



Towards Resilient Ecosystems: Restoring the Urban, the Rural and the Wild

Tools for planning – O35.1

Anthropogenic landscape change: synthesis of the concepts and quantification methods

André M.,
Vranken I., Mahy G., Visser, M., Bogaert J.



1/5 Introduction: anthropogenic disturbances

2



Alizaco, USA, August 16, 2014 - Wired



<http://buzzly.fr>



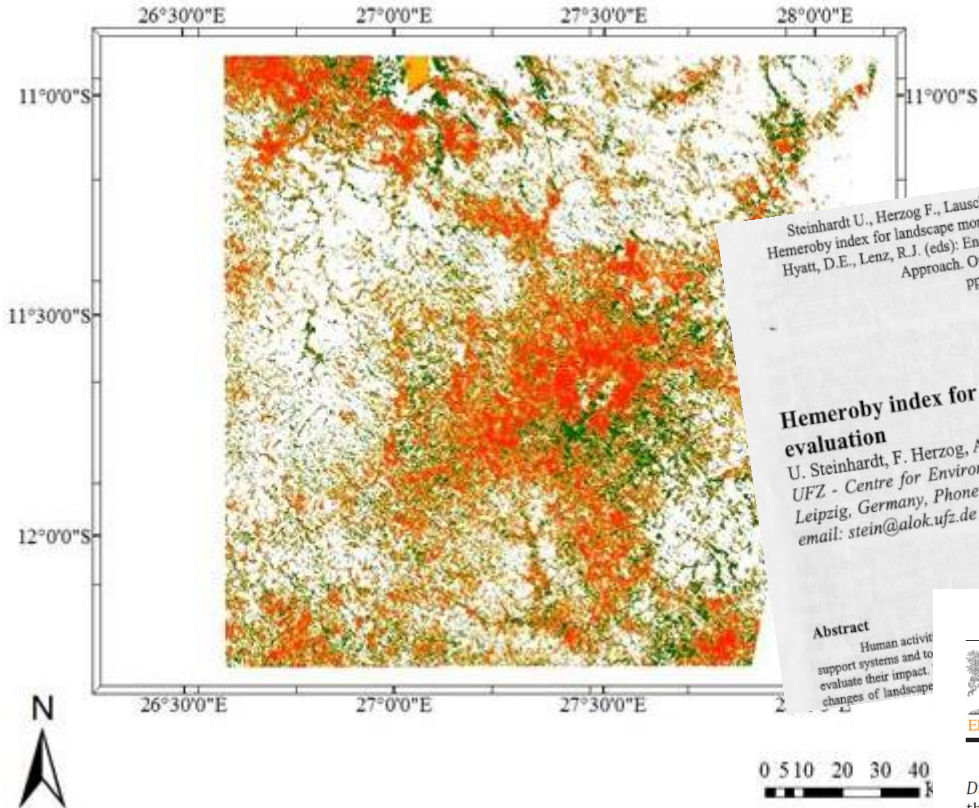
C. Ortiz Rojas



Thyssenkrupp

1/5 Introduction: description, measurement, representation

3



Steinhardt U., Herzog F., Lausch A., Müller E., Lehmann S. (1999):
Hemeroby index for landscape monitoring and evaluation. - In: Pykh, Y.A.,
Hyatt, D.E., Lenz, R.J. (eds): Environmental Indices – System Ar
Approach. Oxford, EOLSS Publ.,
pp. 237-254.

**Hemeroby index for landscape monitoring
evaluation**
U. Steinhardt, F. Herzog, A. Lausch, E. Müller, S. Leh
UFZ - Centre for Environmental Research, P.O. Bo
Leipzig, Germany. Phone + 49 341 235 2678, Fax +
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Abstract
Human activit
support systems and to
evaluate their impact
changes of landscape

0 5 10 20 30 40
km

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An index of naturalness

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ration value and as a descriptor of state
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on its practical application.

Distance to nature—A new biodiversity relevant environmental indicator set at the landscape level

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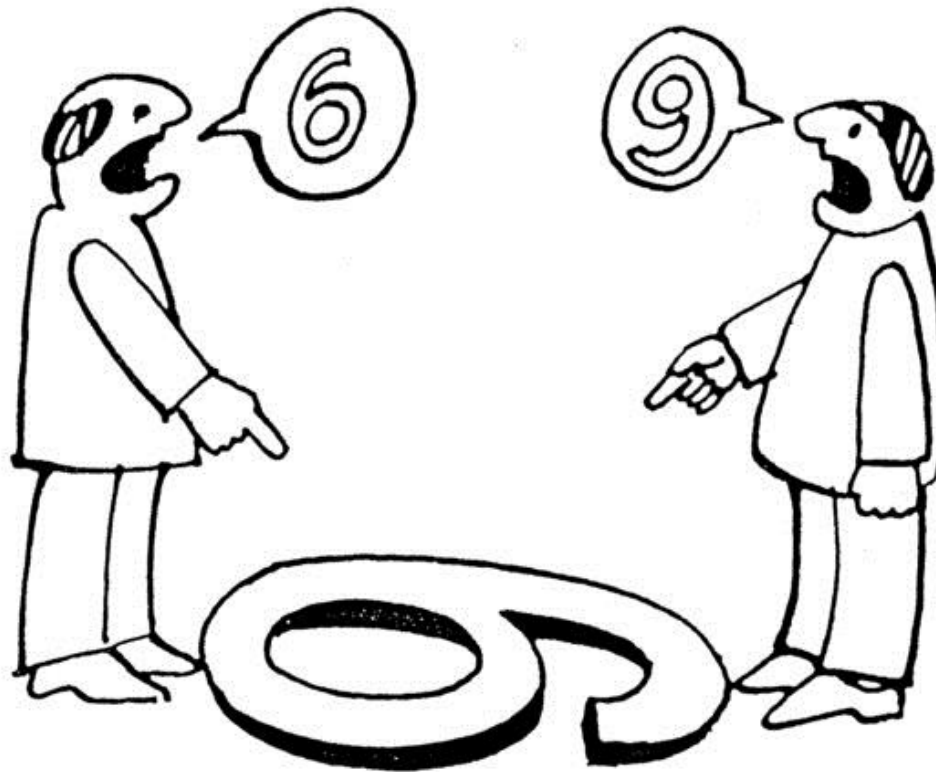
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ABSTRACT

The ongoing worldwide biodiversity crisis comes along with a growing demand for feasible environmental indicators to measure, evaluate and communicate anthropogenic influence on biodiversity. Those indicators can be useful tools for national and regional management and support decision making processes. We propose degree of naturalness (N_d), distance to natural habitat (D_n) and the composite index distance to nature (D/N) as a highly comprehensible environmental indicator set that can be used as surrogate for land use related anthropogenic influence on biodiversity. A high resolution naturalness map for

2/5 Objectives

4



1/5 Introduction: ecological restoration

5



1/5 Introduction: ecological restoration

6

EU Biodiversity Strategy, target 2:

« By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems. »

1/5 Introduction: ecological restoration

7

EU Biodiversity Strategy, target 2:

« *By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems.* »

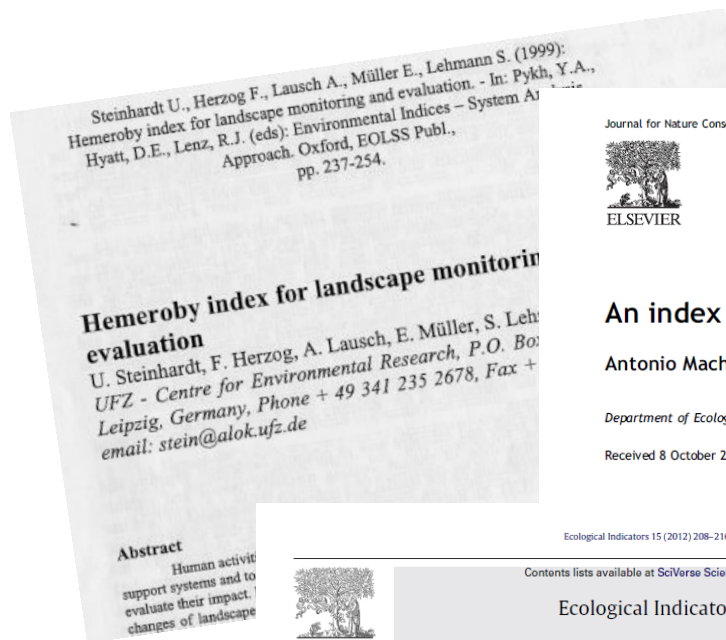
European Commission Biodiversity Strategy Impact Assessment:

