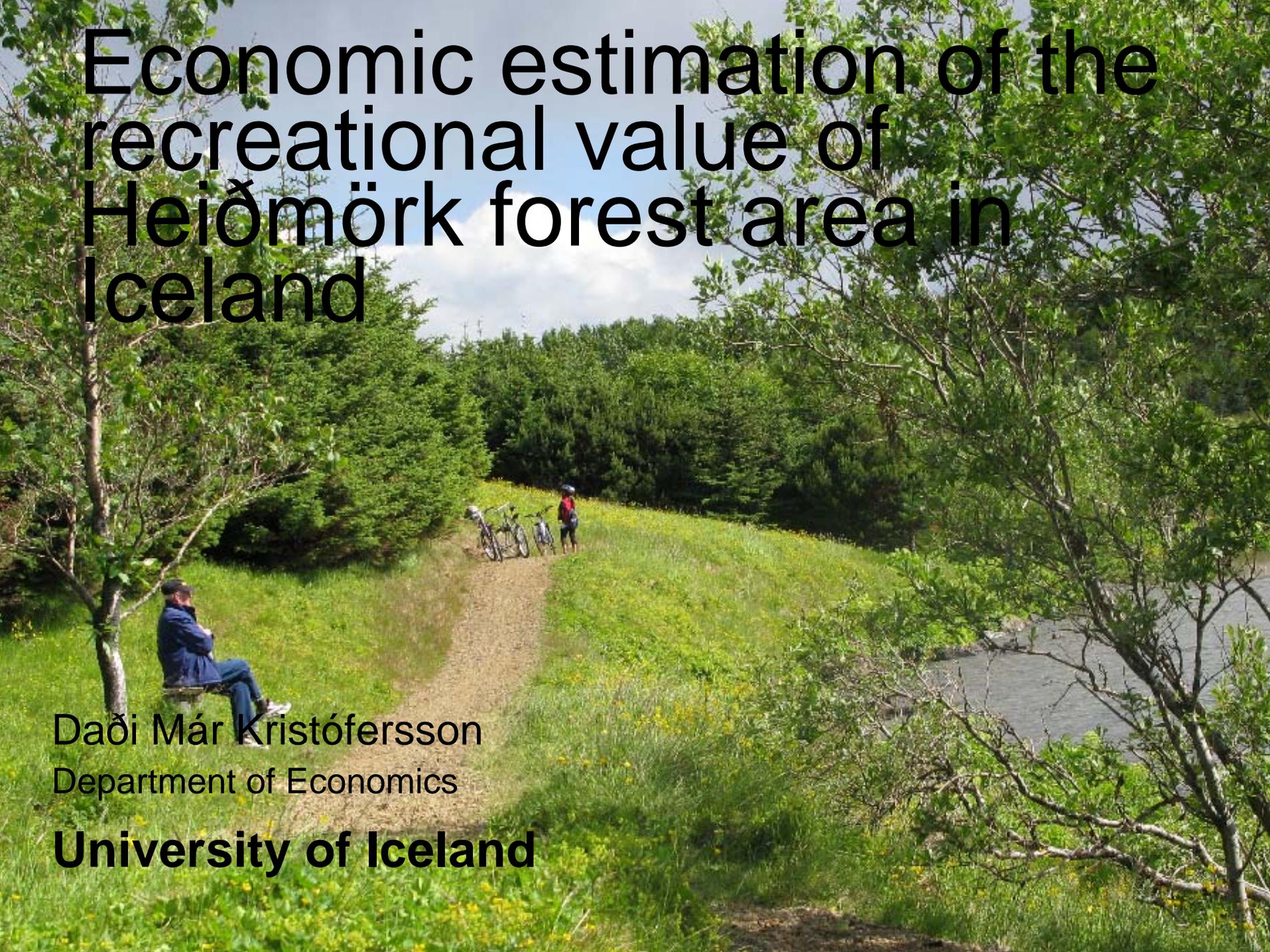


# Economic estimation of the recreational value of Heiðmörk forest area in Iceland



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# Overview

1. Valuing the environment
2. The Heiðmörk study
3. Forest recreation
4. Conclusion

# Valuing the environment



# Basic principal

The economy is a subsystem of nature

- It depends on nature for
  - basic life support
  - natural resources
  - recycling of waste and or waste zinc
  - recreation
- Overexploitation of nature reduces welfare and economic growth potential in the long run
- Human well-being is closely linked to the sustainable use of nature

