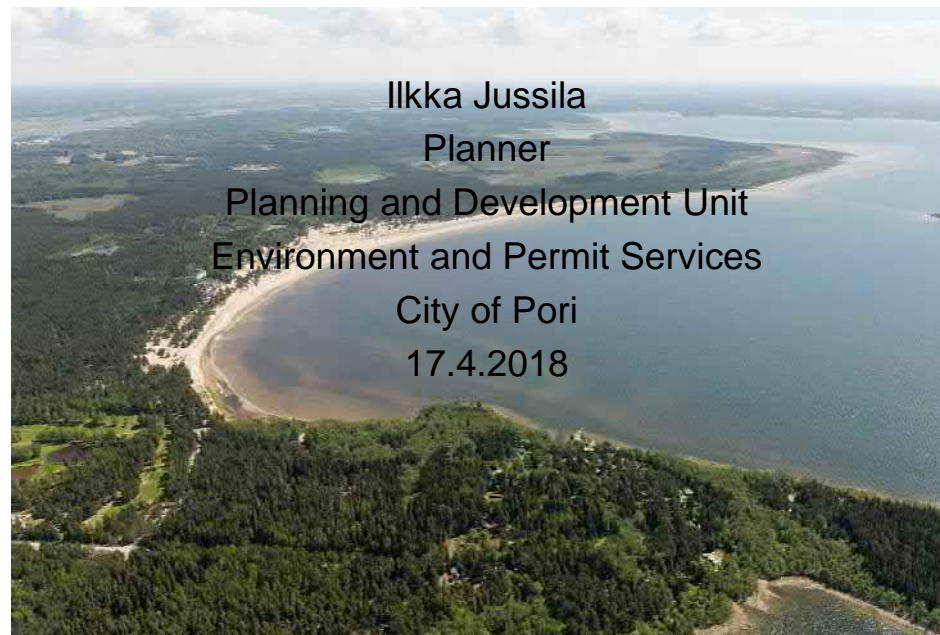


Coastal and Dune Area –projects in Yyteri



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Coastal and Dune Management -project

- Leader transnational project from local action group Karhuseutu ry
 - Rural Development Programme for Mainland Finland 2014–2020
 - 4 partners
 - Finland
 - Estonia
 - Latvia
 - Northern Ireland
 - execution period 1.10.2017 – 30.11.2019



Coastal and Dune Management -project

- Beneficiary and implementing partner of the project in Finland: City of Pori
 - Environment and Permit Services, Planning and Development Unit
- Total fund: 63 695,00 €
 - EU: 24 986,27 €
 - Finland: 19 920,86 €
 - City of Pori: 14 584,00 €
 - Private: 4 203,87 €
 - Porin Seudun Ympäristöseura ry
 - Yyterin Alueen Asukkaat ry
 - Porin Pyrintö ry
 - Kokemäenjoen vesistön vesiensuojeluyhdistys ry



Coastal and Dune area investment -project

- Beneficiary of the investment project: City of Pori
 - Environment and Permit Services, Planning and Development Unit
- Total fund: 15 500,00 €
 - EU: 6 510,00 €
 - Finland: 1 240,00 €
 - City of Pori: 7 750,00 €



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion and deflation of white and embryo dunes
 - reasons
 - climate change
 - more windy and humid climate in 1990's
 - deflation on all the dune coasts of Finland?
 - midsummer parties in 1950? – 1999?
 - camping behind the dunes
 - foot traffic
 - public mass events in the first decade of 2000s
 - beach soccer event in 2010 (25 000 participants)
 - foot traffic
 - motor vehicle traffic in the first decade of 2000s
 - traffic for managing the beach
 - traffic for recreation