« ***Ecological restoration:** The return of an ecosystem to its **original** community structure, natural complement of species and natural functions.* »

2/5 Objectives

8

Sort the different concepts related to the anthropogenic changes



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2/5 Objectives

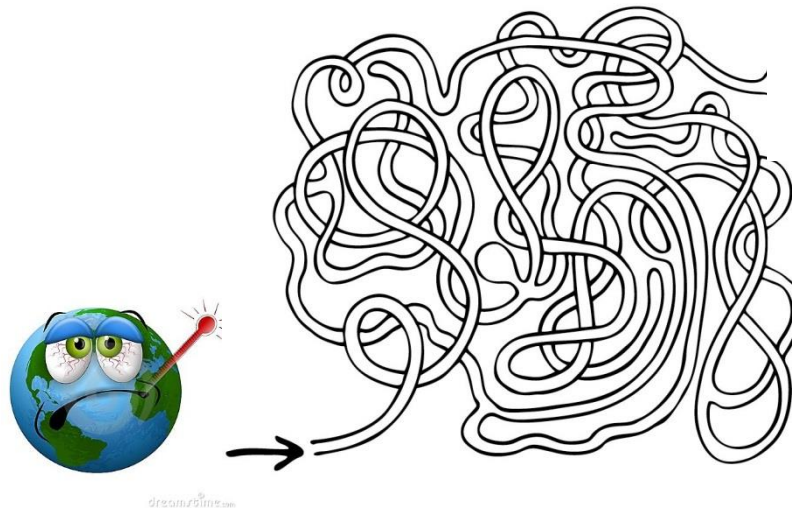
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Sort the different concepts related to the anthropogenic changes



1) What are the alternatives for an anthropised ecosystem or landscape?

/ What are the different end points of a restoration process?



2/5 Objectives

10

Sort the different concepts related to the anthropogenic changes



1) What are the alternatives for an anthropised ecosystem or landscape?

/ What are the different end points of a restoration process?



2) Measure the increase or decrease of anthropogenic effect

3/5 Reference concepts

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Hemeroby

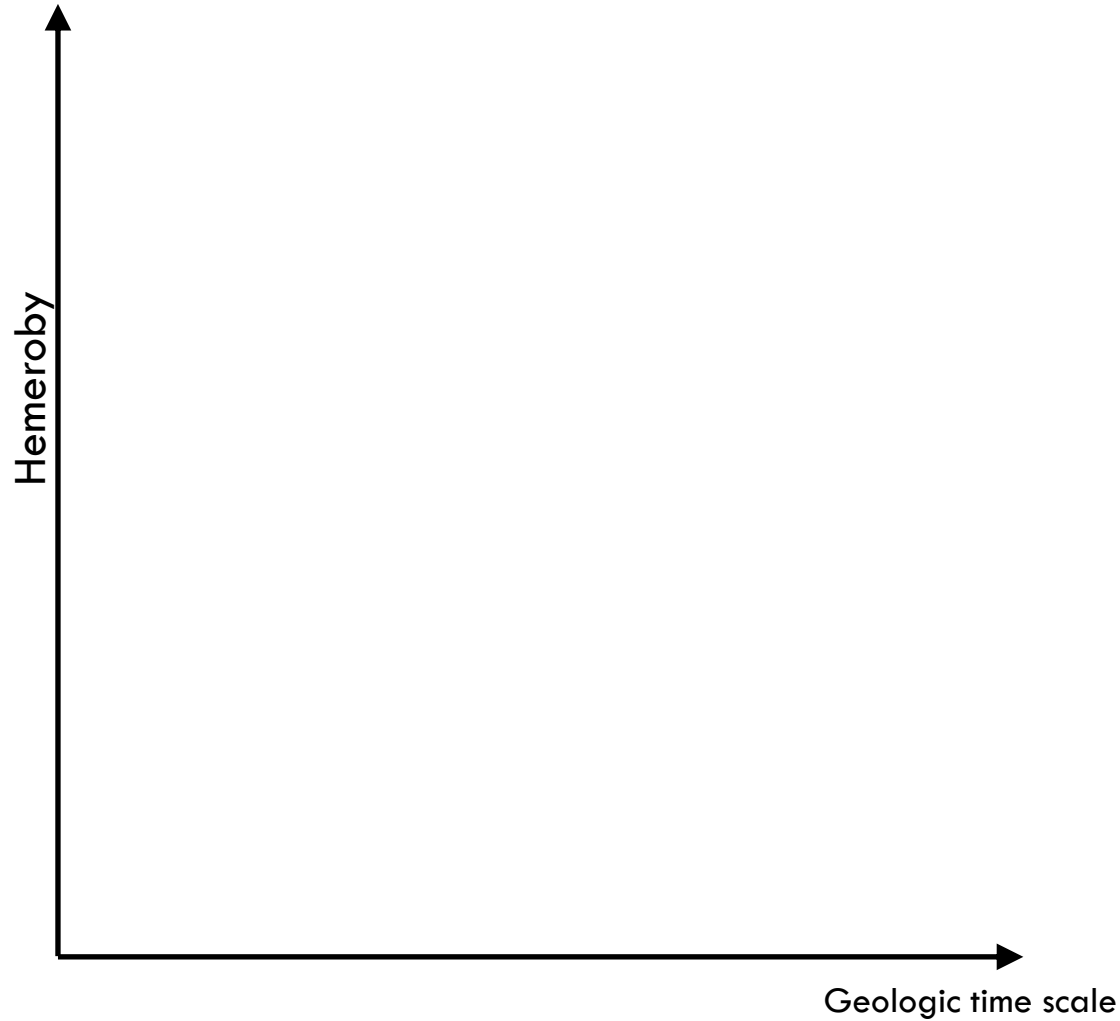


Hemeroby:

Measure of the difference between a reference natural state and an anthropised one

3/5 Reference concepts

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3/5 Reference concepts

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Naturalness:

state of the system when no human activity has influenced it

3/5 Reference concepts

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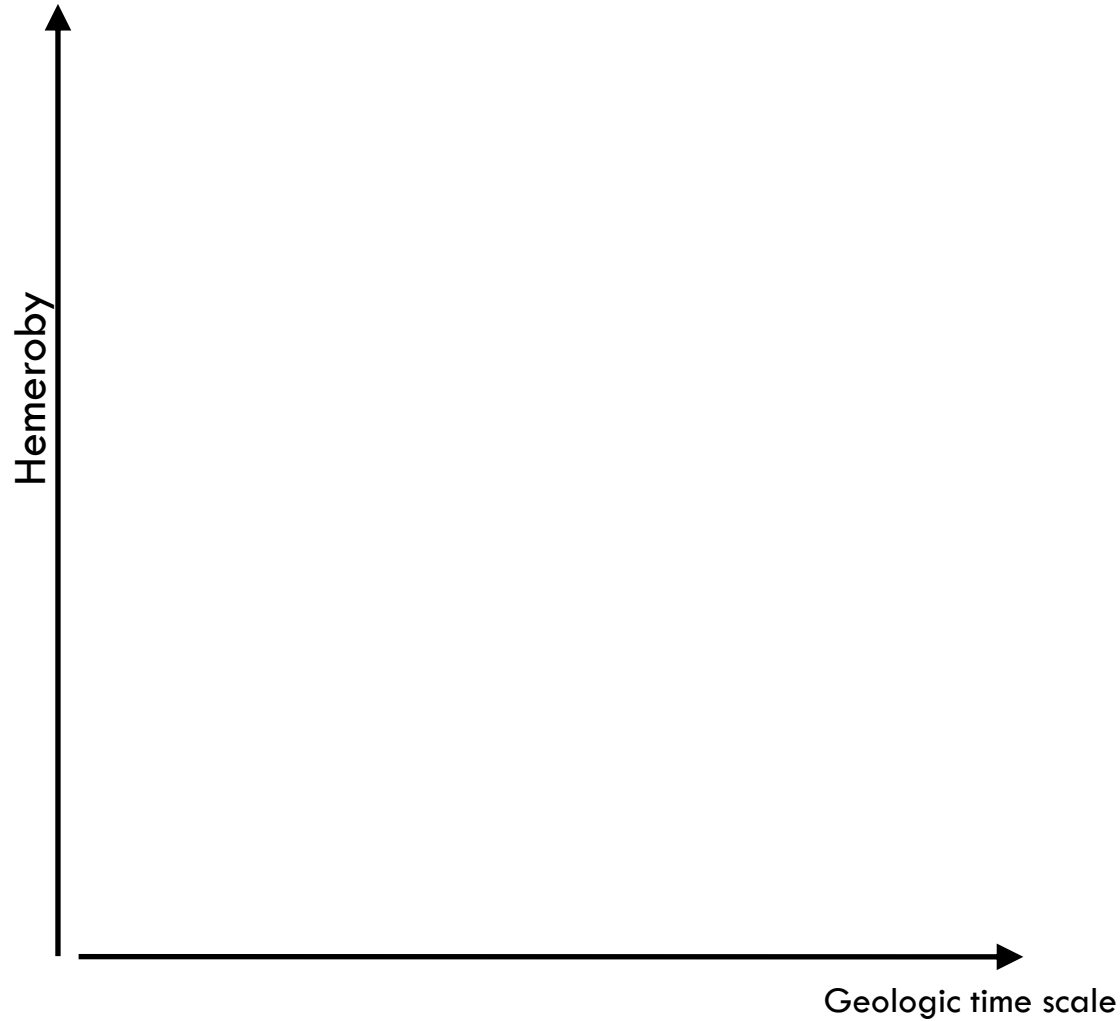
Naturalness:

state of the system when no human activity has influenced it

- Reference state of naturalness
 - = departure point to measure anthropisation
 - = goal to achieve while restoring