# Ecosystem services

## Nature provides a number of different services

### Direct services

- natural resources such as water, plants, fish, recreation...

### Indirect services

- waste recycling, carbon sequestration, biodiversity...

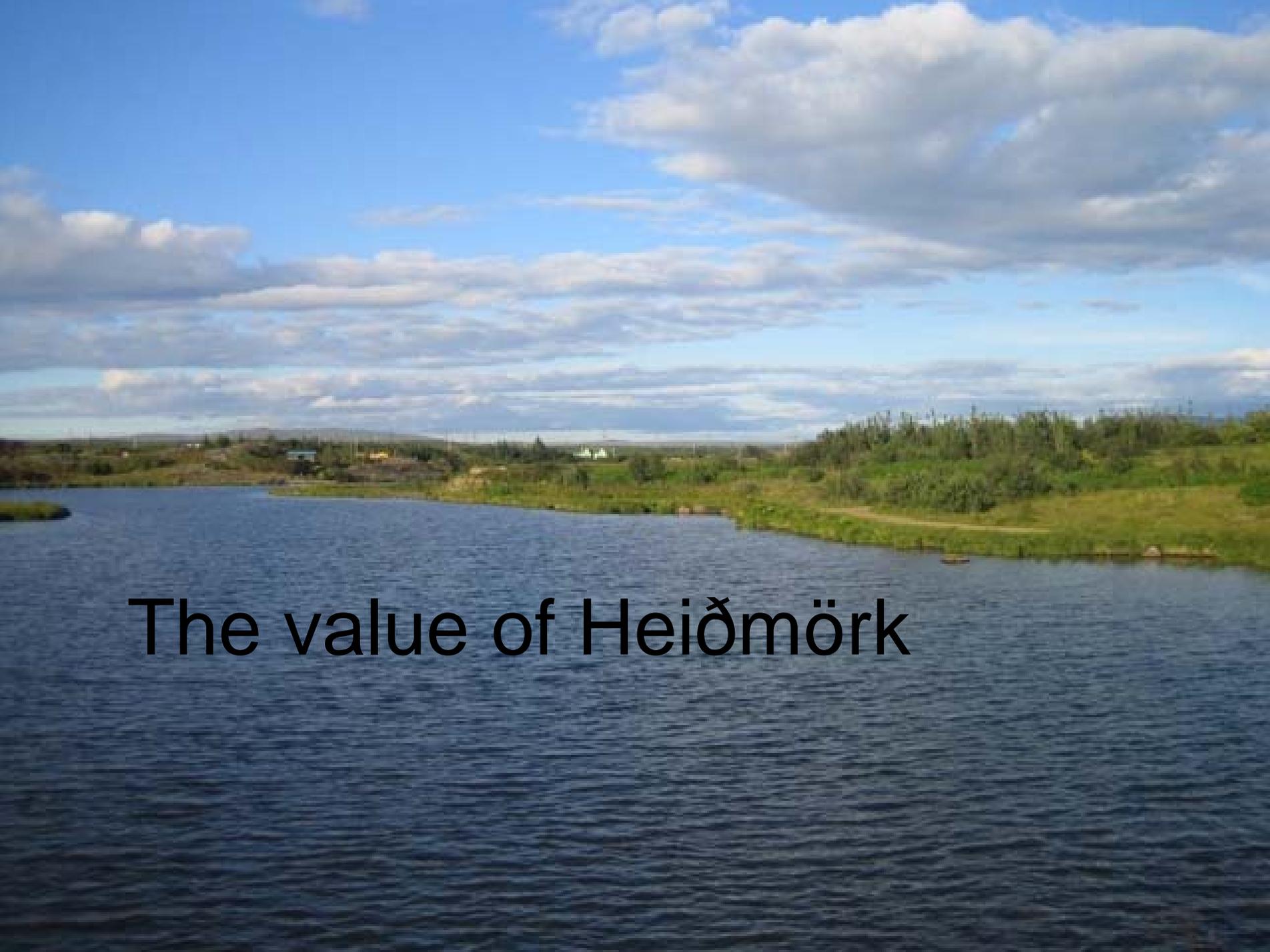
Decisions regarding projects that affect nature have to take into account the effects on all the different ecosystem services the project affects

