The Nature Index within an Ecosystem Accounting Framework: Potentialities and Challenges

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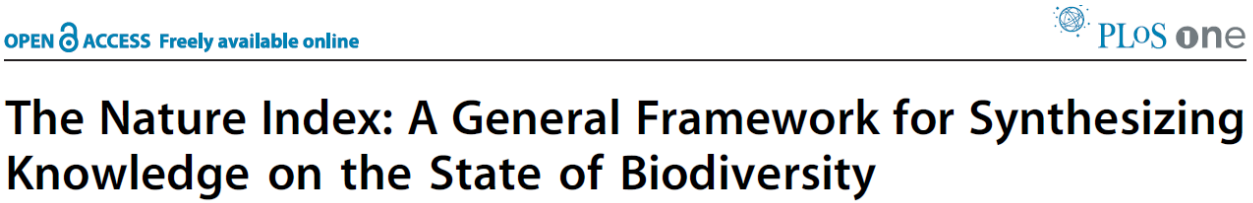
What is the Nature Index ?

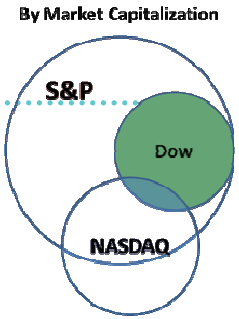
The Nature Index is not a model for biodiversity.

As the title suggests,



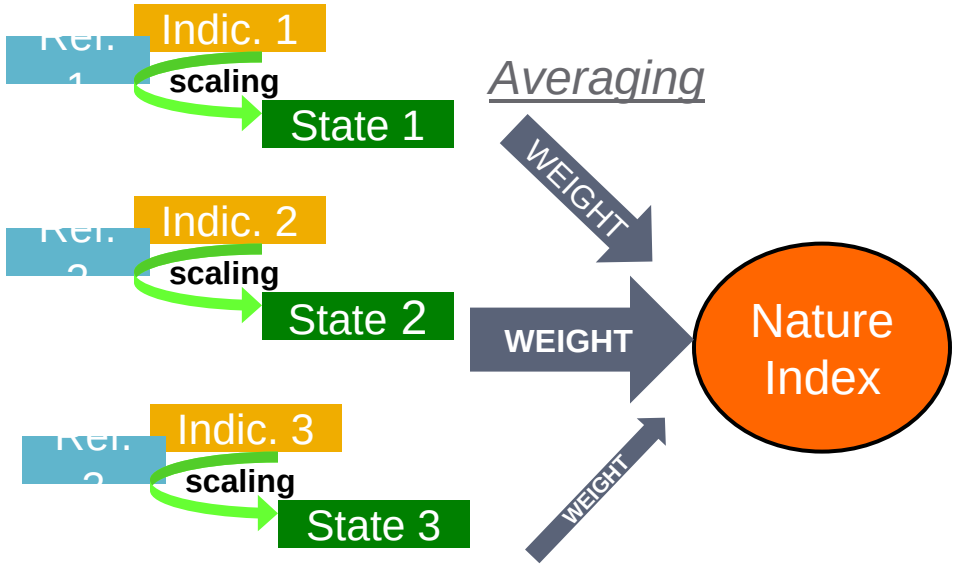
It is a tool to synthesizes the existing knowledge on the state of biodiversity in any ecosystems

What is the Nature Index ?



The Nature Index is an ecological equivalent of a stock market index.

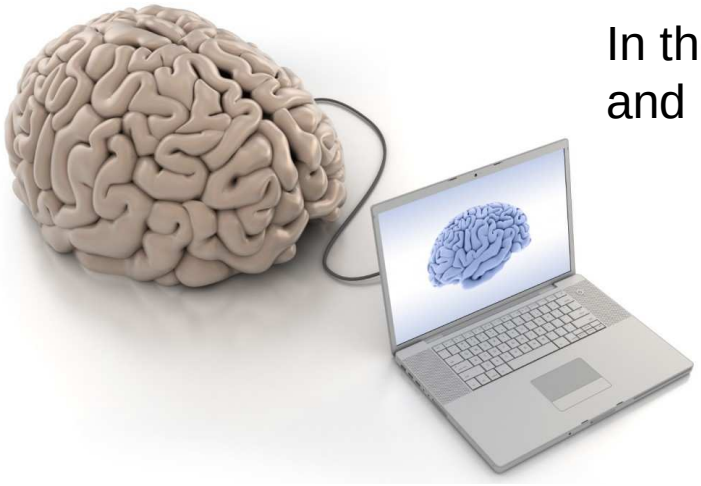
It is a weighted average of scaled indicators:



What is the most reliable source of information on biodiversity ?

Ecologists

Where is located this information ?

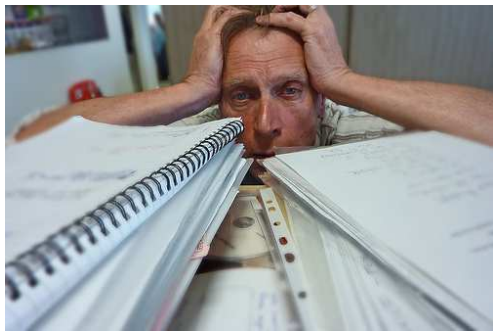


In their **brain**,
and in their **computer**.

Through diverse **reports, publications, medias…**

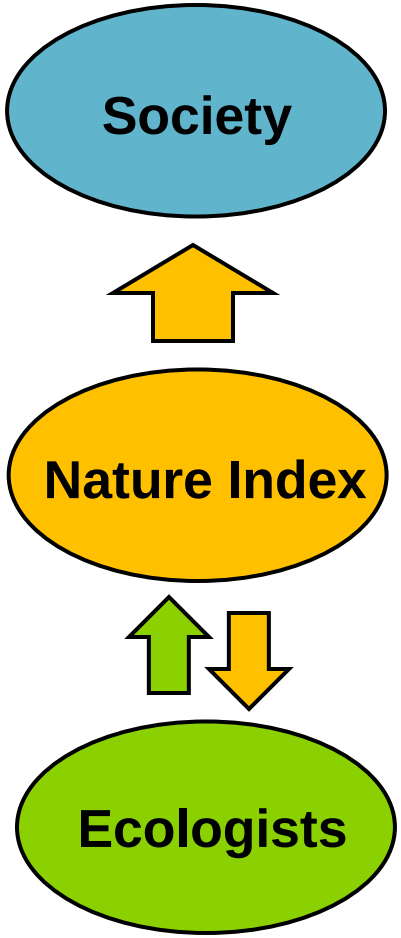
How is it communicated to society ?

The integrated picture might be hard to get…



The Nature Index is a tool to achieve this synthesis

It **collects information** from ecologists,
stores it,
synthesizes and
communicates it .



Which type of information the NI collects ?

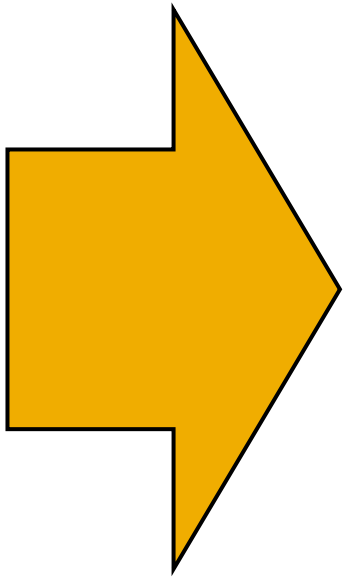
Sample Data

Model output

Satellite observations

Expert opinion

Lack of knowledge



The NI is not bounded by a particular
Method,
Model,
Data type,
Scale,
Ecosystem,
…

All kind of information should be recorded while keeping track of the source.

The most important things you need to implement the Nature Index are:



preferably organized in **groups dedicated to a given ecosystem** (~ 1 expert panel per LCEU)

A **panel of ecologists**


A **database** with **online interface** where the expert will enter information

A **set of rules** to compile, aggregate, and display the **information** in a relevant way

OPEN ACCESS Freely available online

PLoS one

The Nature Index: A General Framework for Synthesizing Knowledge on the State of Biodiversity

Resources needed to implement the Nature Index in a country

Minimum is 2 peoples:

Quantitative ecologist that will organize the expert panels, explain how to document indicators, supervise data collection, and produce the main results.

