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Counting the benefits of Biodiversity: opportunities and challenges

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TEEBelgium D0 conference, April 27th 2012

What are ecosystems worth?

- Virtually no anthropogenic activity is possible without them – in that sense they are worth an almost infinite amount. But that is not very interesting.
- More interesting values of ecosystems relate to the benefits associated with improving them or with preventing their degradation. This is much more difficult.

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Why put a € on nature?

- Communication, awareness raising
- Cost-effectiveness nature restoration and management
- Cost-effectiveness of policy instruments
  (e.g. subsidies, agro-environmental measures, …)
- Impact assessment on ecosystems of infrastructure projects
  - Cost benefit analysis
  - Other tools (life cycle assessment)
  - Win-win nature restoration, water management, …
- Cost-benefit analysis land use decisions
- Payments for ecosystem services

How put a € on nature

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- Ecosystem as source of goods and services to humans
- Valuation = effect of these services on human welfare and wellbeing
  - _ Willingness to pay for it
  - _ Cost to produce services
- What are the relevant ecosystem services flows?
- How will they **change** in response to a given intervention, relative to a business-as-usual baseline? Over what time scale?
- What is this change worth, and to who?

  - _ We try to value changes!

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Millenium Ecosystem Assessment

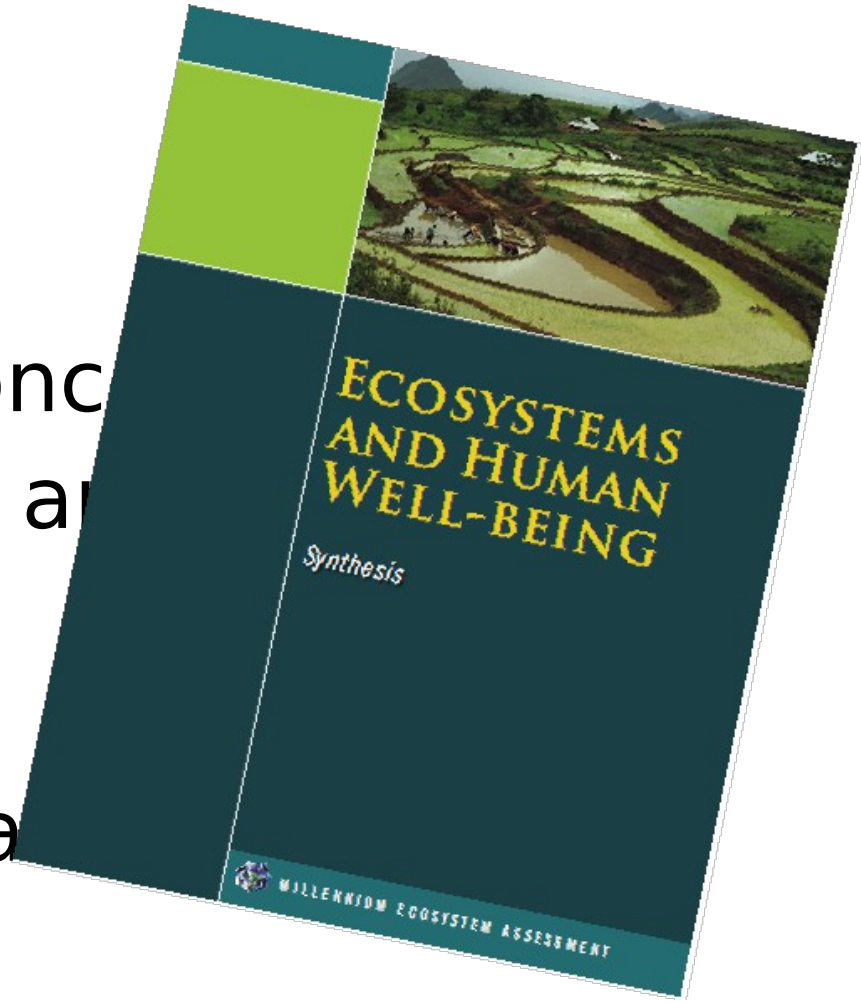
Concept of “Ecosystem goods and services”

