An aerial photograph of a lush green forest with a dark, winding river or stream meandering through it. The trees are dense and vibrant green, with some lighter green patches indicating different species or undergrowth. The river is dark blue/black, creating a stark contrast with the surrounding forest. The overall scene is a healthy, natural landscape.

Choosing good measures for the assessment of ecological sustainability

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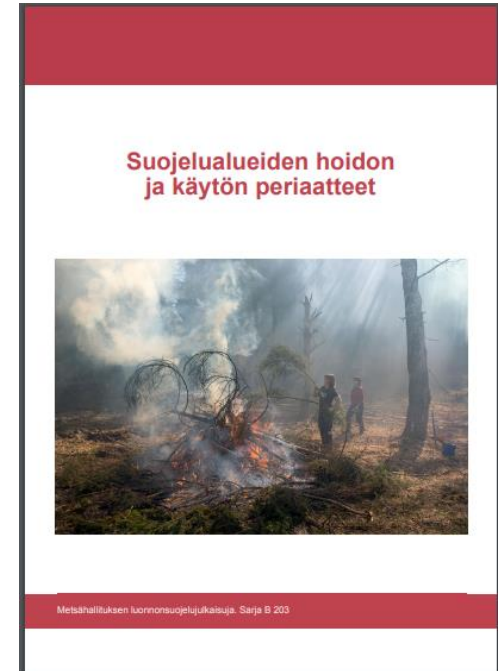


METSÄHALLITUS

Principles of Protected Area Management

Guideline for the principles of protected area management

- Natura 2000 areas: ensuring the protection of the species and habitats listed in the habitats and birds directives
- National legislation concerning the protected areas
- Nature conservation act and decrees on establishing a nature reserve
- Practices and principles of conservation and management of cultural heritage
- Principles of outdoor recreation and nature tourism in protected areas



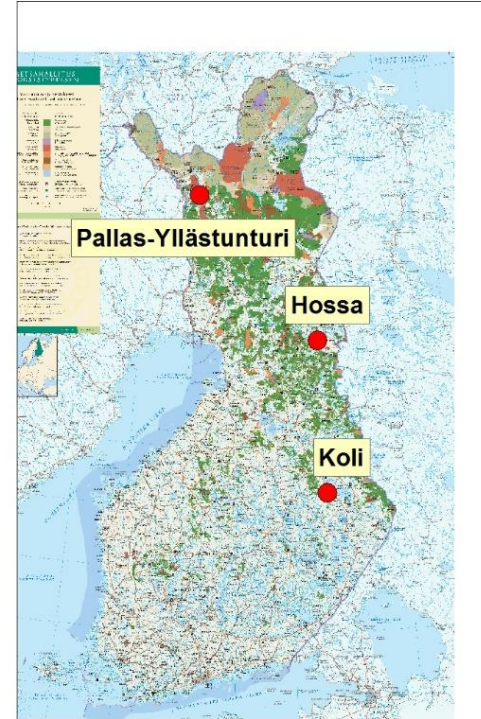
Principles of sustainable tourism

1. **Support the preservation of valuable features at the sites and promote their protection**
2. Minimise the load on the environment
3. Strengthen local aspects
4. Promote use of the sites to increase health and well-being
5. Promote growth and job creation in the local economy
6. Communicate together the values and services of the site



Management and Land-use Plans

- current state of the area
- most important values of the area
- The goals of nature conservation, recreational and other uses
- future development and threats
- environmental impact assessments.
- indicators for monitoring sustainability, limits of acceptable change (LAC)
 - 2018 piloting in 3 National Parks: Hossa, Koli and Pallas-Yllästunturi



Management and Land-use Plan for Hossa national park

Values concerning ecological sustainability

- habitats listed in the habitats directive
 - e.g. Western taiga forests, different freshwater habitats, peatlands and mires, Fennoscandian springs and springfens
- Threatened Species
 - e.g. old-growth forest polypore-species, large birds of prey

Defining the indicators for monitoring ecological sustainability

- number of territories of large birds of prey
- representativity and conservation status of the habitat types of springs and springfens along the trails



Criteria for good measures of ecological sustainability

(Negative) change in the value of the measure is a reliable indicator of recreation impact

- In contrast:
 - natural population changes
 - Effects of habitat restoration and management efforts
- Possibility of utilising data and measures that are already in use
 - Visitor surveys
 - Monitoring of Natura 2000 habitats and bird directive species
 - Monitoring of the nests of the birds of prey
 - GIS-data of Natura 2000-habitats



GIS- and IT-systems:

Ecological data (SAKTI)

Outdoor recreation facilities
and archeological sites (PAVE)

Client management (ASTA)

Measures for the assessment of ecological sustainability

Principle 1 of sustainable tourism:

we support the preservation of valuable features at the sites and promote their protection

- Measure classes
 - Population development of a species potentially sensitive of recreation impact
 - Representativity and conservation status of the habitat types potentially sensitive of recreation impact
 - Soil erosion
 - Zone of influence of the trail network



Population development of a species potentially sensitive of recreation impact

Hossa National park: number of territories of large birds of prey

- Monitoring data of the nests of the birds of prey

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- Species known to be sensitive of human disturbance, nests found typically in remote and quiet natural environments
- Large territories, indicating quiet parts of National parks

- Number of territories per park typically small
- Disappearing of the territories have often natural causes
- How to distinguish good and bad nesting years from disturbance?
- Amount of territories or amount of chicks?



