



# Biological assessment of terrestrial habitats



# A general procedure for assessing habitat quality

**A habitat quality assessment of  
current status and development over time**

**The Natura-2000 Nature Planning**

**(25.000 areas)**

**The National Nature Conservation**

**(63.000 areas)**

**Nature Restoration Projects**

**Environmental Impact Assessments**

**National Parks**

# 5 quality classes for Biological Status



**I High nature status, close to optimal**



**II Good nature status**

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**III Moderate nature status**



**IV Poor nature status**



**V Bad nature status**

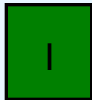

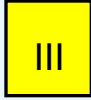

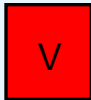
I & II represents the Habitat Directive's demands for Favorable Conservation Status

# Indicators for habitat quality

The Biological Status assessment is based on the evaluation of a set of indicators.

The Biological Status is assessed on a reference scale between 0 and 1, where 1 is the optimal condition without any negative pressures and 0 is the worst possible condition

Each indicator is evaluated separately and given a score between 0 and 1, and the biological status is then calculated from the weighted scores of the indicators

|                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|---------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Status class</b> |  |  |  |  |  |
| <b>Score</b>        | 1,0 - 0,8                                                                           | 0,8 - 0,6                                                                           | 0,6 - 0,4                                                                             | 0,4 - 0,2                                                                             | 0,2 - 0,0                                                                             |



# The field method

## 1. Delineate the area

## 2. Determine the habitat type

## 3. Register the structural indicators

## 4. Register plant species

Kortlægning af terrestriske habitatnaturtyper ver. 1.04

| Statens (MCH-tilsvaret)                                                                                                                                                                                                                                                                                                                  | Følges AFD på ansøg. | Del i folges registrering | inventar   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|------------|
| Habitatnaturtype                                                                                                                                                                                                                                                                                                                         | Arsenal / pct.       | Naturtype                 | Fællesnavn |
| <p><b>Vejgrøntstruktur (uden vegetation) L6</b></p> <p>Arsenal:</p> <p>uden vegetation (for jord, vand, vand...)</p> <p>areal</p> <p>struktur</p> <p>strukturvegetation under 15 cm</p> <p>strukturvegetation 15-50 cm</p> <p>strukturvegetation over 50 cm</p> <p>diverse</p> <p>vegetation/struktur</p> <p>totalt areal af arealer</p> |                      |                           |            |
| <p><b>Hydrologi (uden vegetation) L6</b></p> <p>Kyldning (uden vegetation)</p> <p>Arsenal:</p> <p>(1) Ingen kyldning</p> <p>(2) Kyldning af dybde kun</p> <p>(3) Kyldning af dybde tydelig</p> <p>(4) Kyldning af dybde stærkt</p> <p>(5) Ingen kyldning</p>                                                                             |                      |                           |            |
| <p><b>Afgræsning og drift (uden vegetation) L6</b></p> <p>Arsenal:</p> <p>afgræsning</p> <p>afgræsning af dybde</p> <p>afgræsning af dybde</p> <p>afgræsning af dybde</p>                                                                                                                                                                |                      |                           |            |
| <p><b>Naturtypekarakteristiske strukturer</b></p> <p>Arsenal:</p> <p>struktur</p> <p>struktur</p> <p>struktur</p> <p>struktur</p>                                                                                                                                                                                                        |                      |                           |            |
| <p><b>Bevoksning af nuværende drifttype</b></p>                                                                                                                                                                                                                                                                                          |                      |                           |            |



# Structural indicators in open habitats

The structural indicators reflect the negative influences on the habitats.

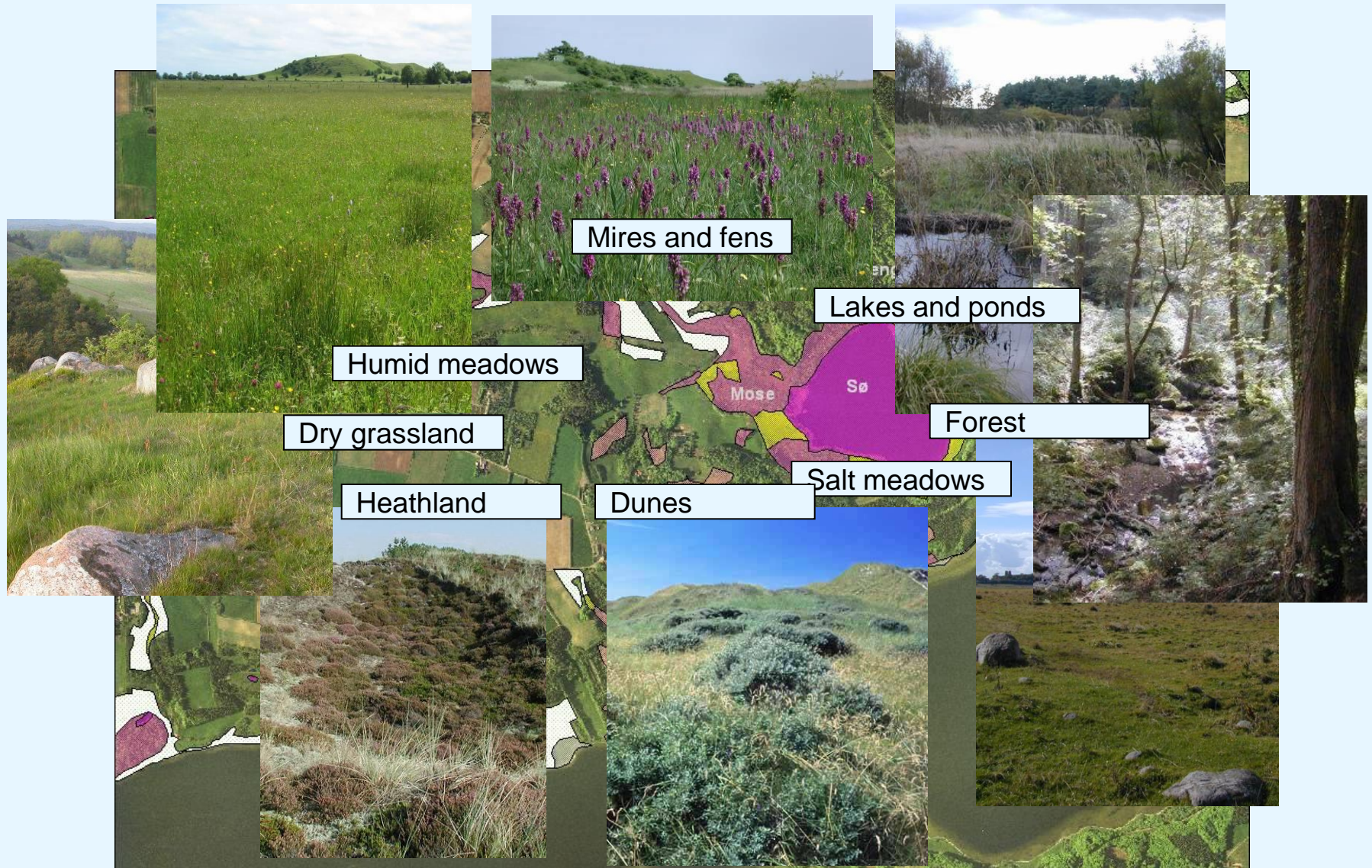
The structural indicators are common for all open habitats, but their influence varies from habitat type to habitat type:

- Vegetation structure
- Hydrology and coastal protection
- Grazing and management
- Agricultural eutrophication and spraying
- Habitat specific structures





# Area: Identification and delineation of habitats





The structural indicators are optimal

Management need is maintaining the current situation








Up to 10 % scrub and tree cover on grassland and heathland –  
More is a problem.

