





FMI 2000 - 18 and Protected Forest Areas



Forest Planning Tools

Strategical Planning Gap Analysis Long term forest plans

Tactical Planning

Harvest Planning

Operational Planning Action on the ground **Restoration of habitats**

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Habitat Modelling for species





What is at risk Do we have enough resources for the future? Will biodiversity survive? How much is enough?

What does the future hold? What planning tools do we have?

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Gap Analysis for strategic conservation planning

	Description
A	The past amount of a particular potential natural vegetation ^a
В	Today's amount of a particular potential natural vegetation
A – B	Representativeness of potential natural vegetation
С	Empirical knowledge of the proportion of a particular land cover required for retaining a viable population of a given species
A*C	Long-term target for the amount of a particular land cover
B – (A*C)	Gap (if the value is negative) or surplus (if the value is positive)
natural ra forest lan (HRV; Kea	nge of variability (NRV; Cyr et al. 2009) in naturally dynami dscapes (e.g., Winter 2012), or historical range of variability ine et al. 2009), such as in traditional cultural landscape (e.g.

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Moisture L υ N Succession fire, drought Multi-cohort fire A Succession fire Fertility B Succession fire С Succession fire, wind D se wind, diseases, insect outbreaks Gap-phase wind F 12

Gap Analysis A – Natural Potential Vegetation

✓ Map of the Natural Vegetation of Europe (Bohn, & Gollub, 2006) ✓ 1:2 500 000

Are there any other ways?

National Soil Databases

- Fertility . Moisture
- Associate it to Forest types
- Forest disturbance regimes

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A – Soils Fertility and Moisture to Map Natural Potential Vegetation

Natural Forest Disturbance Regimes

Multi-cohort Forest

- ⊳ Dry pine forests on poor sand soils
- Frequent low intensity fires or windthrows that result in several cohorts or groups of trees.
- Age class distribution can vary but most often consist of forest >110 years old (70%) Remaining share evenly distributed through the younger age classes.
- Canopy structure is often single layered



The exclusion of fire from this disturbance regime will change the forest stand dynamics and can cause local species extinctions

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Multi-cohort Forest Type as an Example

Western Taïga - 9010 EU Habitats Directory

- > Unfavourable-Bad: A habitat is in serious danger of disappearing
- > Natural old forests as well as those young forest stages naturally developing after fire. Natural old forests represent climax or late succession stages with slight human impact. With intensive forestry, the main features of natural old forests disappear, i.e. the considerable amount of dead and rotten wood, the great variation in tree age and species composition. Old natural forests are habitats of many threatened species, especially bryophytes, lichens, fungi, and invertebrates (mostly beetles). The important role of fire, burned forest areas on young succession stages is important.
- Extremely rare because of efficient fire protection and forestry. Natural recently burned forest areas are very important habitats to many endangered species. Typical for natural burned areas is the great amount of dead burned wood and the varying amount of living trees which greatly conditions the regeneration of the forest.

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Natural Forest Disturbance Regimes

Gap-phase Forest

- > Broadleaf deciduous forests on rich fertile soils with high moisture.
- Small scale disturbances such as the death of a single tree from old age or a storm.
- Large amounts of dead wood in different decay stages.
- The average age of the stand is expected to be >110 years.
- Species dependent on this forest type are generally highly susceptible to forest fragmentation and require old age stands with longevity.



Gap-phase forests have high levels of biodiversity

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Multi-cohort Forest Type as an Example

Central European lichen scots pine forests - 91T0 EU Habitats Directory

- > Unfavourable-Inadequate: a change in management or policy is required to return the habitat to favourable status
- > Natural lichen-rich acidophilous Pinus sylvestris forests belonging to the alliance Dicrano-Pinion occurring on inland nutrient poor sands of the northeastern plains and hills of Central Europe and of the nemoral belt of the middle and southern Sarmatic region.
- > The trees are low growing as the soils are nutrient deficient and subject to drought stress.