Informatician that will sustain the database

Optional but useful competences:

Networking & Communication, GIS, Environmental management

The expert panel is the core of the Nature Index

It is the expert panel that will:

Decide on the **Indicator list**,

Produce the **reference levels** associated to all indicators,

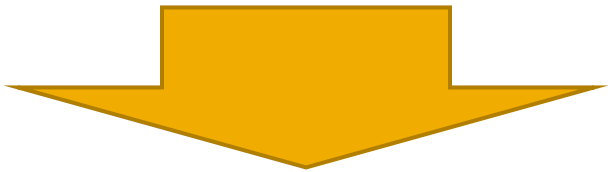
Enter the data,

Suggest the way indicators should be aggregated to produce relevant ”thematic indices”.

Documenting the NI database is EASY and QUICK

Link to the input database

In Norway, **150 experts** spread across **9 major ecosystems** documented more than **300 indicators** at the scale of **~430 municipalities**…



May appear a bit overwhelming… The Nature Index will also work within a **more modest setting.**

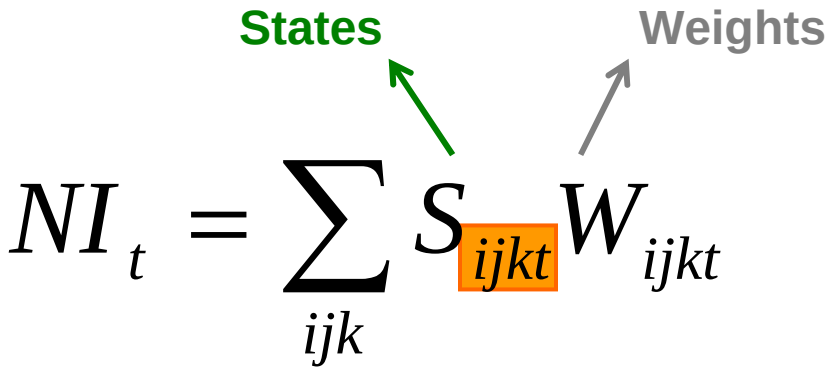
How to combine these informations ?

3 slides on METHODS

The mathematical structure of the Nature Index: a **weighted average**…

4 axes:

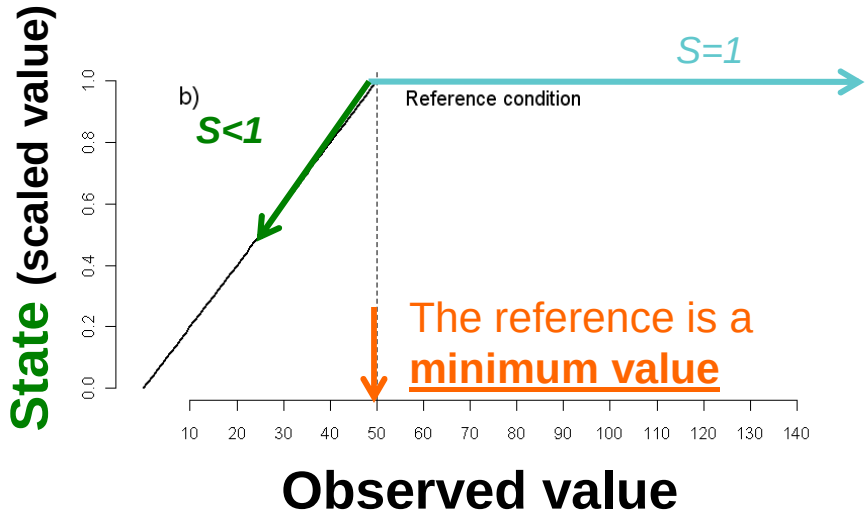
i - indicators,
j - major ecosystems
k - municipality
t - time



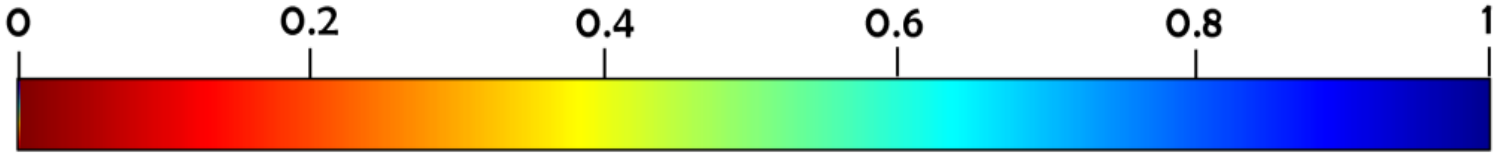
The average can be made across any combinations of these 4 axes, it is to the experts to decide on combinations that **make sense.**

States are calculated by scaling indicators by their **reference value:**

The reference is a value that either correspond to **high biodiversity**, or **minimal extinction risk** for the indicator.



All **States** are dimensionless numbers, expressed on a **0-1** scale



The **weighting system:** combining **States** together.

Across **major ecosystems:** → **Equivalence between major ecosystems**

Across **indicators:**
- → **50% of weights: "Extra-representative" indicators**
- → **50% of weights: equal participation of the functional groups**

Across **municipalities:** → **Weights per municipality area**

So, what kind of results can you expect from such framework ?

