

UAS applications for habitat monitoring

Workshop Smart Inspectors, Friday October 25, 2013

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Wageningen, Wageningen UR, 25 October 2013

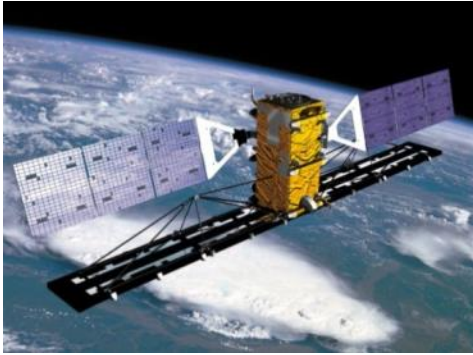


Introduction

- De Octocopter van Wageningen UR wordt o.a. ingezet op het Wekeromse Zand voor EU project BIO_SOS 'BIOdiversity multi-source monitoring system: from Space TO Species'.
- BIO_SOS ontwikkelt een systeem gebaseerd op remote sensing opnamen dat de effectieve, langjarige monitoring van NATURA 2000 gebieden en hun omgeving moet ondersteunen.
- Nieuwe inwinningsmethodieken worden geïntegreerd ingezet zoals gebruik Worldview -2 in combinatie met LiDAR om de vegetiestructuur goed in kaart kan brengen.
- Octocopter kan flexibel worden ingezet om sample of referentie sites goed in kaart te brengen.

Bridging scaling Gaps

Satellieten



Vliegtuigen



UAVs

In-situ

MISSING LINK →



Major objectives European habitat monitoring

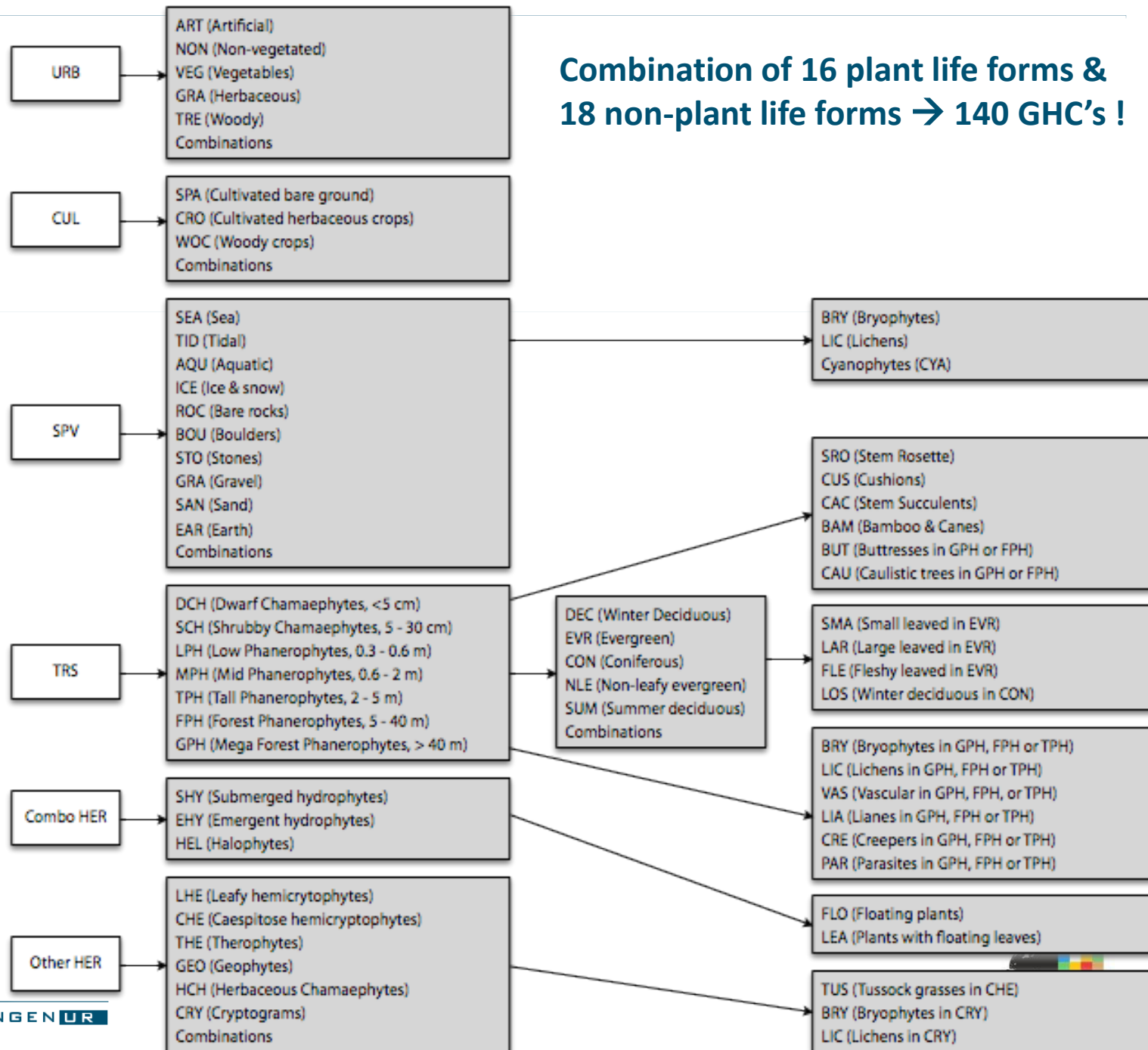
- To consistently collect European habitat information from each country
- To provide consistent European statistics
- To provide strict protocols for habitat mapping
- To support Natura 2000 monitoring