Raised bogs, salt meadows and alkaline fens should not have scrubs





Only absence of invasive species is acceptable. The different habitat types respond differently on invasive species



# Vegetation structure

## 1. Vegetation Structure

| Categories                                                 |       |        |        |         | Registration |
|------------------------------------------------------------|-------|--------|--------|---------|--------------|
| 1.                                                         | 2.    | 3.     | 4.     | 5.      |              |
| <b>Percent area without vegetation cover</b>               |       |        |        |         |              |
| 0-5%                                                       | 5-10% | 10-30% | 30-75% | 75-100% |              |
| <b>Percent area with grass/herb vegetation below 15 cm</b> |       |        |        |         |              |
| 0-5%                                                       | 5-10% | 10-30% | 30-75% | 75-100% |              |
| <b>Percent area with grass/herb vegetation 15-50 cm</b>    |       |        |        |         |              |
| 0-5%                                                       | 5-10% | 10-30% | 30-75% | 75-100% |              |
| <b>Percent area with grass/herb vegetation above 50 cm</b> |       |        |        |         |              |
| 0-5%                                                       | 5-10% | 10-30% | 30-75% | 75-100% |              |
| <b>Percent area with dwarf bush formation</b>              |       |        |        |         |              |
| 0-5%                                                       | 5-10% | 10-30% | 30-75% | 75-100% |              |
| <b>Percent area with tree cover (canope)</b>               |       |        |        |         |              |
| 0%                                                         | 1-10% | 10-25% | 25-50% | 50-100% |              |
| <b>Percent area with invasive species</b>                  |       |        |        |         |              |
| 0%                                                         | 1-10% | 10-25% | 25-50% | 50-100% |              |

# Hydrology and coastal protection

## 2. Hydrology og coastal protection

| Categories                                                 |                                                                      |                                                                                           |                                                                                          |                                                 | Registration |
|------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------|--------------|
| 1.                                                         | 2.                                                                   | 3.                                                                                        | 4.                                                                                       | 5.                                              |              |
| <b>Drainage and water catchment (bogs, mires and fens)</b> |                                                                      |                                                                                           |                                                                                          |                                                 |              |
| No drainage and water catchment                            | No vegetation changes from drainage or water catchment               | Drainage with summer desiccation and initial overgrowth                                   | Generally desiccated and overgrown with tall dryland species                             | Complete desiccation and with dryland character |              |
| <b>Coastal protection (coastal habitats)</b>               |                                                                      |                                                                                           |                                                                                          |                                                 |              |
| No coastal protection                                      | Coastal protection but with natural dynamics and vegetation zonation | Coastal protection with significant influence on natural dynamics and vegetation zonation | Strong coastal protection with fresh water dominated vegetation and only little zonation | Fresh water vegetation with no salt influence   |              |
|                                                            |                                                                      |                                                                                           |                                                                                          |                                                 |              |



# Agriculture and Nature management

## 3. Grassing and nature management

| Categories                                           |       |        |        |         | Registration |
|------------------------------------------------------|-------|--------|--------|---------|--------------|
| 1.                                                   | 2.    | 3.     | 4.     | 5.      |              |
| <b>Percent area with grassing and/or hay cutting</b> |       |        |        |         |              |
| 0-5%                                                 | 5-10% | 10-30% | 30-75% | 75-100% |              |

## 4. Agricultural pressures

| Categories                                                                           |       |        |        |         | Registration |
|--------------------------------------------------------------------------------------|-------|--------|--------|---------|--------------|
| 1.                                                                                   | 2.    | 3.     | 4.     | 5.      |              |
| <b>Percent area with significant effects from agricultural spraying and manuring</b> |       |        |        |         |              |
| 0%                                                                                   | 1-10% | 10-25% | 25-50% | 50-100% |              |

## 5. Habitat specific structures

| Categories of positive and <i>negative</i> structures |                         |                                                                                                        | Registration |
|-------------------------------------------------------|-------------------------|--------------------------------------------------------------------------------------------------------|--------------|
| 1: abundant                                           | 2: sparse/rudimentary   | 3: not present                                                                                         |              |
|                                                       | Habitat type            | Structure                                                                                              |              |
| 6230                                                  | <i>Nardus</i> grassland | Large stones, ant's nests, steep slopes. Scattered trees and bushes                                    |              |
|                                                       |                         | <i>eutroficated and dominated by Lolium per., Elytrigia rep., Cirsium arv., Cerastium and Poa ann.</i> |              |

# Each indicator is set to a category

| <b>Vegetation structure (set category 1-5)</b>              |              |               |               |                |          |
|-------------------------------------------------------------|--------------|---------------|---------------|----------------|----------|
| <b>area without vegetation cover</b>                        |              |               |               |                |          |
| (1)<br>0-5%                                                 | (2)<br>5-10% | (3)<br>10-30% | (4)<br>30-75% | (5)<br>75-100% | <b>1</b> |
| <b>area with grass/herb vegetation below 15 cm</b>          |              |               |               |                |          |
| (1)<br>0-5%                                                 | (2)<br>5-10% | (3)<br>10-30% | (4)<br>30-75% | (5)<br>75-100% | <b>4</b> |
| <b>area with grass/herb vegetation between 15 and 50 cm</b> |              |               |               |                |          |
| (1)<br>0-5%                                                 | (2)<br>5-10% | (3)<br>10-30% | (4)<br>30-75% | (5)<br>75-100% | <b>2</b> |
| <b>area with grass/herb vegetation over 15 cm</b>           |              |               |               |                |          |
| (1)<br>0-5%                                                 | (2)<br>5-10% | (3)<br>10-30% | (4)<br>30-75% | (5)<br>75-100% | <b>1</b> |
| <b>area with dwarf bush formation</b>                       |              |               |               |                |          |
| (1)<br>0-5%                                                 | (2)<br>5-10% | (3)<br>10-30% | (4)<br>30-75% | (5)<br>75-100% | <b>1</b> |
| <b>Area with tree cover</b>                                 |              |               |               |                |          |
| (1)<br>0%                                                   | (2)<br>1-10% | (3)<br>10-25% | (4)<br>25-50% | (5)<br>50-100% | <b>2</b> |
| <b>Area with invasive species (</b>                         |              |               |               |                |          |
| (1)<br>0%                                                   | (2)<br>1-10% | (3)<br>10-25% | (4)<br>25-50% | (5)<br>50-100% | <b>2</b> |