MAPS of ecosystem condition

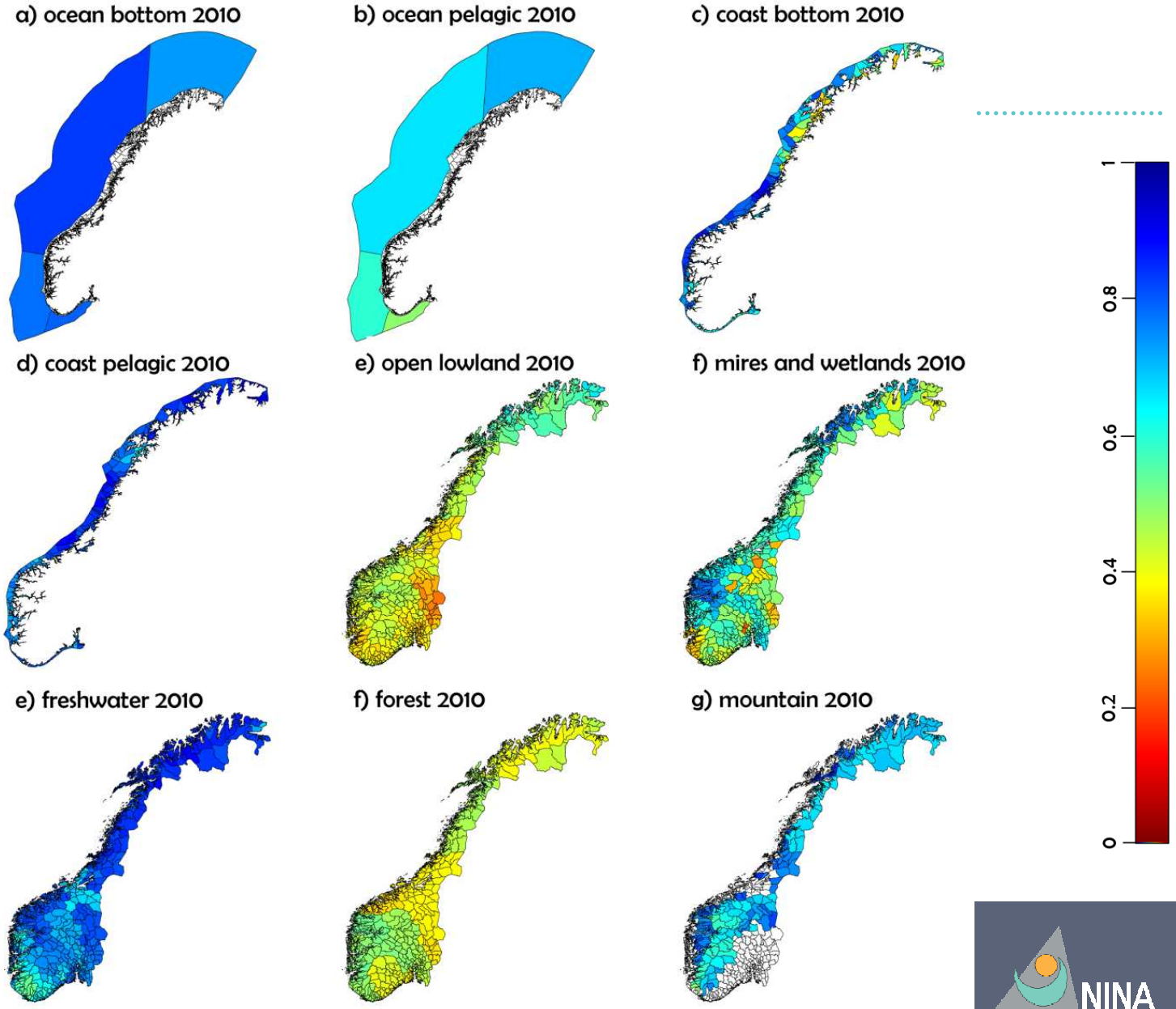
TRENDS of condition change

MAPS showing local **TRENDS**

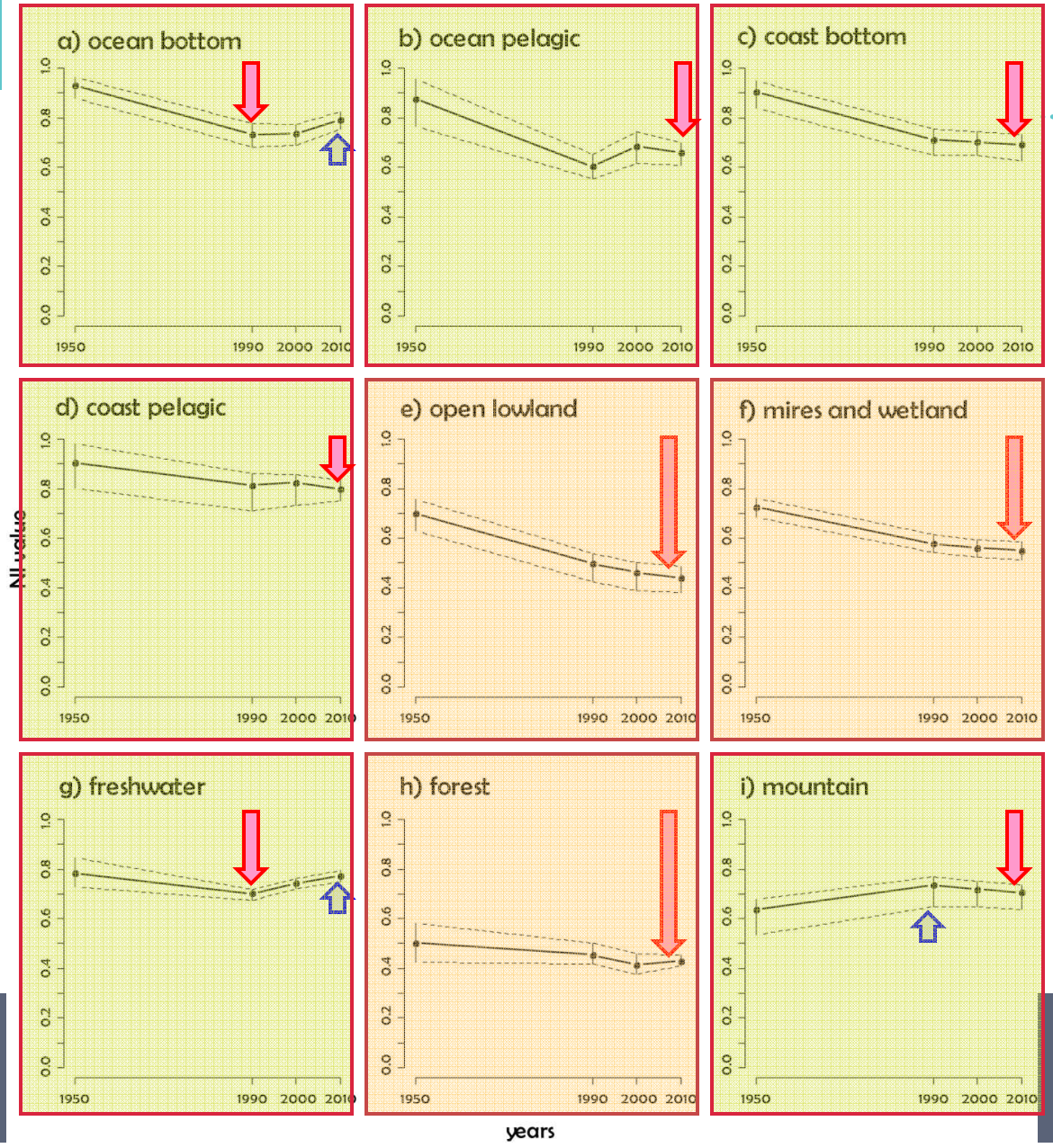
THEMATIC INDICES highlighting specific **themas**:

ecosystem characteristics,
specific services,
environmental pressures,

MAPS of ecosystem condition



TRENDS of change in condition



In Norway,
Most ecosystems are in a **fairly good state**

Some are **significantly threatened**

Small signals of **remediation** have been reported

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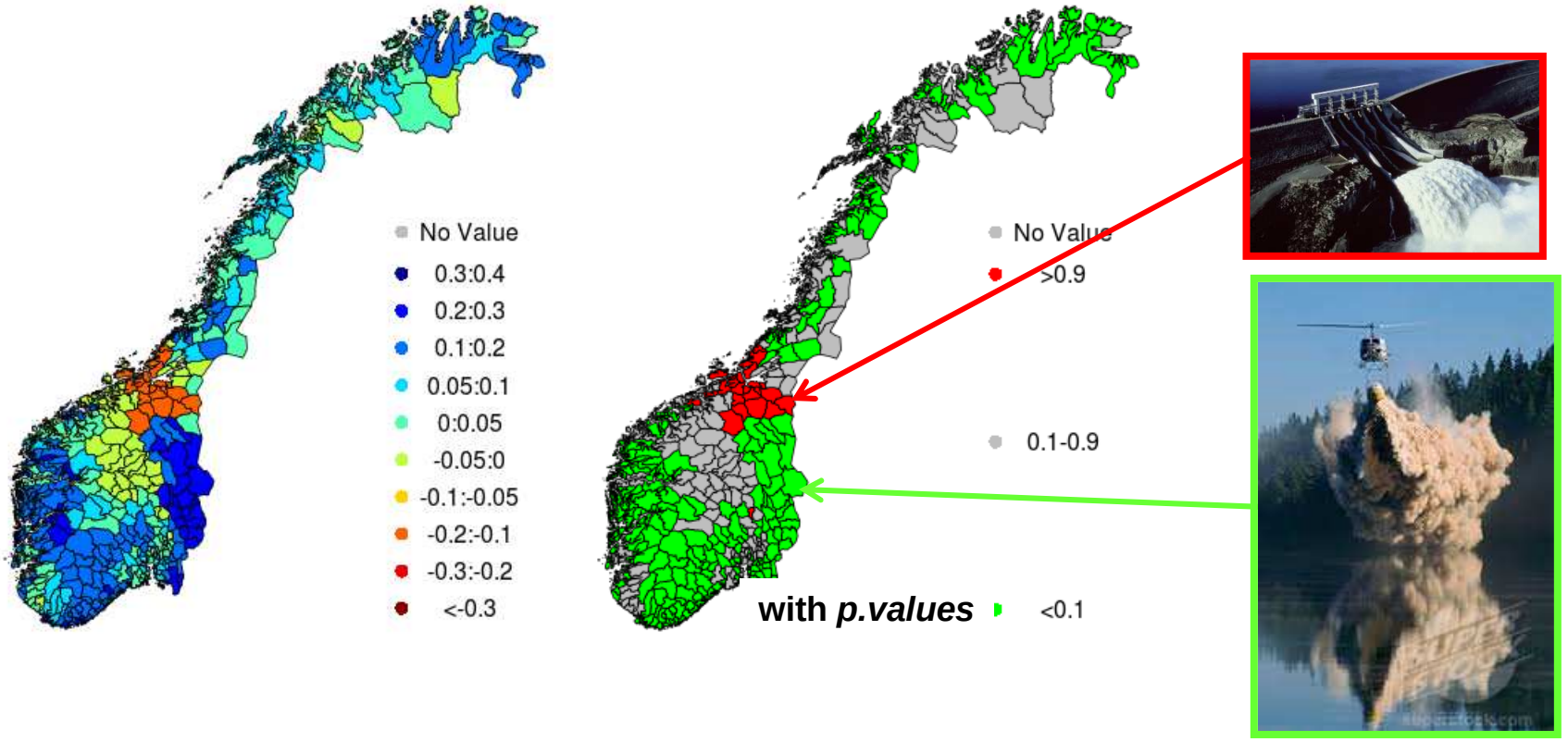
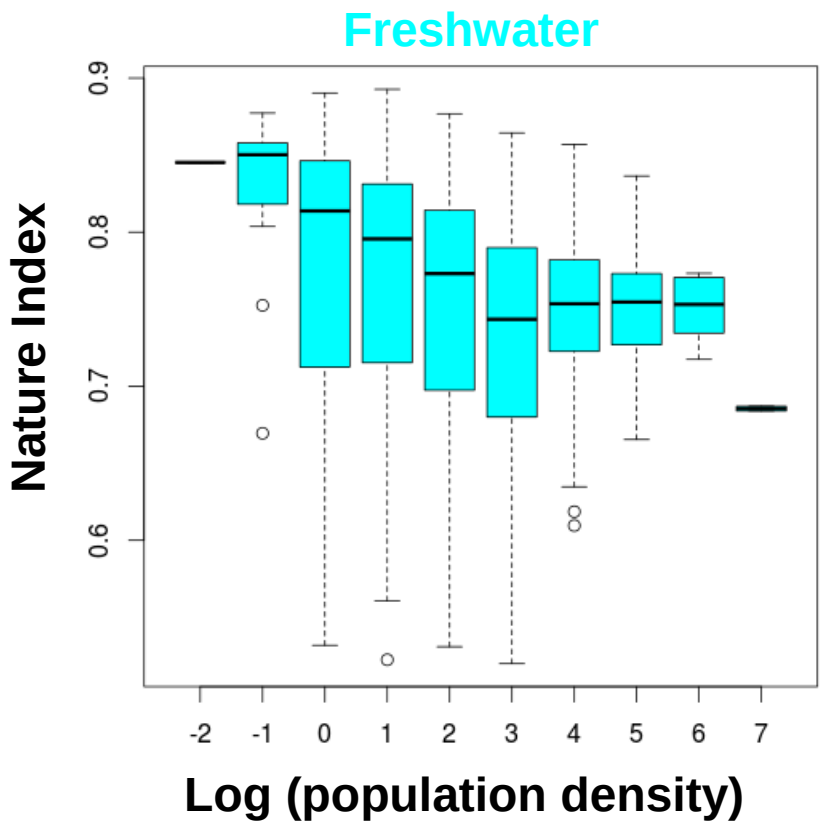
MAPS of TRENDS



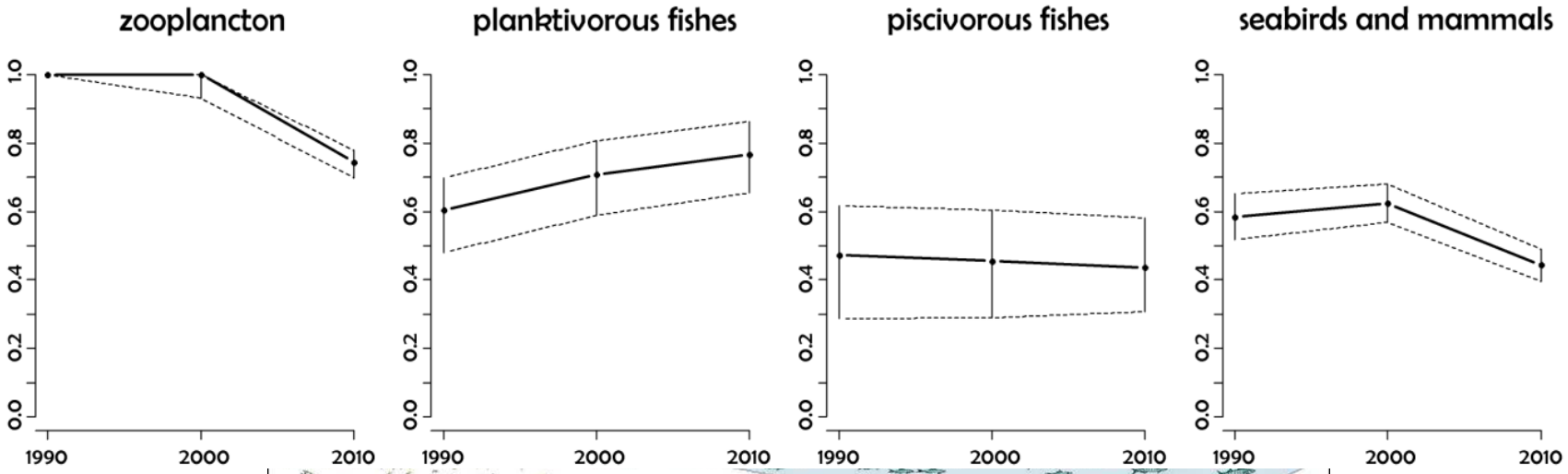
Combining NI to socio-economic information



THEMATIC INDEX on an ecosystem characteristic: the **FOOD WEB STRUCTURE**

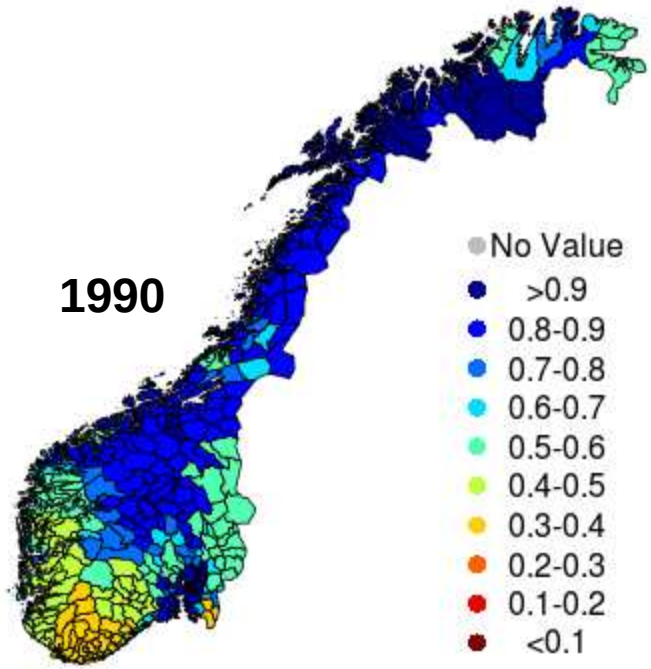
Fishing down the food web:

