CBD Workshop Isle of Vilm

'The EU conceptual 4-level model on ecosystem restoration'

3rd June 2014

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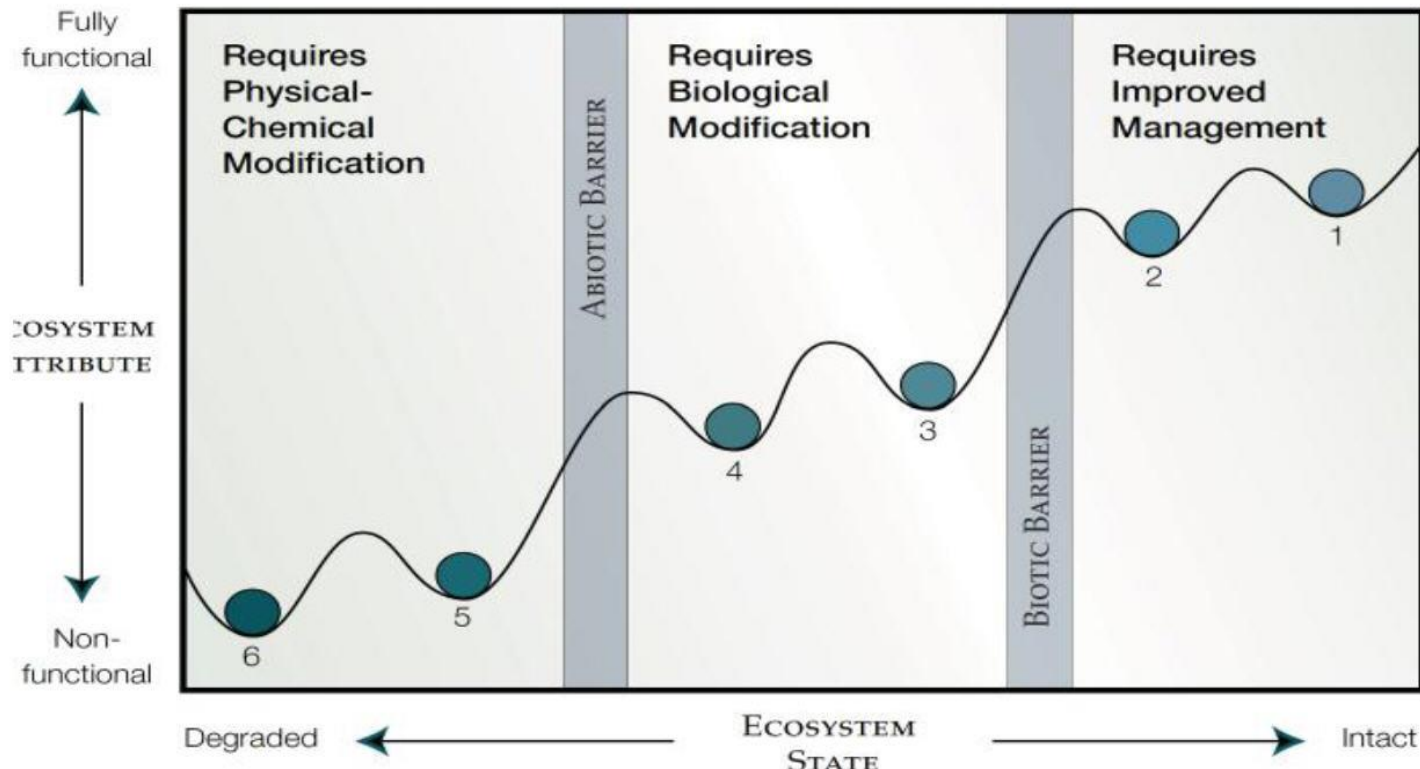
European Commission

'Restoration'

- Several definitions of 'restoration', 'degraded' (EC, CBD, SER, IUCN)

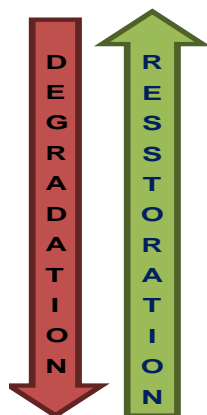- Pragmatic definition of CBD (and SER) will be applied:

> **"***The process of actively managing the recovery of an ecosystem that has been degraded, damaged or destroyed as a means of sustaining ecosystem resilience and conserving biodiversity***"*

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'Restoration'

- Process of restoration needs to be defined in a better way (see conceptual model Hobbs & Harris for understanding ecosystem states and transitions) → work with **restoration levels!**

		Types of areas	Base-line	By 2020 (and net gain)
LEVEL 1	Satisfactory abiotic conditions. Key species, properties and processes of ecosystem patches and their functions, at site level and at landscape level, are in good to excellent condition.	a.o. 'wilderness' areas and N2000 habitats and species in FCS, rivers and lakes in good ecological status (GES), marine ecosystems in GES, ….	30%	32% (**+ 2%** from L2)
LEVEL 2	Satisfactory abiotic conditions, some disrupted ecological processes and functions, either at site level or at landscape level or at both levels. Reduced or declining diversity and key species, compared to L1 but retains stable populations of some native species.	a.o. N2000 habitats and species not in FCS, …	15%	28% (**+ 15%** from L3; - 2% to L1)
LEVEL 3	Highly modified abiotic conditions, many disrupted ecological processes and functions, either at site level or at landscape level or at both levels. Dominated by artificial habitats but retains some native species and stable populations.	a.o. non-protected rural areas, not including intensive agriculture	30%	16% (**+ 1%** from L4; - 15% to L2)
LEVEL 4	Highly modified abiotic conditions, severely reduced ecological processes and functions, both at site level and at landscape level. Dominated by artificial habitats with few and/or declining populations of native species; traces of original ecosystem hardly visible.	'heavily modified ecosystems' (e.g. Intensive agriculture, build urban areas, roads, airports, brownfield areas, heavily modified water bodies); heavily degraded 'natural' and 'semi-natural' ecosystems	25%	24%
TOTAL SURFACE			100%	
TOTAL 'RESTORABLE' SURFACE			70%	
TOTAL 'RESTORED' SURFACE (cumulative starting from baseline, and calculated on the basis of 'restorable surface')				25,7%

ILLUSTRATIVE EXAMPLE of APPLICATION OF 4-LEVEL MODEL

DEGRADATION

RESSTORATION

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General principles of the 4-level model

A. **Definitions and assumptions** applied within the 4-level model should be **consistent** with other initiatives under the Biodiversity Strategy

B. A **pragmatic approach** is **key** for the **successful implementation** of the 4-level model. Although restoration is a complex issue and ecosystem condition can be described in many ways a **balance** needs to found between **scientific accuracy** and **efficiency**. This principle will prevail in the selection of descriptors, the description of threshold values and the proposed way of applying the 4-level model.

"DON'T LET THE PERFECT BE THE ENEMY OF THE GOOD"

C. Restoration needs to be defined for the **different ecosystem types identified in the context of the MAES initiative.**

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General principles of the 4-level model

D. **Restoration is a process**, leading to gradual and measurable progress in ecosystem condition. Therefore a 'quality level' approach for restoration has been developed. **Monitoring** should involve a follow-up of the chosen descriptors over time.

E. **Restoration levels** need to be described for each ecosystem type by means of a well-defined **set of descriptors** and well-defined **threshold** values between the restoration levels

F. An **EU wide common understanding** on how to determine the **levels for ecosystem condition** is very important, i.e. an **agreed list of applied descriptors** as well as **a shared understanding on the transitions between levels (threshold values)**. This is particularly important for determining **level 1**, as this has a direct impact on the restorable area and associated financing needs for restoration.

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General principles of the 4-level model

G. **Degradation** in this concept is the **reverse of restoration**. If areas get degraded (e.g. level 3 to level 4) within the period until 2020, these areas should be **deducted** from the achieved progress towards the 15% restoration target

H. The **15% restoration target includes Natura 2000 targets** (achieved progress on Target 1 of the Biodiversity Strategy contributes to the achievement of Target 2) as well as **all other environmental targets which are relevant in the context of restoration**, such as progress made towards the attainment of good Ecological Status under the WFD and Good Environmental Status under the MSFD

I. **No additional descriptors** need be identified for ecosystem types where restoration is already covered by existing EU environmental legislation and associated targets (habitats and species covered by Natura 2000 targets, freshwater ecosystems covered by WFD, marine ecosystems covered by MSFD).

