

# Monitoring design for Natura 2000 habitats in Flanders



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Final conference LIFE+ MOTH, 11 - 12  
November 2014, Uppsala, Sweden

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**inbo**



Research Institute  
for Nature and Forest

# Overview

## ● Introduction

- Natura 2000 habitats in Flanders

- Natura 2000 monitoring in Flanders

## ● Monitoring strategy for Natura 2000 habitats

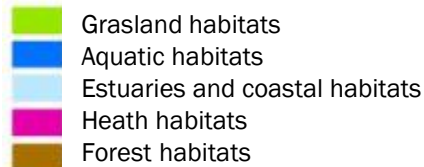
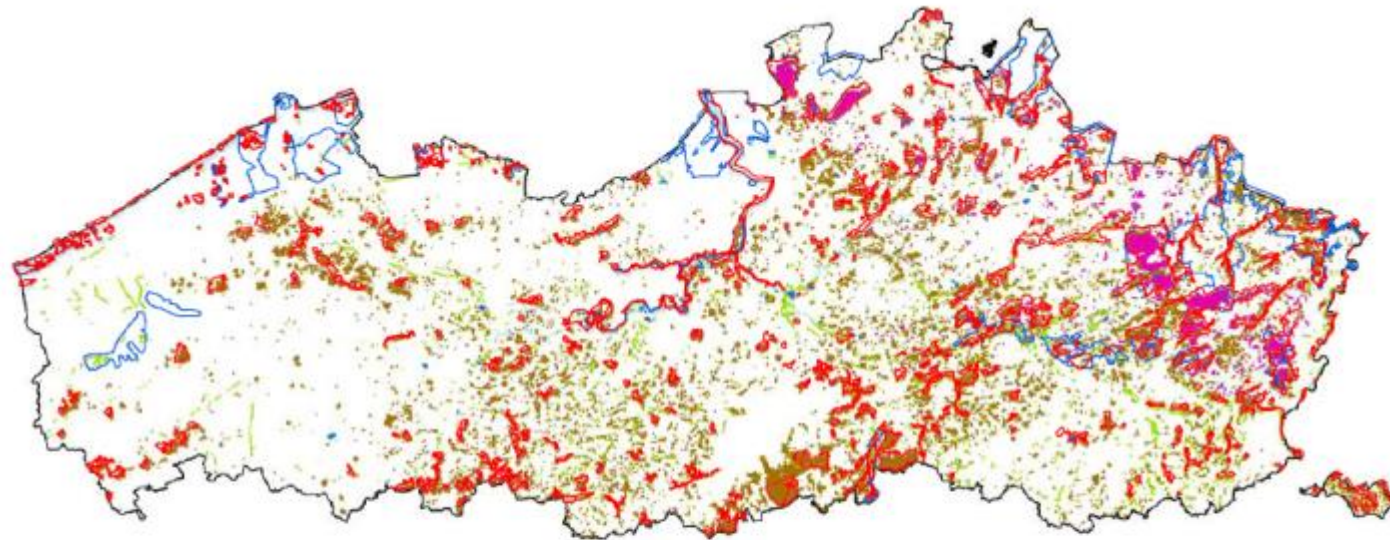
## ● Design of monitoring scheme for Natura 2000 habitat quality

