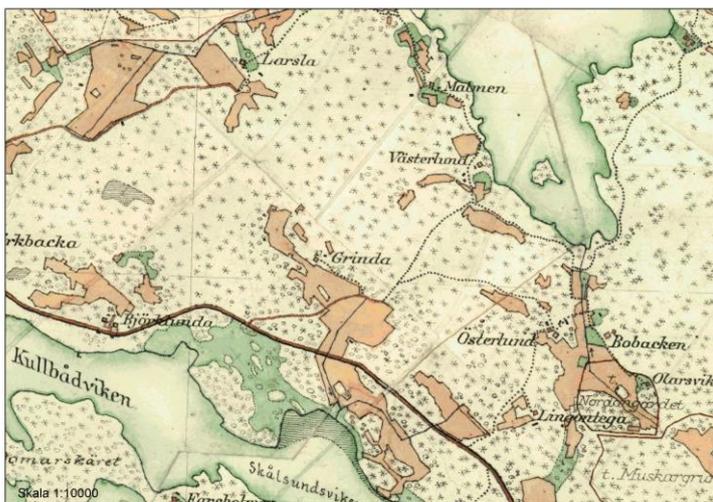


Old oak trees are very valuable for the biodiversity. They can host thousands of different species of mainly birds, beetles, fungi and lichens. Here oak tree with sulphur polypore (*Laetiporus sulphureus*). Photo: Jan-Olov Björklund.

If there is no data from earlier inventories concerning the pastures, or if the pastures have not been examined properly, more detailed inventories should be made of more groups of species. It is recommended to look at vascular plants, butterflies and birds. The tree and shrub layer should be documented, and if there are coppiced trees or other old trees it is recommended to also look at insects and lichens. In grazed forests, fungi on the ground and trees and lichen should be documented. Depending on the character of the area other organism groups may be important. The focus of the inventory should mainly be to look for species connected to grazing or mowing, indicator species and endangered species. In the Swedish Board of agriculture's (Jordbruksverket) report 2003:1, "Indikatorarter - metodutveckling för nationell övervakning av biologisk mångfald i ängs- och betesmarker" there are lists with suggestions of species from different organism groups. The lists can be complemented with regionally important species, endangered species, host plants of endangered butterflies and insects, meadow species, migrant/forest edge species and succession species that you today mainly find in semi-natural grasslands when other habitats disappear.

Even historical remains, such as old buildings (small hay barns, summer milking barns etc.), wooden fencing, stone walls, and other remains should be documented, also remains of other cultural heritage such as ancient graves or similar should be included.

Historical maps can be found over many areas, which give good information concerning the historical land use. They can also give a picture of which kind of species that can be found in the area and what kind of management is suitable for the area. By interviewing the farmer and elders in the area more information can be acquired of how the land has been used historically.



Historical map from 1905 over part of Gräsö, Upland in Sweden. Green areas are meadows, orange areas are arable field and white areas are woodland (circles = deciduous forest, stars = coniferous forest). Lines with green colour are the coastline. Source: Lantmäteriet.

INVENTORY OF ARABLE FIELDS

How much grass lays are there on the farm? Is there enough grass fodder to feed the cattle in winter? Is there a marginal for a long and cold winter, or for dry summers that give a lower yield? Is there a possibility to harvest more grass on the farm or on rented land if the number of cattle are increased?

Discuss with the farmer and get information on number of hay/silage bales that the grass leys give a normal year and how many bales are required per animal and winter. Then it is possible to calculate how much more grass ley is needed to expand the number of cattle to the desired amount.

Go through the grass leys and see what can be done to improve the yield. Is there functioning drainage? Have species such as cow parsley (*Anthriscus sylvestris*), that reduces the nutrient content of the hay, spread out on the ley? If a reestablishment of the grass ley has not been done for a long time this may

be needed to improve the yield. How are the leys fertilised? When are the grass leys usually re-established?

There are different methods to increase the amount of hay.

- One possibility is to increase the hectares of arable fields. If this is not possible at the own farm, the surrounding and nearby farms can be checked if they are willing to let land out for lease. It is important that rental agreements is specified where it says if the leys can be re-established and if manure can be spread and other improvements is allowed.
- Another option is to increase the production in the existing leys at the farm. If the leys has not been re-established for a long time, this could increase the yield considerably. Also, maintenance of ditches is important to get a high yield.
- A third possibility is to increase the production of the leys by sowing new seeds in growing vegetation. New technics are now developing for this method. Long-lasting herbs with suitable properties for establishing in growing vegetation are used. It is important to get help from experts for which seeds is best for the own soil conditions.