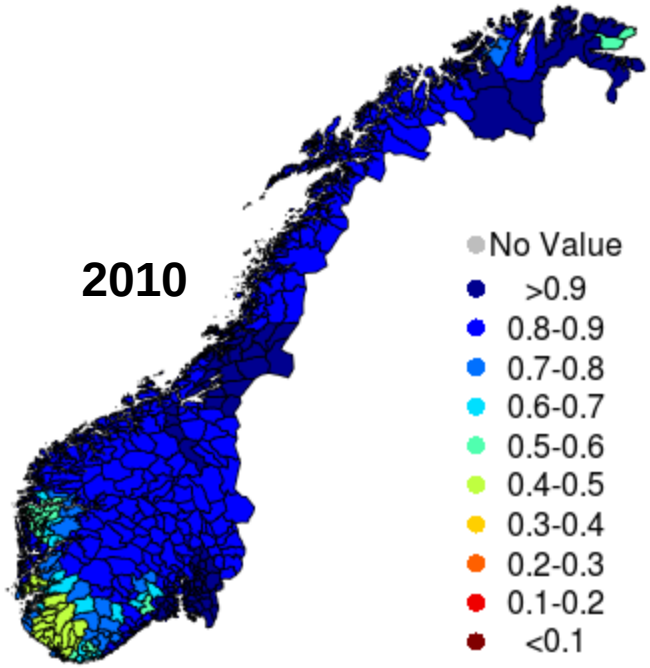
d) thematic index on trophic groups of pelagic systems



THEMATIC INDEX on an ecosystem pressure: Acidification in freshwater

Group all indicators sensitive to acidification:



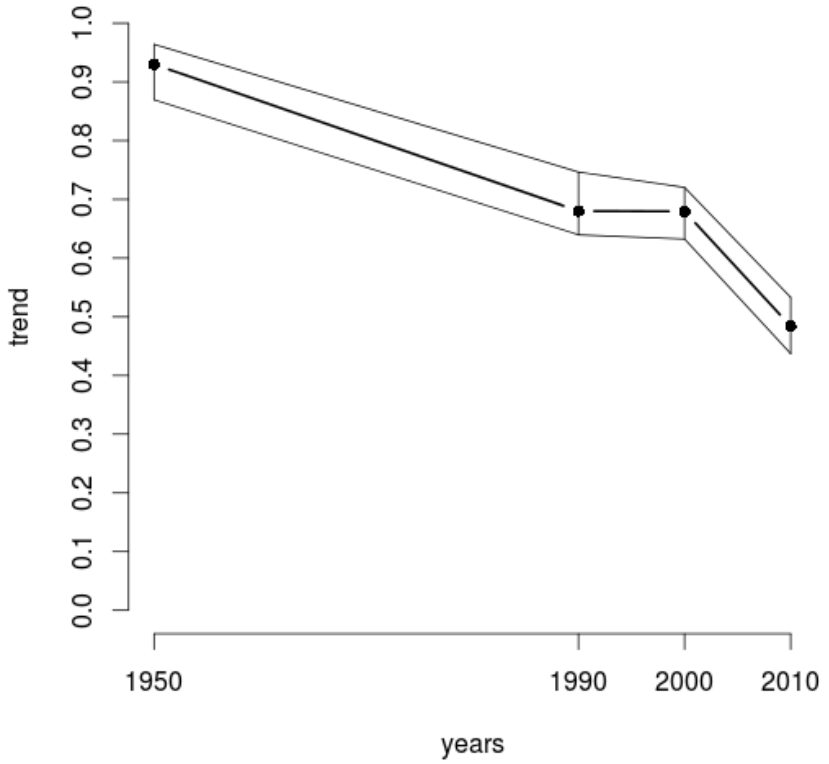


THEMATIC INDEX on an ecosystem service: **"Small game" populations**

Willow Ptarmigan

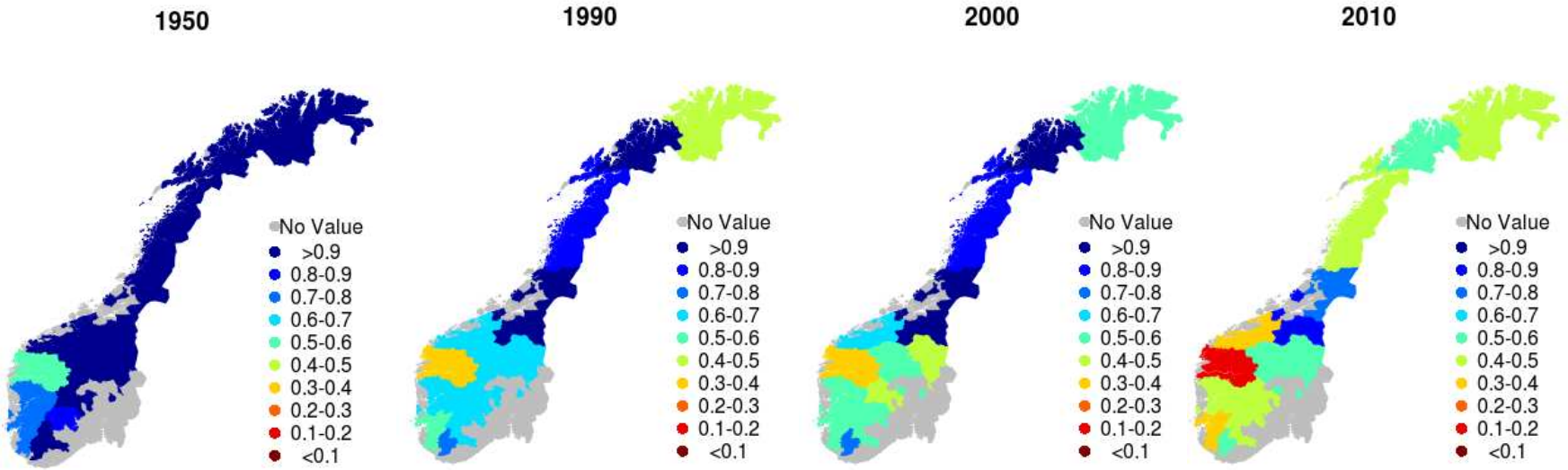
Rock Ptarmigan

Touristic asset



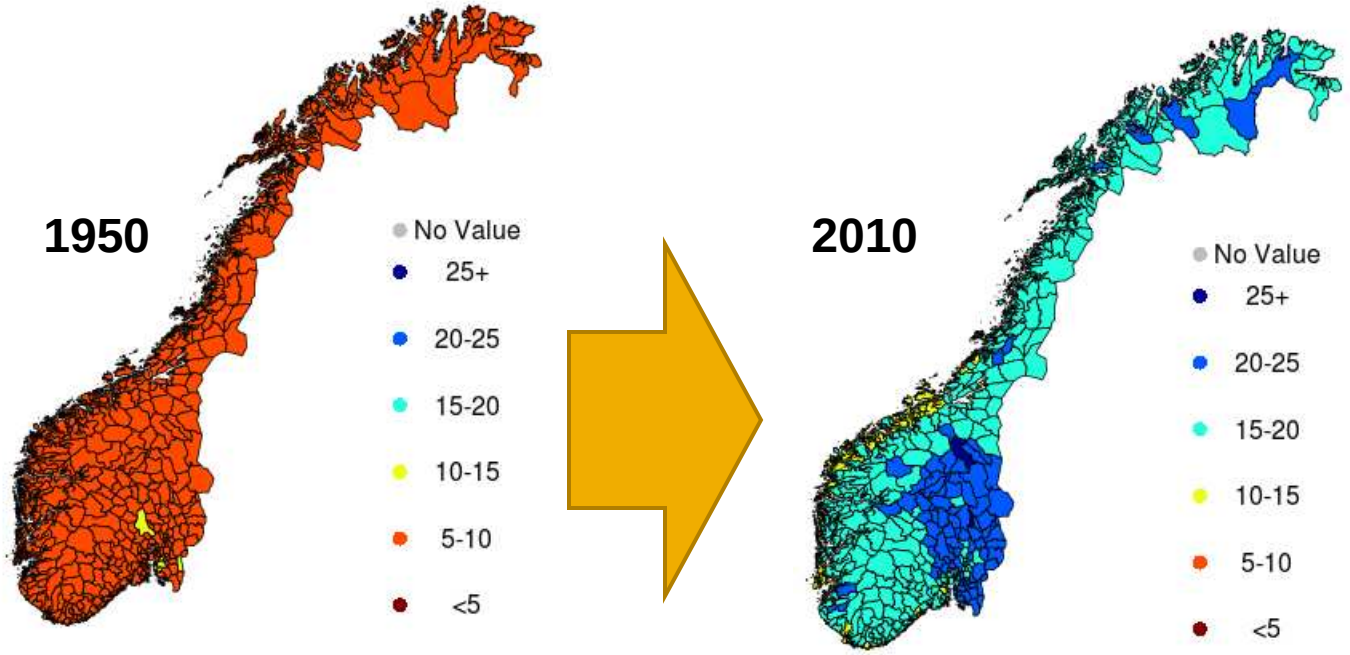
THEMATIC INDICE on an ecosystem service: **"Small game" population**

