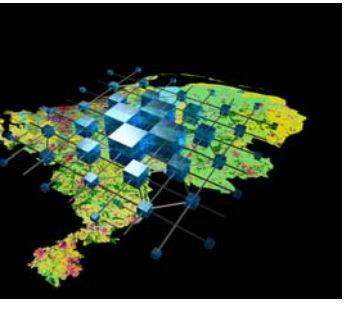
EcoVisie Decision Support System: a tool for ecosystem management

Willy Huybrechts & Guy Engelen

- Institute of Nature Conservation



- Research Institute for Knowledge Systems (RIKS)

Ministerie van de Vlaamse Gemeenschap

- Nature Division, Environment Administration, Flanders

Background

- In Flanders: total nature area is growing with an evolution to larger nature units
- Chances for nature development are high in floodplains (social, ecologic)
- Floodplains: abiotic conditions, especially hydrology, are important for nature

Background

Questions in the field

- Where can/should nature area be developped, where are possibilities less;
- Which type of nature should be conserved, developped or restored;
- How this nature should be managed;
- What should be the boundary conditions (e.g. hydrology)

→ Vision

Approach

1. A combination of models and expertise to explore the potentials of floodplains (knowledge)
2. Based on this knowledge: make choices to come to a vision
   ➔ spatial distribution of ecotopes (with the support of a DSS)
3. Implementation in the field:
   - Development of nature area
   - Apply management schemes

Input for EcoVisie

- Description of ecotope types ('natuurtypen')
- 'ecotope groups' ('natuurtypegroepen') : ecotope types with the same abiotiek preferences but different management
- Potential distribution of 'groups' under certain abiotische scenario's

Ecotope types

Characteristics of ecotope type

- Origin and succesion
- Environmental conditions (groundwater, soil,…)
- Occurence in Flanders
- Flora-vegetation
- Fauna
- Management
- Nature Value

Ecotope types

- Species

ID	Naam kort	Naam lang	Naam	Groep	UFK	Ro	Intern	Opme
512	ACER_PSE	Gewone esdoorn	Acer	1	9		Nee	
513	ACHILMIL	Gewoon duizendblad	Achillea	1	10		Nee	
514	ACHILPTA	Wilde bertram	Achillea	1	7		Nee	
515	ACORUCAL	Kalmoes	Acorus	1	5	5	Nee	

- their relation with ecotopes

NatuurTypeID	SoortID	TypischeSoort	DominanteSoort	CodominanteSoort
21	512	Ja	Neen	Neen
22	512	Neen	Neen	Neen
23	512	Neen	Neen	Neen
1	513	Neen	Neen	Neen
2	513	Neen	Neen	Neen
3	513	Neen	Neen	Neen
4	513	Ja	Neen	Neen

Ecotope Groups

Vegetation management

intensive → extensive

-ep	gekarteerd vegetatietype	Intensief beheer		kort cyclisch beheer (5 à 10 jaar)	lang cyclisch beheer (10 à 15 jaar)	nulbeheer
		maaibeheer	begrazing			
	- kleine zeggenvegetatie - verruigde kleine zeggenvegetatie - mesotroof elzenbroek	Kleine zeggenvegetatie	Verruigde kleine zeggenvegetatie	Verruigde kleine zeggenvegetatie	Wilgenstruweel	Oligotroof elzenbroek
	- verruigde kleine zeggenvegetatie - mesotroof elzenbroek	Grote zeggenvegetatie	Grote zeggenvegetatie	Grote zeggenvegetatie	Wilgenstruweel	Mesotroof elzenbroek
	- dottergrasland - moerasspiraearuigte - mesotroof elzenbroek	Dottergrasland	Kamgrasland met moerasrolklaver	Moerasspiraearuigte	Wilgenstruweel	Mesotroof elzenbroek
	- moerasspiraearuigte - mesotroof elzenbroek	Dottergrasland	Zilverschoongrasland	Moerasspiraearuigte	Wilgenstruweel	Mesotroof elzenbroek
	- RG glanshavergrasland - brandnetelruigte - ruderaal elzenbos	RG glanshavergrasland	Typisch kamgrasland	Vochtige ruigte	Braamstruweel	Vochtig berken-eikenbos
	- overstromingsgrasland	RG glanshavergrasland	Zilverschoongrasland	Vochtige ruigte	Braamstruweel	Vochtig berken-eikenbos
	- natte heide - berkenbroek	Vochtig heischraal grasland (Natte heide)	Vochtig heischraal grasland (Natte heide)	Natte heide	Gagelstruweel	Berkenbroek / Vochtig berken-eikenbos
	- droge heide - berken-eikenbos - eiken-beukenbos	Droog heischraal grasland Droge heide	Droog heischraal grasland Droge heide	Droge heide	Bremstruweel	Berken-eikenbos Eiken-beukenbos

↓ Abiotics (soil, hydrology, inundation)

(Vallei van de Zwarte Beek)

Ecotope Groups

Management

Mapped vegetation types

Fen meadow (Calthion palustris)
Tall-herb fen (Filipendulion)
Mesotrophic alder carr

Yearly mowing regime

fen meadow (Calthion palustris)

Grazing

Dairy pasture

Cyclic mowing (short 5 to 10 years)

tall-herb fen (Filipendulion)

Cyclic management (long 10 to 15 years)