- Measurements

- Sample size

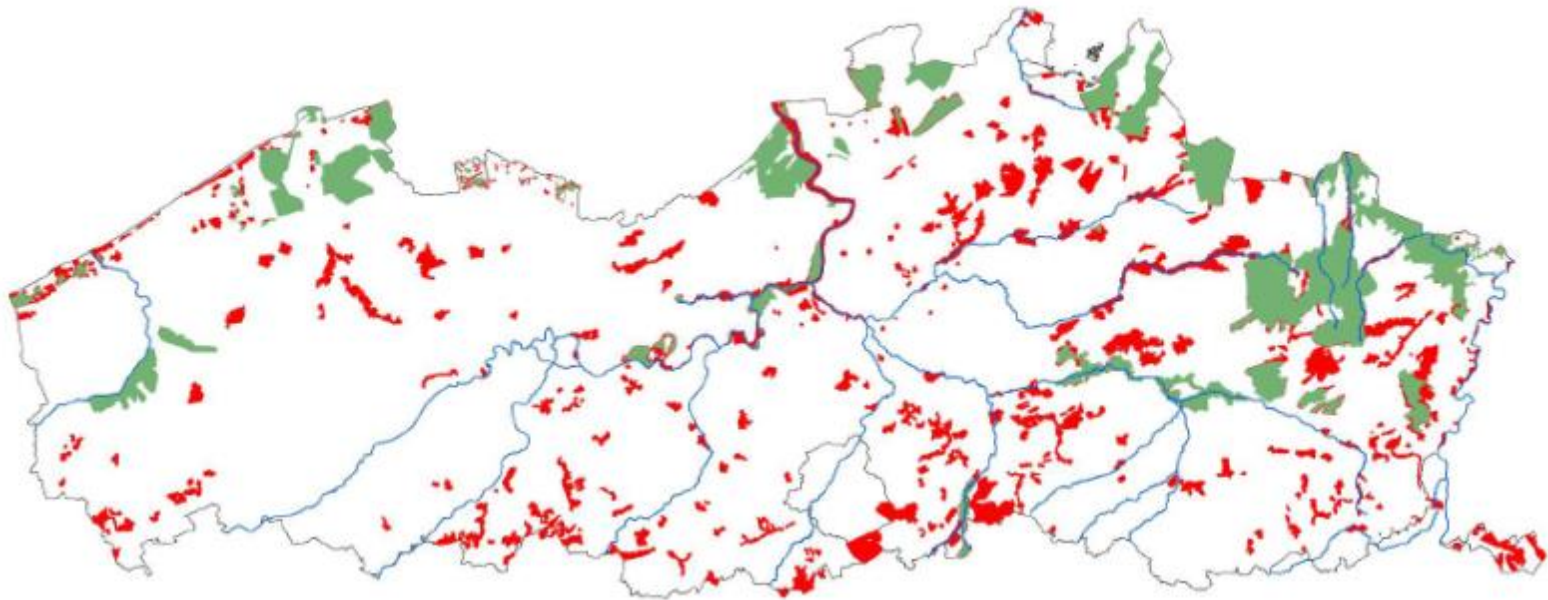
- Sampling technique

# Introduction – Natura 2000 habitats in Flanders



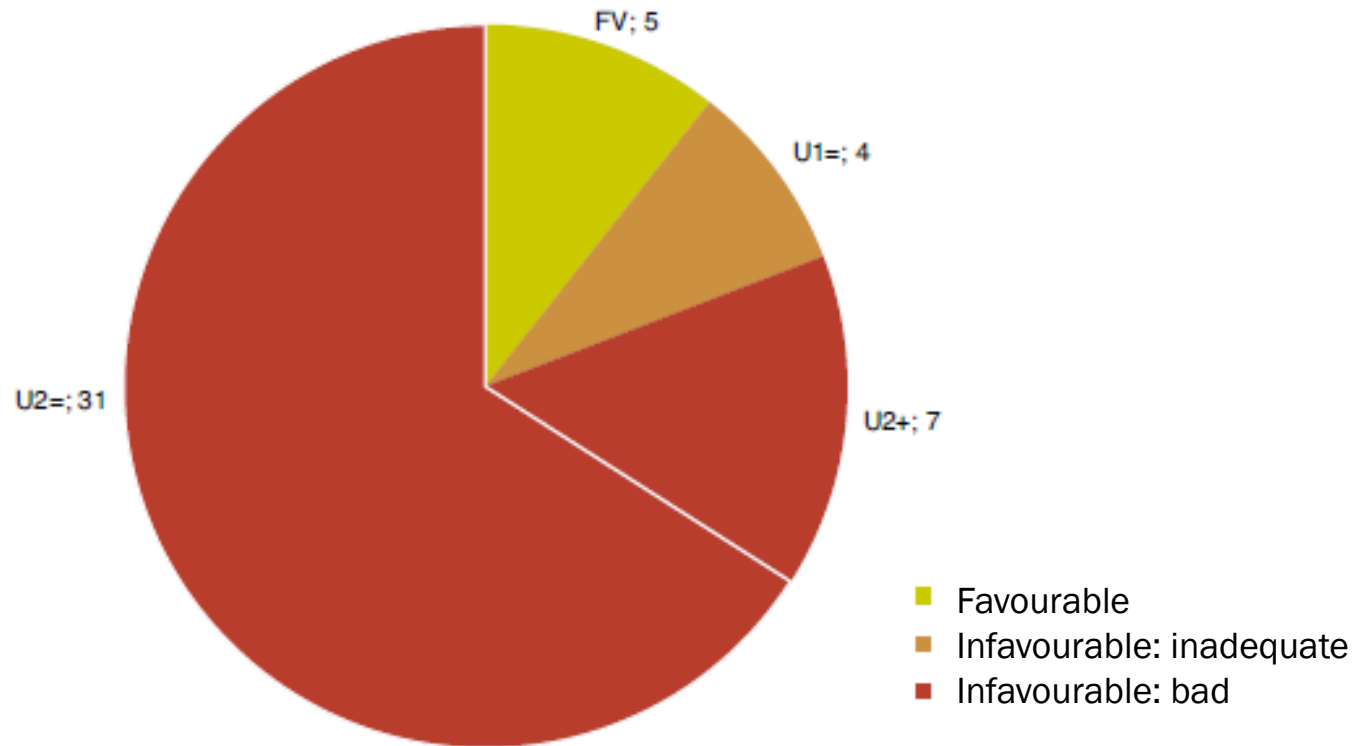
- 66000 hectares Natura 2000 habitat types (4,8% of Flanders)