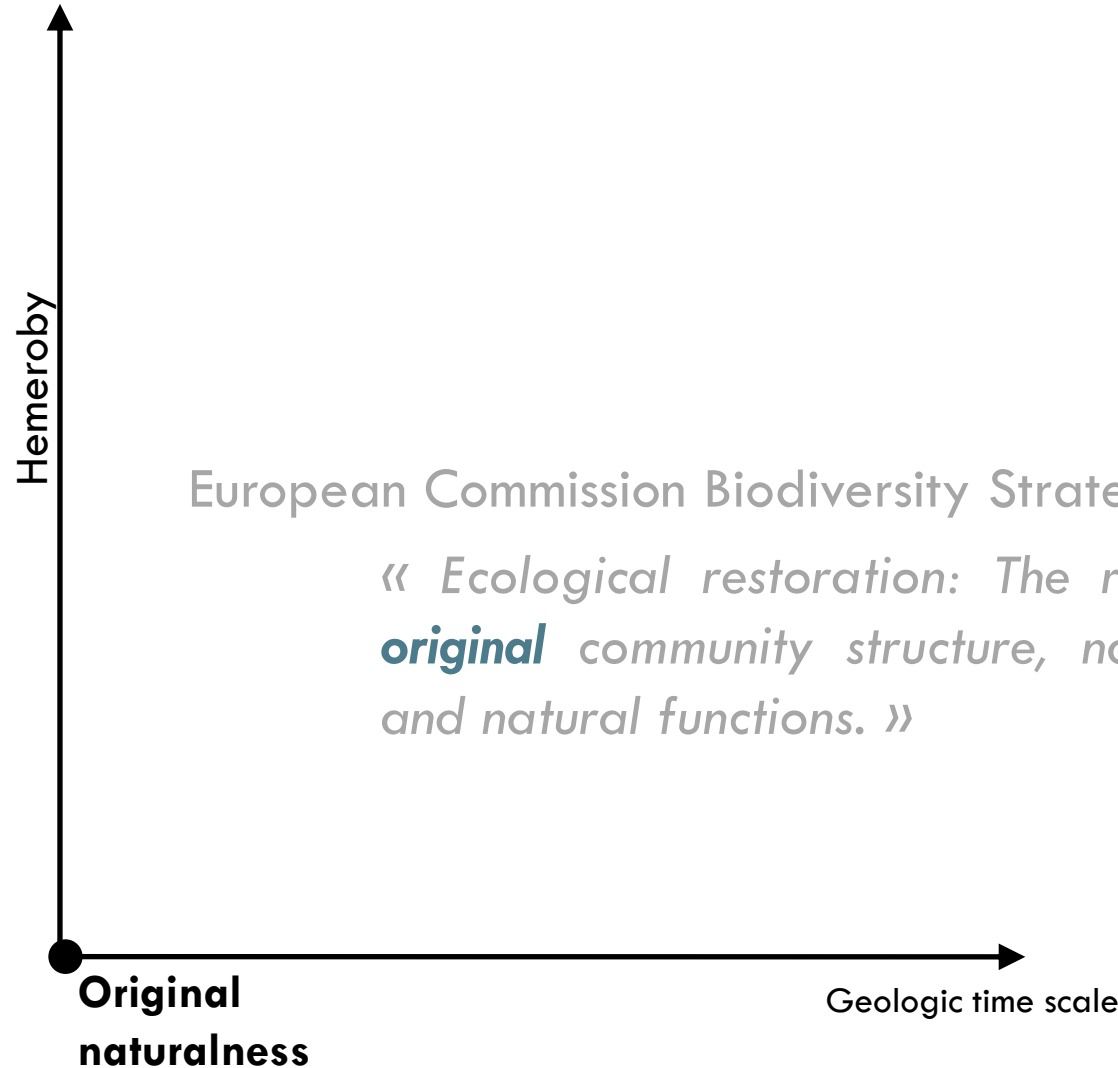
3/5 Reference concepts

15



3/5 Reference concepts

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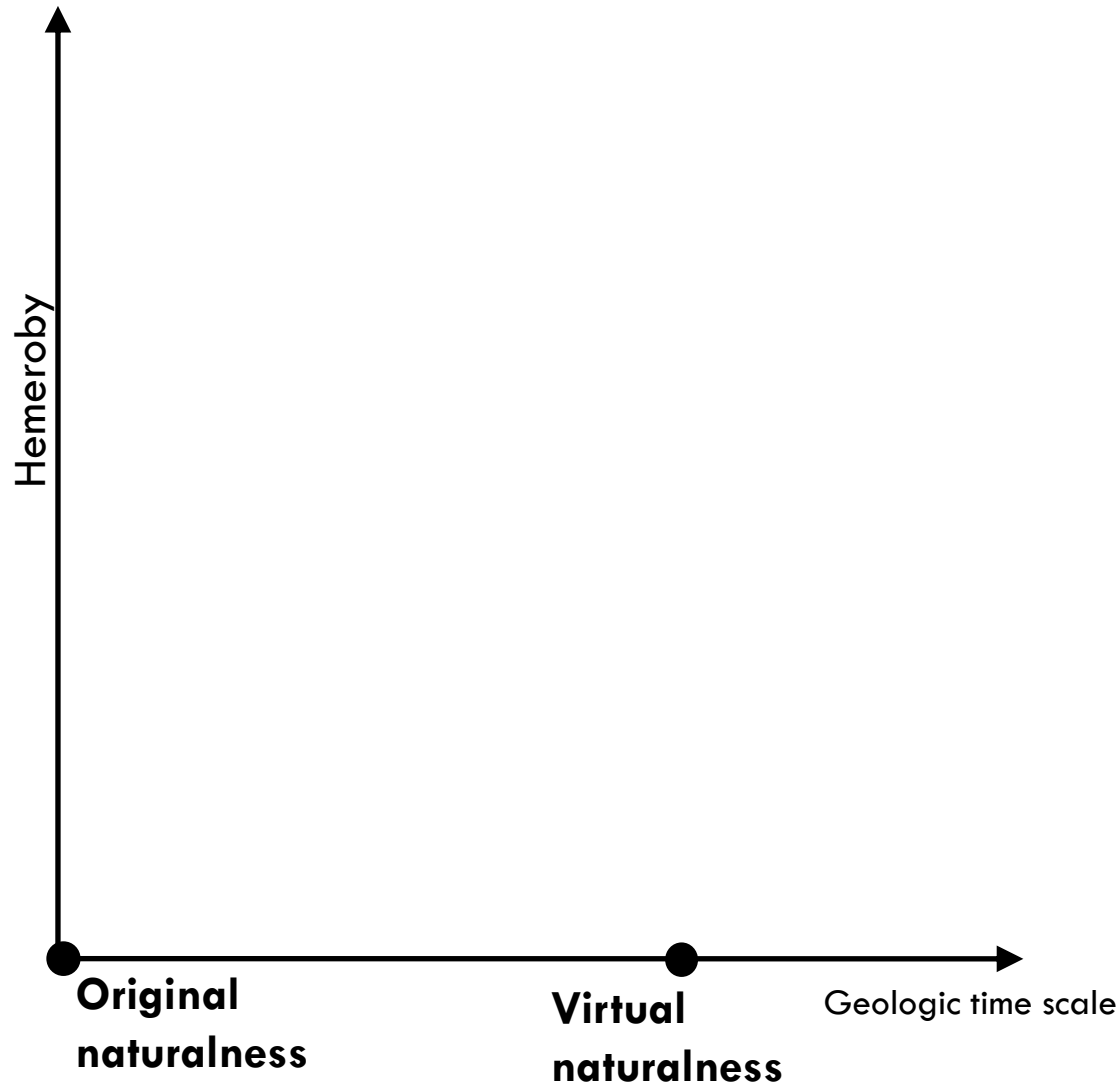