# Valuing the environment

1. All services of an environmental resource are defined.
2. A monetary value is placed on each one using appropriate methodology.
3. Total economic value is the sum of the value for each service provided by the environment – carefully avoiding double counting.

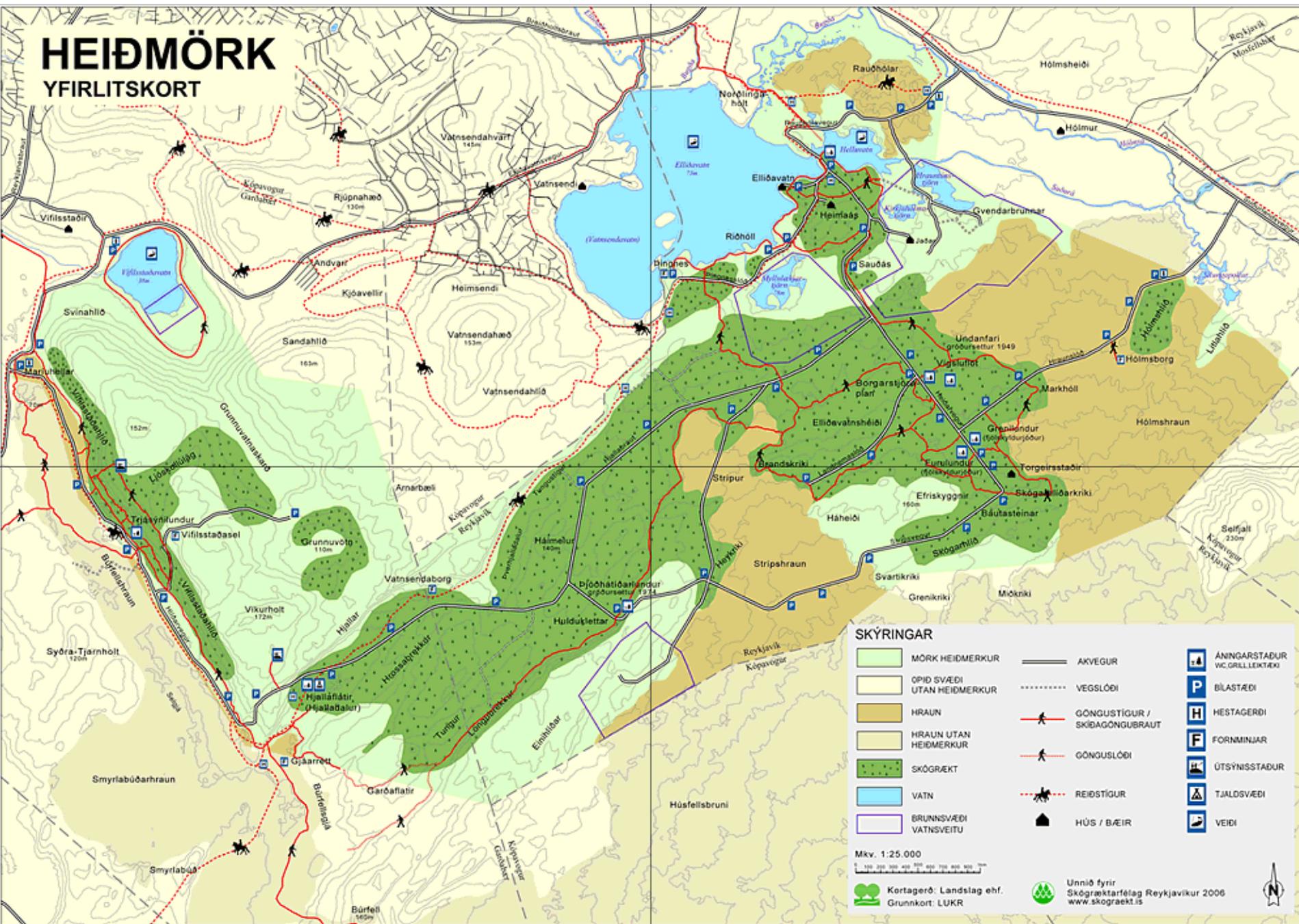
# Examples of valuations techniques

- Direct market pricing
- Avoided cost
- Replacement cost
- Defense expenditures
- Travel cost
- Hedonic pricing
- Contingent valuation/choice experiments



The value of Heiðmörk

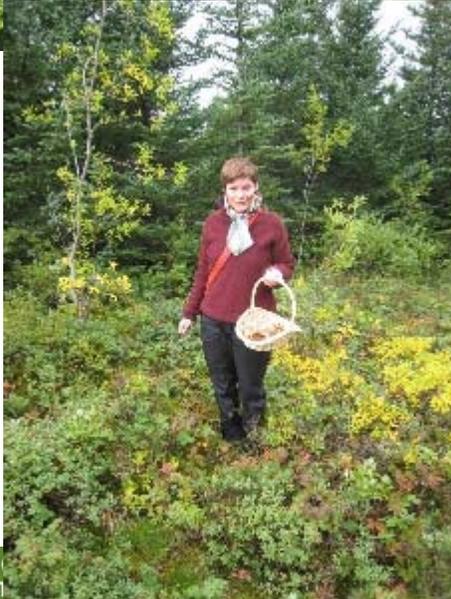
# HEIÐMÖRK YFIRLITSKORT



# Some facts

- 3500 ha
  - forests, lava, open areas and lakes
- Ecosystem services include
  - Recreation
    - Fishing, hiking, bicycling, horseback riding, skiing...
    - Around 500.000 visitors per year
  - Cultural services such as for education
  - Source of timber, Christmas trees, fish, berries, mushrooms and herbs.
  - The Reykjavik area water reserves
  - Dam for Elliðaá hydropower plant

# Heiðmörk



# Research project

- Joint research project (2008-2011)
  - University of Iceland
  - Icelandic Forest Research
  - Reykjavík Forest Society
  - The Institute of Freshwater Fisheries
  - Agricultural University of Iceland
  - Municipalities of Reykjavik and Garðabær
  - Reykjavik energy
- Purpose is to measure the total economic value of Heiðmörk

# Complexity

- Heiðmörk is an excellent example of an area that provides a multitude of different services
- The biggest challenges are to accurately measure them all
- Issues arise with respect to conflicting services
  - timber vs carbon sequestration vs recreation

# Services and valuation techniques

- Water catchment
    - water resources
    - valued using avoided cost methods
  - Forests
    - timber
    - Christmas trees
    - carbon sequestration
    - berries and mushrooms
    - recreation
    - cultural services
- } Measured using direct market pricing
- } Measured using travel cost and survey techniques

# Services and valuation techniques

- Lakes

- fishing } Measured using surveys as well as direct market pricing
- recreation } Measured using travel cost and survey techniques
- cultural services }

- Bio- and geodiversity } Measured using survey techniques
- Other cultural services }

# Special focus - forest recreation

- Four pillars of the valuation
  - Technical measurement of the forest
    - size, composition, growth
    - basis for the estimation of timber value, carbon sequestration as well as overall potential
  - Measurement of other forest related products
    - berries, mushrooms and Christmas trees
    - basis for the estimation of the value of non-timber products

