Management plan
Västerskog stands 1-10

Aleksandra Arent

Västerskog analysis

The planting of Västerskog began in 1993 on agricultural land on the southern part of Sundsvägen and in 1998 on the northern part of the road. It was created as a landscape laboratory for educational and recreational purposes. Västerskog covers 13 ha of varied environments including three ponds, a watercourse and over 30 stands consisting of diferent broadleaf species. It is an ever-changing forest combining the management and decision-making efforts of the researchers, maintenance staff and SLU students. The result is a heterogenous mix of stands with varying effects not only in the tree cover, but also different structures of the understory and the field layer depending on the maintenance and tree species.

In Casework B my group focused on analysing and creating environments for children's play, learning and recreation. We have identified the stands 11-37 to have a bigger potential for recreation due to their aesthetical variety, different affordances to the users, resting areas, water and glades. On the other hand stands 1-10 currently look like production stands, which do not have a big value for recreation or biodiversity. There is dead wood scattered across the stands, a small number of birds' nests in Prunus and Larix trees and a variety of different decay fungi on standing dead trees, stumps and lying dead wood. In around half of the stands there is understory vegetation present.

Map by group 6 with icons from my group

Management goal

According to Grosse-Bächle (2005) and Körner (2005) wild, unmanaged nature in urban forests provides individuals with greater sense of relaxation and potential for free recreation in contrast to the organised lives overflowing with information and order. Grosse-Bächle states that green spaces lacking obvious design provide less information to the users, therefore being more relaxing. This aspect of disorder and spontaneity is especially important in the age of Covid-19, which forced many people in the western countries to work from home and be bombarded with data from work and media from early morning till late night. This applies not only to adults, but also to children.

It is observed that greater numbers of children are suffering from nature deficiency syndrome (research). Moreover for many, the only nature interaction they have is with their house lawn and a hedge or kindergarden or school lawn with a few managed trees. If children's formative years are defined by heavily designed vegetation either in the urban areas, agricultural areas or forest plantations, they may grow believing that nature has to be maintained by humans, which will only deepen the anthropogenic destruction of biodiversity. Apart from the educational and empathical benefits gained from the interaction with wild nature it also offers a vast array of play possibilities, which include observation and touching plants, fantasy play, stewardship of wildlife, exploration and physical play when for example one jumps over dead wood or pushes over dead trees (Loebach & Cox, 2020). The availability of various play possibilities and opportunities for risky play in wild nature are beneficial to children's mental and physical development (research).

For the aforementioned reasons and because of the biodiversity crisis we are facing, I decided to focus on the transformation of the stands 1-10 with the aim to create a greater number of microhabitats. I followed the Regime B for thinning and understory management described by Löf et al. (2016). It concentrates on thinning for the sake of promoting growth of selected crop trees and leaving the understory untended. Out of the three regimes described this one had the biggest positive influence on the fauna and flora species diversity through creating understory microhabitats, opening the canopy through thinning and thus promoting new shrub and tree species establishment as well as growing larger crop trees resulting in more tree microhabitats in the future.

There are at least 42 different possible tree microhabitats (Asbeck et al., 2021). They include cavities, holes, bark loss and wood decay, wounds, breakages, fire scars, bark pockets, sprouts, cankers, nests, microsoil, dead wood etc. Through those qualities trees provide dwelling and feeding habitats to epiphytes, saprophytes, other insects, birds, bats, other mammals, amphibians and reptiles. Hence, they are an essential part of natural forest ecosystems as their benefits result from collaborative relationships of different species, for example decay fungi which often enter trees through exposed sapwood and causing heart rot, which in turn is in most cases essential for woodpecker cavity creation.

According to Bengtsson (2015) tree microhabitat creation in young forests can be stimulated through the processes of artificial veteranisation with different ways of harming living trees to mimick natural disturbances such as lightning strikes, animal scratching or fires. I decided to apply a selection of veteranisation methods to my management plan as they they will not only create more dead wood with time but also open canopy at different rates caused by the tree decay. Apart from microhabitat creation, dead wood is also valuable for moisture retention in the soil, which is essential in progressing time periods of droughts. The gaps in tree canopy, that will be created spontaneously, will let the growth of species dealing better with the climatic situation at the given time in the future.