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General principles of the 4-level model

J. Therefore the **main challenge** for the further elaboration of the 4-level model is to identify **suitable descriptors** and threshold values for **ecosystem types** such as arable land, permanent crops, plantation forests, and urban environments where the **legal framework for restoration is much weaker**, and targets and descriptors are much less developed

K. With regard to the **nature of the 15% target**, it is acknowledged that improvements to ecosystem condition will have both **quantitative** (area based) and **qualitative** (e.g. improvement in biotic and abiotic conditions, reduction in pollution load) components.

L. The **baseline situation** is the situation in 2010, as this was the start of the EU Biodiversity Strategy. If no data are available for 2010 the most recent data should be used (e.g. Art 17 reporting Natura 2000 provides data for the situation in 2006). Monitoring of progress towards the 15% restoration target should be related to this reference point

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General principles of the 4-level model

M. An important element of the 4-level restoration model is the **continuous bookkeeping** of the **total restorable area**. As a first step the **total restorable area in the baseline situation** should be defined and the extent and condition of the different ecosystem types should be mapped and assessed. **All areas in level 1 should be out of scope for the 15% restoration target**. All other areas (level 2 to level 4) are '**restorable area'.** As non-restoration driven **land use changes** and restoration-driven **transformations between ecosystem types** will take place in the remaining period till 2014 there will be a **need to adjust the surface** of ecosystem types and their condition levels in 2020 to the actual situation in 2020.

N. The 15% restoration target **applies to each Member State**.

O. The 15% restoration target should **apply to both the marine as well as the terrestrial area**. This means 15% restoration in the marine environment and 15% restoration in the terrestrial environment

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General principles of the 4-level model

P. **Different types of descriptors can be applied, describing state, pressures or measures. State descriptors are largely preferred** compared to other types of descriptors as only state descriptors offer a solid guarantee to demonstrate progress. **Biotic state descriptors** are **preferred** to abiotic state descriptors. Pressure descriptors can offer useful additional information and, in particular regarding the trends in external influence. **Measure descriptors** which directly support the restoration process (so maintenance measures are excluded) are acceptable and sometimes useful. Restoration levels can be described by a **combination of different types of descriptors**.

