INIS, an Information System to support the calculation of the Natural Capital Index (NCI) in The Netherlands.

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1. Introduction

In 2002 The Netherlands will publish a Nature Outlook. As part of this extensive study a group of researchers has calculated an indicator for the biodiversity in The Netherlands, the Natural Capital Index (NCI). For the first time they provide accurate and scientific based marks, to answer the simple question: How is nature doing in The Netherlands?
This condensed answer is the result of a complicated process of gaining consensus on the approach and the demands, gathering data and making well founded choices on the implementation. This paper focuses on the implementation and describes the information system that we developed to support this process. Additionally we will provide some information on the backgrounds of the NCI.

2. What is the Natural Capital Index?

The NCI is a simple and powerful composite indicator (index) for biodiversity depletion. It can be used to explore, monitor and evaluate the condition of natural or agricultural ecosystems in terms of biodiversity and to present a meaningful picture of future trends. It was developed and discussed by the Convention on Biological Diversity (CBD, UNEP 1977) in order to evaluate its first objective. The concept is rather simple: calculate the product of two factors*, the change in quantity of the habitat area* (as fraction of the total area under study) and its *change in quality* (as fraction of a historical or geographic baseline). The quality is calculated by the average abundance as percentage of the baseline, for a selected set of animal and plant species. A simple way to represent this, is shown in fig.1

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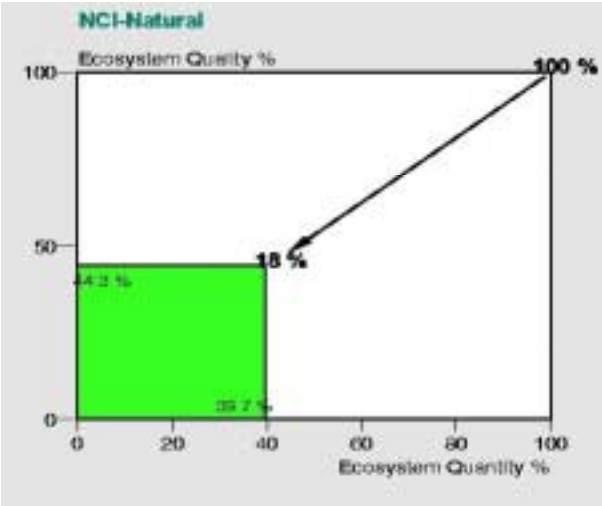

Fig. 1: Example of the Natural Capital Index for The Netherlands.

3. From concept to implementation

On the implementation of this simple concept, a number of demands were formulated. The indicator should be robust (inert to natural fluctuations) yet sensitive to ecosystem changes caused by human interference. To be easily applicable on both local and global level, a sound and simple aggregation protocol had to be defined. Habitat types had to be distinguished, and for each a representative selection of species had to be made.

This species-selection had to include a number of defined target-species, should be as small as justified and be policy- and ecosystem-relevant. For each selected species, both a baseline value and a current abundance had to be available. The availability of monitoring data of species, gathered by many private organisations was of crucial value. The Central Bureau of Statistics played an important role in co-ordinating and pre-processing these data-flows. We needed an information system to support this process. Ideally, we would like to monitor at anytime how do we scored on all these demands. Had we selected an acceptable number of species for each habitat type? How was the balance between plants, birds and mammals? If the habitat-type is dry, did the selected species correspond with this condition? What was the fraction of rare species? Did we have monitoring data of all selected species? To

answer these questions, we developed INIS: the Indicators for Nature Information System.

4. System concept and development

The core of INIS is a relational database. We wanted to store biological data on species, habitat types, monitoring data and selected species. A normalised data model eases the creation of flexible reports. Time restrictions did not allow the building of an information system on forehand, so we built the ship and its dock simultaneously. As a consequence, the implementation team could not work with a fully operational information system to actually produce their results. But the system could support their decisions and provide feedback on it.

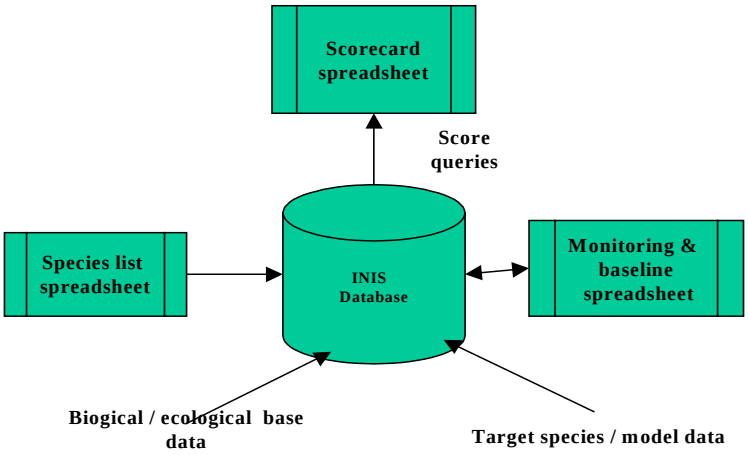

Fig.2 Main components and structure of the Indicators for Nature Information System (INIS)