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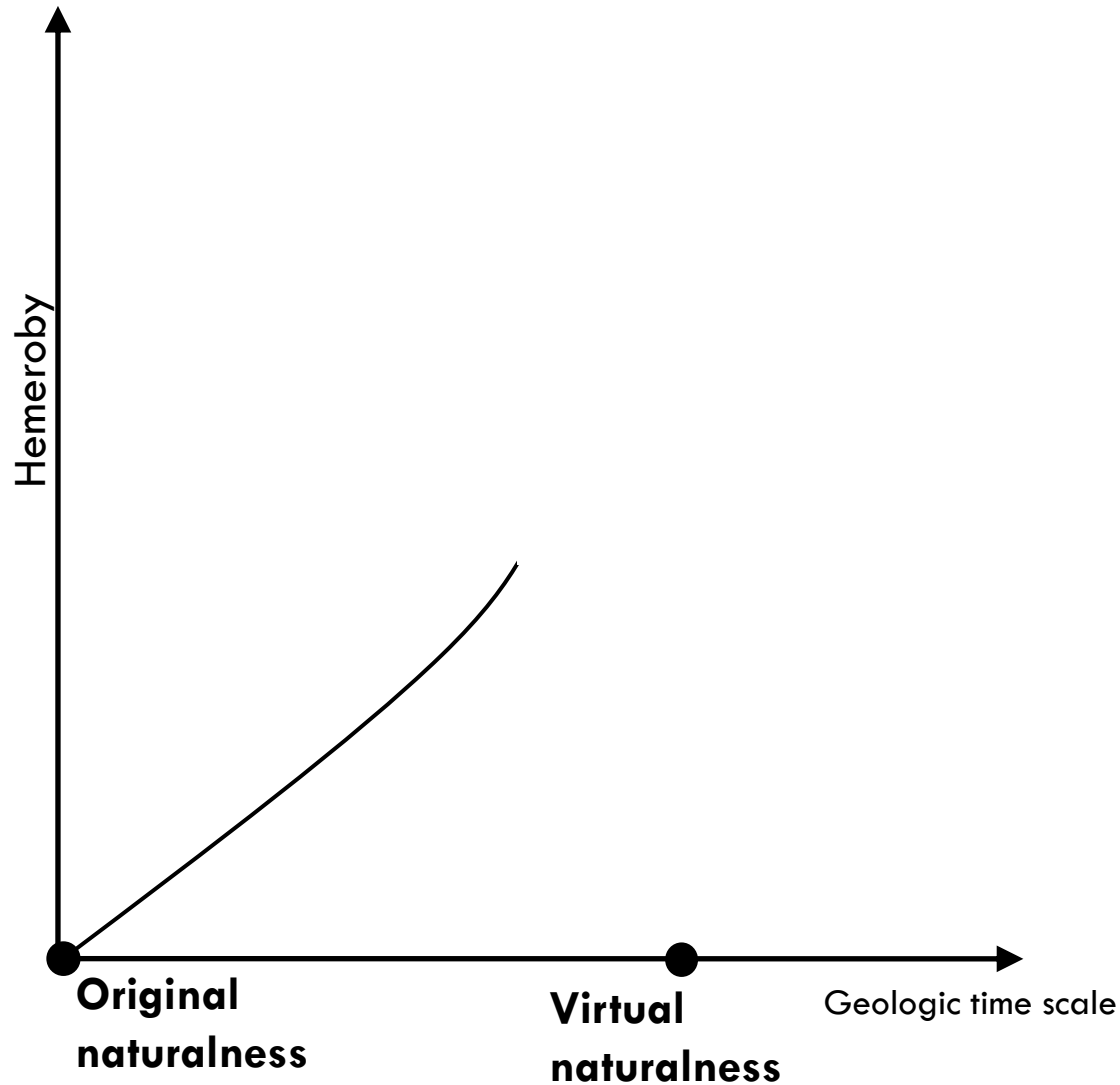
3/5 Reference concepts

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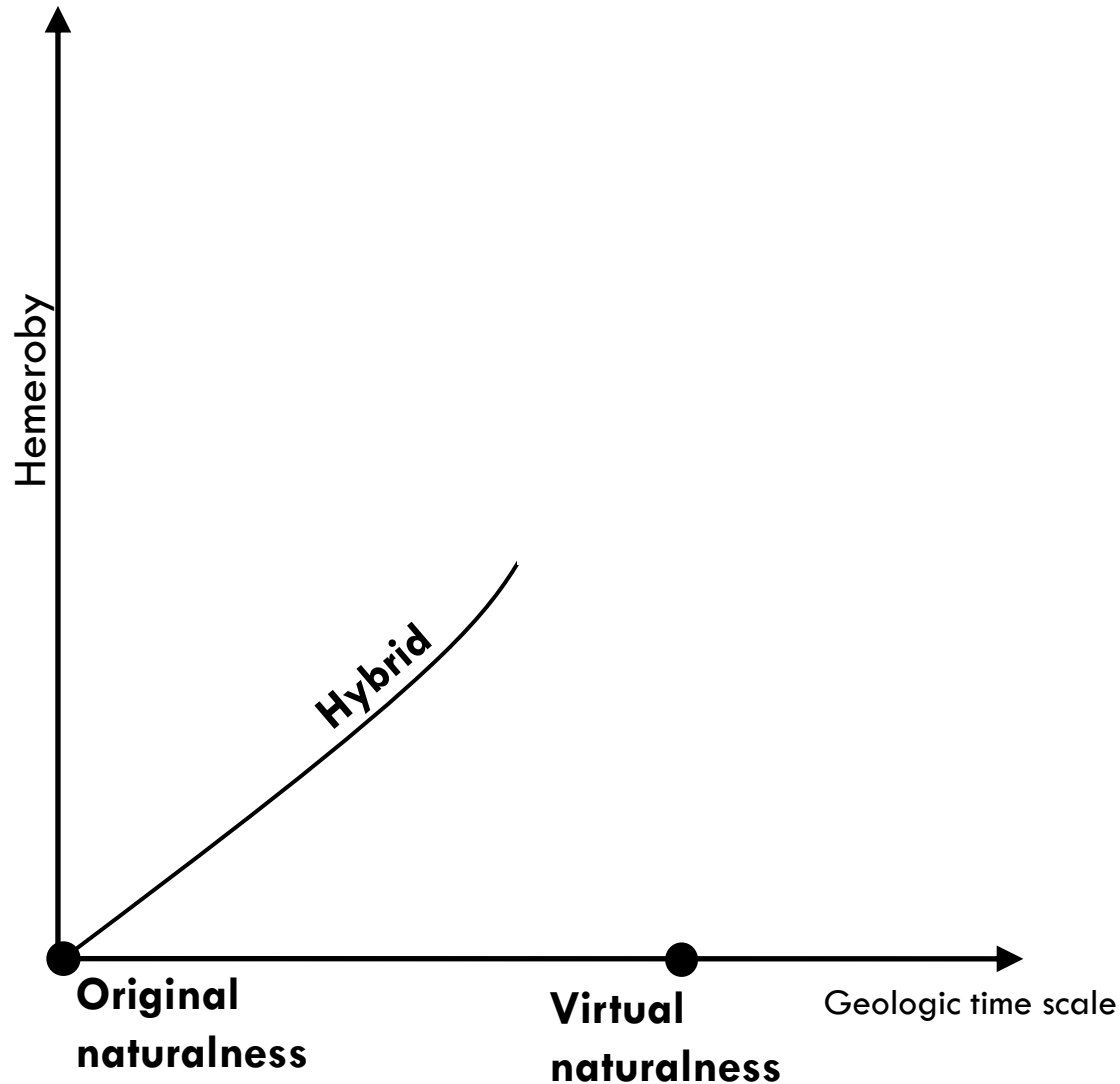
3/5 Reference concepts