The categories are scored 0 to 1 (0-100%) and weighted

| Vegetation structure (set category 1-5)            |            |           |           |            |   |  |     |
|----------------------------------------------------|------------|-----------|-----------|------------|---|--|-----|
| <b>area without vegetation cover</b>               |            |           |           |            |   |  |     |
| (1)<br>100                                         | (2)<br>60  | (3)<br>30 | (4)<br>10 | (5)<br>0   | 1 |  | 5%  |
| <b>area with grass/herb vegetation below 15 cm</b> |            |           |           |            |   |  |     |
| (1)<br>0                                           | (2)<br>10  | (3)<br>30 | (4)<br>60 | (5)<br>100 | 4 |  | 20% |
| <b>Area with grass/herb vegetation 15-50 cm</b>    |            |           |           |            |   |  |     |
| (1)<br>80                                          | (2)<br>100 | (3)<br>60 | (4)<br>30 | (5)<br>0   | 3 |  | 20% |
| <b>Area with grass/herb vegetation above 50 cm</b> |            |           |           |            |   |  |     |
| (1)<br>100                                         | (2)<br>60  | (3)<br>30 | (4)<br>10 | (5)<br>0   | 2 |  | 20% |
| <b>Area with dwarf shrub formation</b>             |            |           |           |            |   |  |     |
| (1)<br>80                                          | (2)<br>100 | (3)<br>60 | (4)<br>30 | (5)<br>0   | 2 |  | 5%  |
| <b>Area with tree cover</b>                        |            |           |           |            |   |  |     |
| (1)<br>80                                          | (2)<br>100 | (3)<br>60 | (4)<br>30 | (5)<br>0   | 2 |  | 20% |
| <b>Area with invasive species</b>                  |            |           |           |            |   |  |     |
| (1)<br>100                                         | (2)<br>40  | (3)<br>20 | (4)<br>10 | (5)<br>0   | 2 |  | 10% |

# Calculating the structural index

| Vegetation structure (set category 1-5)            |            |           |           |            |   |      |     |
|----------------------------------------------------|------------|-----------|-----------|------------|---|------|-----|
| <b>area without vegetation cover</b>               |            |           |           |            |   |      |     |
| (1)<br>100                                         | (2)<br>60  | (3)<br>30 | (4)<br>10 | (5)<br>0   | 1 | 1.00 | 5%  |
| <b>area with grass/herb vegetation below 15 cm</b> |            |           |           |            |   |      |     |
| (1)<br>0                                           | (2)<br>10  | (3)<br>30 | (4)<br>60 | (5)<br>100 | 4 | 0.60 | 20% |
| <b>Area with grass/herb vegetation 15-50 cm</b>    |            |           |           |            |   |      |     |
| (1)<br>80                                          | (2)<br>100 | (3)<br>60 | (4)<br>30 | (5)<br>0   | 3 | 0.60 | 20% |
| <b>Area with grass/herb vegetation above 50 cm</b> |            |           |           |            |   |      |     |
| (1)<br>100                                         | (2)<br>60  | (3)<br>30 | (4)<br>10 | (5)<br>0   | 2 | 0.60 | 20% |
| <b>Area with dwarf shrub formation</b>             |            |           |           |            |   |      |     |
| (1)<br>80                                          | (2)<br>100 | (3)<br>60 | (4)<br>30 | (5)<br>0   | 2 | 1.00 | 5%  |
| <b>Area with tree cover</b>                        |            |           |           |            |   |      |     |
| (1)<br>80                                          | (2)<br>100 | (3)<br>60 | (4)<br>30 | (5)<br>0   | 2 | 1.00 | 20% |
| <b>Area with invasive species</b>                  |            |           |           |            |   |      |     |
| (1)<br>100                                         | (2)<br>40  | (3)<br>20 | (4)<br>10 | (5)<br>0   | 2 | 0.40 | 10% |

**0.7**  
**40% ~ 0.28**



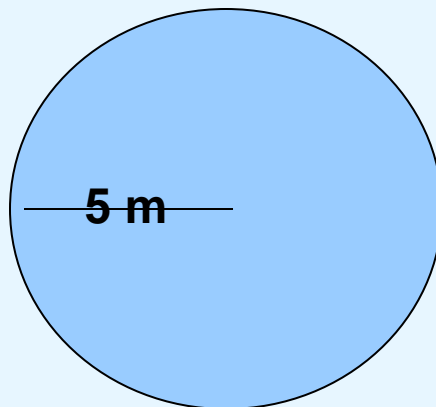
# Registration of plant species

## Basic registration:

A **non-systematic** registration of Annex II or IV species, redlisted species, “one star” or “two star” species, problem species or invasive species found on the site

## Extended registration:

A **systematic** registration of all vascular species found in a documentation circle (5 m radius = 78,5m<sup>2</sup>)



The 5 m circle is situated in the best and most characteristic part of the habitat site



# Calculation of species index

Scores between 1 and 7 are assigned to the species reflecting their susceptibility to adverse influences. Great susceptibility scores maximum - these species are the first to disappear from the areas. Invasive species and species indicating severe negative influence is given a score of -1.

The mean species score of the 5 m circle is transformed to the reference value between 0 and 1 as the species index

| Habitat type | score | Common Danish name       | Scientific name                            |                  |
|--------------|-------|--------------------------|--------------------------------------------|------------------|
| 6210         | -1    | kløver, hvid-            | <i>Trifolium repens</i>                    | Negative species |
| 6210         | -1    | kvik, almindelig         | <i>Elytrigia repens</i> ssp. <i>repens</i> |                  |
| 6210         | 1     | hundegræs, almindelig    | <i>Dactylis glomerata</i>                  |                  |
| 6210         | 1     | kløver, rød-             | <i>Trifolium pratense</i>                  |                  |
| 6210         | 2     | gåsemad, almindelig      | <i>Arabidopsis thaliana</i>                | tolerant         |
| 6210         | 2     | Gåsepotentil             | <i>Argentina anserina</i>                  |                  |
| 6210         | 3     | hønsetarm, storblomstret | <i>Cerastium arvense</i>                   |                  |
| 6210         | 3     | kamgræs, almindelig      | <i>Cynosurus cristatus</i>                 |                  |
| 6210         | 4     | enghavre, dunet          | <i>Helictotrichon pubescens</i>            |                  |
| 6210         | 4     | Flipkrave                | <i>Teesdalia nudicaulis</i>                | susceptible      |
| 6210         | 5     | Djævelsbid               | <i>Succisa pratensis</i>                   |                  |
| 6210         | 5     | evighedsblomst, gul      | <i>Helichrysum arenarium</i>               |                  |
| 6210         | 6     | kobjælde, opret          | <i>Anemone pulsatilla</i>                  |                  |
| 6210         | 6     | kohvede, blåtoppet       | <i>Melampyrum nemorosum</i>                |                  |
| 6210         | 7     | Guldblomme               | <i>Arnica montana</i>                      | Very susceptible |
| 6210         | 7     | gøgeurt, bakke-          | <i>Orchis ustulata</i>                     |                  |