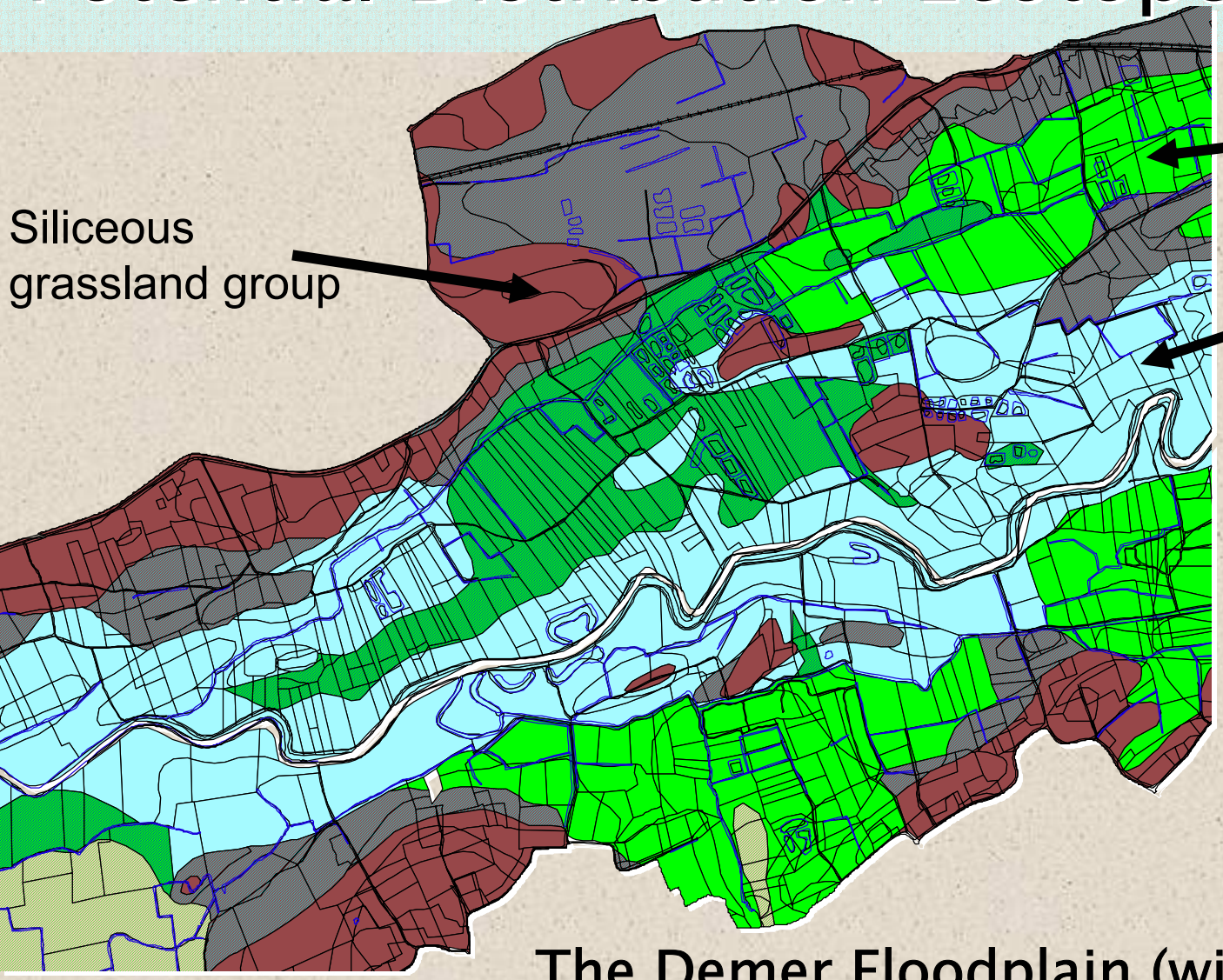
Salix carr

No management

Mesotrophic alder carr

Ecotope group 2 of Zwarte Beek: moist conditions without inundation

Potential Distribution Ecotope Groups



The Demer Floodplain (with improved hydrologic conditions, no inundations)

DSS-functions

- Process information (maps and tables)
- Facilitate acces to this information for the decision maker
- Present the results of choices that are made in the process (interactive)
- Assist in developing different scenario's for an area
- Offer tools to evaluate scenario's

DSS

Possible Applications

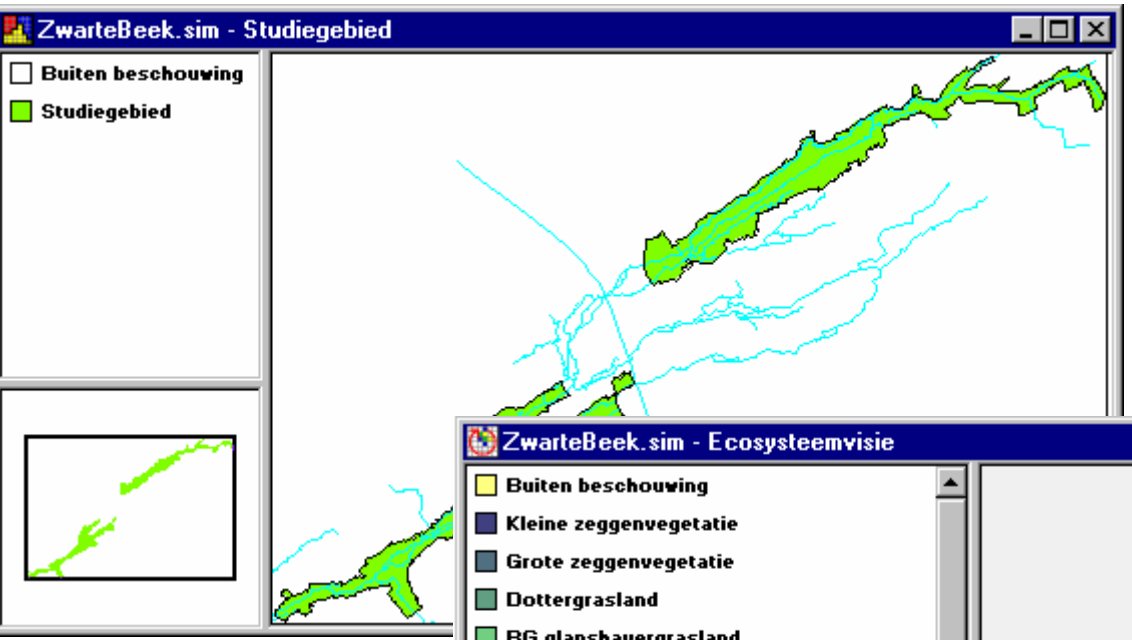
- Prepare visions on nature in Floodplains
- Planning of nature development projects
- Design of nature management schemes
- Assist in discussions about balance between wishes (planners) en possibilities (managers in field)
- In discussions with other sectors (agriculture, forestry, ….)