MANAGEMENT OF THE PASTURES

After an inventory of the land area structure and valuable species, a plan can be made to optimise the management of the different pastures depending on which values have been found in the ground layer and or the shrub and tree layer. The most common management regime in Sweden is to let the cattle out in grazing areas in the spring (May to early June in Upland area) and have a group of cattle grazing the area the whole grazing season (until latest late October). Some wild plant and animal species may benefit from this management, but most of the biodiversity rather benefit from a more varied management.

General management of semi-natural grasslands

- Semi-natural grasslands must not be cultivated or fertilized and pesticides must not be used in these areas. All these actions will decrease the biodiversity.
- Feeding the cattle with additional concentrates and grain during grazing on semi-natural grasslands must be avoided to keep a high biodiversity. It adds nutrition to the grassland and often makes damage on the ground at feeding places.
- Pastures should be managed with such a grazing intensity that no old grass is left at the end of the grazing season. The grassland does not need to be completely grazed earlier in the season. It is good for biodiversity that there are ungrazed parts in the pasture where plants can flower and seed before they are grazed.
- Shoots from trees and bushes need to be taken away yearly. Especially in areas that have been recently restored from overgrowing trees and bushes, this can be a great deal of work. If there are a lot of shoots they need to be collected in piles and if possible burned.
- Keep away unwanted vegetation, such as nettles (*Urtica dioica*), meadowsweet (*Filipendula imaria*), bracken (*Pteridium aquilinum*) etc. in the grasslands. If the cattle don't graze these species, you need to manually cut them off, preferably several times during the season to minimize their expansion.
- Grazing period should be during the grass growing season, from earliest mid-April to latest November. Grazing during wintertime adds nutrient to the grassland, which promotes large grasses and decrease the biodiversity of specific grassland species. Nutrient run-off to watercourses is high with animals out in winter. Also the tramps of the cattle destroy the herb and grass layer.



Well grazed grassland in the beginning of the autumn. Photo: Gillis Aronsson.

In Sweden, if you have valuable semi-natural grasslands, and follow these management rules, you are entitled to agri-environmental payments with an additional support. This is an essential income in the production of beef, and for good economy it is important to optimize the support from the RPD (Rural Development Programme) for pastures.

Adapted management for specific species connected to semi-natural grasslands

If there are endangered species or other especially valuable species in the area or adjacent to the area, the management should mainly be directed towards protecting these species. Usually there are more species in the area that benefit from this management. Historically there were large areas of meadows where plants could flower and seed before the grass was mown. The meadows and pastures were also managed with a larger variation than today. The management should be adapted so that endangered species have a possibility to survive and expand their populations. It can be a plant that needs to flower and seed before grazing, a butterfly whose larva need to eat a host plant before it is grazed or a bird that needs to get its chicks out of a nest placed on a tussock before it is grazed.

Bellow are different suggestions of how to adjust the management to favour specific species:

- Early grazing at shore meadows (from early May). This could keep the reed (*Phragmites australis*) away from the area and let other species spread. It is valuable if the grazing can create a “blue belt” of open water between the shore and the reed beds. Here in the shallow warm water many amphibians and insects live, and birds can find food. The shore meadows should not be too hard grazed though, because many wetland birds need grass tuft and areas with higher grass to build nests in. A lower grazing pressure in June to mid-July would be preferred in shore meadows, followed of a higher pressure later on to remove the grass.
- Late grazing, from the middle of July or later. Important on grasslands where there are endangered species that cannot manage early grazing, such as the butterfly Clouded Apollo (*Parnassius Mnemosyne*) or the moth *Agonopterix bipunctosa*. This also favours a large amount of plants that have drastically decreased in grasslands. Some examples of these plants are *Inula salicina*, *Seseli libanotis*, *Serratula tinctoria*, *Melampyrum cristatum*, *Crepis praemorsa* and *Rhinanthus minor*.
- Low grazing pressure to moderate grazing pressure. leading to relatively many areas in the pastures that are not completely grazed during the whole season, and where there are areas with higher vegetation at the end of the season. This favours species sensitive to grazing in a similar way as above.

- No grazing during one or two years of five. This increases the possibility of reproduction of plants and insects. If years with no grazing are used in intensively grazed pastures this gives a large addition to the seed production and on a larger scale a more continual supply of pollen and nectar in the area. This also gives a buffer for eventual misses during a 5-year period: too intensive grazing, too early grazing or too late reproduction due to weather.

Several methods above can be combined in the same pasture. To avoid old grass accumulating in the grassland the following methods can be used during the spring (April) after a year with no grazing or low intensive grazing.

- Mowing and raking of last years grass. The method replaces grazing during the period of early growth after a year with no grazing or low intensive grazing. When taking away the previous years grass instead of the growing biomass surprisingly good grasslands with good conditions for establishment of plants is created.
- Spring grazing with cattle, April. Same effects as above.



