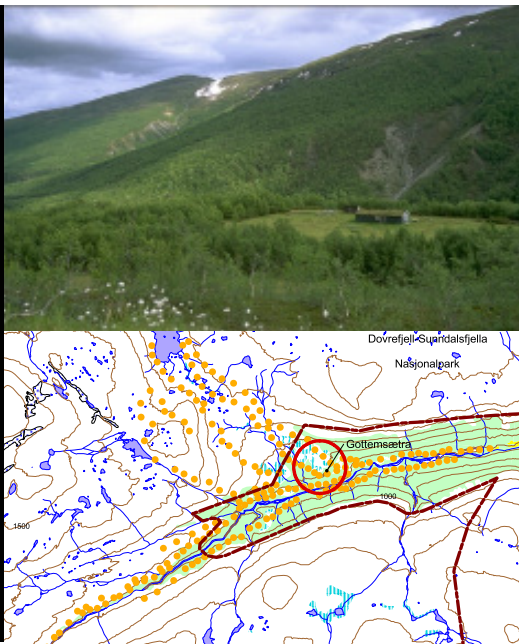


BioMAT Module 3 Monitoring design tool

Erik Framstad, NINA



EuMon – EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest – EuMon Conference: 28.-30. January 2008



BioMAT Module 3: Strategic advice on design of monitoring

Idea of Module 3

- What's the best generic approach to monitoring, given various objectives and constraints?
- How does a given monitoring scheme compare to recommended schemes?

Need to

- clarify objectives & constraints
- limit possibilities to a few main approaches

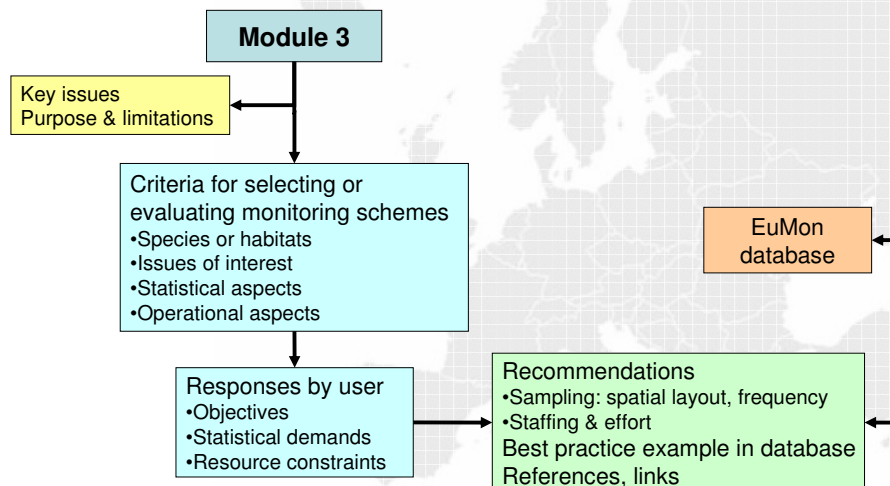
(many issues are relevant, only some have a few clear alternative outcomes)



EuMon – EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest – EuMon Conference: 28.-30. January 2008



Module 3 main structure



EuMon – EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest – EuMon Conference: 28.-30. January 2008



Issues of interest: changes in state & trends of species or habitats

Species

- distribution
- abundance
- species diversity
- demography
- phenology
- causes of change

Habitats

- amount (patch number, area)
- habitat type distribution
- patch size distribution
- patch spatial structure
- habitat quality
- phenology
- causes of change

Site-based monitoring

- site-specific objectives
- often species & habitats



EuMon – EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest – EuMon Conference: 28.-30. January 2008



Species issues of interest – which measures are relevant?

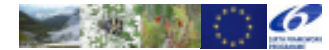
- | | |
|------------------------|--|
| • species distribution | ⇒ presence/absence |
| • species abundance | ⇒ numbers, density |
| • species diversity | ⇒ relative/absolute frequency |
| • demography | ⇒ special measures, estimates |
| • phenology | ⇒ timing of specific occurrences |
| • causes of change | ⇒ information on specific causes, linked to observations |

Habitat issues of interest – which measures are relevant?

- | | |
|-----------------------------------|--|
| • habitat amount | ⇒ patch number, area, by type |
| • habitat type distribution | ⇒ relative/absolute frequency, by type |
| • habitat patch size distribution | ⇒ patch size data, by type |
| • habitat patch spatial structure | ⇒ measures of specific spatial attributes, by type |
| • habitat quality | ⇒ measures of specific attributes |
| • phenology | ⇒ timing of specific occurrences |
| • causes of change | ⇒ information on specific causes, linked to observations |

Data sources

- Complete coverage: Remote Sensing
- Sampled data: field measures



Habitat typology

- Habitat types refer to a specific classification
 - Habitat Directive Annex 1
 - EUNIS
 - A wide range of local typologies
- Here we assume that
 - A specific typology is selected (where necessary)
 - Each type can be identified and delimited from other types on the basis of measured properties in nature
 - We do not cover habitat classification methods etc here