Growing use of this conc

To combine ecological a

Economic science

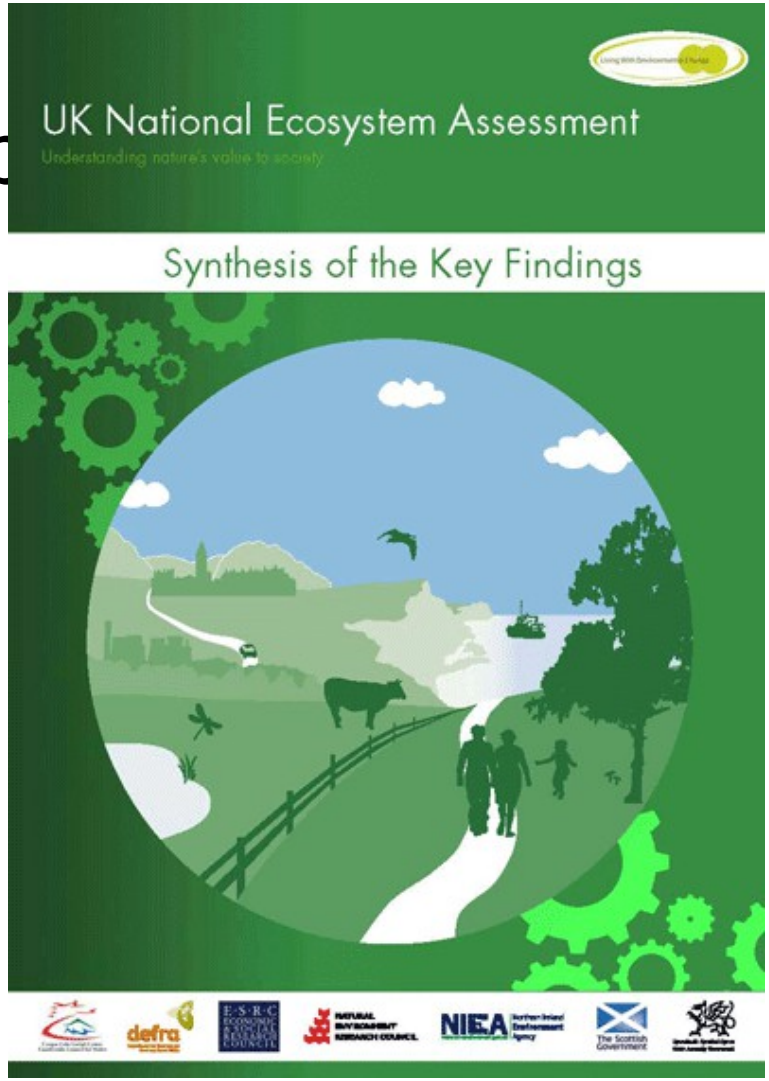
But limited data availa



k om de modelstijlen te b

weede niveau

- Derde niveau
  - Vierde niveau
    - » Vijfde niveau



Measuring Values

- Market prices can be used in some cases e.g. contribution of biodiversity to development of new drugs

- In most cases, we need to use a range of "non-market valuation methods":
  - replacement costs; avoided costs
  - travel costs and hedonic pricing
  - stated preference methods (contingent valuation and choice experiments)

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Data availability

- Number of studies still increasing
- Lacking knowledge on ecosystem functioning for certain ecosystems, certain ecosystem services
  - Prioritising : better info for well documented services or first and simple info for undocumented services?
- Valuation studies often focusing on methodological issues
- In Belgium very few original studies

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Benefit transfer

- use of data of a study site/context for a policy site/context
- Single value
- Single function
- Function based on meta-analysis

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Benefit transfer

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use of data of a study site/context for a policy site/context

project A

environmental context

socio-economic context

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Benefit transfer

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use of data of a study site/context for a policy site/context

project A project B

environmental context env. context

socio-economic context socio-econ. context

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Benefit transfer

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use of data of a study site/context for a policy site/context

project A project B

environmental context env. context

socio-economic context socio-econ. context

Minimise transfer errors

quantication and valuation functions instead of single values

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Benefit transfer

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use of data of a study site/context for a policy site/context

project A project B

environmental context → env. context

socio-economic context → socio-econ. context

Minimise transfer errors

quantication and valuation functions instead of single values

simple to estimate and easy to use

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To go one step further

- Data collection and surveys are still needed
- Such an approach that facilitate benefit transfer
- Optimization of ES=>bundle
- Spatial explicitness is very important!