This only represent the service **capacity**, not its actual use



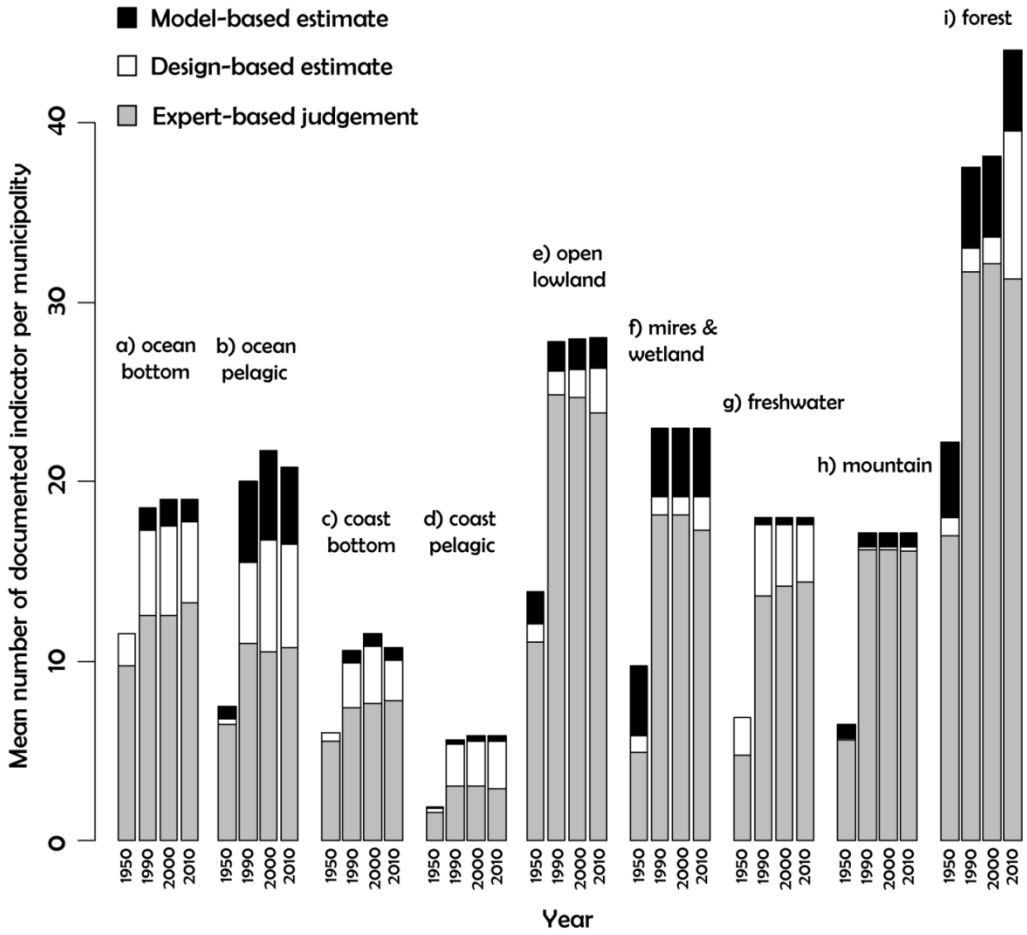
THEMATIC INDEX on Lack of Knowledge

Number of documented indicators for a given Ecosystem **(Freshwater)**

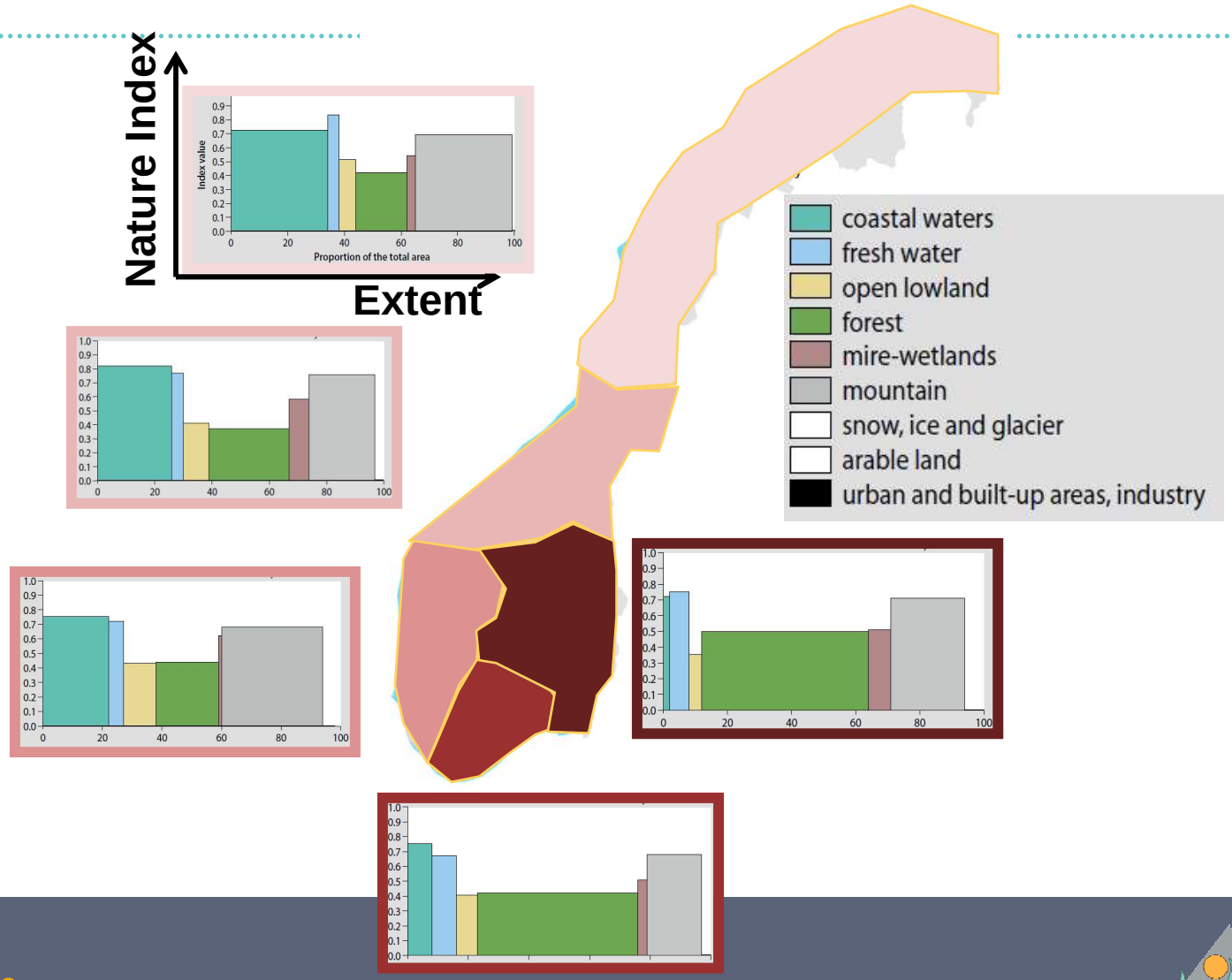


THEMATIC INDEX on Lack of Knowledge