# Calculation of biological index

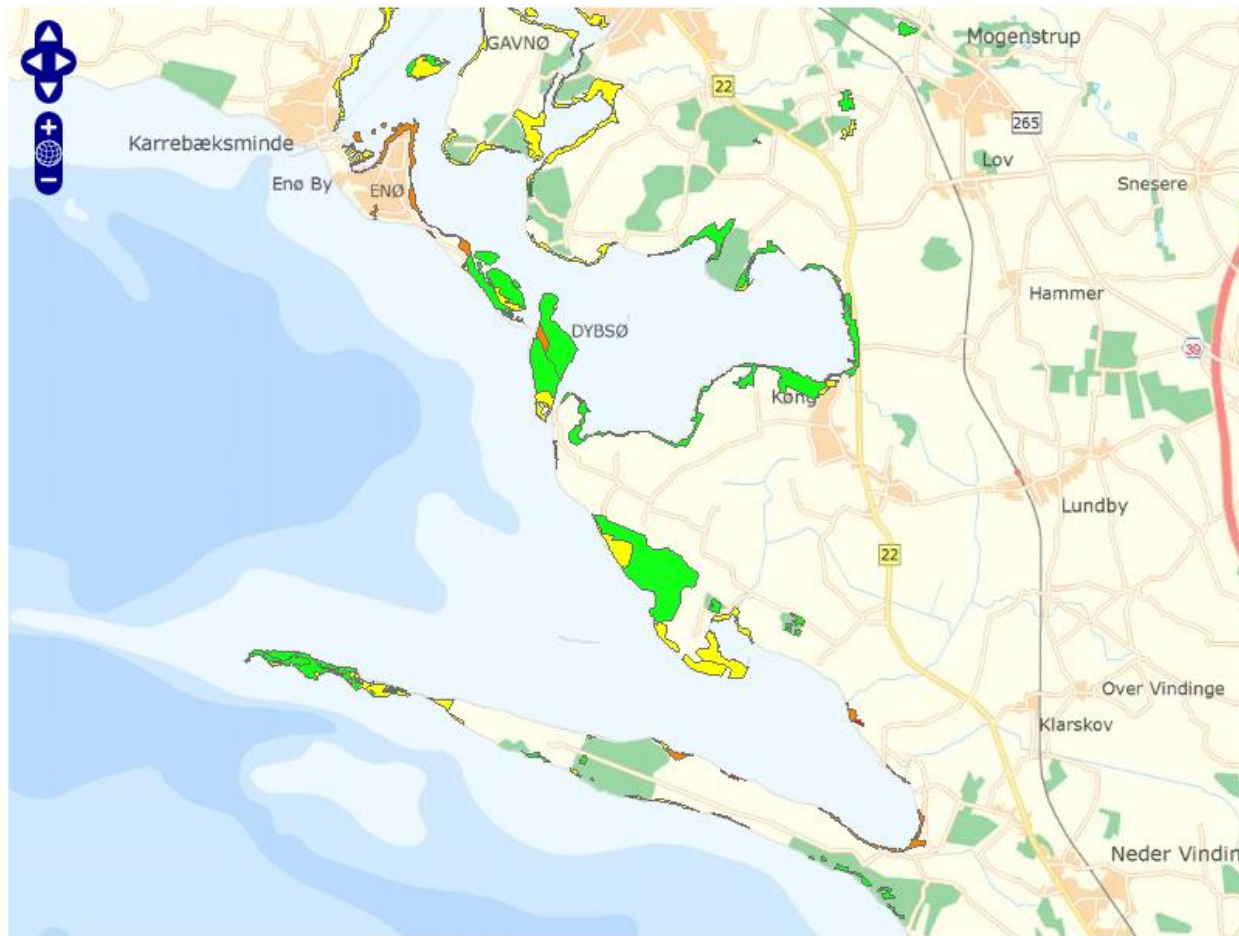
$$\text{Biological index} = w_1 \text{Structural index} + w_2 \text{Species index}$$

Structural index lowest:  $w_1=0.6$  and  $w_2=0.4$

Species index lowest:  $w_1=0.4$  and  $w_2=0.6$

# http://prior.dmu.dk

## Natura 2000 Naturtilstand & Forvaltningsbehov



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  - Tilstand
    - Naturtilstand
    - Strukturtilstand
    - Artstilstand
  - Forvaltning
  - Indikatorer

- Vis fredskov tilstande
- Vis ikke-fredskov tilstande
  - Tilstand
    - Naturtilstand
    - Strukturtilstand
    - Artstilstand
  - Forvaltning

- Baggrundslag
  - TDK / Skærmkort
  - Ortofoto
- Adm. grænser

| Lysåben: Tilstands-klasser | Skov: Tilstands-klasser |
|----------------------------|-------------------------|
| Høj                        | Høj                     |
| God                        | God                     |
| Moderat                    | Moderat                 |
| Lav                        | Lav                     |
| Dårlig                     | Dårlig                  |