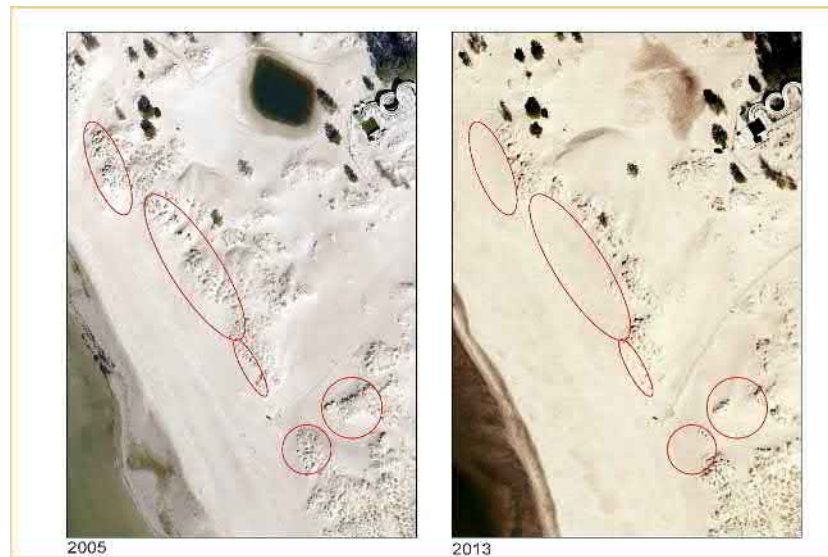


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Coastal and Dune Management -project

- beach soccer event in 2010 (25 000 participants)



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion and deflation of white and embryo dunes
 - consequences
 - dying and disappearance of plants especially sea lyme grass (*Leymus arenarius*)
 - low resistance to vehicle or foot traffic
 - wind-scoured blow outs and moulded dune ridges
 - strong winds from southwest
 - damages and deflation on dunes
 - some of white dunes 7 meters high flattened even 3-5 meters
 - mobile dunes
 - total destruction of some low embryo dunes



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Coastal and Dune Management -project

- dying and disappearance of plants especially sea lyme grass (*Leymus arenarius*)
- damages and deflation of dunes



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Coastal and Dune Management -project

- wind-scoured blow outs and moulded dune ridges



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion and deflation of white and embryo dunes
 - operations
 - communal work of volunteers
 - managed by the city of Pori
 - fitting of the wind and rope fences
 - functioning as heaping the sand and guiding the visitors
 - implanting and seeding the plants
 - sea lyme grass (*Leymus arenarius*)
 - functioning as heaping and fixation of the sand



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Coastal and Dune Management -project

- communal work of volunteers



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Coastal and Dune Management -project

- fitting the wind and rope fences



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Coastal and Dune Management -project

- implanting and seeding the plants (sea lyme grass)



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Coastal and Dune area investment -project

- Environmental problems in Yyteri
 - erosion and deflation of white and embryo dunes
 - operations
 - Green Care -rehabilitative work
 - managed by the city of Pori
 - construction and fitting the wind fences
 - functioning as heaping the sand and guiding the visitors
 - construction and fitting the rope fences
 - functioning as guiding the visitors not to walk on the dunes
 - construction and modifying the boardwalks
 - boardwalks are used to reduce negative effects of foot traffic to the environment



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Coastal and Dune area investment -project

– Green Care -rehabilitative work



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Coastal and Dune area investment -project

- construction and modifying the boardwalks



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion of forested dunes
 - reasons
 - midsummer parties in 1950? – 1999?
 - use of the slope as a stand for visitors
 - sledding down the hill in winter
 - small amount of snow
 - climate change
 - warmer winter weather in 1990's and 2000's
 - interval exercise of sportsmen and –women on summer
 - team and individual sports



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Coastal and Dune Management -project

– midsummer parties in 1950? – 1999?



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Coastal and Dune Management -project

- sledding down hill in winter
- interval exercise in summer



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion of forested dunes
 - consequences
 - erosion of trails and slopes on forested dunes
 - moving of sand down the slopes
 - moving of the man-made gravel down the slopes
 - dying of trees on dunes
 - roots growing naked like on mangrove forest



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Coastal and Dune Management -project

- moving of sand down the slopes
- moving of gravel down the slopes



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Coastal and Dune Management -project

- roots growing naked like on mangrove forest



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion of forested dunes
 - operations
 - communal work of volunteers
 - while training for interval exercise
 - minimum age 15 year old
 - collect and pick up the gravel from the trails
 - carry the sand up the trails and slopes
 - give instructions to different sports training interval exercise
 - to collect the gravel and carry the sand as warm-up exercise