Habitat field recording

- Stratified random samples of 1km²
- Mapping of areal, linear and point habitats.
- Estimation % plant life forms per mapping unit !
- Life form: vegetative form of a plant based on position growth point during adverse period.
- Vegetation structure central.
- Dominant species per lifeform.
- Recording of additional qualifiers

Plant Life Forms

Combination of 16 plant life forms & 18 non-plant life forms → 140 GHC's !



Phanerophytes

- Phanerophytes: “plants whose stems, bearing the buds which are to form new shoots, project freely in to the air.”

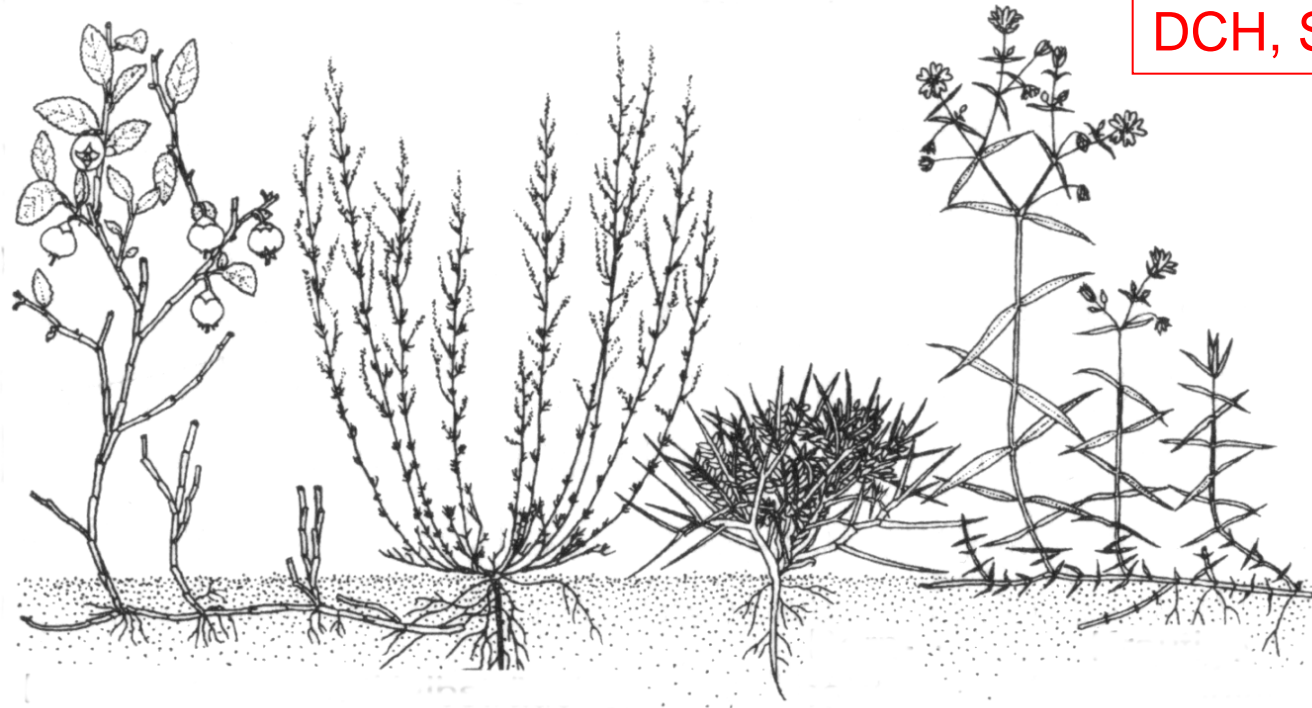


Life Forms: LPH,
MPH, TPH,
FPH, GPH

Chamaephytes

- Chamaephytes: "... having the surviving buds situated closed the ground."