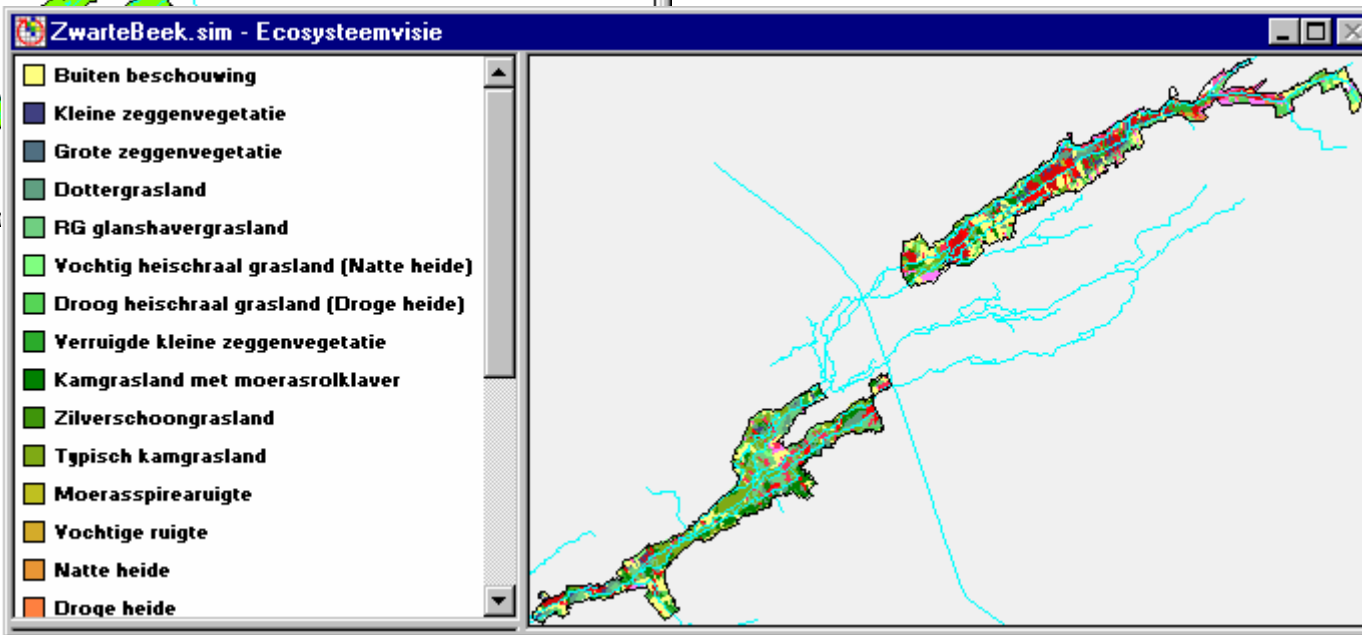
Floodplain (study area)

Studiegebied

Ecosystem vision = map with desired ecotopes

Ecosysteemvisie



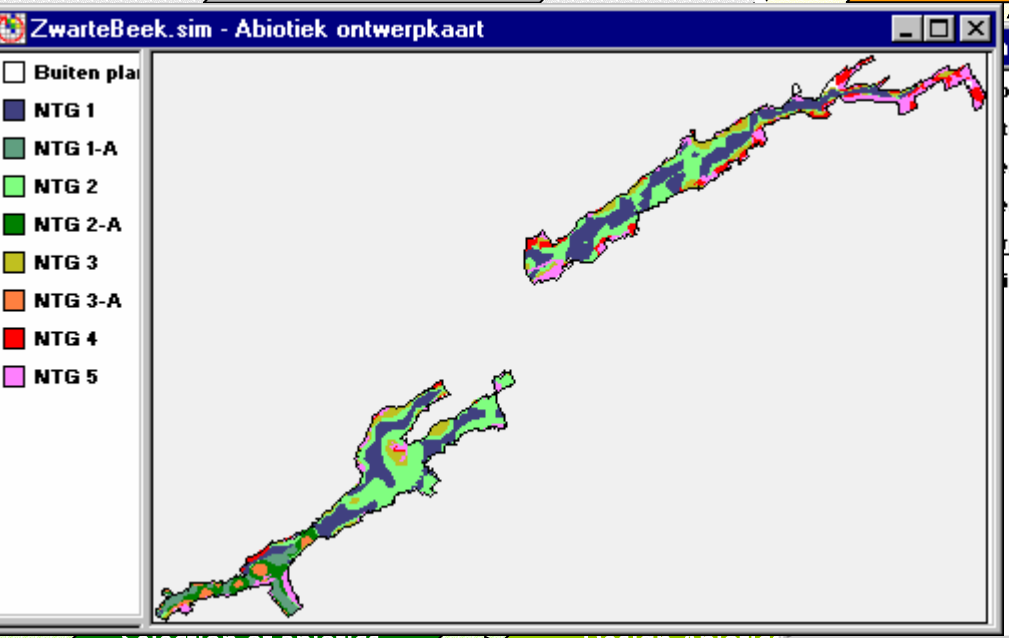


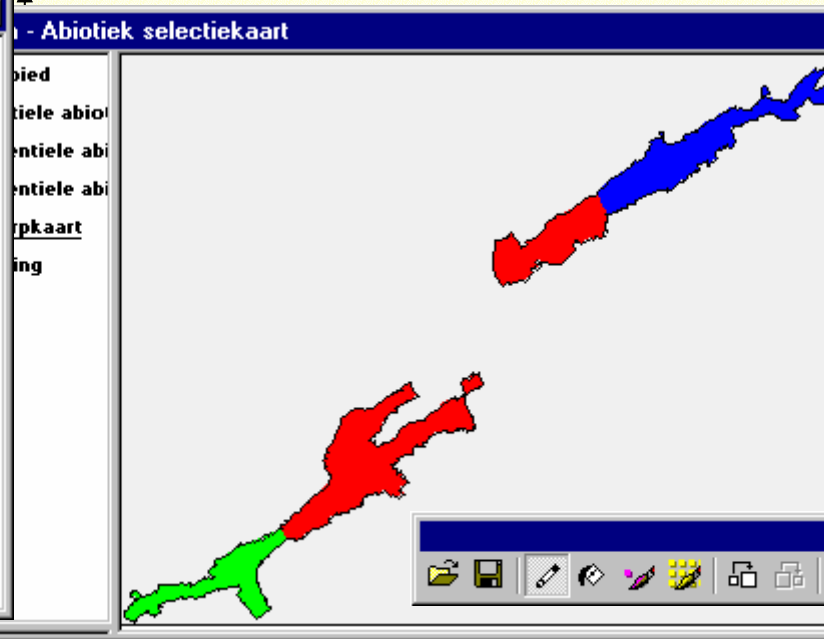
Floodplain (study area)