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Coastal and Dune Management -project

- collect and pick up the gravel from the trails
- carry the sand up to the trails and slopes



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Coastal and Dune area investment -project

- Environmental problems in Yyteri
 - eutrophication of the grey and forested dunes
 - reasons
 - climate change
 - global warming and more humid climate
 - air pollution
 - nitrogen load
 - fecal matter
 - human urine and animal droppings (deer, moose, hare, dog)
 - organic matter
 - litter from broadleaf trees and shrubs



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Coastal and Dune area investment -project

- animal droppings
- litter from broadleaf trees and shrubs



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Coastal and Dune area investment -project

- Environmental problems in Yyteri
 - eutrophication of the grey and forested dunes
 - consequences
 - tree and shrub species colonizing the dunes
 - the grey dunes revert to forest
 - invaded by pine, birch, aspen, alder, rowan and willow
 - changes on the vegetation
 - dominating species
 - invasive species



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Coastal and Dune area investment -project

- the grey dunes revert to forest
- invaded by pine, birch, alder, rowan and willow



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Coastal and Dune area investment -project

- Environmental problems in Yyteri
 - eutrophication of the grey and forested dunes
 - operations
 - forest clearing or thinning
 - the area where the old dance hall has situated
 - optional: mass exchange
 - roots of willow species



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Coastal and Dune area investment -project

- forest clearing or thinning
- optional: mass exchange



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - eutrophication of beaches
 - reasons
 - eutrophication of water in Baltic Sea
 - nitrogen and phosphorous load
 - increased amount of filamentous macroalgae
 - waves makes assemblages of algae on the beach
 - green algae: green branched weed (*Cladophora glomerata* / *C. fracta*), tufted sea moss (*Cladophora rupestris*)
 - brown algae: dead man's rope (*Chorda filum*), golden sea hair (*Dictyosiphon foeniculaceus*)
 - red algae: black siphon weed (*Polysiphonia fucoides*), clawed fork weed (*Furcellaria lumbricalis*)
 - increased amount of vascular plants growing in water and on shoreline
 - waves makes assemblages of plants and drift seeds on the beach



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Coastal and Dune Management -project

- increased amount of filamentous macroalgae



Algae (black siphon weed (Polysiphon fucoides)?) and vascular plants on beach at 9.6.2017. Algae (green weed Cladophora fracta ? and other filamentous species) in water at 9.6.2017.



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Coastal and Dune Management -project

- increased amount of filamentous macroalgae



Algae (green, green, red and brown) from water at 1.9. and 8.9.2017.



Filamentous macroalgae (green branched weed (*Cladophora fracta*)?) in water at 9.6.2017.



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Coastal and Dune Management -project

- increased amount of filamentous macroalgae



Golden sea hair (*Dictyosiphon foeniculaceus* / *D. chordaria*) in water at 6.10.2017.



Common green branched weed (*Cladophora glomerata*) in water at 6.10.2017.



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Coastal and Dune Management -project

- increased amount of filamentous macroalgae



Algae and vascular plants from water at 6.10.2017.



Black siphon weed (*Polysiphonia fucoides*) in water at 6.10.2017.



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Coastal and Dune Management -project

- increased amount of filamentous macroalgae



Algae and vascular plants on beach at 31.12.2017.



Algae black siphon weed (*Polysiphonia fucoides*) on beach at 31.12.2017.



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Coastal and Dune Management -project

- increased amount of filamentous macroalgae



Algae (black siphon weed) and vascular plants from beach at 31.12.2017.



Black siphon weed (Polysiphonia fucoides) from beach at 31.12.2017.



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - eutrophication of beaches
 - consequences
 - germination of several plant species
 - over 50 species on summer 2016 and 2017
 - plant species benefit from nitrogen coming from assemblages of algae
 - species typically on seashore like several saltbush (*Atriplex*) species
 - species typically on field and meadow like goosefoot (*Chenopodium*) species
 - changes on the vegetation
 - dominating species
 - invasive species



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Coastal and Dune Management -project

- germination and sprouting of several plant species



Germinated and/or sprouted plants at 9.9.2017.