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Spatial issues

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Supply of ecosystem services:

characteristics of the ecosystem (size, …)

environmental context (e.g. upstream-downstream)

Demand for ecosystem services

size of the market or range of beneficiaries

varies for different services from same ecosystem

availability substitutes

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Why different in BE

- High population Density en industrialisation.
- High pressure on ecosystems
- High value of protection

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Denitrification

- Valuation = abatement costs

=> Environmental cost model

  - €74/kg N
  - International: replacement costs: €10-30/kg N

spatial differentiation still lacking: For the moment national number, not spatial explicit e.g. per basin

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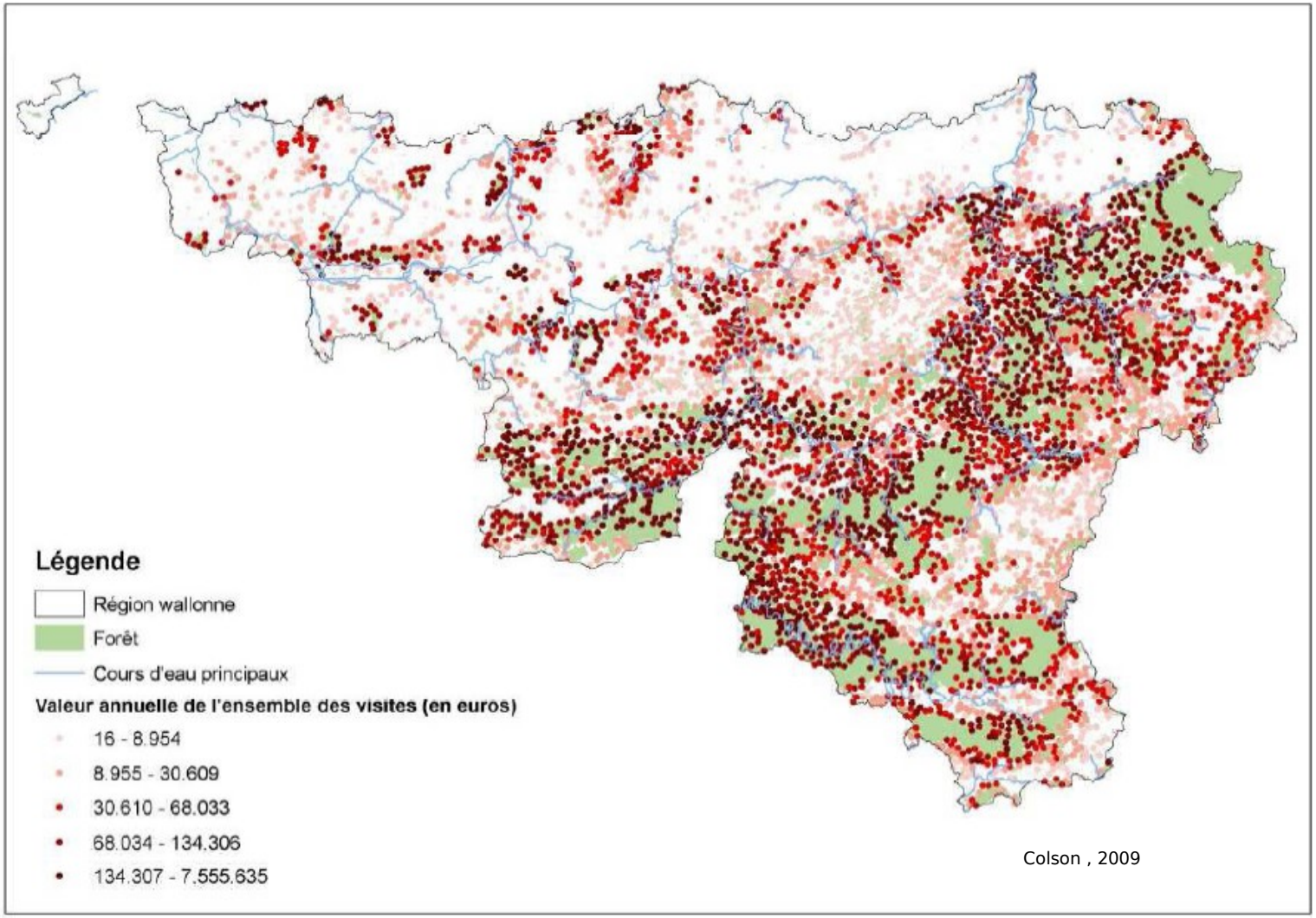
Recreation in Walloon forests



Controlled flooding

- In comparison with international figures: high costs but also higher benefits

- Scheldt: 5000ha controlled flooding area
  - C: (€100,000/ha on average).
  - B: 22000€/ha a year
- Danube: 160000 ha
  - C: 3000€/ha
  - B: €500/ha a year

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Nature Value Explorer v 1.0

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Purpose:

- Help to quantify and value changes in EGS
- Linked to land use
- For natural scientists and economists