Ecosystem vision

Studiegebied

Ecosysteemvisie

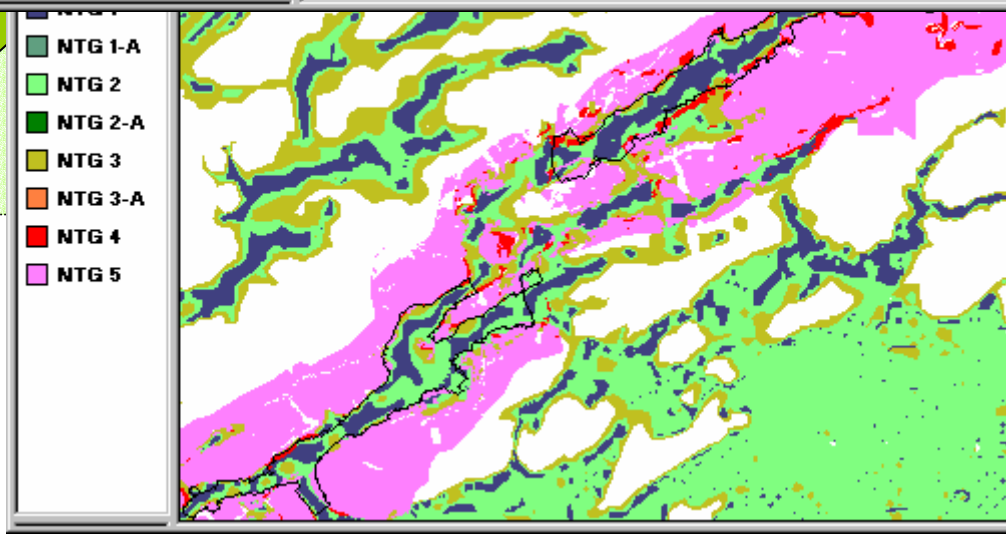


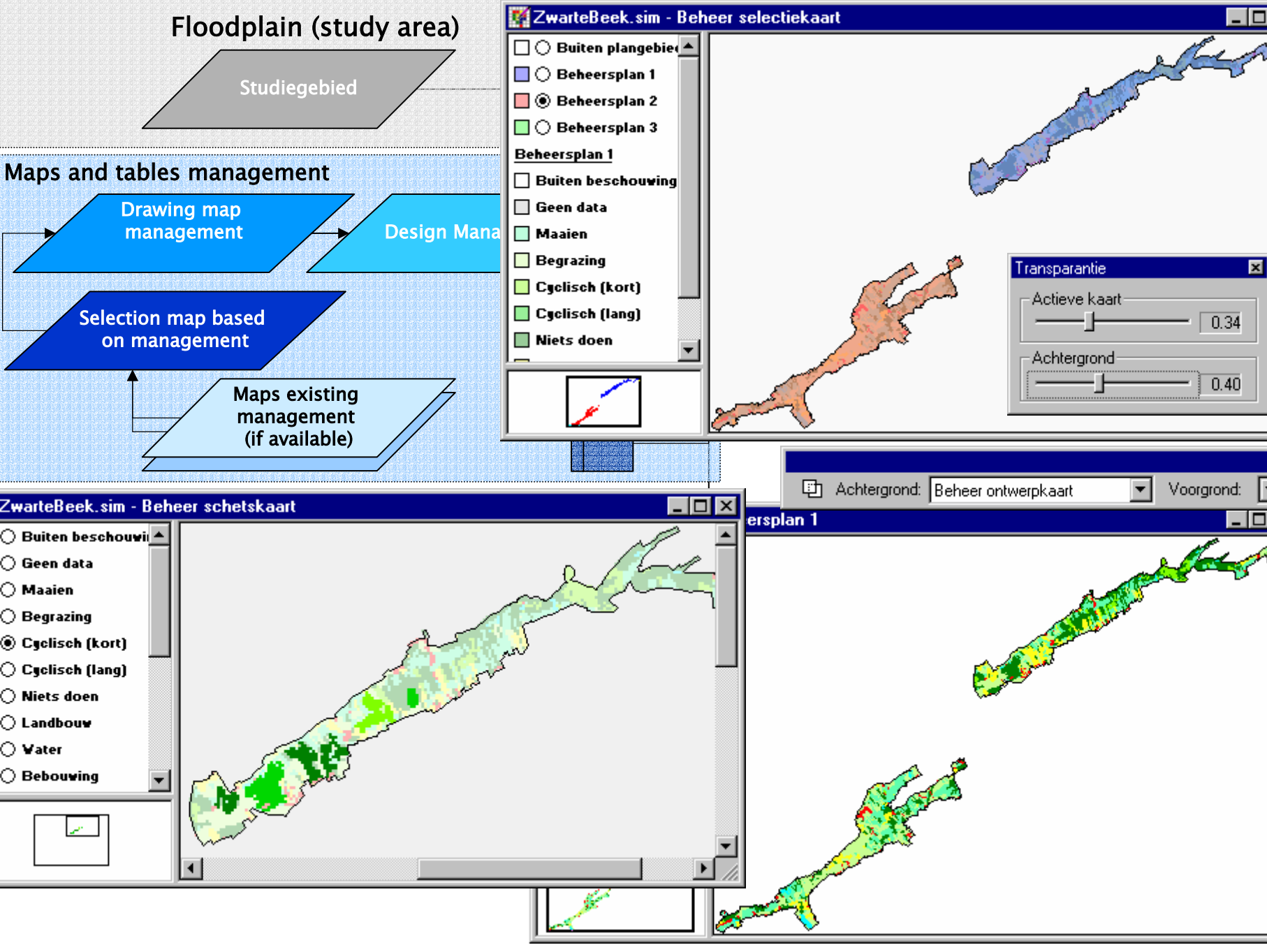


Selection of abiotics

Design Abiotics

Maps with potential ecotope groups



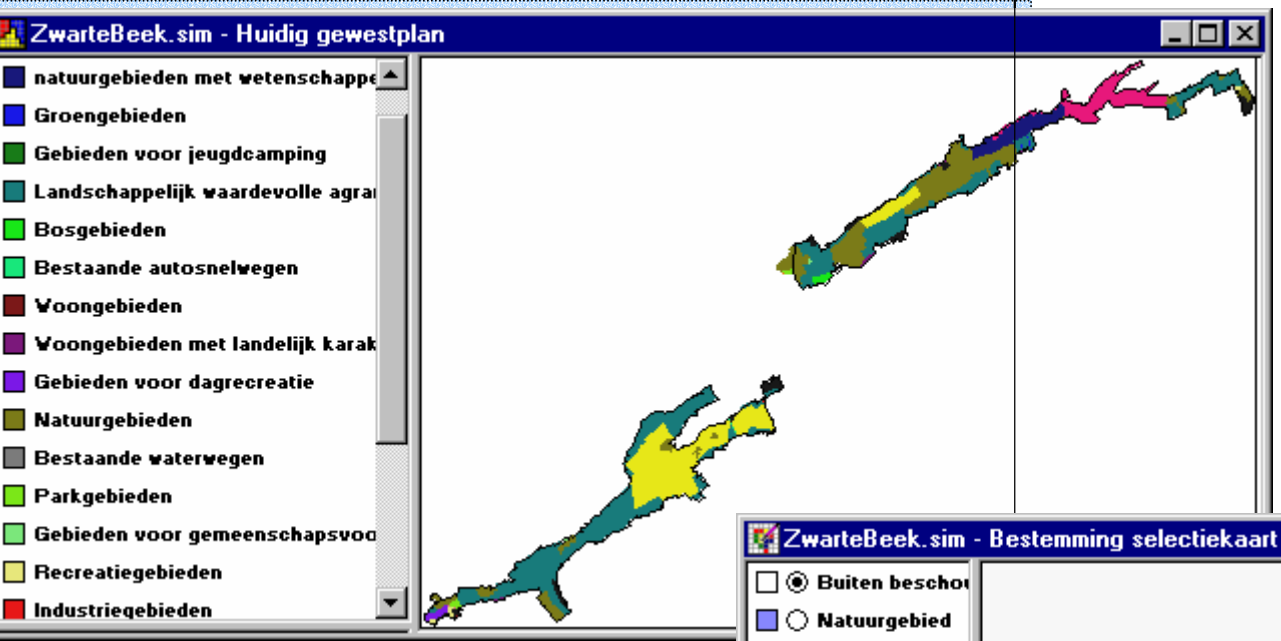

Floodplain (study area)
Studiegebied
Maps and tables management
Drawing map management
Design Mana
Selection map based on management
Maps existing management (if available)
ZwarteBeek.sim - Beheer selectiekaart