Life Forms:
DCH, SCH



From: E. Padoa-Schioppa

Hemicryptophytes

- Hemicryptophytes: “ which has the surviving buds in the soil-surface, protected by the soil itself and by the dead portion of the plant.”

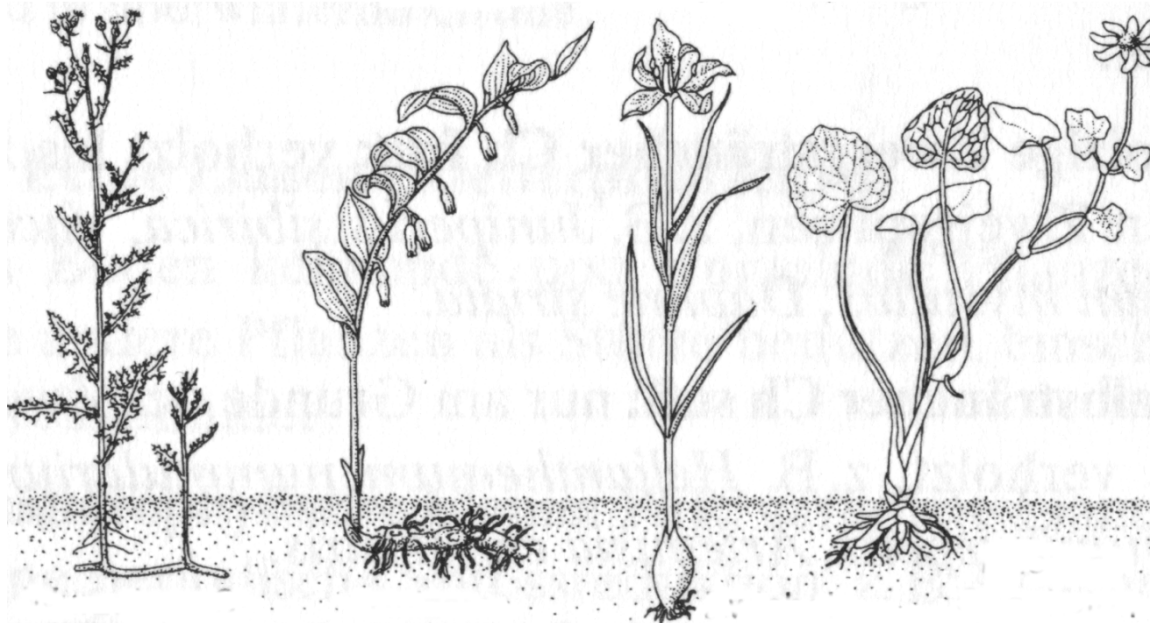
Life Forms:
LHE, CHE



From: E. Padoa-Schioppa

Cryptophytes

- Cryptophyte: “ is characterized by having its buds completely concealed in in the ground or at the bottom of the water” (Geophytes – Helophytes – Hydrophytes)



Life Forms:
GEO, HEL,
SHY, EHY

From: E. Padoa-Schioppa

Therophytes

- Therophytes: “ plants which complete their life cycle within a favourable season and remain dormant in the form of seeds during unfavourable periods.”



Life Form:
THE

From: E. Padoa-Schioppa

Image & recording sheet



Used environmental code

5.3 Neutral Mesic

Used site codes

143 Consolidated elastic siliceous (e.g. sandstone)

162 Brown earth

236 below 1% tree cover, but above 6 trees/ha

Used management codes

304 Active

313 Grazing (beef)

316 Grazing (horses for recreation)

323 Grazing (other exotic animals)

350 residential

397 intensive crop (= less than 10 weed species per 10 m²)