Late grazing has positive effects on the biodiversity in species-rich grasslands. Photo: Maria Hoflin.

The above management methods not only benefit biodiversity, it can also be economical profitable. If late grazing or grazing free years is practiced, more hectares of pastures can be used for the same number of cattle. This gives a higher support from the RDP. Also the parasite pressure is lower if grazing areas are more extensively used.

Other management

Management can also be adapted to visualise historical remains. In this case a relatively intensive grazing is needed. The pasture can also be divided into smaller pens with rotation grazing to get a good regrowth, to optimize the nutrition in the grass for the growing cattle.

PRODUCTION OF WINTER FODDER

What does the feeding system look like on the farm? Do the cattle have free access to fodder? Is hay or silage used? How is the fodder kept?

Hay production is very dependent on the weather. If it is raining when the grass is cut it loses a lot of its nutritional values. Hay bales also need to be kept dry so that fungus and mould is kept away. If silage is made more expensive machines are needed, but the benefits are so large that it should be seen as the best way to store fodder for the winter.

For an optimal quality of silage the grass needs to be harvested with the right technique so that soil bacteria does not end up in the grass, the grass is harvested at an optimal time and the bales are tightly packed. Silage wrapped in plastic can be kept outside.

When raising beef cattle it is not necessary to optimise the protein content in the grass by harvesting early. It is better to wait and take a later harvest with more biomass. For suckler cows, heifers and steers it is better as the grass that is harvested later in the season has higher fibre content.

Grass leys usually lose their nutritional content after about 4-5 years, when quite a few clover species usually have disappeared. Many farmers will then plough the grass ley and reseed it. This is costly and the runoff is high from ploughed fields. When the time period until ploughing and reseeding is lengthened both the economy and environment is improved. There are seed mixes with a lot of clover species that last for more years and give a good biomass, for example blue lucern. Lucern is also an appreciated nectar plant for insects and butterflies. It is also possible to sow seeds in growing grass leys without ploughing them. This could mean that a grass ley could stay unploughed for about 15 years without the grass losing so much in nutritional content.

Read more: Baltic Beef – a handbook for beef production, Anna Jamiesson, report 2013/11
Upplandsstiftelsen, and Factsheet “Long laying grass leys”, at www.upplandsstiftelsen.se/snowbal.

RESTORATION OF OVERGROWN PASTURES

The development of a farm based on grazing cattle usually means that the number of cattle are increased, leading to a need of more grasslands. When an inventory of the farms grasslands is done eventual overgrown grasslands should also be taken into account. The farmer probably knows which areas were grazed historically and if the cattle grazed in the forest. Study older maps for clues on which areas used to be more open and therefore probably where grazed or mown. The areas should be visited in the field to make a judgement of if there are still species connected to grazing/mowing or structures in the area. Even if there are plantations of spruce trees or similar there can still be so much natural values connected to grazing that it can be prioritised to restore the area from a nature conservation point of view.

Restoration of semi-natural grasslands are time consuming and can cost a great deal. A detailed restoration plan is needed over the area that is to be restored, if it is a larger, more complicated area. Attention needs to be paid to the natural values that are still in the area so that they can be developed. For example, areas with a rich flora needs to be opened so that more sun can reach the ground, wide crowned trees need to be freed and young shoots from trees and bushes should be cleared away.

Measures that are often needed:

- Fencing
- Removing trees that have come up during periods of overgrowth which are shading wide crowned trees
- Removing trees that have come up during periods of overgrowth which are shading previously open, grassy areas
- Clearing of young shoots of trees and bushes
- Combating reed on coastal meadows by clearing or grinding
- Grinding down alder stumps and other trees that give shoots that are not grazed
- Collecting and removing twigs

If heavier machines are used it is important that the ground is frozen or very dry so that machine tracks are avoided. If entrepreneurs are contracted make sure that you state that the tree felling is for nature conservation and the goal is a pasture. Twigs are to be taken away. It is often best to mark trees that are to be felled or trees that are to be left in an area. Make sure that trees and bushes with flowers and berries are saved. If there are species with specific requirements on structure, for example a variation of bushes as shelter, this needs to be planned for. To make sure that valuable trees and bushes are saved, it is recommended that the trees that should be taken away are marked with color. It is often good to make maps with instructions for restoration and management for each specific area, see appendix 1 for an example.



Above an overgrown wooded pasture. Below is the same pasture after restoration. Large trees, pollard trees, bushes with berries and trees with bird hollows are saved. Illustration: Art Anna 2012.



Read more: Fact sheets on “Restoration of wooded grasslands”, “Coastal Meadows are wetlands”, “Problem vegetation in grasslands” at www.upplandsstiftelsen.se/snowbal.