Indstil gennemsigtighed:  
Adm. grænser: 0%  100%  
Tilstande: 0%  100%



# http:\prior.dmu.dk : Biological index

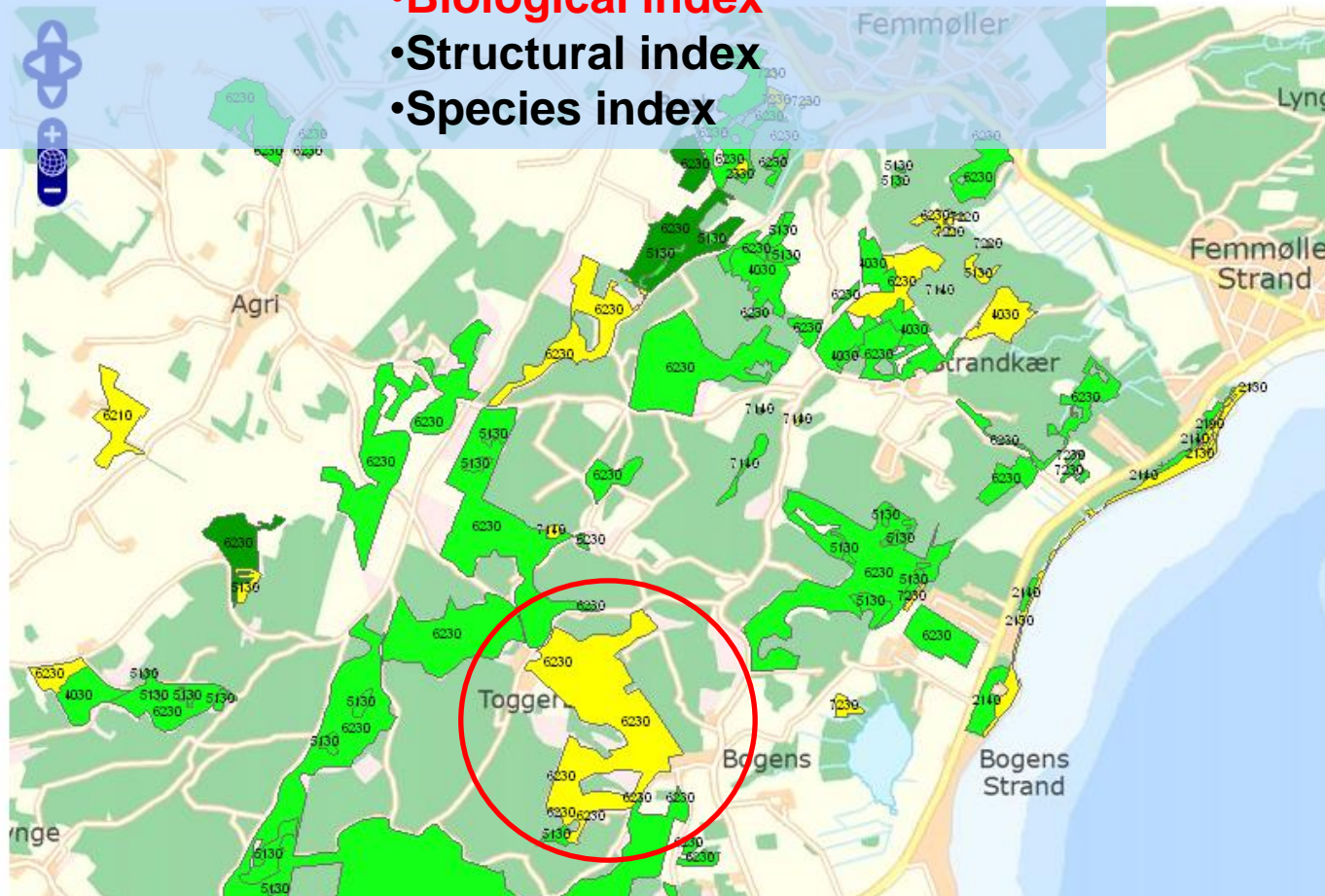
On the Prior-maps you can

•Toggle between

- Biological index**
- Structural index
- Species index

Natura 2000

Naturtilstand & Forvaltningsbehov



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 Adm. grænser

Lysåbne:  
Tilstands-  
klasser

- Høj
- God
- Moderat
- Lav
- Dårlig

Skov:  
Tilstands-  
klasser

- Høj
- God
- Moderat
- Lav
- Dårlig

# http:\prior.dmu.dk : Structural index

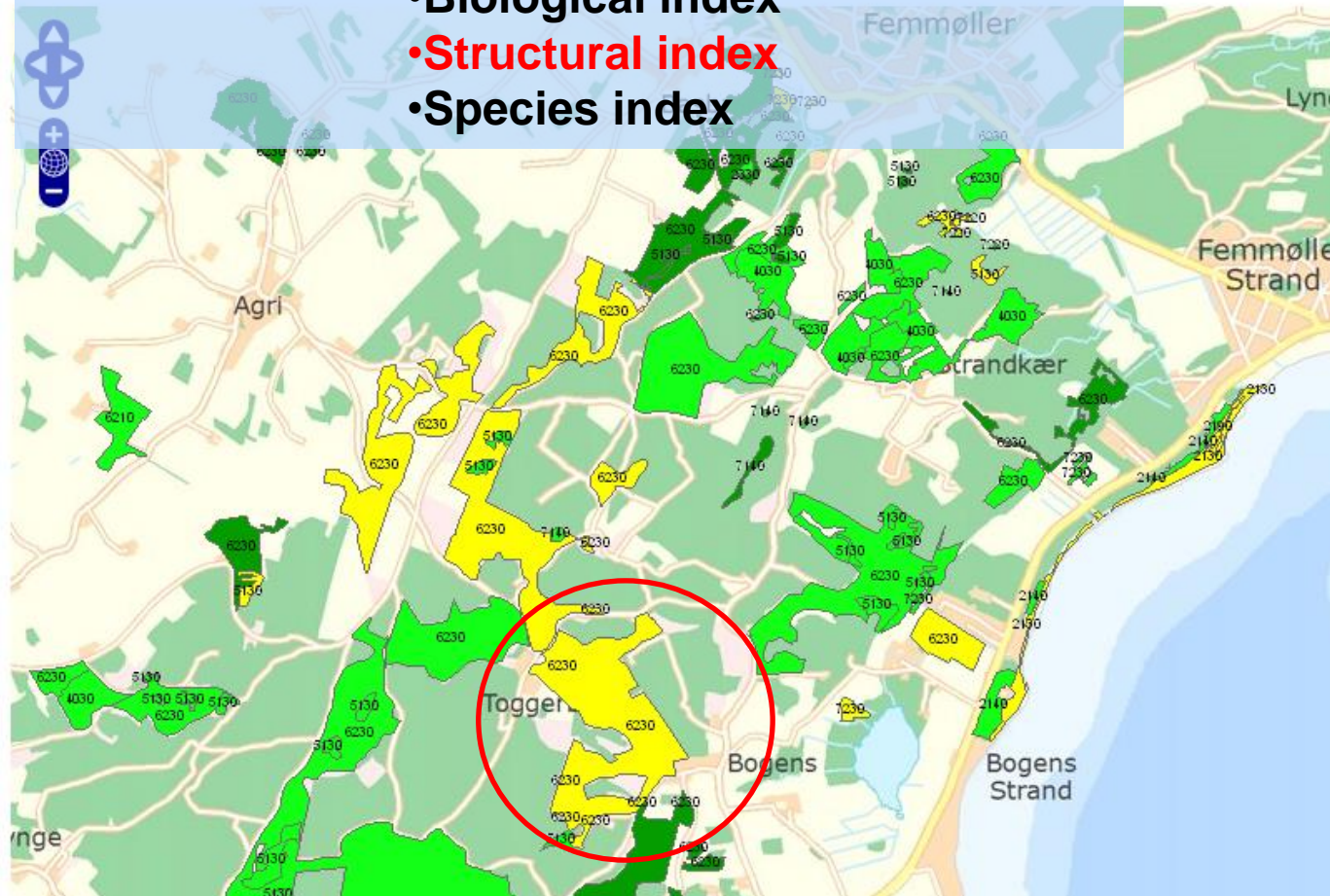