401 ploughed

407 cut for hay

422 plantation native species

used species codes

501 wheat

511 maize

520 walnut

used codes of linear elements

638 sunken road

Areal Unit Recording Sheet

Square name: Korbeek-Dijle

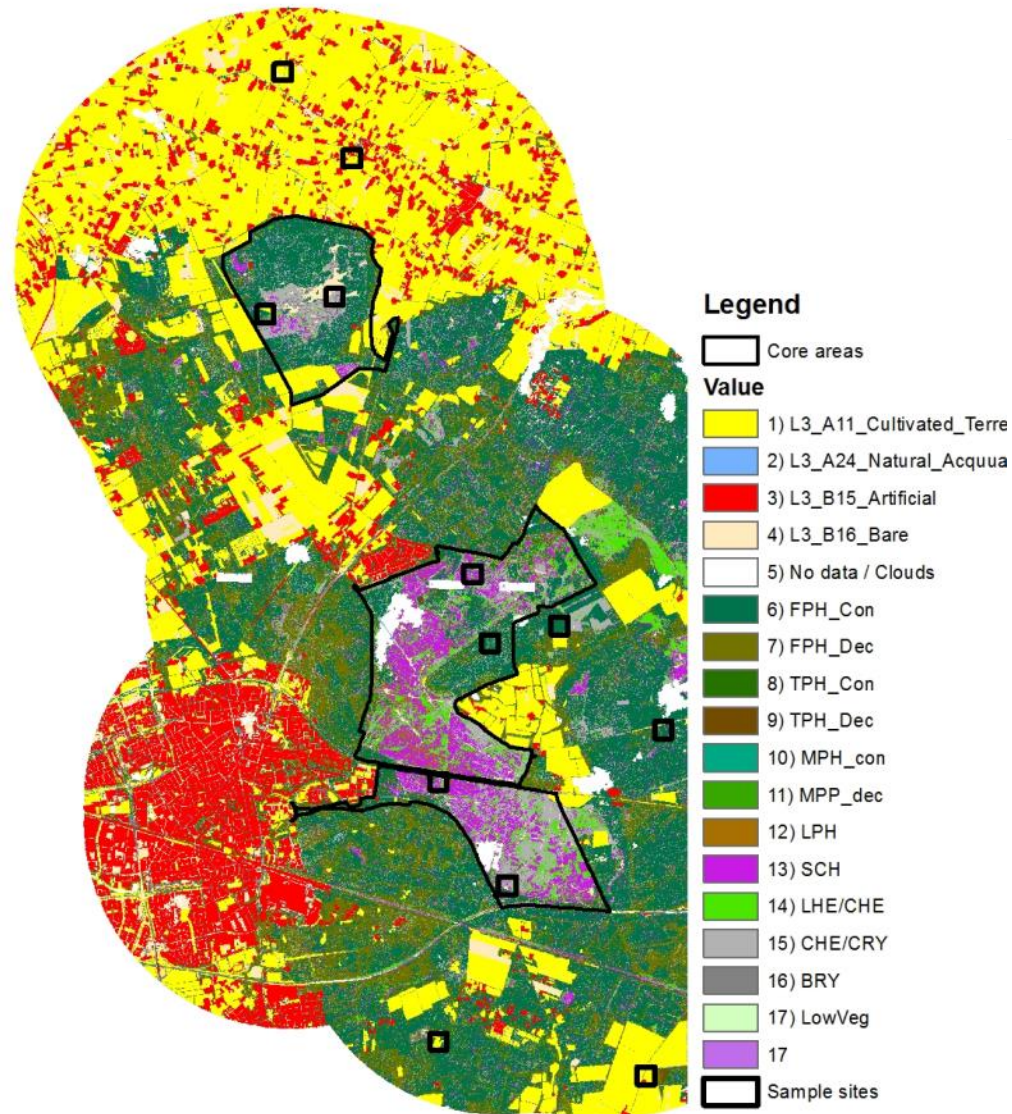
Observer: Bob Buaso, Gaert De Blast, Desiré Paclinsckx

Date: 24/05/2005

code	Field 1	Field 2	Field 3	Field 4	Field 5				Field 6	Field 7	Field 8
					Life form/Species		Pan Europ class				
cl	General Habitat category	Global Env. Qualifier	Site Qualifier	Nat. Qualifier	Life form	%	Species	%			
A	URN/ART/GRA urban/artificial/ herbaceous	-1	0	304 350	-1				-1	un	-1
B	HER/CHIE herbaceous/ caespitose hemicryptophytes	5.3	162	323 313 226 422	CHIE	100	Lolper	100	NA	hp	NA
C	FPN/DEC Forest phanerophytes/ winter deciduous	5.3	162 143	638	FPN	90	Frax Salix	70 30	NA	kw	NA
D	HER/CHIE	5.3	162	313	CHIE	100	Achillea	10	NA	hp	NA
E	HER/LHE/CHIE herbaceous/leafy and caespitose hemicryptophytes	5.3	162	316	CHIE LHE	70 30	Anthrax Agroup	30 20	NA	hp + hp*	NA
F	CUL/CRO Cultivated herbaceous crops	5.3	162	397	0	0	511	0	-1	bl	-1
G	CUL/CRO	5.3	162	397	0	0	501	0	-1	bl	-1
H	CUL/SPA Cultivated Bare Ground	5.3	0	0	0	0	0	0	-1	bl	-1
I	CUL/WOC Cultivated Woody Crops	5.3	0	401 407	CUL/SPA CHIE	50 50	520 Apple Arthen	0 0 30	-1	ky/bl + ky/hp*	-1
Unique Codes/species											