# Forest recreation

## – Travel cost study

- measures indirectly the value of recreational services
- the value of recreation must exceed the cost of travel
- sample of visitors answer questioners on site

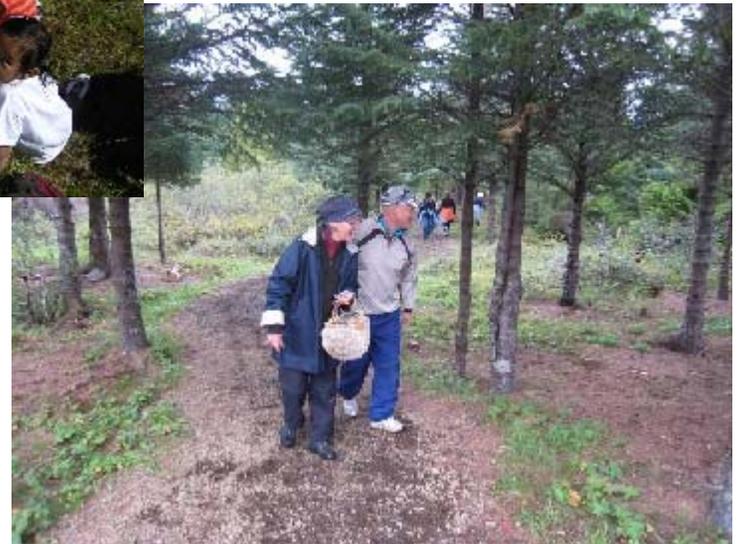
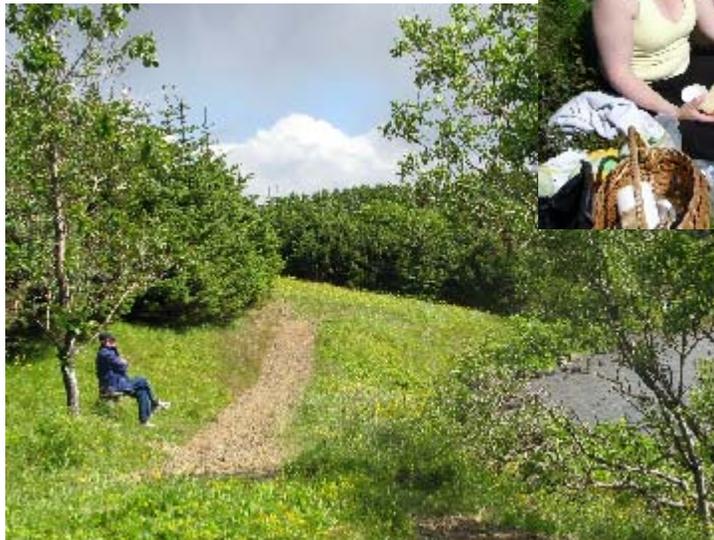
## – Survey – choice experiments

- sample of the population asked about their use of Heiðmörk and views on planning alternatives
- used to measure the value of recreation but also to measure the value of having access to Heiðmörk and its existence

# Forest recreation – conflicting uses

- Optimizing the value of the area involves choosing the best management strategy
- Optimizing with respect to timber value, carbon sequestration and recreation results in different results
- Optimizing recreational value involves losses in timber value and sequestration potential
- Further there are conflicting recreational uses
- These tradeoffs have to be taken into account

# Different uses



# Conclusion

- Monetary valuation of a crucial step when determining the best management of environmental resources, such as forests
  - Resolving tradeoffs between different ecosystem services require a common measure
- Neglecting recreational values may lead highly sub-optimal management

A photograph of a forest scene. In the foreground, a dirt path leads into the woods. The trees are mostly evergreens, and the ground is covered with grass and small plants. The text "Thank you" is overlaid in the center of the image in a white, sans-serif font.

Thank you