On the Prior-maps you can

•Toggle between

- Biological index
- Structural index**
- Species index

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Forvaltning

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Adm. grænser

Lysåben:  
Tilstands-  
klasser

- Høj
- God
- Moderat
- Lav
- Dårlig

Skov:  
Tilstands-  
klasser

- Høj
- God
- Moderat
- Lav
- Dårlig

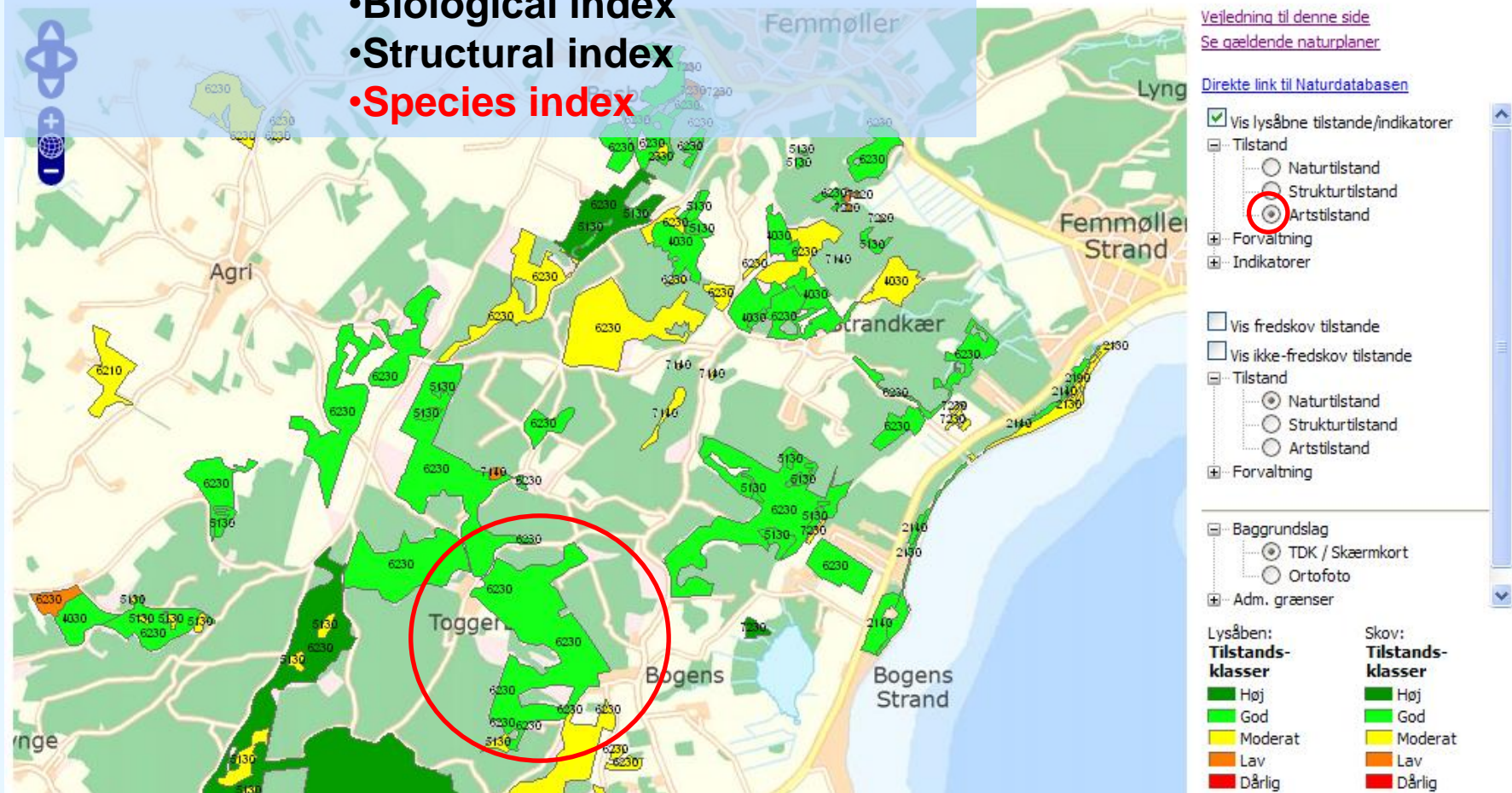


# http:\prior.dmu.dk : Species index

On the Prior-maps you can

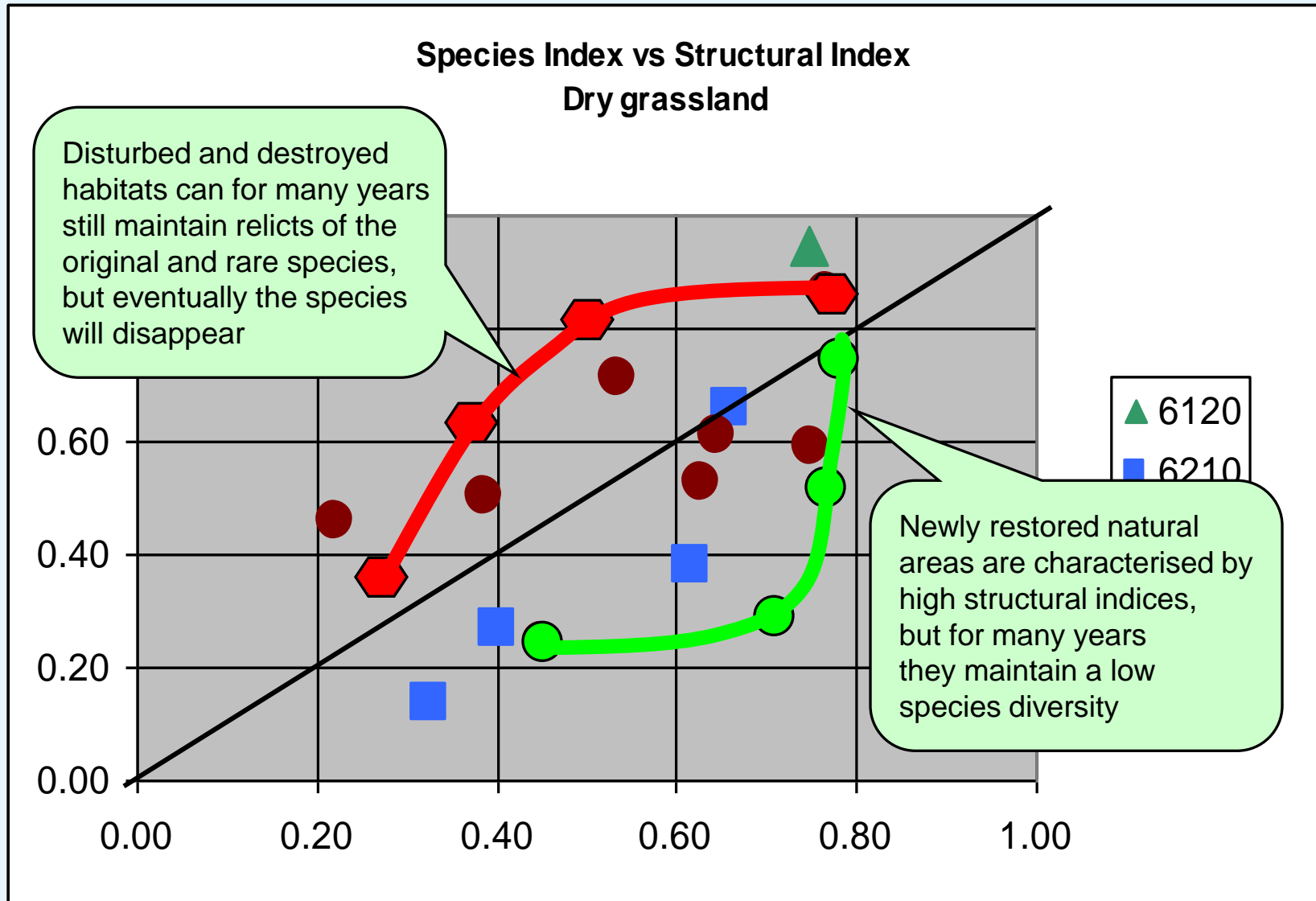
•Toggle between