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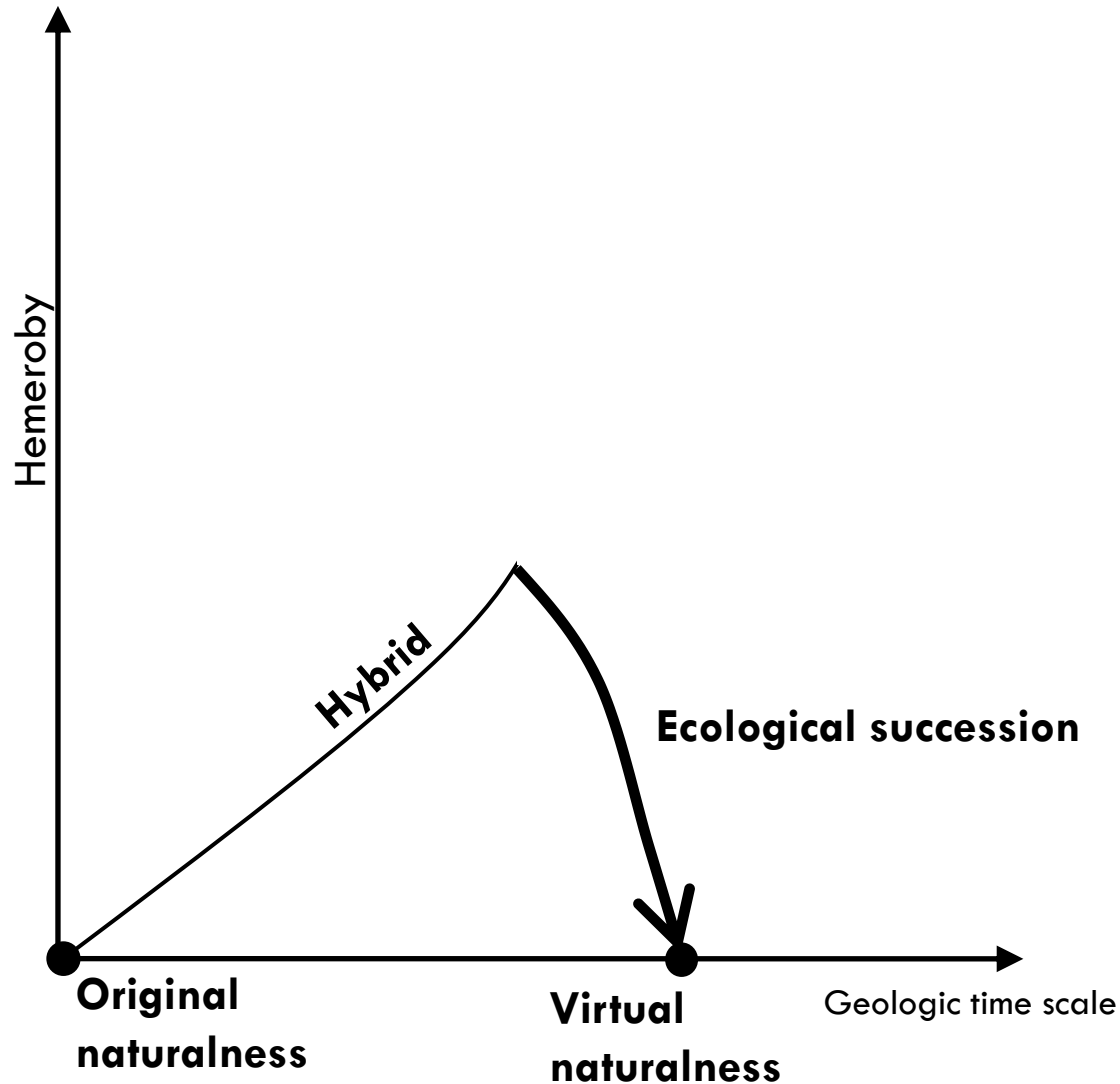
3/5 Reference concepts

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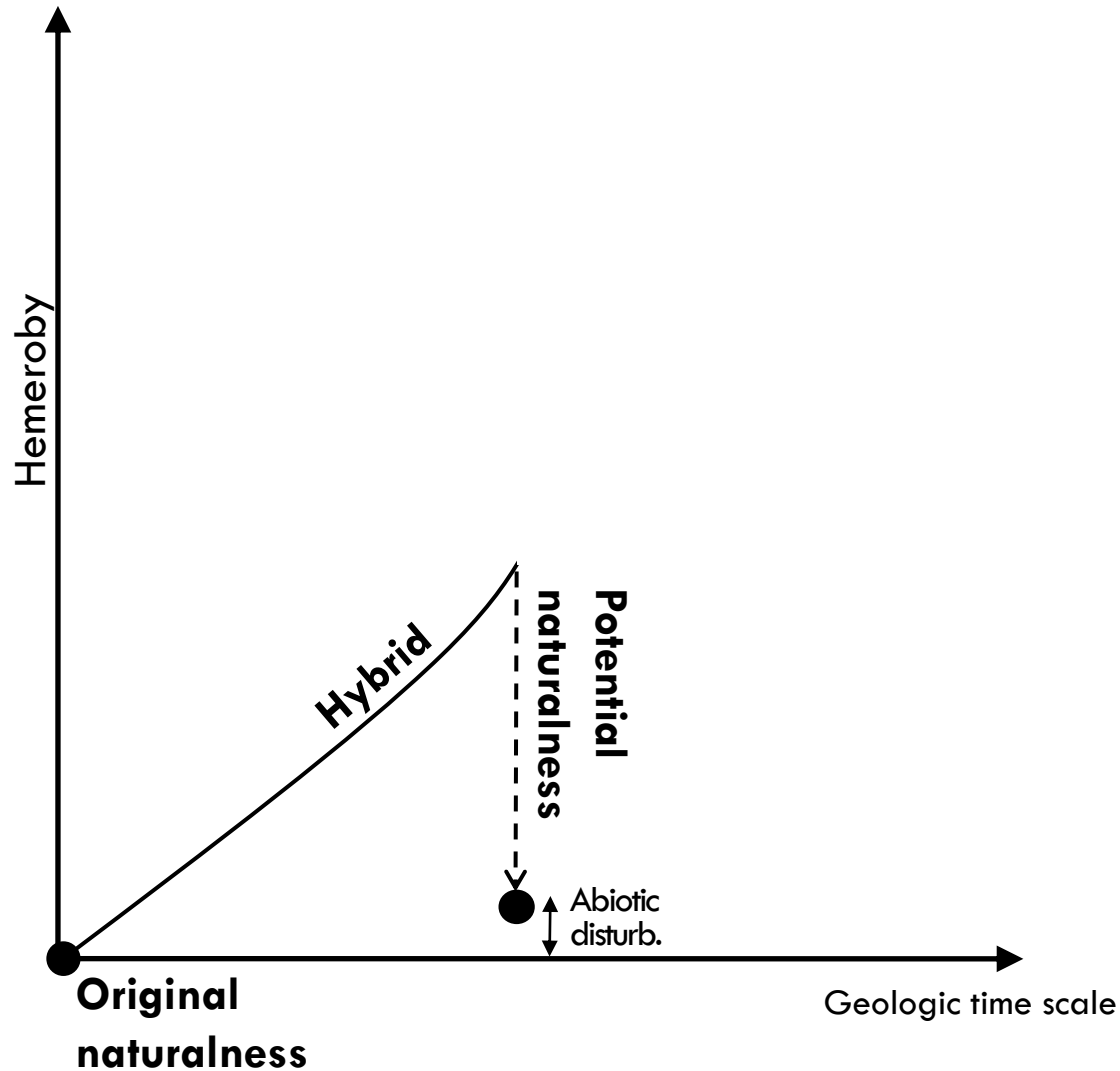
3/5 Reference concepts