# Introduction – Natura 2000 habitats in Flanders



- Natura 2000 network: 166.000 ha (12,3% of Flanders)
  - SAC (Habitat directive): 105.000 ha
  - SPA (Bird directive): 98.000 ha

# Introduction – Natura 2000 habitats in Flanders



Conservations status (2013): 38 of 47 habitat types unfavourable: bad

# Introduction – Natura 2000 monitoring in Flanders

☉ INBO is responsible for Natura 2000 monitoring in Flanders (= ~ Atlantic region of Belgium)

☉ Habitats (Habitat directive)

☉ Species (Habitat and bird directive)

☉ Abiotic factors



# Introduction – Systematic approach for Identifying and prioritizing monitoring targets

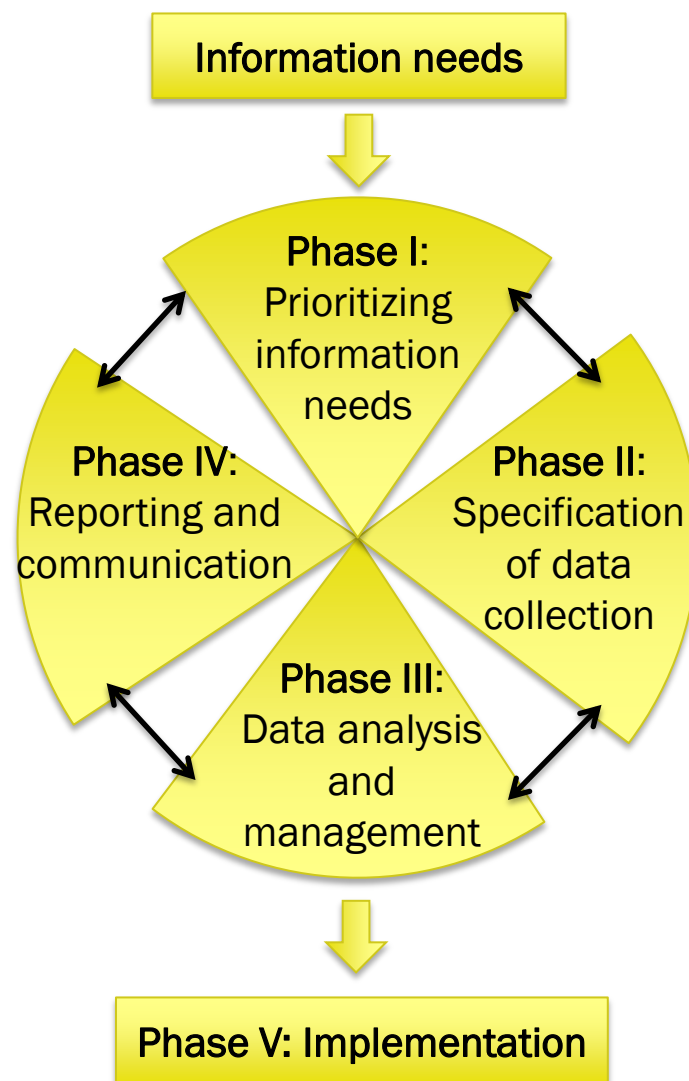
● INBO developed a practical guide for designing monitoring networks