- Biological index
- Structural index
- Species index

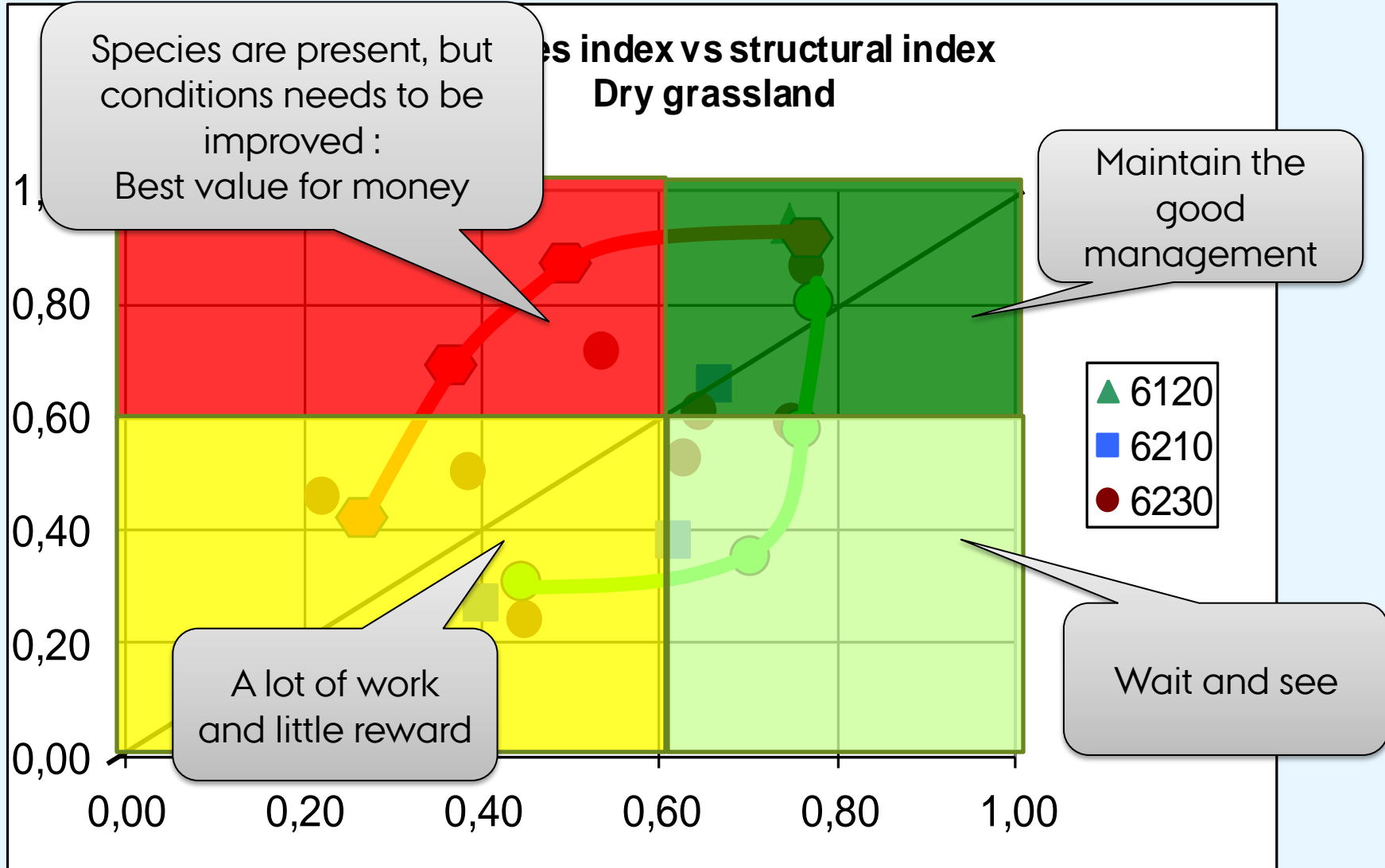




# Ecological inertia

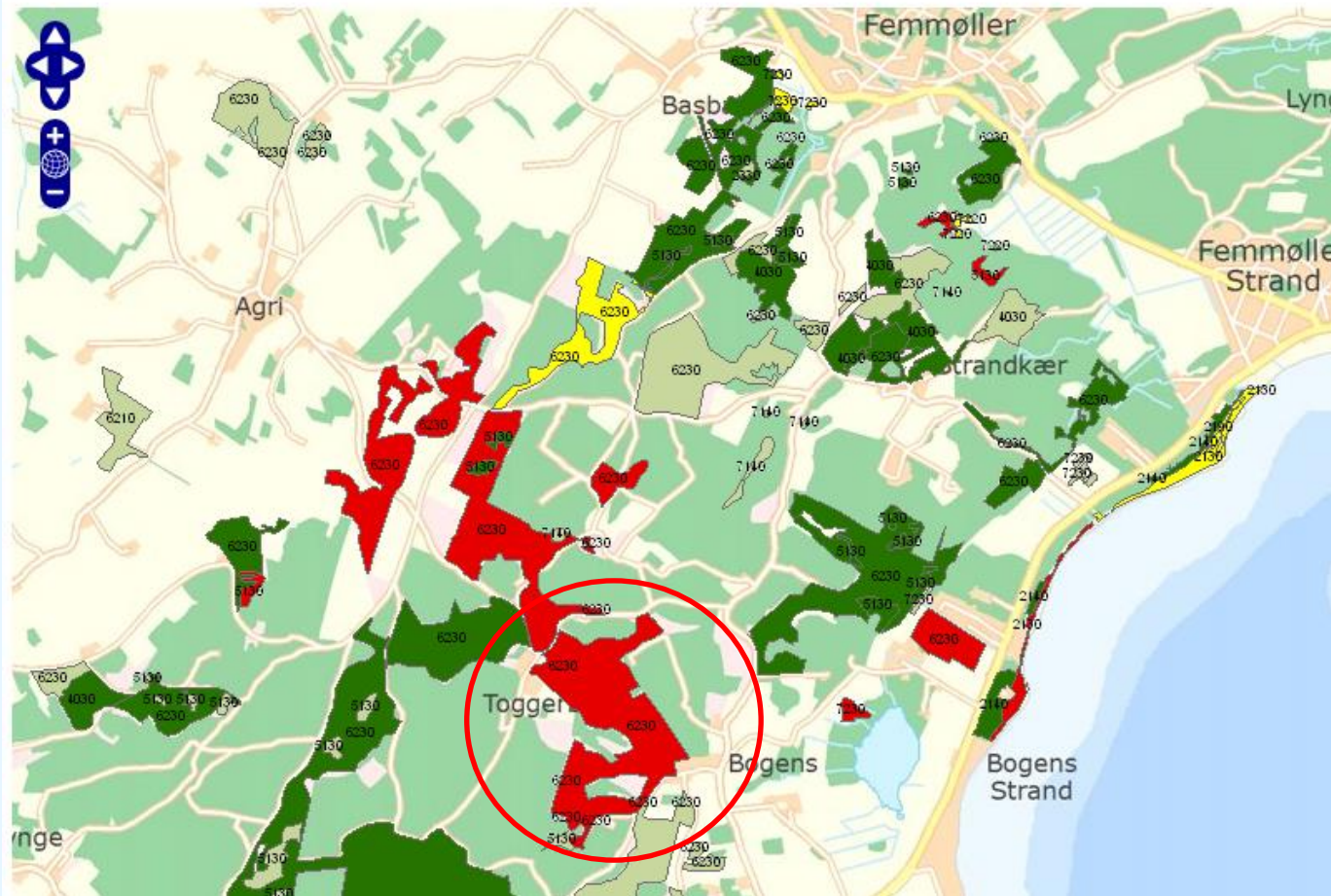


# 4 Management classes



# Management classes

## Natura 2000 Naturtilstand & Forvaltningsbehov



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Lysåben:

**Forvaltnings-**  
**klasser** Høj Str/Høj Art Høj Str/Lav Art Lav Str/Høj Art Lav Str/Lav Art

Skov:

**Tilstands-**  
**klasser** Høj God Moderat Lav Dårlig



# Management needs

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- Strukturtilstand