Buiten plangebie
Beheersplan 1
Beheersplan 2
Beheersplan 3
Beheersplan 1
Buiten beschouwing
Geen data
Maaien
Begrazing
Cyclisch (kort)
Cyclisch (lang)
Niets doen
Transparantie
Actieve kaart
0.34
Achtergrond
0.40
Achtergrond:
Beheer ontwerpkaart
Voorgrond:
ersplan 1
ZwarteBeek.sim - Beheer schetskaart
Buiten beschouwi
Geen data
Maaien
Begrazing
Cyclisch (kort)
Cyclisch (lang)
Niets doen
Landbouw
Water
Bebouwing

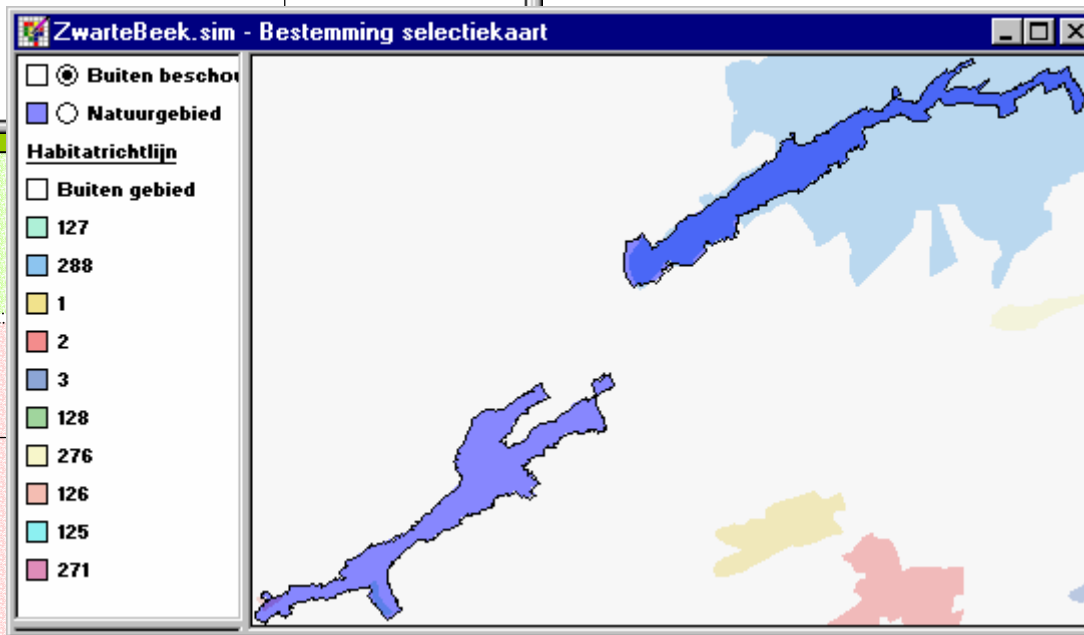
Floodplain (study area)