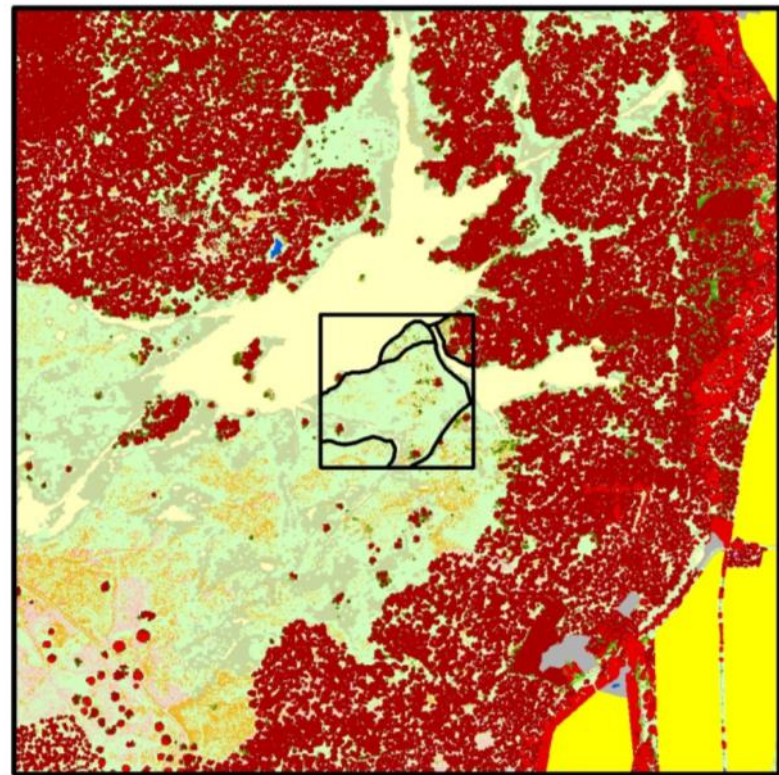
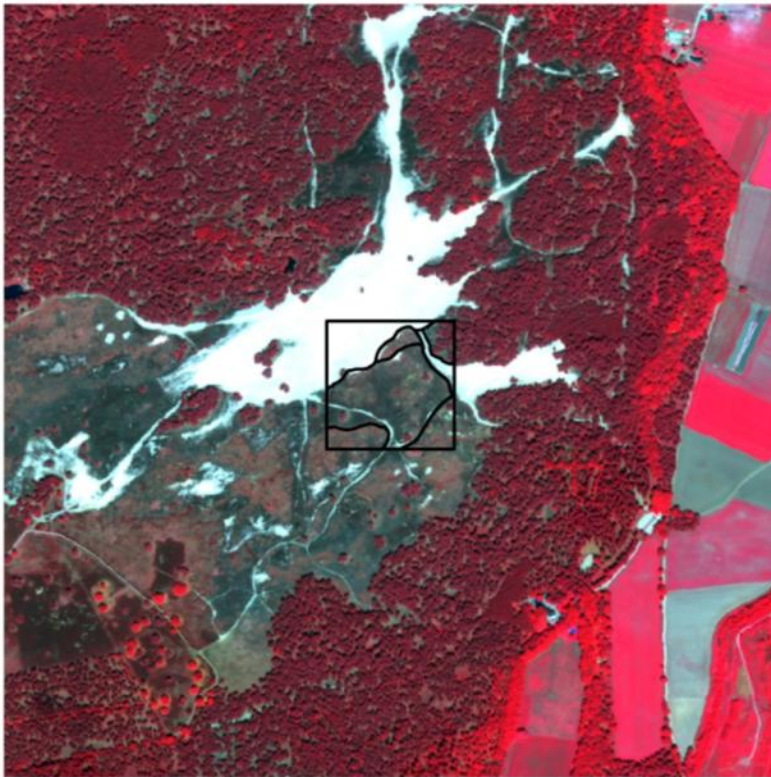
Sampling design fieldwork BIOSOS









Stratified random sampling



Nr Samples	Inside	Outside
Agriculture		3
Forest	2	3
Heathland	3	
Sand dunes	1	
Total	6	6

Sample 1410



- | | | |
|--|---|---|
|  A11 Cultivated terrestrial |  CHE/CRY |  MPH_Dec |
|  B15 Artificial |  LHE/CHE |  TPH_Con |
|  B16 Bare |  SCH |  TPH_Dec |
|  B27 Artificial water |  LPH |  FPH_Con |
|  BRY |  MPH_Con |  FPH_Dec |