Number of documented indicators **across ecosystems, with information source**



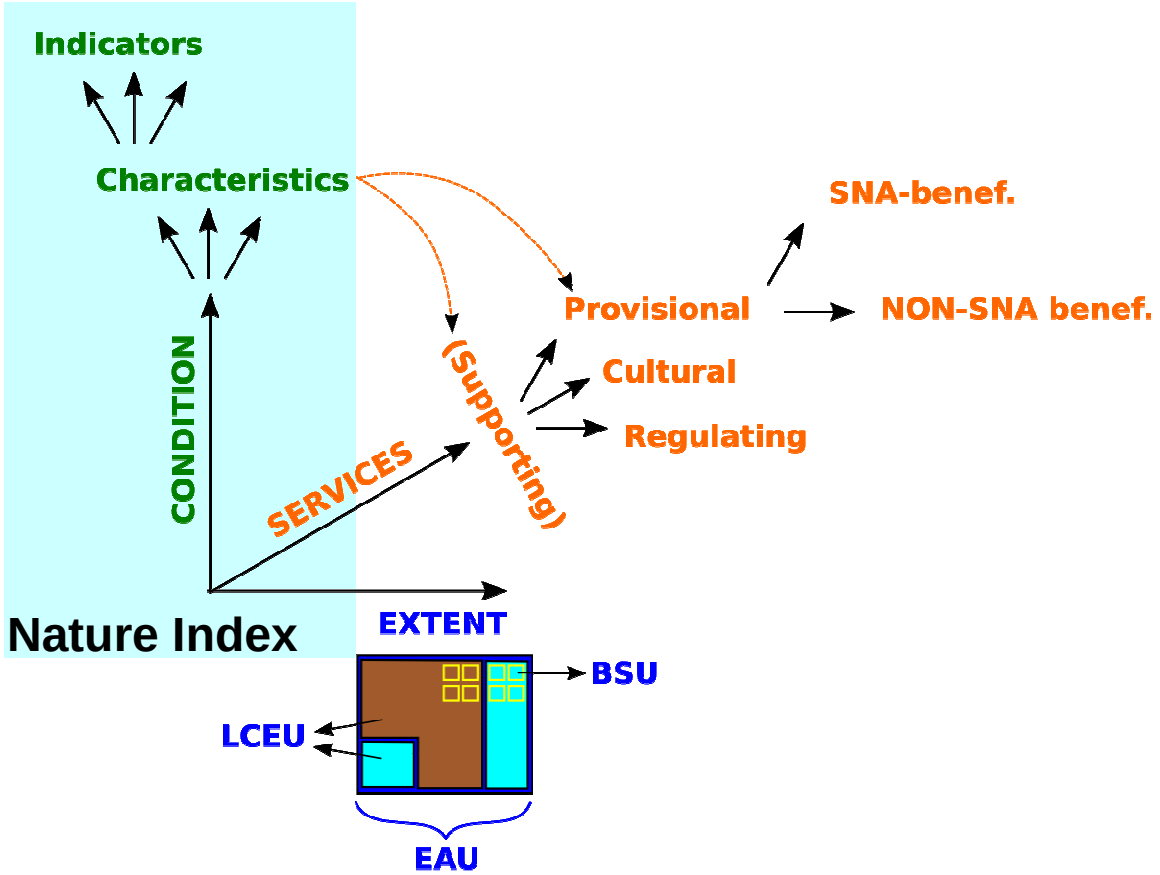
Joint reporting on ecosystem Condition and Extent



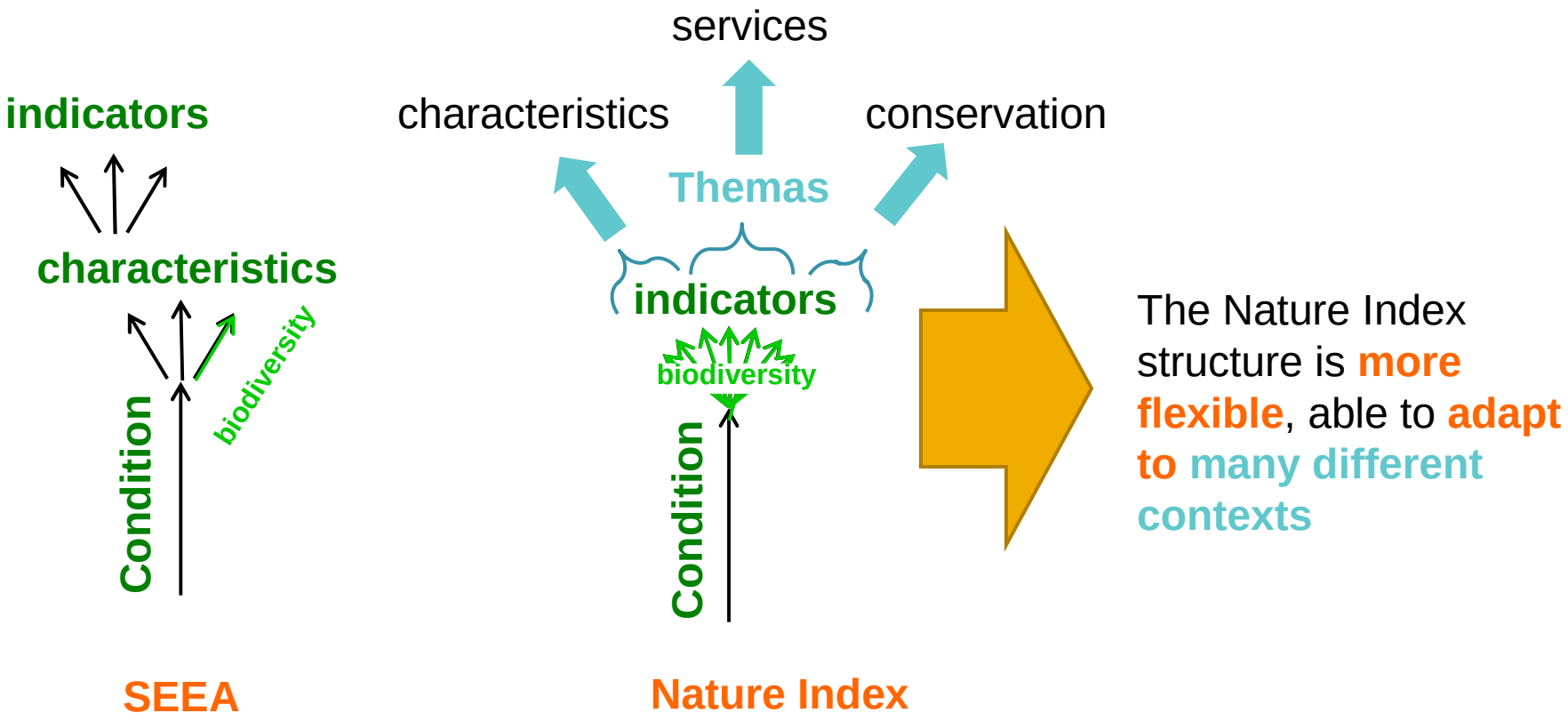
The public will be able to consult the NI result

Link to the public output website
(in development)