Method:

- Input scenarios and area characteristics
- Quantification of change in EGS
- Physical effects translated into welfare effects
- Benefit transfer functions

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Natuurwaardeverkenner 1.0

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- The tool can be consulted on http://rma.vito.be/natuurwaardeverkenner/ . (dutch)

Status :

- version 1.0 : free on-line tool
- Based on specific studies for Flemish government
- 100 registrated users: large interest from different policy fields
- Extension planned end 2012
  - Extra ES, spatial isssues, ...
  - Ongoing process

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Natuurwaardeverkenner

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Rapport

Scenario: noordkasteel

Kwantificering van ecosysteemdiensten

	Gebied	Eenheid
Ecosysteemdienst	**null**	
Belevings- en overdrachtswaarde:	1 479 249	huishoudens in 50km
Nitraatverwijdering via biologische denitrificatie:	1 522	kg N/jaar
C opslag in de bodem:	4	ton C/jaar
N opslag in de bodem:	-1 177	kg N/jaar
P opslag in bodem:	-78	kg P/jaar
C opslag in de strooisellaag en biomassa van bossen:	23	ton C/jaar
N opslag in de strooisellaag en biomassa van bossen:	107	kg N/jaar
P opslag in de strooisellaag en biomassa van bossen:	11	kg P/jaar
Verbetering luchtkwaliteit(vnl. fijn stof):	184	kg PM/jaar
Geluidsreductie door bossen:	32	dBA met bos

Waarde van ecosysteemdiensten in euro/jaar

	Gebied	Totaal
Ecosysteemdienst	**null**	
Belevings- en overdrachtswaarde:		1 166 942
Nitraatverwijdering via biologische denitrificatie:	112 664	112 664
C opslag in de bodem:	757	757
N opslag in de bodem:	-87 075	-87 075
P opslag in bodem:	-62 757	-62 757
C opslag in de strooisellaag en biomassa van bossen:	4 268	4 268
N opslag in de strooisellaag en biomassa van bossen:	7 889	7 889
P opslag in de strooisellaag en biomassa van bossen:	8 528	8 528
Verbetering luchtkwaliteit(vnl. fijn stof):	6 917	6 917
Geluidsreductie door bossen:	300 115	300 115
Totaal:	370 492	1 537 434

Let op:
Deze totale sociaaleconomische waarde is de bijdrage die de (verandering in de) door u bestudeerde natuurgebieden leveren aan de menselijke welvaart maar zegt niets over de waarde die deze gebieden daarnaast hebben voor het welzijn van bepaalde planten en dieren.

De rekentool is onderheven aan veranderingen. Indien wijzigingen aangebracht worden aan de rekenmodule zullen eerder ingegeven scenario's berekend worden met de nieuwe rekenmodule. Dit kan resulteren in afwijkende resultaten t.o.v. het verleden en de vroegere resultaten zullen worden overschreven. Wenst u uw resultaten te bewaren kan u best kiezen om de resultaten op mail toegestuurd te krijgen. Geplande wijzigingen aan de rekenmodule zullen op voorhand worden gecommuniceerd met de gebruikers.

☐ Mag dit resultaat voor het publiek beschikbaar worden gesteld op deze website?

Terug naar invoerscherm | Mail resultaat | Suggesties/Feedback

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Ecosystem valuation: sense and no(n)sense

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- Good link between biophysical and economic information
- Comparing scenarios
- Bundle of ecosystems
  - Adding up problem
- Marginal value
  - *Critique: Values for individual sites cannot be added together to assess large scale changes in the extent of ecosystems.*
  - True: Large losses in the stock of an ecosystem within a region will impact the value of the remaining stock

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Conclusions & Recommendations

- We need to simplify and standardize application of tools for valuing ecosystem services.
  - _ At a rough top down level for broad aggregate figures.
  - _ At a detailed bottom up level.
  - _ With attention to spatial and temporal issues
- More multidisciplinary studies to cover link between ecosystem functioning and ecosystem services
- Further work on valuation, based on impact pathways is needed (e.g. applied to toxicological pathways).
- Studies on trade-offs between ecosystem services AND between different ecosystems.
- Use the numbers intelligently.

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End conclusion

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The proof of the pudding is in the eating,

The objective of economic valuation is not to put a ‘true’ value on what is priceless, but to provide sound scientific info to improve decision making, i.e.

to translate the value of losses from the destruction of some ecosystems /benefits of protection policies

in terms that allow a comparison with other societal issues adapted to Belgian conditions.

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