Population development of a species potentially sensitive of recreation impact

Ärjänsaari: amount of breeding Laridae species (gulls and terns)

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- Monitoring data of Natura 2000 bird directive species
- Human disturbance is probably one of the main reason for absence of breeding pairs in Ärjänsaari

- Breeding results can be affected also by natural causes
 - Predatory mammals (american mink, fox)
- Bird colonies change breeding sites, which can be left empty for some time
- Management efforts of the breeding site
- Current value is zero => difficulties of assessing limits of acceptable change



Population development of a species potentially sensitive of recreation impact

- Koli NP: *Diplazium sibiricum*, amount of shoots

+++

- Monitoring data of Natura 2000 habitats directive species
- Recreation impact , e.g. trampling easy to recognize

- Only one small site, does not tell about recreation impacts on a larger scale
- Other directive species which could be used as indicators:
 - Vascular plants: *Cypripedium calceolus*, *Calypso bulbosa*, *Pulsatilla*
 - Mammals: Saimaa ringed seal (*Pusa hispida saimensis*)
 - Fishes: salmon (*Salmo salar*), grayling (*Thymallus thymallus*)
 - freshwater pearl mussel (*Margaritifera margaritifera*)
 - European crayfish (*Astacus astacus*)



Representativity and conservation status of the habitat types potentially sensitive of recreation impact

Koli NP: representativity and conservation status of the habitat types of siliceous rocky slopes

Hossa NP: representativity and conservation status of the habitat types of springs and springfens along the trails

+++

- Several biotope sites found along the trails
- Recreation impact , e.g. trampling easy to recognize
- Stable biotopes, no short term natural changes

- Current value can be obtained from GIS-data but monitoring data must be collected separately
- Other directive habitats which could be used as indicators:
 - Pine forests on glaciofluvial eskers, coastal biotopes (dynes etc.), alpine biotopes



Soil erosion

- Visitors experience of soil erosion along the trails

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Visitor surveys

Large coverage

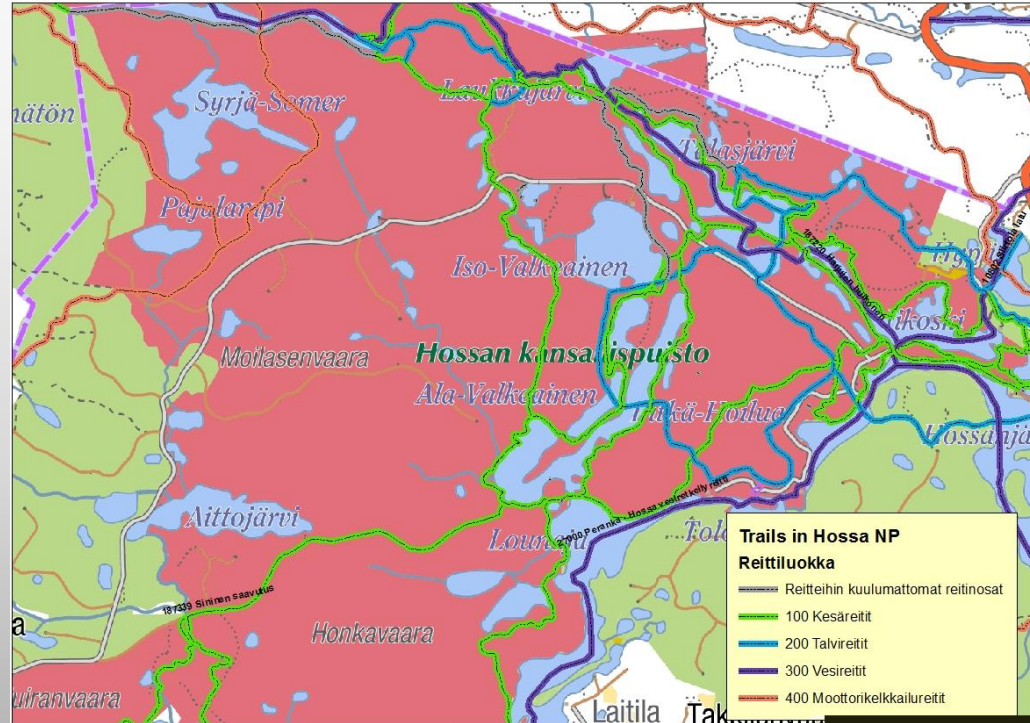
Sites of recreation impact are easy to locate

Complementary measure with measures of habitat types potentially sensitive of recreation impact



Zone of influence of the trail network

- GIS-analysis (PAVE)



A photograph of a dense forest of thin, vertical trees, likely pines or firs, standing in a deep layer of snow. The sun is low in the sky, casting long, dark, parallel shadows across the snow-covered ground. The background shows a bright, open area, possibly a lake or a clearing, under a pale sky.

**Thank you for
your attention!**



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