Studiegebied

Ecosystem vision

Ecosysteemvisie



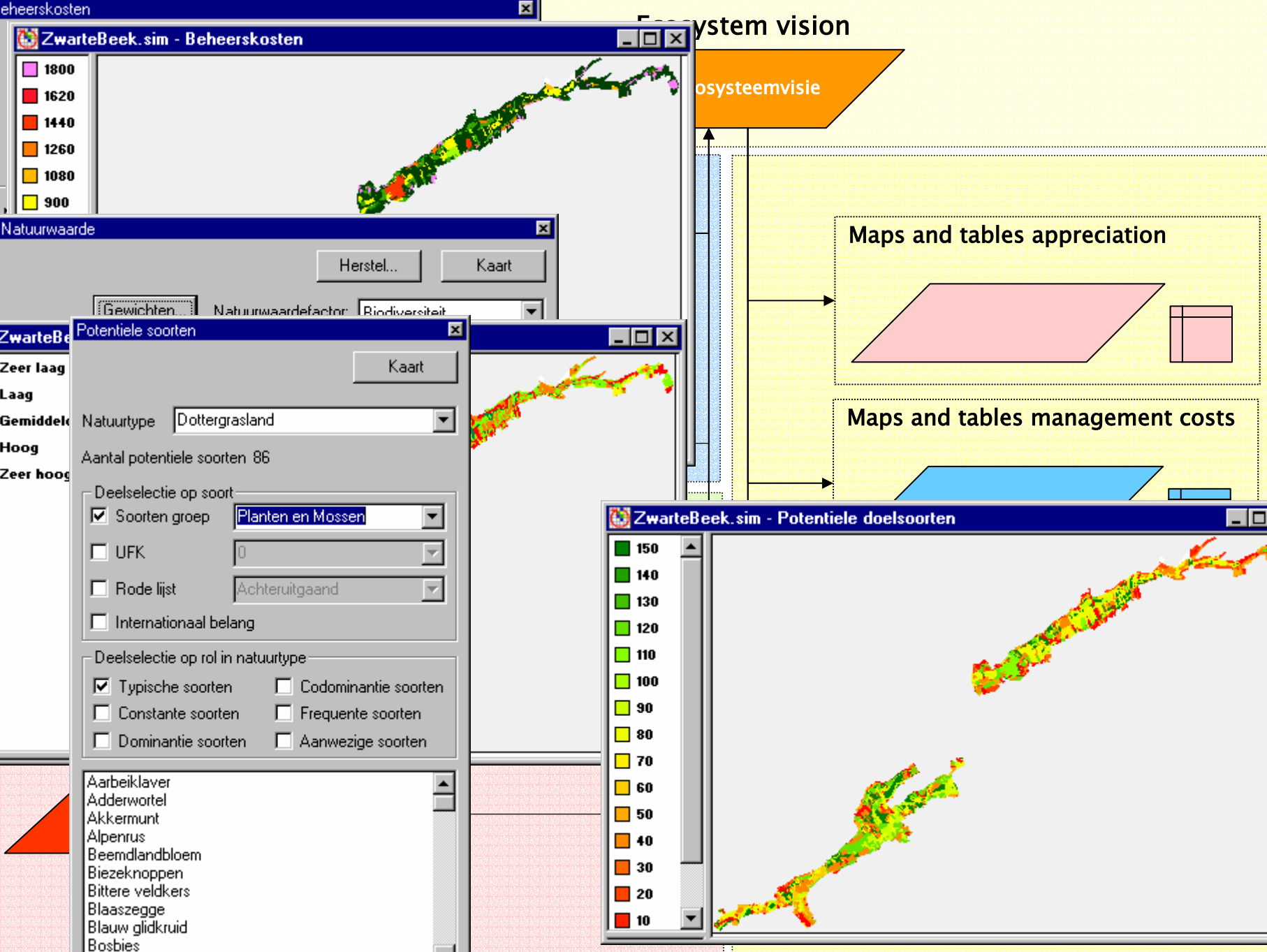


Maps potential ecotope groups

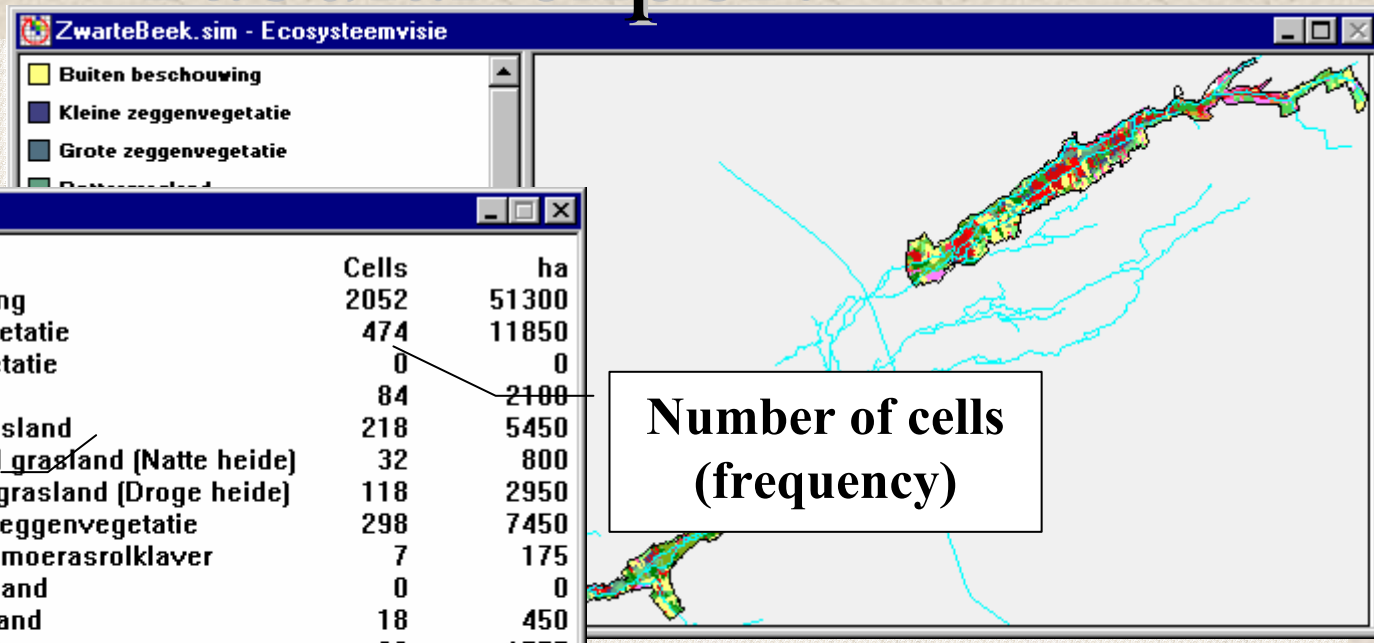
Zoning maps

Selection map based on zoning

Zoning maps, Habitat and Bird directives


ZwarteBeek.sim - Beheerskosten
1800
1620
1440
1260
1080
900
Natuurwaarde
Herstel...
Kaart
Gewichten...
Natuurwaardefactor:
Biodiversiteit
Potentiele soorten
Kaart
Natuurtype
Dottergrasland
Aantal potentiele soorten 86
Deelselectie op soort
Soorten groep
Planten en Mossen
UFK
0
Rode lijst
Achteruitgaand
Internationaal belang
Deelselectie op rol in natuurtype
Typische soorten
Codominantie soorten
Constante soorten
Frequente soorten
Dominantie soorten
Aanwezige soorten
Aarbeiklaver
Adderwortel
Akkermunt
Alpenrus
Beemdlandbloem
Biezeknoppen
Bittere veldkers
Blaaszegge
Blauw glidkruid
Bosbies
Zeer laag
Laag
Hoog
Zeer hoog
ystem vision
osysteemvisie