I chose different management strategies for stands 1 and 2, because of their current architecture and location. In stand 1 I would like to give more light to fruiting for Pyrus, but also create pollards and coppices for microhabitat creation. The stand 2 is going to be transform into a composition like in an open woodland pasture to promote growth of big oaks with all their benefits for biodiversity and recreation. Stand 2 should be managed together with local schools for the sake of ecological education.

The paths should be kept as they are currently.

Present state (2022)

STAND 1

Species: Pyrus communis
Understory: -
Comments: 1-layered tree structure, enclosed with a glade in the centre, surrounded by plains.
Biodiversity signs: nests

STAND 01

All documentation of the stands is by group 2

STAND 2

Species: Quercus petraea
Understory: a few small Crataegus ssp. and Cornus sanguinea
Comments: 1-layered, straight but open edges, semi-open with scattered trees, glades, surrounded by plains, decorative piles of branches
Biodiversity signs: -

STAND 02

Management

STAND 1

Goal: better fruiting and microhabitat creation, preservation of current enclosure architecture
Detailed management: thin out half to give sun access for better fruiting. Coppice trees on the outer edge of the stand on all sides the maintain the enclosure character despite heavy thinning**.** In the second row from the outer edge pollard the trees. Leave all dead wood where it falls.
What to favour: trees with multiple stems, twisted branches, bark inclusion and any signs of damage
What to remove: every second tree unless it meets all the criteria above or it has a nest
How to remove: girdling
Thinning pattern: check
Thinning strenght: 50%

STAND 2

Goal: Woodland pasture like stand for microhabitats in oaks
Management: Leave 8 oaks scattered in largest distances possible to give the stand a woodland pasture character. Plant a few oaks in the glade next to the Pyrus stand in the same distances as in the stand calculating 25 trees/hectare. Allow for a smooth gradient of understory between the stands like in Stand 3. Thin the oaks by girdling. When they start falling leave them at the stand. Clear 100% of the understory manually by hand once a year in early spring. Involve local schools in that task. Leave all dead wood where it falls.
Thinning pattern: Check
Thinning strenght: leave 8 oaks

Present state (2022)

STAND 3

Species: Quercus robur, Larix eurolepsis
Understory: a few Cornus sanguinea, Sambucus nigra, Ligustrum vulgare, Crateugus monogyna, Rosa canina
Comments: 3-layered, dense, glade enclosed by dense vegetation, glade sem open
Biodiversity signs: logs in piles, uprooted tree with exposed root, birds nests

STAND 03



STAND 4

Species: Quercus robur
Understory: Betula pendula, Rubus, Cornus sanguinea, Populus tremula, Quercus, Acer campestre
Comments: 2-layered, semi open, small glade
Biodiversity signs: piles of branches

STAND 04



Management

STAND 3

Goal: Opening up canopy for better larch growth and understory regeneration
Management: Maintain the glade on the west side of the stand by clearing the understory and cutting grass. Leave all dead wood where it falls.
What to remove: thin out 40% of the larches in a random pattern, not those with nests or other microhabitats
How to remove: 30% girdling and 10% winching at different heights over 1,5m
Thinning pattern: random, but thin out more in one place to create a round glade of around 15m diameter
Thinning strenght: 40%
Additional actions: hit the bottom of 3 trees with a sledgehammer to damage their bark 20cm over ground to promote decay and hollowing

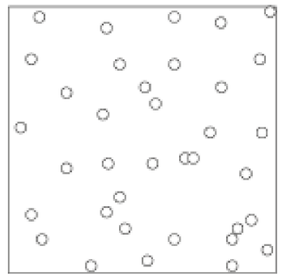

Winching, image by Bengtsson (2015)

image by Bengtsson (2015)

STAND 4

Goal: More natural appearance, development of oaks with big canopies, microhabitats
Management: break straigh rows through girdling the trees. Leave around 10m gaps between trees but in a way that it looks random and not straight. Let the understory grow. Leave all dead wood where it falls.
How to remove: By girdling (70% of the targets) and using explosives (30% of the targets) at different heights above 1m. Spread the thinning across 10 years, removing 50% of the targetted trees in the first year, then in year 5 remove next 25% and in 10 years the last 25%
Thinning strenght: leave 35 oaks