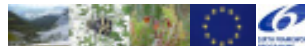
Statistical aspects

- Spatial coverage & representativity
 - Focal area defined?
 - Target species/habitats distribution over focal area?
 - Aim: unbiased estimate from focal area
- Response time & sensitivity
 - How great a change would we like to discover within a given observation period?
 - Power: probability of observing real change
 - Confidence that observed change is real
 - Info on Standard Errors needed

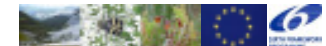
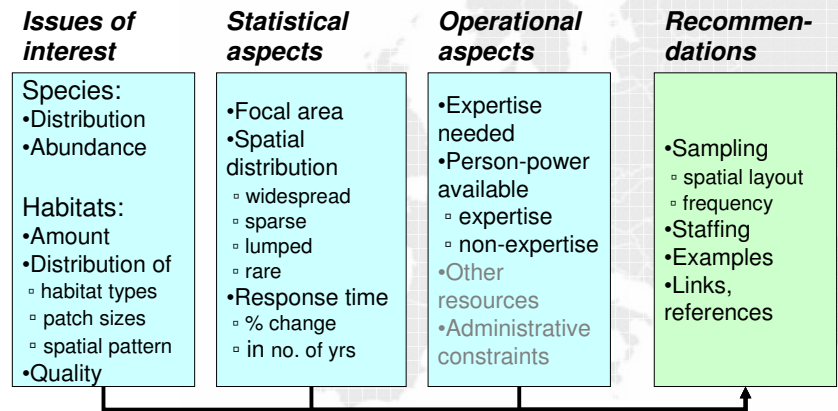


Operational constraints

- Expertise & person-power needed
 - Is professional expertise essential?
 - Can volunteers contribute?
 - How many are needed?
 - Accessible at relevant time and place?
- Other resources available
 - Infrastructure & money
- Administrative constraints
 - Defined roles & responsibilities
 - Long-term funding/resource commitment
 - Agreed access to sites
 - Clear IPR



User preferences ⇒ recommended approach



Abundance of common birds

- | | |
|--|---|
| <ul style="list-style-type: none"> • Issue <ul style="list-style-type: none"> – bird abundance (cf EU Headline indicator) • Statistical aspects <ul style="list-style-type: none"> – focal area: whole country – spatial pattern: widespread – response time: 30% change over 10 yrs • Operational aspects <ul style="list-style-type: none"> – expertise needed – trained volunteers OK | <ul style="list-style-type: none"> • Recommendations <ul style="list-style-type: none"> – stratified random sampling by main nature types – annual counts on ≥200 sites, need ≥50 positive obs – mobilise & train volunteers, need ≥1 per 5 sites • References to <ul style="list-style-type: none"> – short text on alternative census methods – examples in database – deliverable docs on analysis of data – standard texts on census methods |
|--|---|



Distribution of red-listed invertebrate species

- | | |
|--|--|
| <ul style="list-style-type: none"> • Issue <ul style="list-style-type: none"> – geographical distribution of selected threatened species (cf IUCN criteria) • Statistical aspects <ul style="list-style-type: none"> – focal area: whole country – spatial pattern: rare/lumped – response time: 30% change over 10 yrs • Operational aspects <ul style="list-style-type: none"> – experts needed – trained volunteers possible <p><i>Do we need information on species group and their main habitats?</i></p> | <ul style="list-style-type: none"> • Recommendations <ul style="list-style-type: none"> – stratified random sampling in relevant habitat types – presence/absence at known & ≥100 new sites, every 5-10 yrs – mobilise & train volunteers, need 1 per 10 sites • References to <ul style="list-style-type: none"> – short text on alternative inventory methods – examples in database – deliverable docs on analysis of data – standard texts on inventory methods |
|--|--|



Amount & quality of high nature value (HNV) farmland

- Issue
 - amount and quality of habitat types covering HNV farmland
 - Statistical aspects
 - focal area: whole country
 - spatial pattern: lumped
 - response time: 30% change over 10 yrs
 - Operational aspects
 - expertise needed
 - trained volunteers OK
 - relevant Remote Sensing data available at 5yr intervals
- Assumed*
- *criteria for habitat types defined*
 - *quality criteria given*
- Recommendations
 - amount: analyse RS data for relevant geographical regions
 - quality: stratified random field sampling by nature types, every 5 yrs
 - measures on all or ≥ 100 sites
 - mobilise & train volunteers, need 1 per 20 sites
 - References to
 - short text on alternative RS analysis & habitat quality issues
 - examples in database
 - deliverable docs on habitat issues
 - standard texts on habitat mapping methods

Perspectives for the workshop

- Which are the key issues, which have a limited number of alternative outcomes, for
 - Monitoring issues
 - Statistical aspects
 - Operational aspects
- What's the optimal user interface to limit tedious questions and provide relevant answers?
- What kind of strategic recommendations will users find interesting?
 - sampling strategy: space & time
 - person-power & other operational aspects
- How to make comparison to schemes in the database? (cf species & habitat evaluation yesterday)