Including 51 vegetation plots cov. all samples

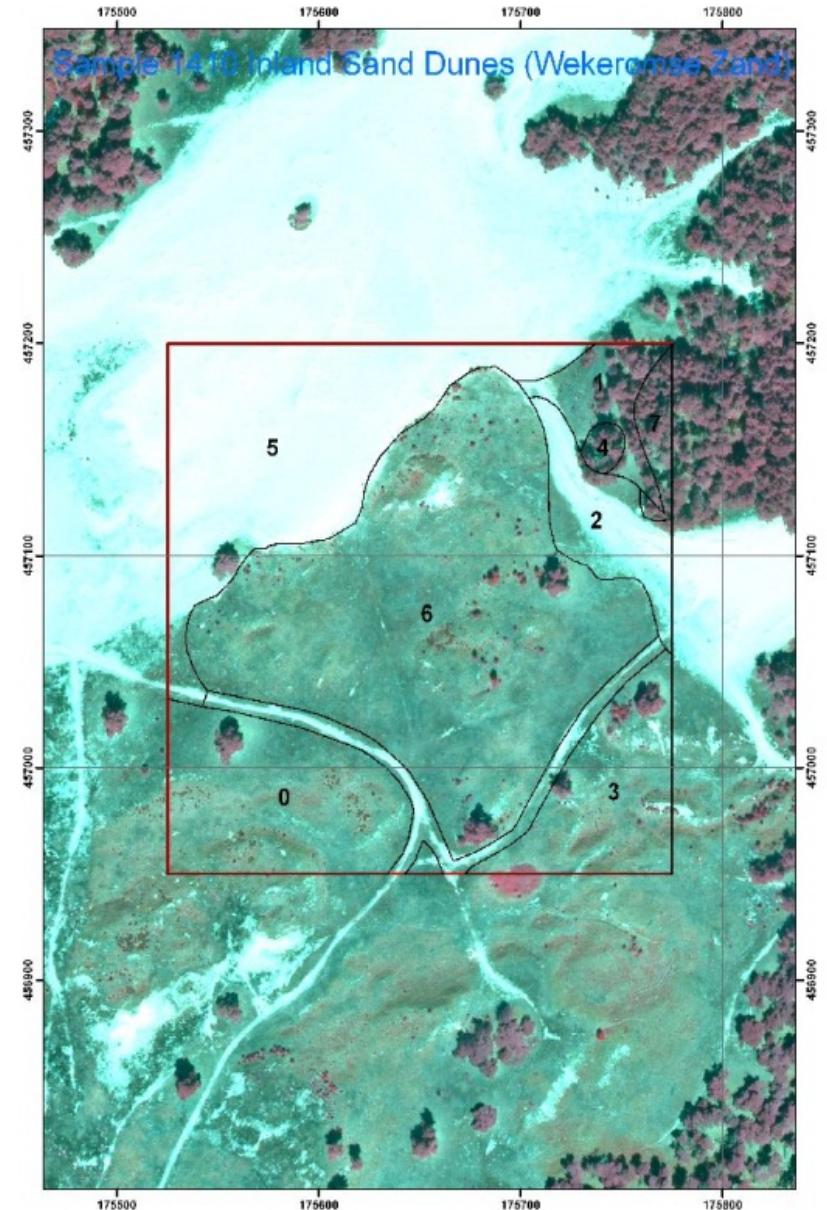
Observer: Raymond van der Wijngaart

Date: 18-8-2011

Location: Wekeromse zand. X-plot 1410-C1

GHC /EN V.O ua:

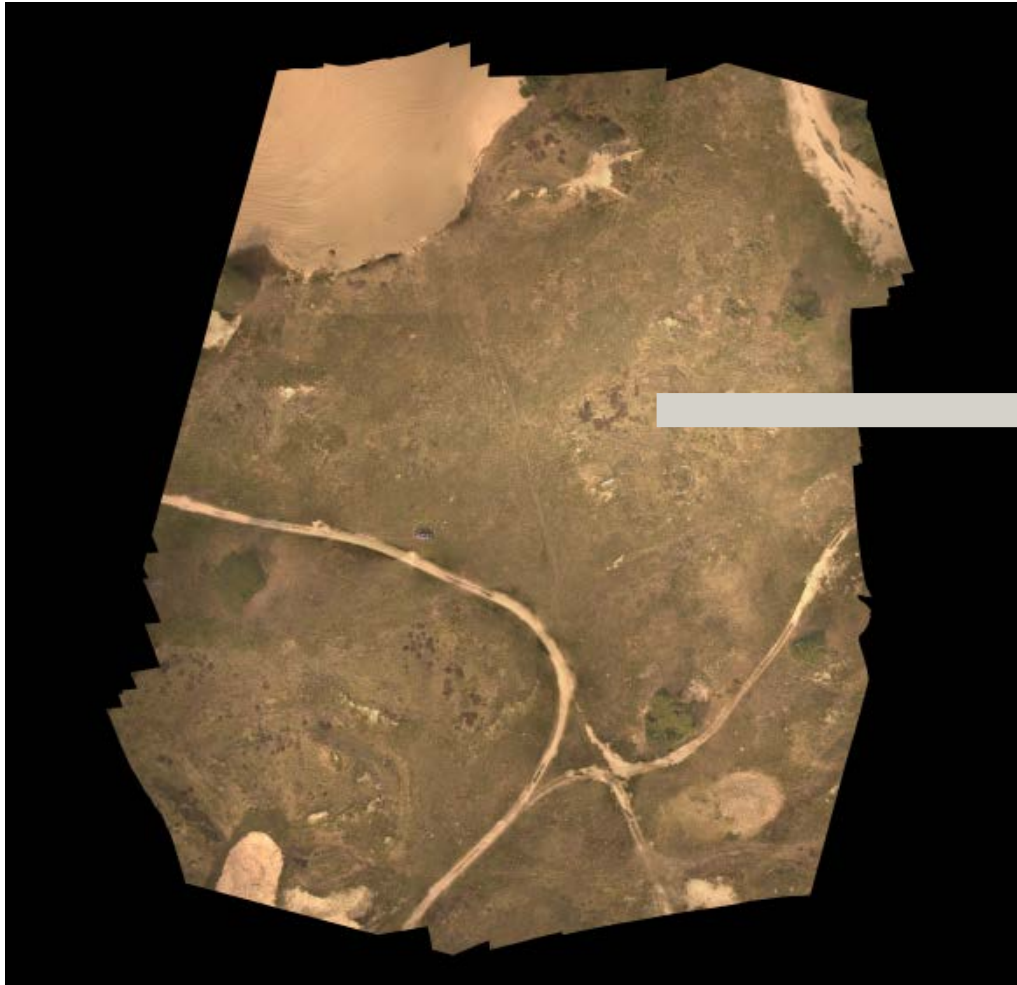
Plot	Code	Species	%
4m ²		<i>Corynephorus canescens</i>	5
		<i>Festuca filiformis</i>	1
		<i>Agrostis vinealis</i>	1
		<i>Rumex acetosella</i>	1
		<i>Spergula morisonii</i>	1
		<i>Cladonia uncialis</i>	1
		<i>Cetraria aculeate</i>	1
		<i>Campylopus introflexis</i>	95
		<i>Cladonia floerkeana</i>	1
		<i>Cladonia ramulosa</i>	1
		<i>Cladina portentosa</i>	1
		<i>Cladonia grayi</i>	1
	25m ²		<i>Pinus sylvestris</i>
		<i>Cladonia fimbriata</i>	1
		<i>Cladonia foliacea</i>	1
50m ²		<i>Politrichum piliferum</i>	1
		<i>Cladonia coccifera</i>	1
100m ²		<i>Cladonia glauca</i>	1
		<i>Cladonia crispata</i>	1
		<i>Cladonia macilentata</i>	1
		<i>Hypnum jutlandicum</i>	1
		<i>Dicranum scoparium</i>	1
		<i>Cladonia strepsilis</i>	1
		<i>Cladonia squamosa</i> ??	1