- Artstilstand

Forvaltning

- Forvaltningsklasser

Indikatorer

- Afgræsning/slæt
- Vedplanterydning
- Hydrologi
- Dværgbuske
- Invasive arter

Vis fredskov tilstande

Vis ikke-fredskov tilstande

Tilstand

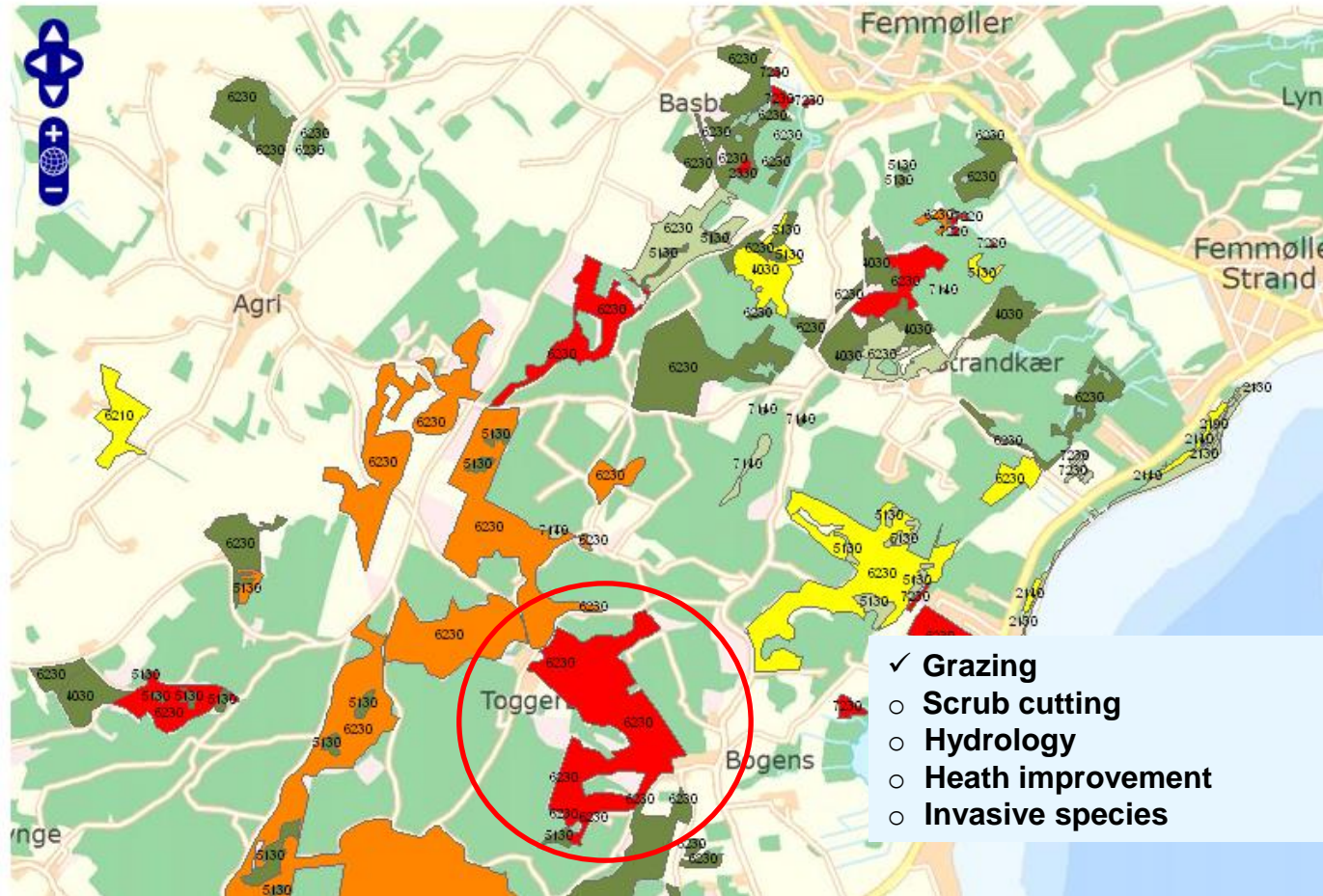
- Naturtilstand
- Strukturtilstand
- Artstilstand

såben:  
indikator  
etydning

- <5%
- 5-10%
- 10-15%
- 15-20%
- >20%

Skov:  
Tilstands-  
klasser

- Høj
- God
- Moderat
- Lav
- Dårlig



- Grazing**
- Scrub cutting**
- Hydrology**
- Heath improvement**
- Invasive species**



Thank you for your  
attention