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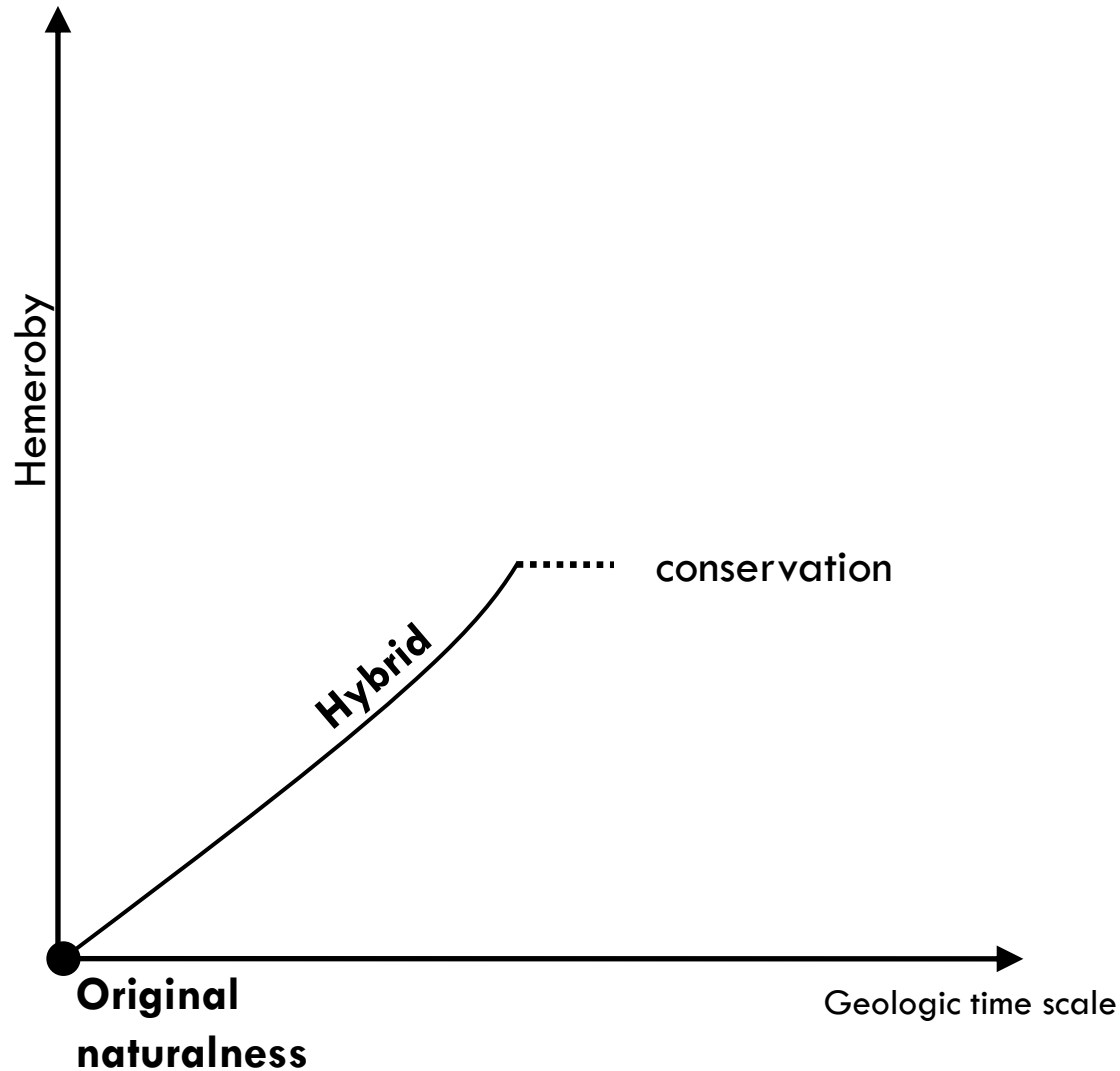
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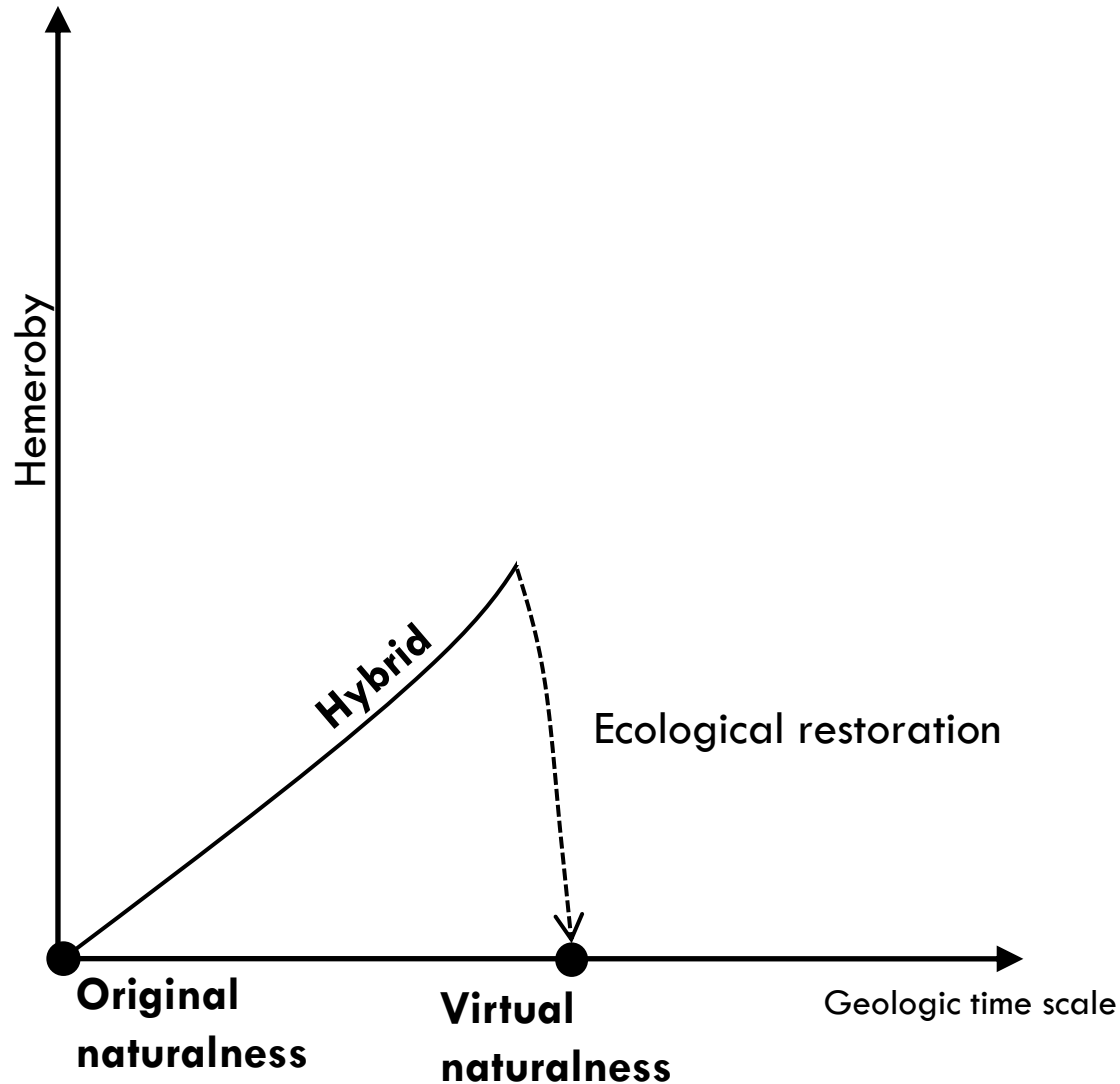