Q. A **landscape scale approach** should be integrated within the 4-level model, as this allows to take account of the importance of landscape scale ecological processes and functions with relevance for the condition of the ecosystem patch. In this way external influence (e.g. threats) can be taken into account in describing ecosystem condition. Therefore landscape-related descriptors need to be integrated in the set of descriptors.
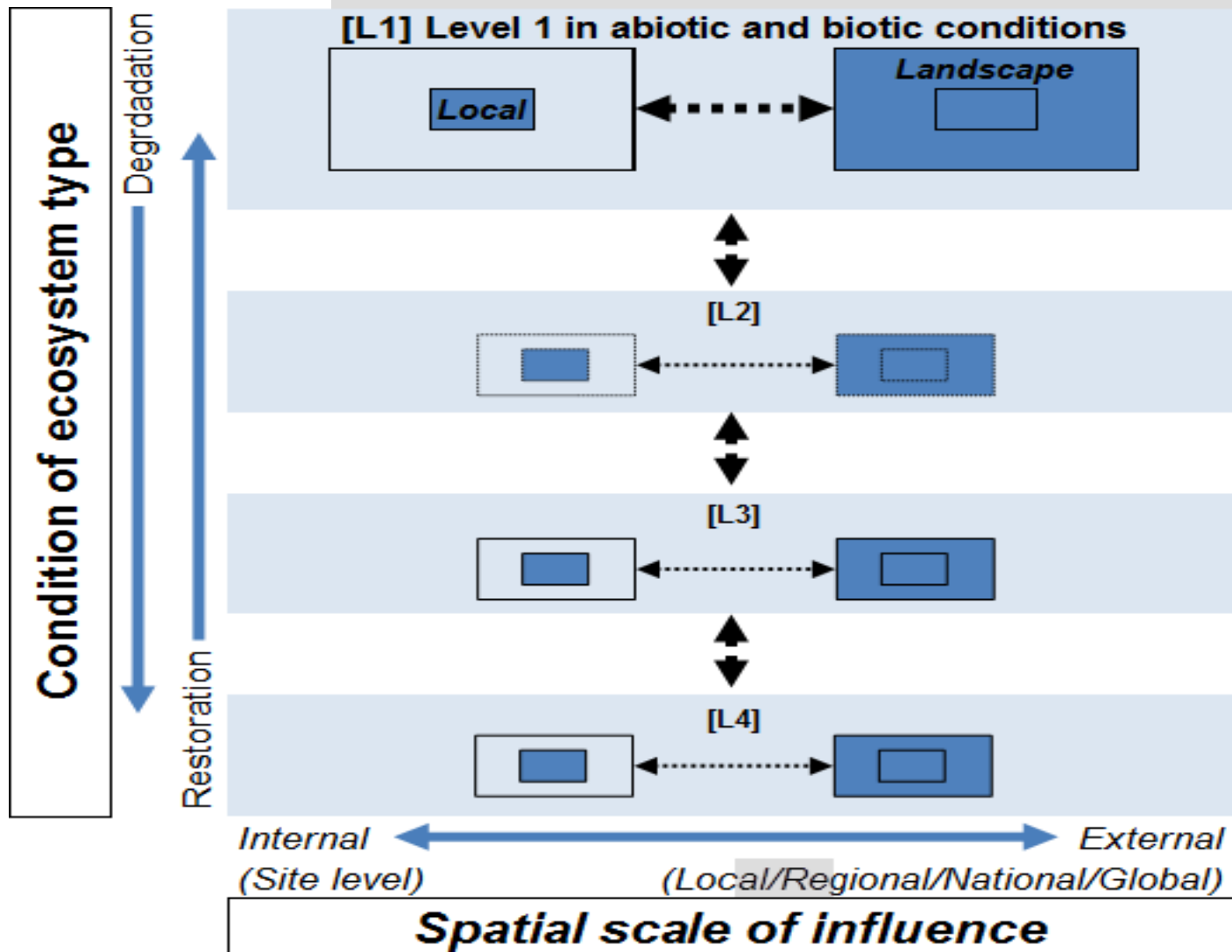
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Landscape approach