Maps and tables appreciation
Maps and tables management costs
ZwarteBeek.sim - Potentiele doelsoorten
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10

Tabular export



Info

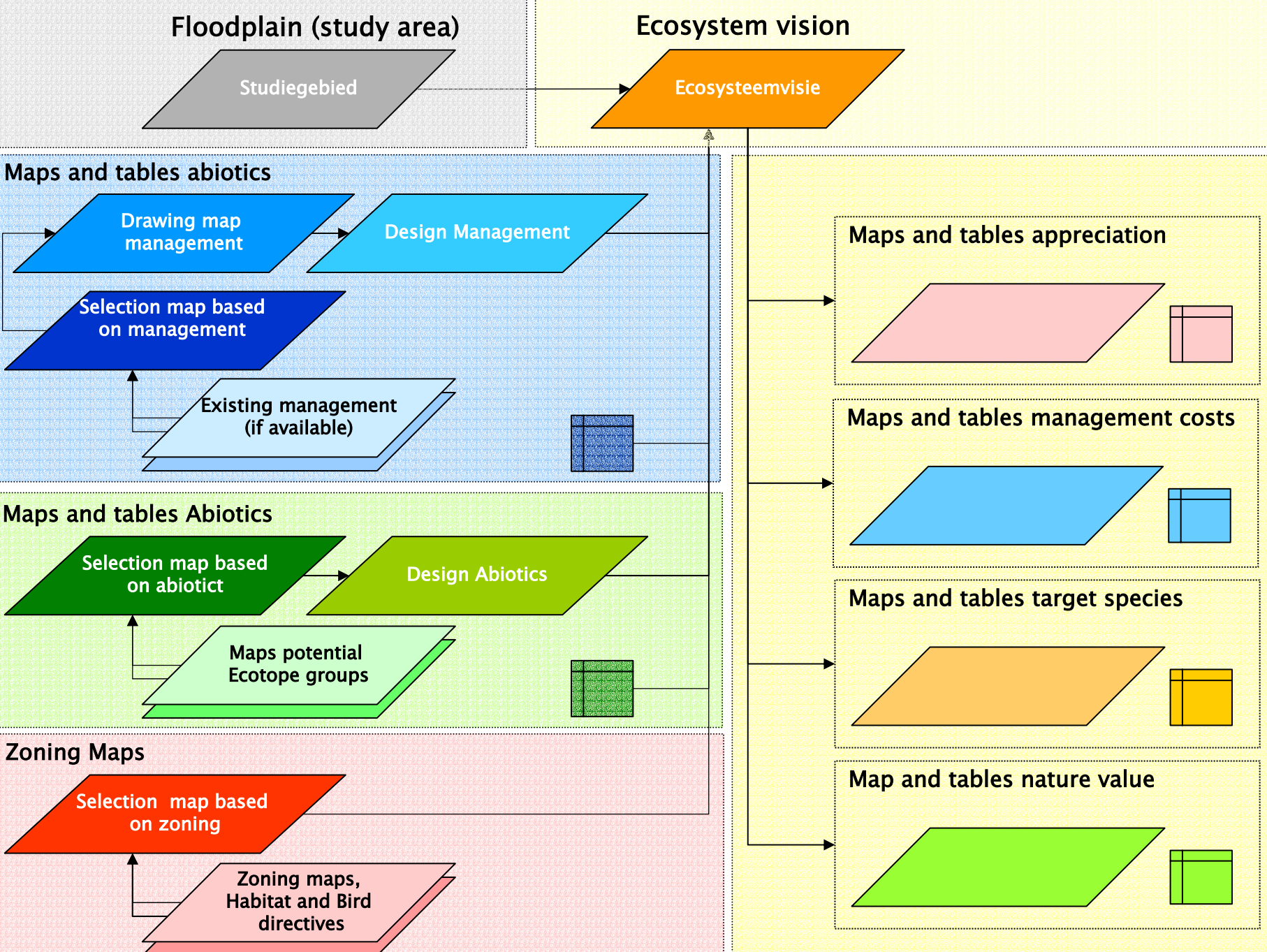
	Cells	ha
Buiten beschouwing	2052	51300
Kleine zeggenvegetatie	474	11850
Grote zeggenvegetatie	0	0
Dottergrasland	84	2100
RG glanshavergrasland	218	5450
al grasland (Natte heide)	32	800
grasland (Droge heide)	118	2950
zeggenvegetatie	298	7450
Kamgrasland met moerasrolklaver	7	175
Zilverschoongrasland	0	0
Typisch kamgrasland	18	450
Moerasspiearuigte	63	1575
Vochtige ruigte	186	4650
Natte heide	18	450
Droge heide	206	5150
Wilgenstruweel	578	14450
Braamstruweel	300	7500
Gagelstruweel	29	725
Bremstruweel	39	975
Oligotroof elzenbroek	0	0
Mesotroof elzenbroek	0	0
Vochtig berken-eikenbos	0	0
Berkenbroek / vochtig berken-eikenbos	0	0
Berken-eikenbos eiken-beukenbos	0	0
Total	4720	118000