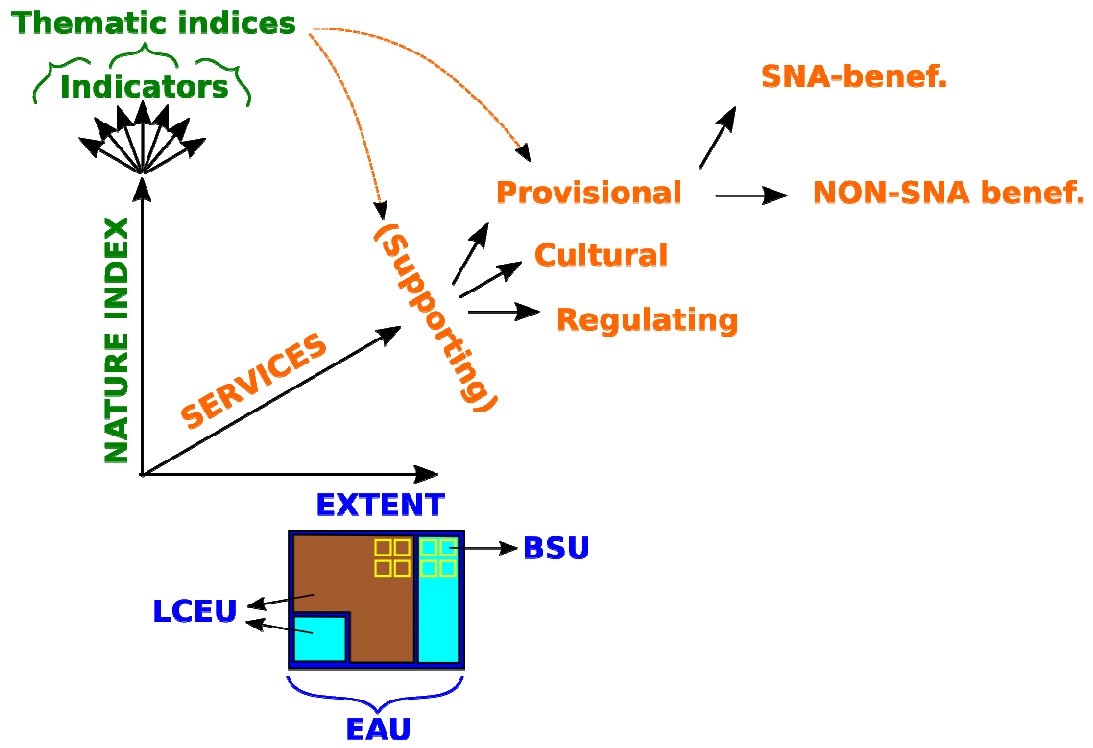
The **Nature Index** within the **SEEA ecosystem accounting framework**



Structural differences between SEEA and NI



The **Nature Index** within the **SEEA ecosystem accounting framework**



What role for the **Nature Index** in an **ecosystem accounting** framework ?

A **very effective tool** to account for **ecosystem condition at the EAU scale**.

The NI has not been designed to focus on ecosystem services. But:

a) **Thematic indices** focusing on some services can be created

b) When specific measures of ecosystem services have been obtained, **they can be incorporated within the NI** for comparison.

In a nutshell, the NI can be used as a **general interface to store and display information on physical accounting at the EAU scale.**

In the future…

Database

Input (data)

Output (figures, tables)

Training courses will be organized, where guidelines for implementing the NI will be given, and where the database will be shared for free

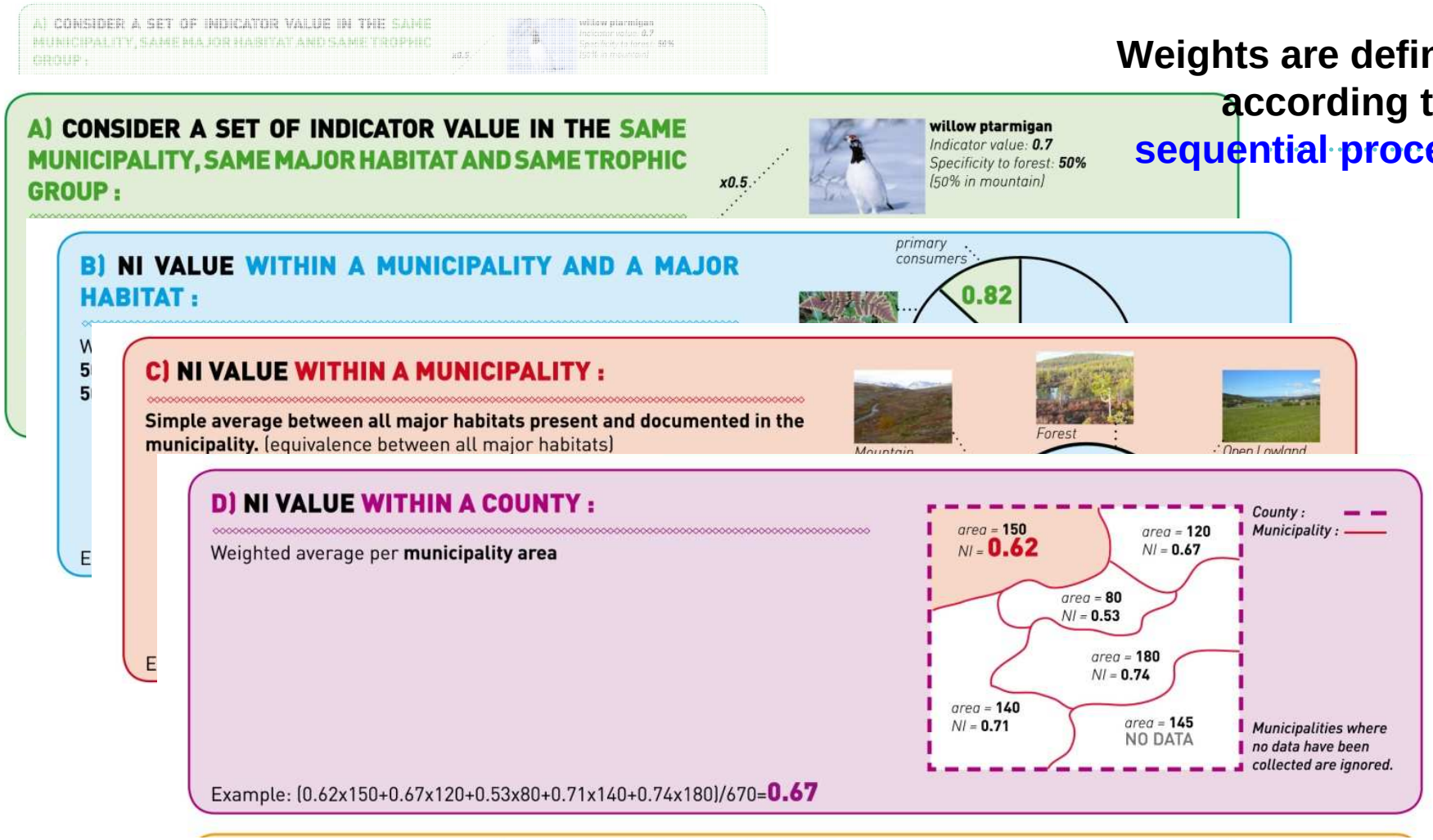
tablets and mobile phones,

Ready in the next 2-3 months.

Thanks for your attention, and time for questions !

Example of calculation:

Weights are defined according to a sequential process



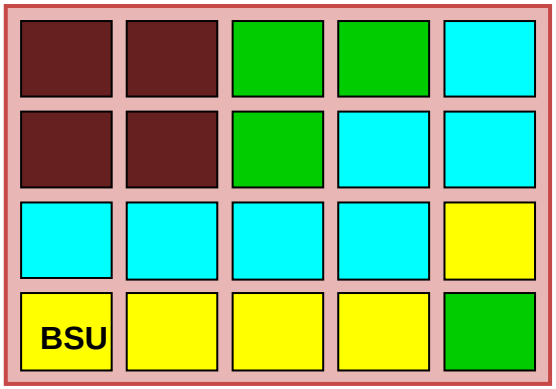
Some steps can be dropped to get more specific information

NI and SEEA in space

SEEA

mountain

forest

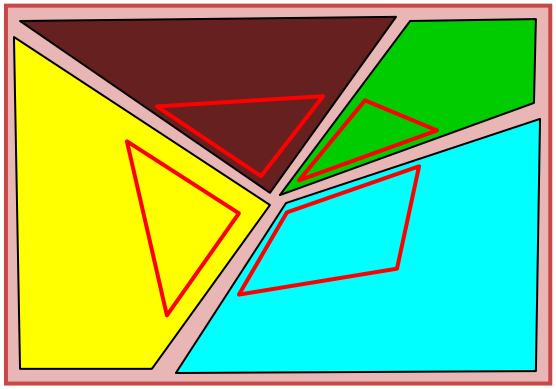


river

open areas

EAU

NI



The NI does not requires that all information should be traced back to the BSU scale.

The NI allows each ecosystem to change in area *to some extent*. Dramatic reduction in areas are captured as reduced ecosystem condition.