● Both for scientist and policy makers

● 5 phases

● Key points (Evident, but often neglected/ignored...)

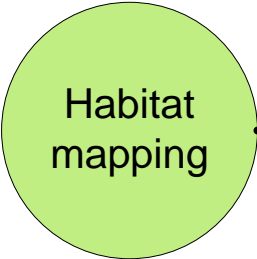
- Interaction between designer and client/policy maker
- Clearly define questions/targets
- Prioritize
- Avoid false expectation
- Program >< project monitoring



# Monitoring strategy for Natura 2000 habitats

Monitoring Strategy

Information needs

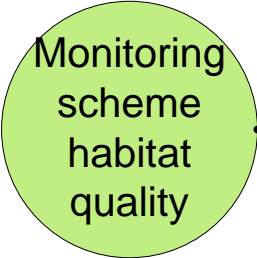


Area/ distribution

	N2000	Regional habitats of importance
Flanders	Green	Green
SAC Network	Green	Green
Individual SAC	Green	Green

Habitat Quality

	N2000
Flanders	Yellow
SAC Network	Yellow
Individual SAC	Yellow



Area/ distribution

	N2000	Regional Habitats of importance
Flanders	Yellow	Red
SAC Network	Yellow	Red
Individual SAC	Red	Red

Habitat Quality

	N2000
Flanders	Green
SAC Network	Green
Individual SAC	Red

- Information needs fully covered
- Information needs partially covered
- Information needs not covered



# Monitoring strategy for Natura 2000 habitats

## ☛ Habitat mapping

- ☛ Field-based
- ☛ All SAC's and all (known) habitat locations outside SAC's are mapped
- ☛ 12 year cycle

## ☛ Monitoring scheme for habitat quality

- ☛ Sample-based approach
- ☛ Separate sample for each habitat type
- ☛ Not for scarce habitat types (<10 ha) → habitat quality assessed in combination with habitat mapping
- ☛ 12 year cycle
- ☛ Synergy with existing monitoring schemes (Forest, dunes, estuary)

# Monitoring scheme habitat quality: measurements

## ☞ What do we measure?

- ☞ Indicators for (local) habitat quality from existing tables for each habitat type
  - Indicators based on vegetation composition and structure
  - Positive and negative indicators
  - Target values for indicators to distinguish between favourable and unfavourable habitat quality