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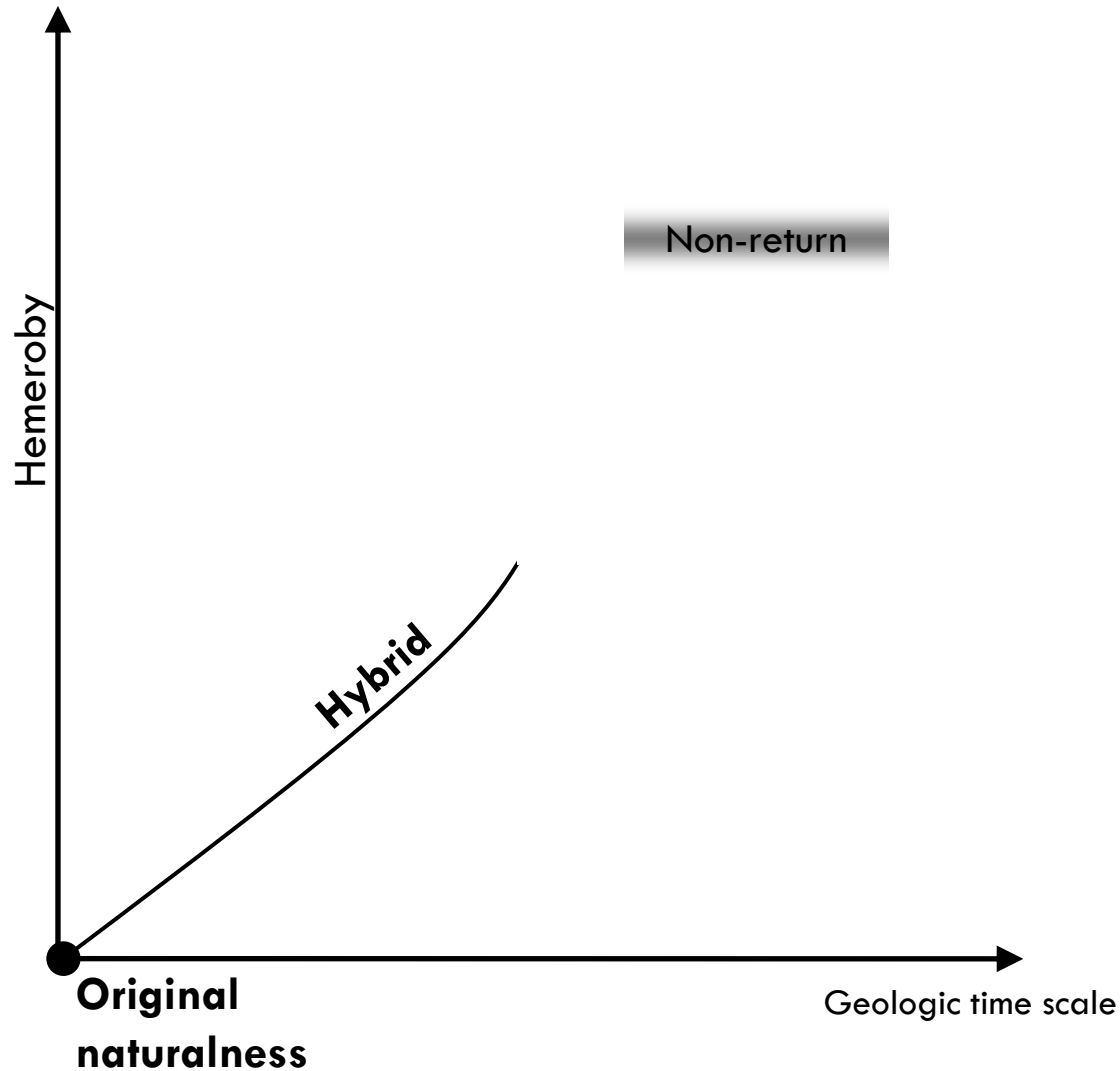
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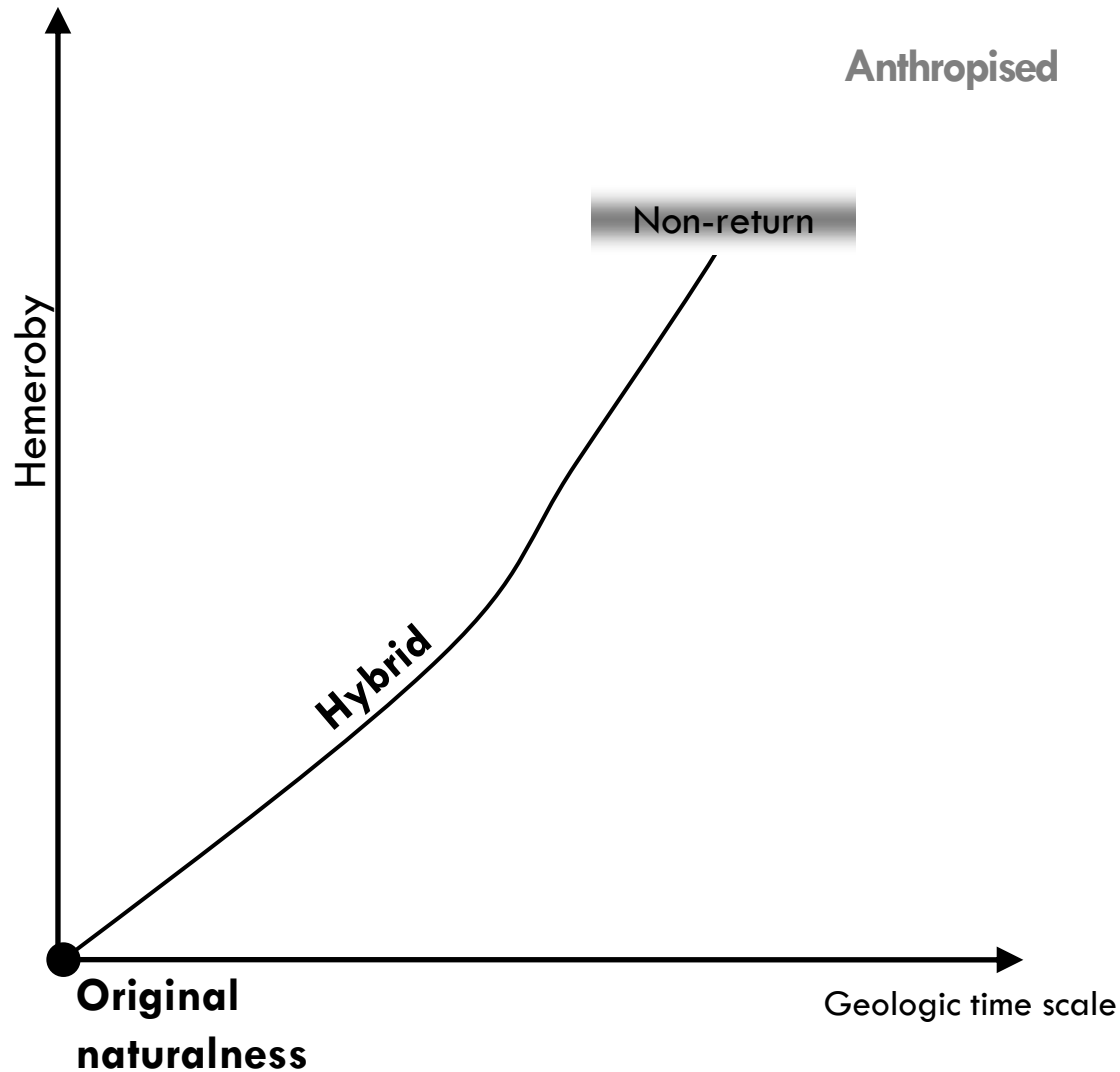
3/5 Reference concepts