The Emergence of Landscape Ecology
From Equilibrium to Dynamic View

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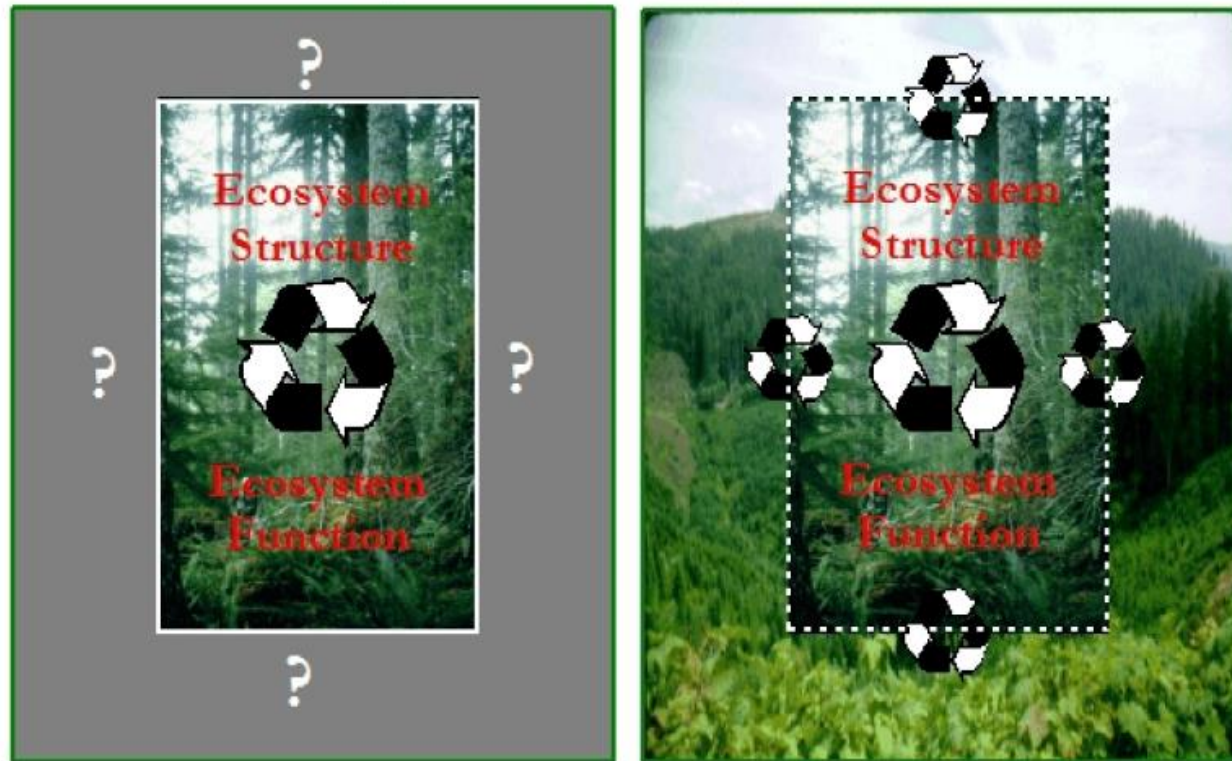
Landscape approach

- Landscape approach is widely applied in restoration ecology

- Insight in threats and pressures is the basis for defining the right set of restoration activities

- Many threats and pressures are generated outside the ecosystem ('external influence') → landscape point of view important for restoration

- 4-level approach based on ecosystem typology → risks to oversee landscape-ecological processes and functions

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Condition of ecosystem type

Degrdadation

Restoration

[L1] Level 1 in abiotic and biotic conditions

Local

Landscape

[L2]

[L3]

[L4]

Internal (Site level)

External (Local/Regional/National/Global)

Spatial scale of influence

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Landscape approach

- Extra dimension to the 4-level concept, but not adding to complexity
- 'Internal' and 'external' descriptors
- Advantages:
  - More complete picture
  - Allows for better identification of actions and appropriate institutional level
  - Species!
  - Mosaic landscapes

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Landscape approach

- Green Infrastructure requires landscape approach

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General principles of the 4-level model

R. The list of descriptors should consist of both **'on-site' descriptors** (or 'internal' descriptors) and **'landscape-related' descriptors** (or 'external' descriptors). This is in line with the advocated integration of a landscape approach in the 4-level model. Landscape related descriptors can refer to the wider context at a local (neighbouring patches), regional, national, EU or global scale, and can provide relevant information on **external influence**

S. The way restoration is achieved (e.g. passive or active measures) is less important than the result. Therefore restoration can be:

  - active and passive
  - **on-site and off-site**

T. **Ecosystem condition and progress of restoration** need to be **measurable.** Therefore for each descriptor, measurable indicators and threshold values between restoration levels need to be defined

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U. **Availability of data** should be a prerequisite for selection of descriptors, indicators and threshold values. **EU databases are preferred** (e.g. SEBI) in order to enhance comparability between Member States in their efforts to achieve the 15% restoration target. National databases should be used to complement EU databases.

V. **Transformation** between ecosystem types needs to considered carefully and **rules need to be established:**

- **Transformation** from one ecosystem type to another ecosystem type **in the framework of nature restoration**.

- **Transformation between level 4 modified ecosystems** can never be considered as restoration or degradation.

- **Upgrading of level 4 modified ecosystems by re-creation of a 'natural' ecosystem type** will always result in a net gain.

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General principles of the 4-level model

W. **Natural disaster induced changes** in ecosystems (surface, condition) should **not be considered as degradation**. In these cases the recommended solution is to adjust the restorable surfaces for each concerned ecosystem type in 2020, and to recalculate the restoration achievements in relation to the 15% target.