OPTIMISING FARM SUBSIDIES

To get a good economy from beef production based on grasslands EU’s farm subsidies, such as single area payments and agri-environmental support, need to be applied for on the land. A big part of the farms incomes comes from EU subsidies, on some farms it can be 70% of the total income.

The farmer needs to make sure that the pastures that are used are those that give the highest subsidies. Grazing these pastures also gives the highest benefits for biodiversity as they create habitats where biodiversity connected to semi-natural grasslands can survive. The lower the production is in the pastures the larger area of pasture can be grazed, meaning that a higher amount of subsidies can be calculated per animal.

It is important that the pastures are managed according to the rules for single area payments and agri-environmental subsidies, otherwise deductions may be made from the EU payments.

An important part of the development plan for the farm is to go through the farms land and see if the hectares seem to correspond with the application, that the land meet the requirements for the subsidies and that they are managed according to the requirements. It is also important that the right agri-environmental subsidies are applied for on each area. The application should be looked through together with the farmer and the land visited in the field. There may be areas that have been taken away from the application due to overgrowth that can be restored and reentered into the application.

SUITABLE CATTLE BREEDS ON SEMI-NATURAL GRASSLANDS

If the farm has a lot of semi-natural grasslands in their production it is appropriate to raise lighter breeds that grow well even on low producing grasslands. Examples of lighter breeds are Hereford and Aberdeen Angus. Highland cattle are also good cattle for grazing, but give a lower beef production. Heavier beef cattle easily damage grasslands by trampling, for example coastal meadows, and they often need some concentrates to grow enough.



Hereford is a good breed for grazing semi-natural grasslands. Photo: Inger Abrahamsson.

FENCING

The pastures fencing should be looked over. To avoid cattle from escaping or being hurt the fencing should be kept in good shape. The fencing wire or netting should be well stretched and vegetation kept away from the fence.

On many farms barbed wire is used for fencing. Often it is mended in places and some stretches can be rusty. In some cases trees may have been used for attaching the wire to and trees and bushes can have grown into the fence. Barbed wire is cheap to buy but can hurt both cattle and wild animals and is difficult to work with. It can be very hard to take away if vegetation has grown into the fence.

In the development plan there should be plans for replacing barbed wire with electrical fencing or netting. If there is a possibility to use oak poles, juniper or other durable materials this is preferable to treated wood poles. Traditional fencing such as wooden fencing and stonewalls are good to use where possible.

If new fencing is put up, plan this from a landscape perspective. If it is possible include forest edges and islets in the pasture. Let the fencing go out into the water on the coastal meadow, so that the cattle can graze out into the water and create a "blue zone" of shallow water between the shore and reed beds where wading birds, ducks and others can find food.



The cattle are grazing very well in wet shore meadows, and a zone of shallow water is created inside the reed. If the fence could be removed, more of the reed could be grazed.
Photo: Maria Hoflin.

GRAZING

The number of cattle in the pastures should be planned for the pastures. When planning one needs to consider if there are pastures that because of its flora or fauna, need late grazing, less intensive or more intensive grazing than normal. One also needs to look at where the pastures are located, what the possibilities are to move the cattle and what is practically possible without too much work.

In table 1 is presented guidelines for number of grazing animals for different types of pastures. Figures are average for all grazing seasons. The grass is growing faster in spring and early summer why the number of cattle often needs to be higher in the early season and can be lower in later season. All grasslands are different depending on soil conditions, number of trees and bushes, stony areas, climate and so on, why figures need to be adapted to local conditions. Also weather conditions are important. The production in grasslands differs significantly in dry summers compared to wet summers. It is important that there are pastures in reserve for dry years or when the pasture grass is finished. It is possible to use mown grass leys, or wet areas, if they exist, that still produce grass during dry spells.

Table 1. Number of cattle on different types of pastures. The figures are based on common figures for semi-natural grasslands in Sweden and adapted to conditions in coastal part of Upland based on experience.

Type of grazing animal	Dry semi-natural grassland	Moist semi-natural grassland	Forest grazing	Wet semi-natural grassland	Old arable field, now permanent grassland
Calves < 1 year	1	2	0,4	4	4
Heifer, steers > 1 year	0,5	1	0,2	2	2
Suckler cow	0,5	1	0,2	2	2
Suckler cow with calf	0,35	0,7	0,15	1,5	1,5
Sheep, about 65 kg, with 2 lamb	1	2	0,5	3	3
Horse	0,75	1,5	0,3	3	3

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The aim of this plan is to show how a beef farm based on grazing semi-natural grassland can improve the farm profit at the same time as biodiversity and the environment is improved. In this example a farm in the costal area of eastern Sweden has been used as an example. The reasoning is based on this example but should be applicable, to a large extent, all around the Baltic Sea and other areas where grazing and mowing has been carried out historically during centuries.



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