## ☞ Measuring technique?

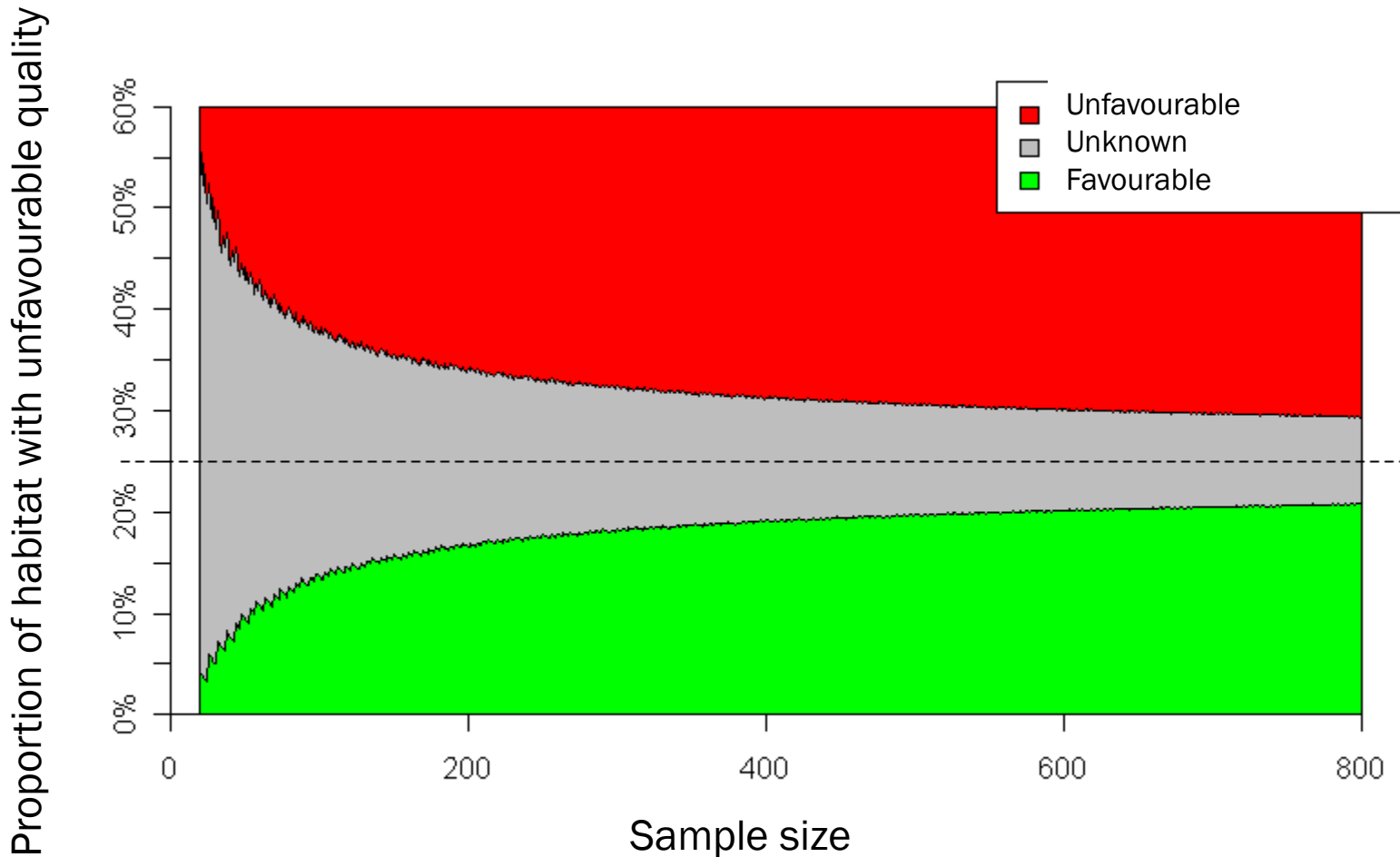
- ☞ Terrestrial habitat: 2 plots at each sample location
  - Circular plot of 18m diameter → structural indicators
  - Square plot (16 x 16m for forest and 3 x 3 for all other habitat types) → species composition and cover (all species)
- ☞ Standing water bodies: sampling unit = entire water body
- ☞ Rivers: sampling unit = 100 m transect

# Monitoring scheme habitat quality: sample design

## ☉ Sample size

- ☉ Proportion of habitat with unfavourable (local) quality is estimated from a sample of locations
- ☉ Overall quality of a habitat is unfavourable if  $\geq 25\%$  of habitat is (locally) unfavourable
- ☉ Sample size determines if estimated proportion is significantly different from 25%-norm

# Monitoring scheme habitat quality: sample design



# Monitoring scheme habitat quality: sample design

- ☉ Sample size = 170:

- ☉ if  $\geq 35\%$  of sampling units unfavourable

- proportion in target population is significantly larger than 25%-norm

- Minimal detectable difference ( $\Delta$ ) of 10% (significance level= 5%; power=80%)

- ☉ Sample size = 80

- $\Delta = 15\%$

- ☉ Choise of sample size

- ☉ Habitattypes and subtypes (scale of Flanders) →  $\Delta = 15\%$

- ☉ Habitattypes within network of SAC →  $\Delta = 10\%$  → oversample within network of SAC

- ☉ Finite correction factor → decrease sample size for habitats with smaller areas

- ☉ In total (including existing sampling units)