X. **Climate change induced changes** in ecosystems (surface, condition) **which cannot be solved by means of restoration** (at least at a reasonable cost) should **not be considered as degradation**. In these cases the recommended solution is to adjust the restorable surfaces for each concerned ecosystem type in 2020, and to recalculate the restoration achievements in relation to the 15% target

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General principles of the 4-level model

Y. **The added value of using ecosystem services as descriptors Is high** for reasons of **communication.** Ecosystem services are **ideal descriptors** to bring a **convincing narrative** and to get support from **stakeholders** for restoration projects (e.g. links to climate change adaptation, links to human well-being, links to financing of restoration and funding opportunities). Generally it makes more sense to apply ecosystem services as descriptors in **modified ecosystems** than in **natural and semi-natural ecosystems**, as it is generally accepted that a balanced generation of ecosystem services will automatically be achieved when restoring abiotic and biotic conditions in natural and semi-natural ecosystem types. As applying ecosystem services as descriptors **suffers from lack of data and mapping**, as well as from **complexity of quantifying ecosystem services** (as quantification is highly dependent on local situations – stakeholder benefits – stakeholder appreciations) descriptors should be carefully selected.

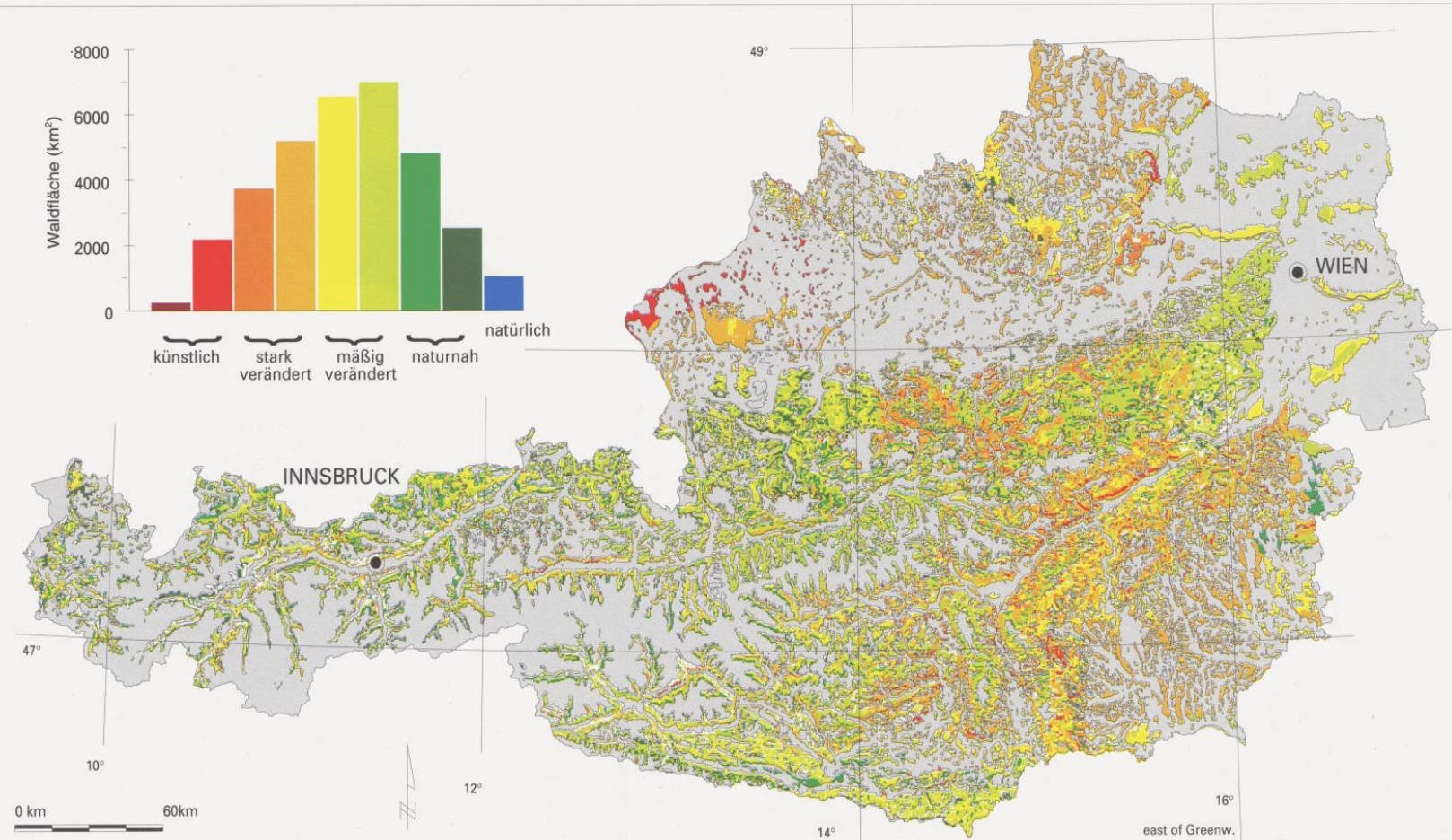**ARCADIS**

General principles of the 4-level model