In practice there were two distinguished subgroups in the project: one that composed sets of species for each of 11 habitat types and 7 regions, and one that collected monitoring and baseline data on the species. Both subgroups kept their data in spreadsheets. These were constructed in such a format that the relevant data could be imported into the database and linked with the other data at any time. The information system thus acted as an integrator. An advantage of this approach was that hardly any data had to be entered into the database by hand – and no input screens were necessary. We could concentrate on what the system can give to us, instead of what we had to do for the system. We developed condensed scorecards that s dynamically query their data from the database, to display the status

of indicator development for each habitat types. This has proven to be a useful way to report progress and perform a final check.

Stratum code	**100**						
Region	**The Netherlands**			***Habitat Type:***	**Agriculture**	***Date***	***30-10-01***
Nr of Species	***362***						
Quantity	***94%***	*of Area 1950*	***48 %*** *of Area Netherlands*		***2.35*** *mln ha Current*	***2.50*** *mln ha Area 1950*	
Criterium	***Standard***	**Current**					
1. Information available	***100%***	**100%**	*Baseline Values Available*		*Baseline Year*	1950	
2. Ecosystem relevance	***100%***	100%	*Characteristic for Habitat Type*				
3. Policy Relevance	***>30%***	**4%**	*Target Species*	46	*Target Spp. Habitat Type*	30%	*of all Target Spp. Selected*
4. Measurability	***100%***	83%	*Regular Monitoring*	17%	*Occasional Measurement*		
5. Model Availability	~	75%	*Modelled*				
6. Representativity Ecosystem	***Animal Charac-teristics***		***Feeding***		***Dispersion***		***Minimal Population Area***
		33%	*Herbivore*	25%	*0 -3 km*	28%	*0-100 ha*
		20%	*Insectivore*	11%	*3-15 km*	10%	*100-500 ha*
		9%	*Pesci/Carnivore*	15%	*>15 km*	3%	*500 - 2000 ha*
		2%	*Omnivore*	37%	*Non-migratory species*	2%	*>2000 ha*
		35%	*Unknown*	21%	*Migratory species*	57%	*Unknown*
Sub-habitat types	***Plant Charac-teristics***	11%	*Dry*			98%	*Fresh*
		72%	*Wet*			2%	*Brackish*
		16%	*Water*			0%	*Salt*
		52%	*Eutrophic*	2%	*Tree*	30%	*Acid*
		46%	*Oligotrophic*	98%	*Herb*	46%	*Neutral*
		2%	*Unknown*			23%	*Basic*
Functional groups		67%	***Producer***	33%	***Consumer***	? %	***Reducer***
7. Representativity Theme - Sensitivity		***Sensitivity***	***Theme***	***Model***			
		91%	*Acid/Trophy/Desicc*	75%			
		25%	*Toxification*	59%			
Monitored & Modeled	~	17%	*Fragmentation*	6%			
		9%	*Disturbance*	21%			
		99%	*Management*	75%		***Species Groups***	
		22%	*Habitat destruction*	75%	***Share***		***Number***
		75%	*Climate Change*	55%	67%	*Plants*	243
		9%	*Foreign Pressure*	#N/A	7%	*Butterflies*	27
8. Sensitivity	***30-70%***	44%	*Sensitive Species*		0%	*Reptiles*	1
9. Robustness	***>10 abs %***	67%	*Plants*	243	9%	*Birds*	32
		23%	*Invertebrates*	85	0%	*Mammals*	1
		9%	*Vertebrates*	34	16%	*Macrofauna*	58
		100%	***Total***	362	0%	*Fishes*	0

Fig 3 Scorecard with scores on 9 criteria for habitat type Agriculture.

5. Conclusion

The first time calculation of a NCI for The Netherlands can be considered an important step ahead. It has succeeded by the co-operation of many parties and the Indicators for Nature Information System contributed to this success. INIS is still growing and new data make it to a powerful resource for our research. It helps us with sensitivity analyses for the NCI and provides an agenda for further research and data-gathering. It will provide good services in future NCI–calculations, maybe also in other countries. We will stimulate such activities where we can and will be happy to make INIS available for such purposes.