- ☉ Terrestrial habitats = 4000 sampling units

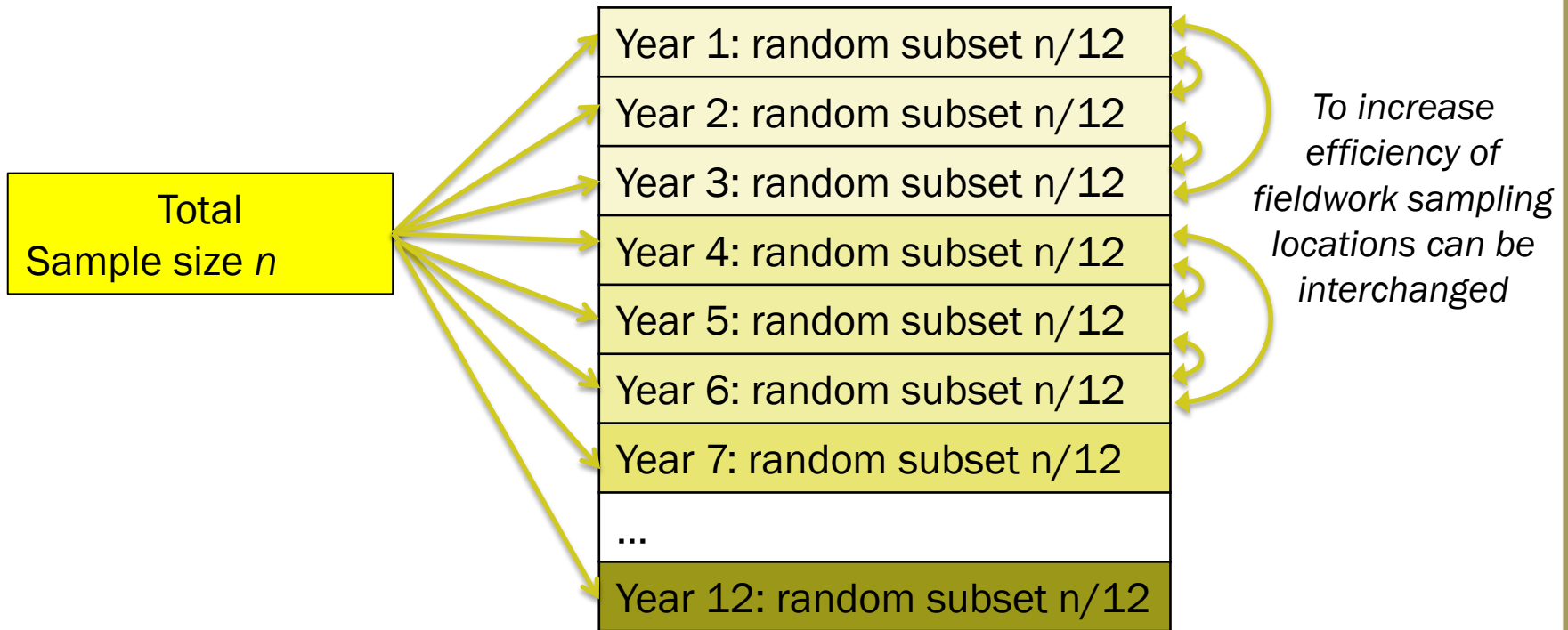
- ☉ Standing water bodies = 300 sampling units

- ☉ Streams = 170 sampling units

# Monitoring scheme habitat quality: sample design

- ☉ Sampling frame: (existing) habitat map of Flanders
- ☉ Sampling technique: spatially balanced random sample
  - ☉ 32m x 32m grid over Flanders
  - ☉ Random ranking number for all grid points (GRTS-algorithm)
  - ☉ Overlay with grid and sample frame → select n gridpoints with lowest ranking

# Monitoring scheme habitat quality: sample design



# Monitoring scheme habitat quality: current status

- 2013: Pilot projects → field protocols
- 2014: Start-up heathland habitats, one grasland habitat (6510), standing water bodies
- 2015 and onwards:
  - Phased start-up of other habitat groups
  - Preliminary data analysis



**Thanks for your attention!**

**Questions?**