Legenda items

Number of cells (frequency)

Area

Total, Average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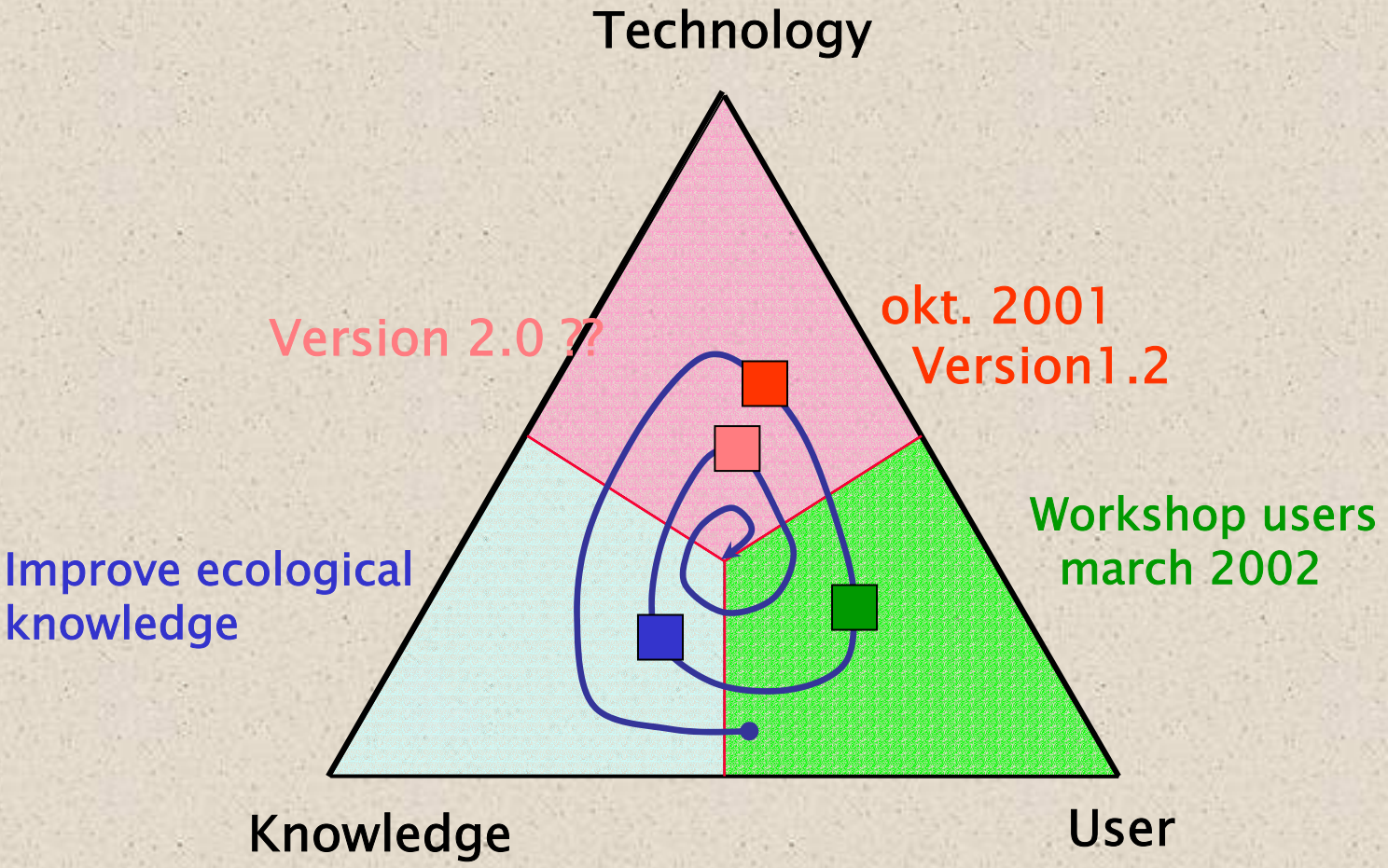
Zoning maps, Habitat and Bird directives
Maps and tables appreciation
Maps and tables management costs
Maps and tables target species
Map and tables nature value

Prototype DSS EcoVisie

- Technically good functioning instrument
  - Decisions are translated quickly in results ➔ interactive use
- Integrates environmental conditions and management
- Financial aspects are considered (costs, subsidies)
- Can be applied in any floodplain, if necessary input available

Prototype DSS EcoVisie

- For some applications ecological knowledge is insufficient
  - Relation species – ecotopes
  - Evaluation Nature Value (ecotopes, vision)
- Some functions are not considered
  - Spatial relations between ecotopes
  - Spatial relations between ecotopes and infrastructure
  - Time aspect for ecotope development
  - Feasability of scenario's


Technology
Version 2.0 ??
okt. 2001
Version1.2
Workshop users
march 2002
Improve ecological
knowledge
Knowledge
User