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Natural Forest Disturbance Regimes

Successional Forest

- Mixed forest where large stand successions is initiated by wind, insect outbreaks
- fire and human intervention on mesic sites Forest age distribution is bell-shaped
- Forest stands are similar in age have similar structure



> Current forest management emulates the successional forest regime.

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Natural Forest Disturbance Regimes - Gap-phase Forest

Fennoscandian hemiboreal natural old broad-leaved deciduous forests rich in epiphytes - 9020 EU Habitats Directory

- > Unfavourable-Bad: A habitat is in serious danger of disappearing
- > The hemiboreal natural old broad-leaved deciduous forest forms a transition between the Western Taiga and the nemoral forests. The most common tree species are Quercus robur, Ulmus spp., Fraxinus excelsior, Tilia cordata or Acer platanoides.

> There is typically a considerable amount of dead wood and a long continuity of woodland cover on the sites. The species-diversity of lichens, fungi, insects and soil-organisms is high.

Gap-phase forests have high levels of biodiversity

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Natural Potential Forest vs. Today forest The A and B of the Gap Analysis



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Gap Analysis

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Age class distribution of Natural Forest by Disturbance Regimes



Gap Analysis C – Empirical knowledge on your target for preservation



2017 Formal and Voluntary Forest Protected Areas Strict Reserves Parks Natura 2000 BAST PAST . wкн Nests Cultural heritage Other orest group Forest group IIa Forest group IIb aroup III v Group | 1.5% Group II 11.7% Group III & IV 17.6 % Problems in Biodiversity Conservation in the Baltic Forests and possible solutions Riga 25 November 2019





Gap Analysis 2 Results 2017 Forest stand data, >70 age with harvest restrictions

17 % benchmark of todays forest cover

250

200

150 100

50

0

-50

-100

State Private Total

Multi-cohort

Gap / Surplus proportion

27

17 % benchmark 250 Propotion of Forest 120 0 0 0 Private State State Private Private State Total Total Total -50 Multi-cohort Succession Gap Problems in Biodiversity Conservation in the Baltic Forests and possible solutions Riga 25 November 2019

Gap Analysis 1 Results Representative gaps in natural potential forest cover

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Some forest management strategies for Multi-cohort stands



Introduce low intensity prescribed burning

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State Private Total

Succession

Protection gap % (Group I &II forests > 70 years)

State Private

Gap

Total

- Multi-cohort stands are underrepresented and vulnerable ٠
- Gap-phase forests are at the highest risk ٠
- Management strategies that replicate natural disturbance regimes are needed in Gap-phase and Multi-cohort forest disturbance stands
- Successional Forest are most common (business as usual) •
- · Overall the formal protected areas need to be strengthened

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FIRE????? What are you Crazy?



NO !!! NOT THIS !!!

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Fire History

- How often should prescribed burning be done?
- Long term paper records are hard to find or don't exist
- Multi-cohort stands are living fire history record keeper



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Multi-cohort stands the next step

- > Re-Introduce low intensity prescribed burning as a trial
- ≻ Well.....
- Limited support from foresters and nature conservation groups

Wildfire from mid Sweden





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Multi-cohort stands

Dry pine forests on poor sand soils

- Frequent low intensity fires
- > Re-Introduce low intensity prescribed burning



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Fire History in Dzukija's Multi-cohort stands on going project Manton and Ruffner



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Some Forest management strategies for Gap-phase stands

- Continues cover forestry the emulates natural gap-phase dynamics
- Selective cutting with <u>natural regeneration</u>
- Leaving more deadwood
- Increased nature protection



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Stopped wood mining frontier moving into the Dvina-Pinega intact forest



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Protect or Harvest?

- Cultural Oak forest in Gulnar, Turkey
- In one 50km2 area >50 000 old hollow pollards
- One of the largest concentration of old pollards in the world
- Fighting for survival....



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