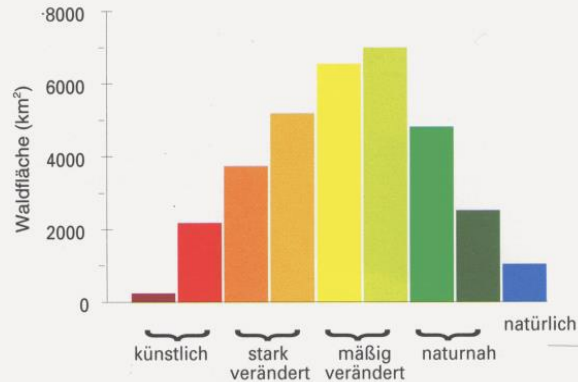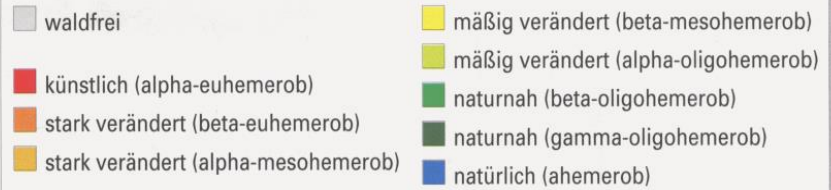**Y.** **Restoration activities should be framed within a coherent long-term restoration vision.** As the time-scale of restoration differs widely between ecosystem types, **safeguards** need to be built in the 4-level model **against restoration initiatives that only are implemented with the purpose to achieve results by 2020 but cannot be considered as priority actions in the context of a coherent restoration program.** Therefore restoration measures that are in place by 2020 to achieve the desired "restored" situation after 2020 should also be accounted for. A specific descriptor on 'initiated restoration actions' might therefore be part of the descriptor's list

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Descriptors, indicators, thresholds

- Selection criteria e.g. SEBI criteria
- Data availability
- Thresholds available for descriptors applied in HD, WFD, MSFD
- Also 'naturalness' indices as applied in some MS provide basis for thresholds
- However for many descriptors thresholds need to be defined
- Proposed descriptors for forests, croplands, grasslands, wetlands and urban

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HEMEROBIE ÖSTERREICHISCHER WALDÖKOSYSTEME

Weiterführende Information zur Hemerobiekarte in:
Österreichische Forstzeitung 1/1997

waldfrei	
künstlich (alpha-euhemerob)	mäßig verändert (beta-mesohemerob)
stark verändert (beta-euhemerob)	mäßig verändert (alpha-oligohemerob)
stark verändert (alpha-mesohemerob)	naturnah (beta-oligohemerob)
	naturnah (gamma-oligohemerob)
	natürlich (ahemerob)

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Proposal for practical implementation

- Further clarifications required on many issues!

  - Set of descriptors for each ecosystem type

  - Indicators and threshold values

  - Minimum level of detail

  - Rules for moving between levels

  - Rules for measuring progress

- Actions:

  1. EC guidance

  2. Support mechanism

- Member States to take action

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