Stand 4



Present state (2022)

STAND 5

Species: Quercus robur, Betula pendula
Understory: Crataegus ssp., Cornus sanguinea, Prunus avium, Prunus padus, Ulmus glabra, Ligustrum ssp., Lonicera xylosteum, Populus tremula
Comments: 3- layered, semi open, Clematis glade
Biodiversity signs: not much deadwood

STAND 05

STAND 6

Species: Populus tremula
Understory: Betula pendula, Rubus, Cornus sanguinea, Populus tremula, Viburnum, Clematis, Rosa dumalis, Quercus, Acer campestre
Comments: 3-layered, semi open, dense forest edge
Biodiversity signs: mold logs, twigs, brushwood, dead standing Populus

STAND 06

Management

STAND 5

Goal: More understory regeneration, mocrohabitat creation
Management: on the north side of path break 10% of Betula trees at different heights over 3m with explosives. Thin away 10% of oak through ring barking. Let Clematis grow, cut it short after 5 years and then after the next 5 years. Leave all dead wood where it falls. Let the understory grow.
How to remove: explosives and girdling
Thinning pattern: to break the straight lines
Thinning strenght: 20%
Additional actions: ringbark all Betula pendula over 20cm DBH for cavity nesters (Basile et al., 2019)

STAND 6

Goal: More understory regeneration, mocrohabitat creation
Management: Thin away the competitors for light around the biggest trees, which are smaller than 20cm DBH by girdling and sledge hammering. Leave all dead wood where it falls. In the understory remove regenerating Populus.
How to remove: girdle 30%, hit 10% of the trees heavily with a sledge hammer
Thinning strenght: 40%
Additional actions: Ringbark all Populus tremula with DBH over 20cm for cavity nesters

Present state (2022)

STAND 7

Species: Betula pendula, Prunus avium
Understory: Prunus avium, Viburnum opulus, Cornus sanguinea, Lonicera xylosteum
Comments: 2-layered, semi open, dense forest edge
Biodiversity signs: slash and twigs, low stumps

STAND 07



STAND 8

Species: Betula pendula
Understory: Betula pendula, Rubus, Lonicera
Comments: 1-layered, semi open
Biodiversity signs: -

STAND 08


Management

STAND 7

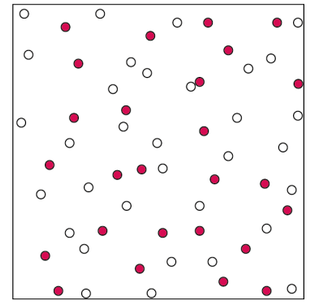
image by Bengtsson (2015)

Goal: Microhabitat creation, richer understory
Management: thin away trees so they are not in straight rows. Leave all dead wood where it falls.
Detailed management for the next 10 years:
What to favour: Prunus towards the south-wester border for better fruiting
What to remove:
How to remove: girdling
Thinning pattern: random
Thinning strenght: Leave 50% of undamaged trees
Additional actions: Ringbark all Betula pendula over 20cm DBH for cavity nesters
When there is no risk of fire burn the bottom of 5 Prunus and 5 Betula to promote crown and root decay, inocculate 10 birches with Inonotus obliquus

STAND 8

Goal: Microhabitat creation, richer understory
Management: break the straight rows, break trees, do not clear the understory. Leave all dead wood where it falls.

Stand 8



Overall management:
Detailed management for the next 10 years:
What to favour:
What to remove: Those trees that in the end create the pattern below. Also ringbark instead of exploding all Betula pendula over 20cm DBH for cavity nesters
How to remove: By girdling and using explosives at different heights. Spread the thinning across 10 years, removing half of the targetted trees in the first year, then 25% of the targetted trees in year 5 and 25% in year 10
Thinning strenght: leave around 40 birches
Thinning pattern: leave the white dot trees, break the red dot trees with explosives at different heights, girdle the rest

Present state (2022)