Area3 (Sample 1410) - Orthoimage

Mosaic

Detail



Invasive moss *Campylopus introflexus*

Direct monitoring Forest Cuts Wekeromse Zand

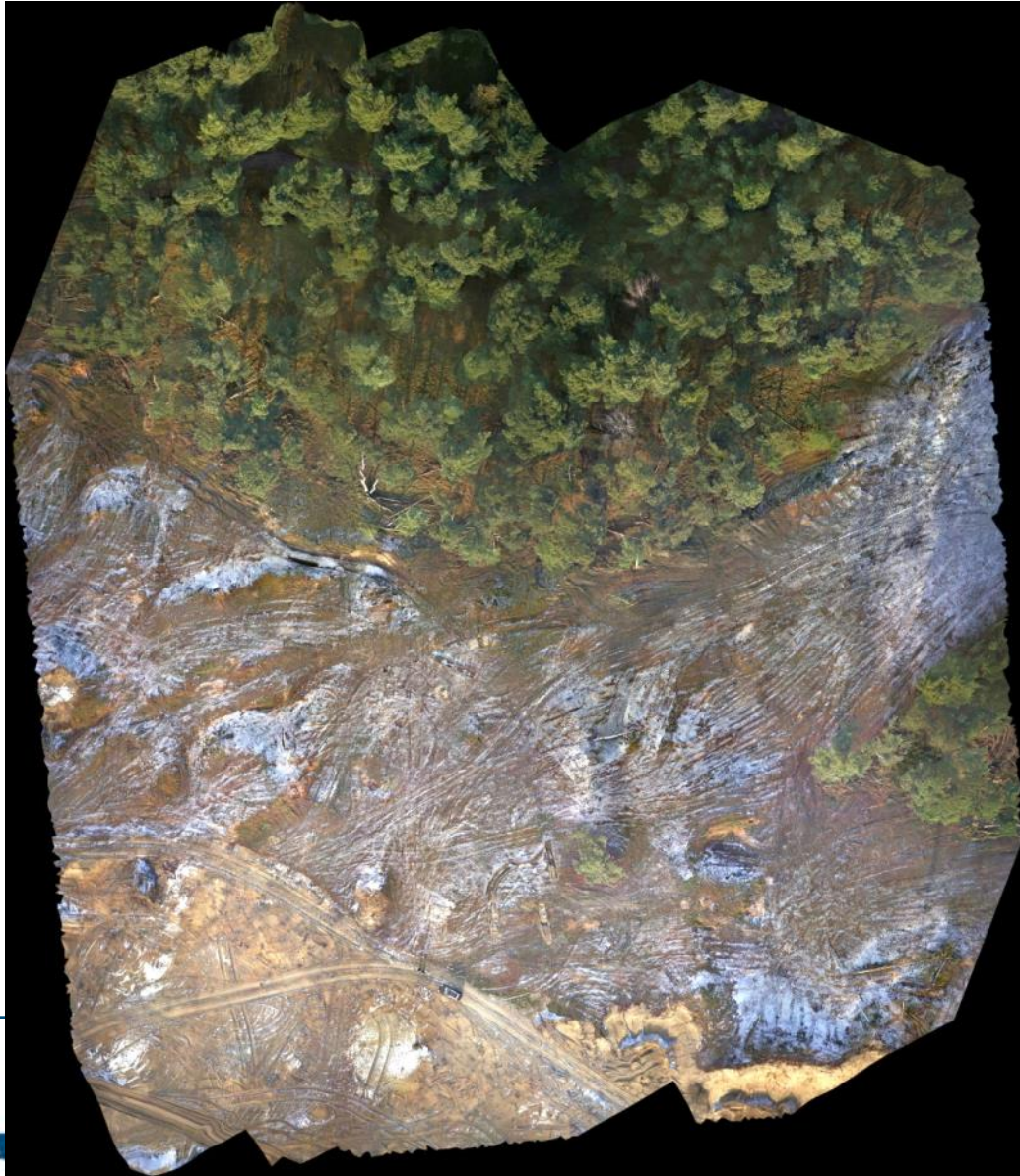


Oblique opname gemaakt vanuit Octocopter

Forest
cuts



Monitoring Deforestation Wekerom



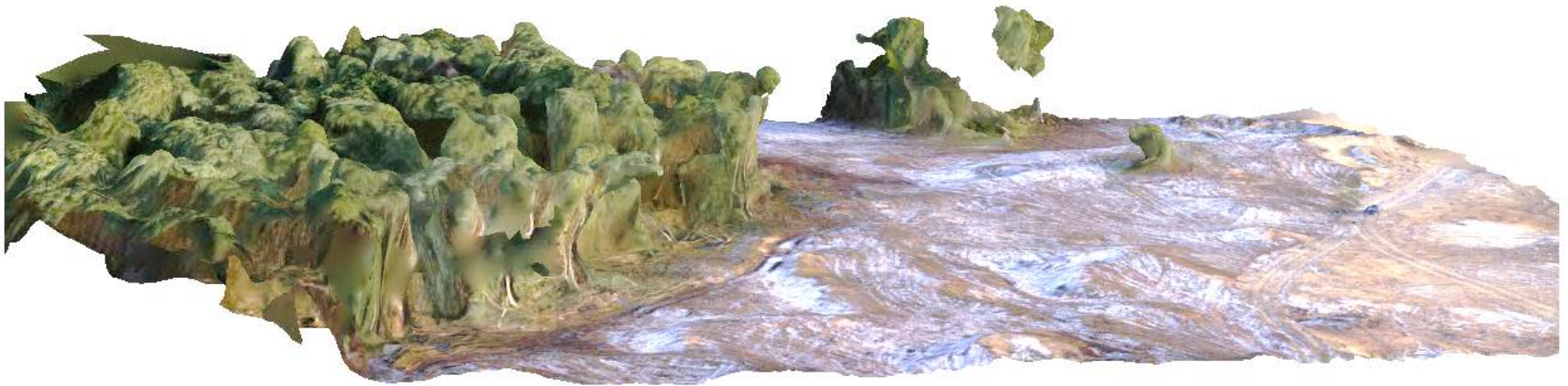
Google Earth



Jappe Franke , Juha Suomalainen
Philip Wenting



3 D model



Preliminary conclusions

- Maximum user flexibility with Octocopter.
- Providing up-to-date sample recording.
- Available hyperspectral and multispectral camera's not sufficient in spatial detail for plant species
- Optical camera's sufficient spatial detail but not easy to classify.
- Camera's need to be improved !
- Octocopter excellent platform to obtain 3D vegetation structure to support habitat recordings



Thank you for your attention!