Germinated and/or sprouted plants at 1.9.2017.



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Coastal and Dune Management -project

– germinated plant species



Centaurium (*Centaurium littorale*) at 18.7.2017.



Red goosefoot (*Chenopodium rubrum*) at 18.8.2017.



Grass-leaved orache (*Atriplex littoralis*) at 18.8.2017.



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Sprouting of plants in 1.9.2017.

Coastal and Dune Management -project

- Environmental problems in Yyteri
 - eutrophication of beaches
 - operations
 - removal or harvesting of macroalgae
 - communal work of volunteers
 - collecting algae with hand rakes
 - optional: utilization or recycling the algae
 - use as seedbed
 - high content of nitrogen: 2-6 % of dry weight
 - chemical analyses in summer 2018
 - recycling and transporting to the fields
 - risk of high level metal content
 - chemical analyses in summer 2018



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Coastal and Dune Management -project

- collecting algae with hand rakes



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Coastal and Dune Management -project

- collecting algae with hand rakes



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Coastal and Dune area investment -project

- Environmental problems in Yyteri
 - eutrophication of beaches
 - operations
 - removal or harvesting of macroalgae and vascular plants
 - collecting algae and vascular plants with tractor
 - modifying the old cleaning machinery used on the Yyteri beach



Coastal and Dune area investment -project

- collecting algae and vascular plants with tractor



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - eutrophication of sand flats and meadows
 - reasons
 - eutrophication of water in Baltic Sea
 - nitrogen and phosphorous load
 - eutrophication of water in forest ditch
 - nitrogen load
 - end of grazing?
 - history of grazing is not available
 - uplifting of the ground
 - changes on vegetation
 - natural succession



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Coastal and Dune Management -project

- eutrophication of sand flats and meadows



Yyteri peninsula at 8.6.2012.



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - eutrophication of sand flats and meadows
 - consequences
 - vegetation undergrown by common reed (*Phragmites australis*)
 - extinguishes several plant species typical on field and meadow
 - prevents nesting of several bird species like endangered Southern Dunlin (*Calidris alpina ssp. schinzi*)
 - benefits
 - breeding ground and consuming insects
 - some bird species benefit like Bearded Tit (*Panurus biarmicus*) and Eurasian Bittern (*Botaurus stellaris*)



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - eutrophication of sand flats and meadows
 - operations
 - monitor the indicator species
 - to protect the meadow species and design and optimize the removal of the reed
 - make a terrain model from sand flats and meadows
 - to map out and design the removal or harvesting of the reed



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Coastal and Dune Management -project

- eutrophication of sand flats and meadows



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Coastal and Dune Management -project

- monitoring the indicator species



Meadow at 16.6.2017.



Lady's smock (*Cardamine pratensis*) at 16.6.2017.



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Coastal and Dune Management -project

- protecting the meadow species



Marsh pea (*Lathyrus palustris*) at 12.7.2017.



Mary's grass (*Hierochloa odorata*) at 12.7.2017.



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Coastal and Dune area investment -project

- Environmental problems in Yyteri
 - eutrophication of sand flats and meadows
 - operations
 - removal or harvesting of the reed
 - using tractor or ATV (all-terrain vehicle) with mover or shredder
 - optional: utilization or recycling
 - transfer to the fields
 - more biomass and humus on ground
 - make seedbed for greenhouses and gardens
 - burn for energy
 - burn for bio coal



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Coastal and Dune area investment -project

- removal or harvesting of the reed



Meadow at 23.8.2011.



Meadow at 16.6.2017.



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - study visit
 - Northern Ireland
 - improved accessibility combined with dune protection
 - Latvia
 - removal or harvesting of macroalgae
 - algae collection
 - Estonia
 - management of coastal areas
 - Sweden
 - production of biogas from algae
 - optional: production of bioethanol from algae



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Coastal and Dune Management -project

- Environmental problems in Yyteri
 - erosion of dunes
 - making information material
 - video
 - management of dunes
 - brochure or leaflet
 - guiding principle for visitors
 - guiding practice for training
 - story routes
 - spatial information system
 - high school students



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Thank you!