STAND 9

Species: Prunus avium
Understory: Crataegus ssp., Cornus sanguinea, Prunus avium, Prunus padus, Ulmus glabra, Ligustrum ssp., Lonicera xylosteum, Populus tremula
Comments: 2-layered, tree and shrub layer, semi open
Biodiversity signs: twigs and brushwood

STAND 09

STAND 10

Species: Quercus robur, Prunus avium
Understory: Ulmus glabra, Quercus robur, Prunus avium, Crataegus, Acer campestre, Corylus avellana
Comments: 3-layered, enclosed
Biodiversity signs: Some logs left after thinning

STAND 10

Management

STAND 9

Goal:
Management: More space so the stand its more multilayered and not in straight rows, favour multistemmed and with big ratio branches. Let understory grow and Prunus get thicker. Leave all dead wood where it falls.

Overall management:
Detailed management for the next 10 years:
What to favour: random
What to remove: 40% of trees in random pattern
How to remove: 10% with explosives, 10% by uprooting with a winch (or whatever damage is achieved with that tool), 20% by girdling in year 5
Thinning pattern: random, not in rows, groups some, scatter others
Thinning strenght: 40%
Additional actions: within 10% of left not damaged trees take off stripes of bark

Stand 10

Management: leave only Quercus and multistemmed Prunus by girdling competitors for light. Try to keep equal numbers of both species in the end. Leave all dead wood where it falls.
Thinning strenght: 30%
Additional actions: damage bottom of 5% of the left trees with a chainsaw, scratch another 5% with a knife or other sharp tool

image by Bengtsson (2015)

Management summary

Stand	Thinning year 1 (2022)	Thinning year 5	Thinning year 10	Understory	Deadwood	Other actions in year 1
1 Pyrus communis	thin 50% of the trees in a grid by girdling, favouring weird and multistemmed	-	-	Clear	Do not touch	coppice outer row around the stand, pollard the one row closer to the center of the stand
2 Quercus petraea	Leave 8 oaks in biggest distances from each other, girdle the rest	-	-	Clear	Do not touch	Plant 25 oaks/hectare towards stand 1
3 Quercus robur, Larix eurolepsis	40% of larches in a random pattern (30% by girdling, 10% by winching at different heights over 1,5m), leave one glade with 15m diameter	-	-	Leave	Do not touch	hit the bottom of a 3 trees with a sledgehammer to damage their bark 20cm over ground
4 Quercus robur	50% of targetted trees according to the pattern (from which 70% by girdling and 30% by explosives)	25% of targeted trees (from which 70% by girdling and 30% by explosives)	25% of targetted trees (from which 70% by girdling and 30% by explosives)	Leave	Do not touch	-
5 Quercus robur, Betula pendula	on the north side of path break 10% of Betula trees at different heights over 3m with explosives. Thin away 10% of oak through ring barking. Create random pattern	Cut Clematis short	-	Leave	Do not touch	ringbark all Betula pendula over 20cm DBH
6 Populus tremula	Thin away the competitors for light around the biggest trees, which are smaller than 20cm DBH by girdling (30%) and sledge hammering (10%).	-	-	Leave everything but Populus tremula	Do not touch	ringbark all Populus tremula over 20cm DBH
7 Betula pendula, Prunus avium	Thin 50% by girdling so the trees are not in rows and have a random pattern	-	-	Leave	Do not touch	Ringbark all Betula pendula over 20cm DBH. Burn the bottom of 5 Prunus, inocculate 10 healthy Betula with Inonotus obliquus
8 Betula pendula	50% of targetted trees according to the pattern (from which 70% by girdling and 30% by explosives)	25% of targeted trees (from which 70% by girdling and 30% by explosives)	25% of targetted trees (from which 70% by girdling and 30% by explosives)	Leave everything but birch	Do not touch	-
9 Prunus avium	10% with explosives, 10% uprooting with a winch to break the rows and create random pattern	20% girdling,	-	Leave	Do not touch	within 10% of undamaged trees take off stripes of bark
10 Quercus robur, Prunus avium	leave Quercus and multistemmed Prunus by girdling 30% of the trees focusing on those, which compete for light with the favoured ones	-	-	Leave	Do not touch	damage 5% of the left trees with a chainsaw, scratch another 5% with a knife or other tool

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