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3/5 Reference concepts

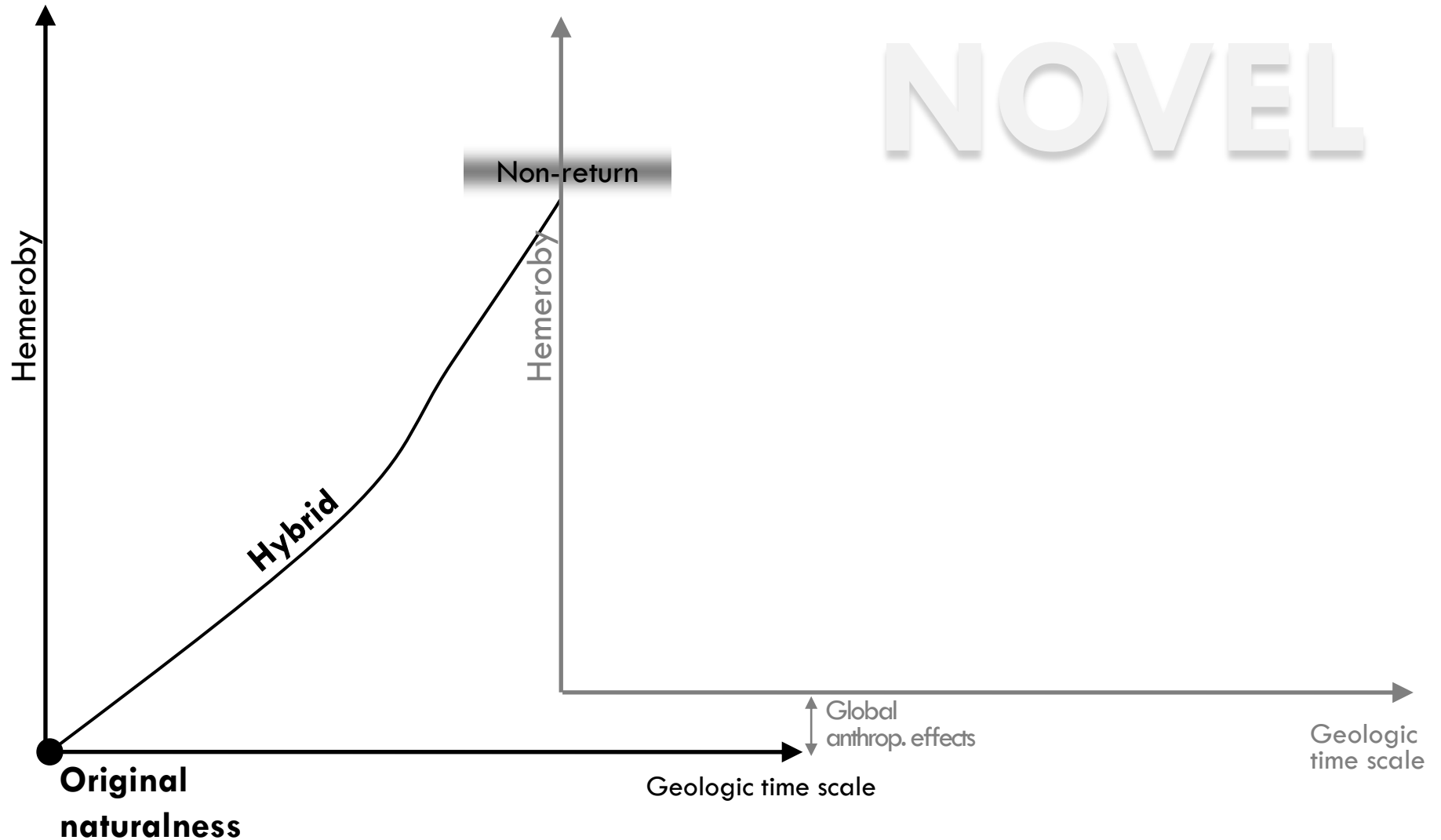
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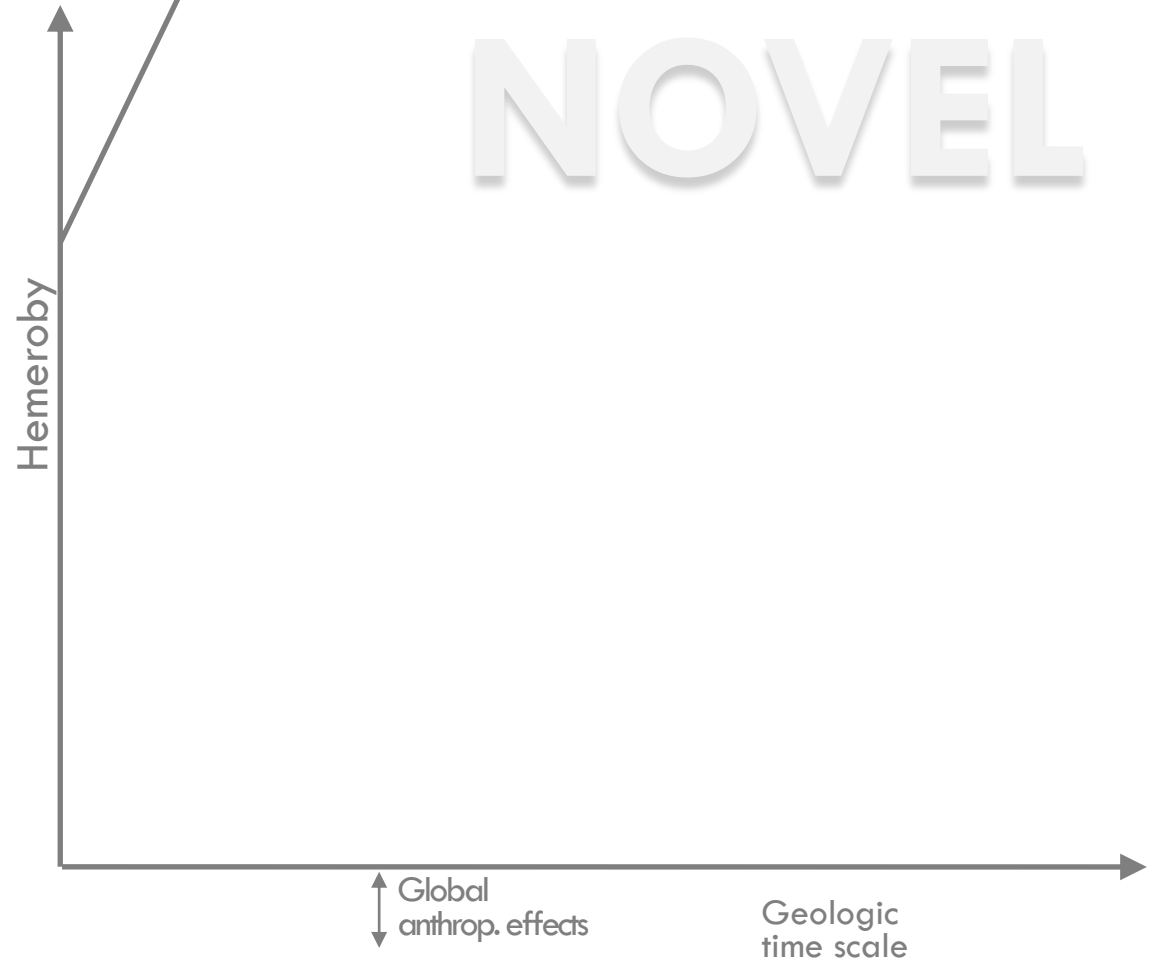
3/5 Reference concepts

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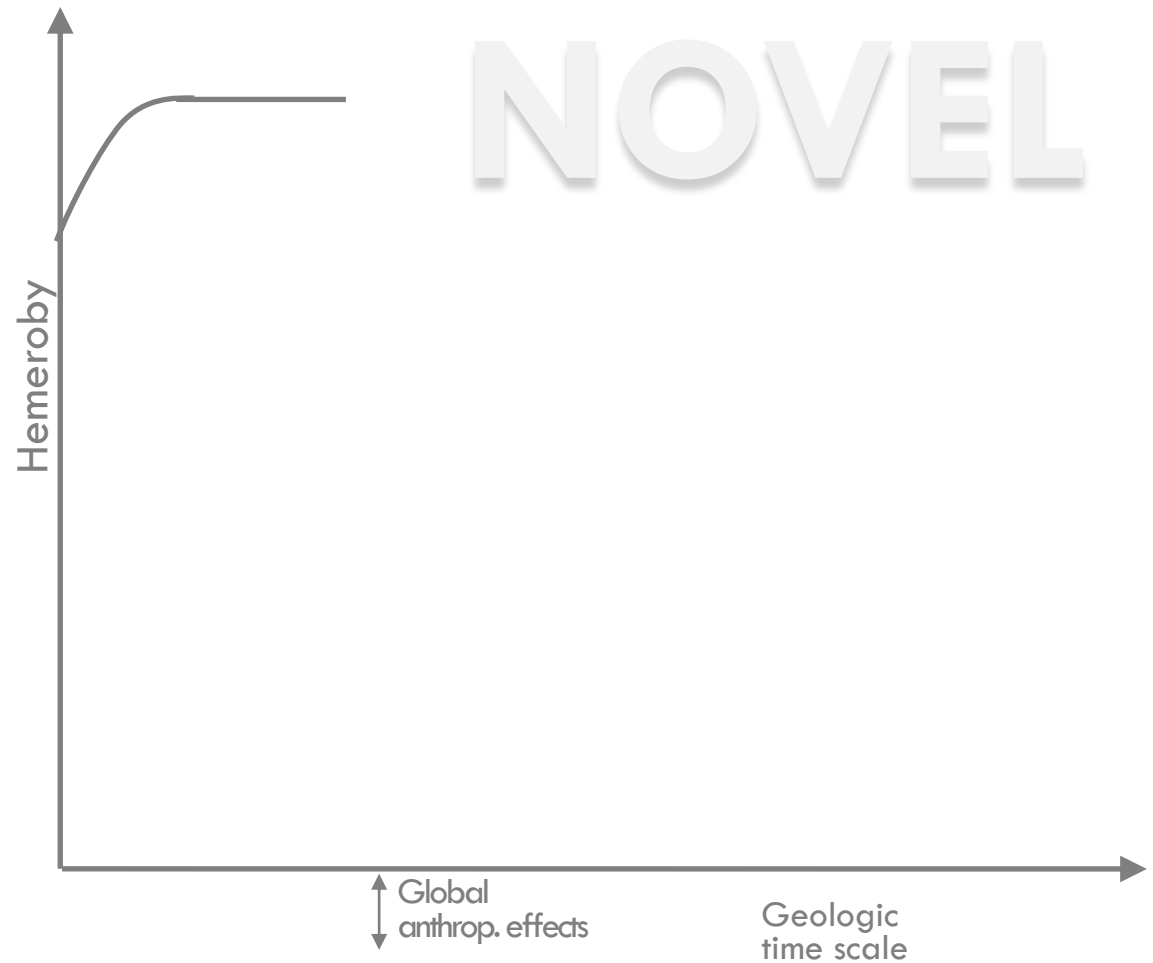
3/5 Reference concepts

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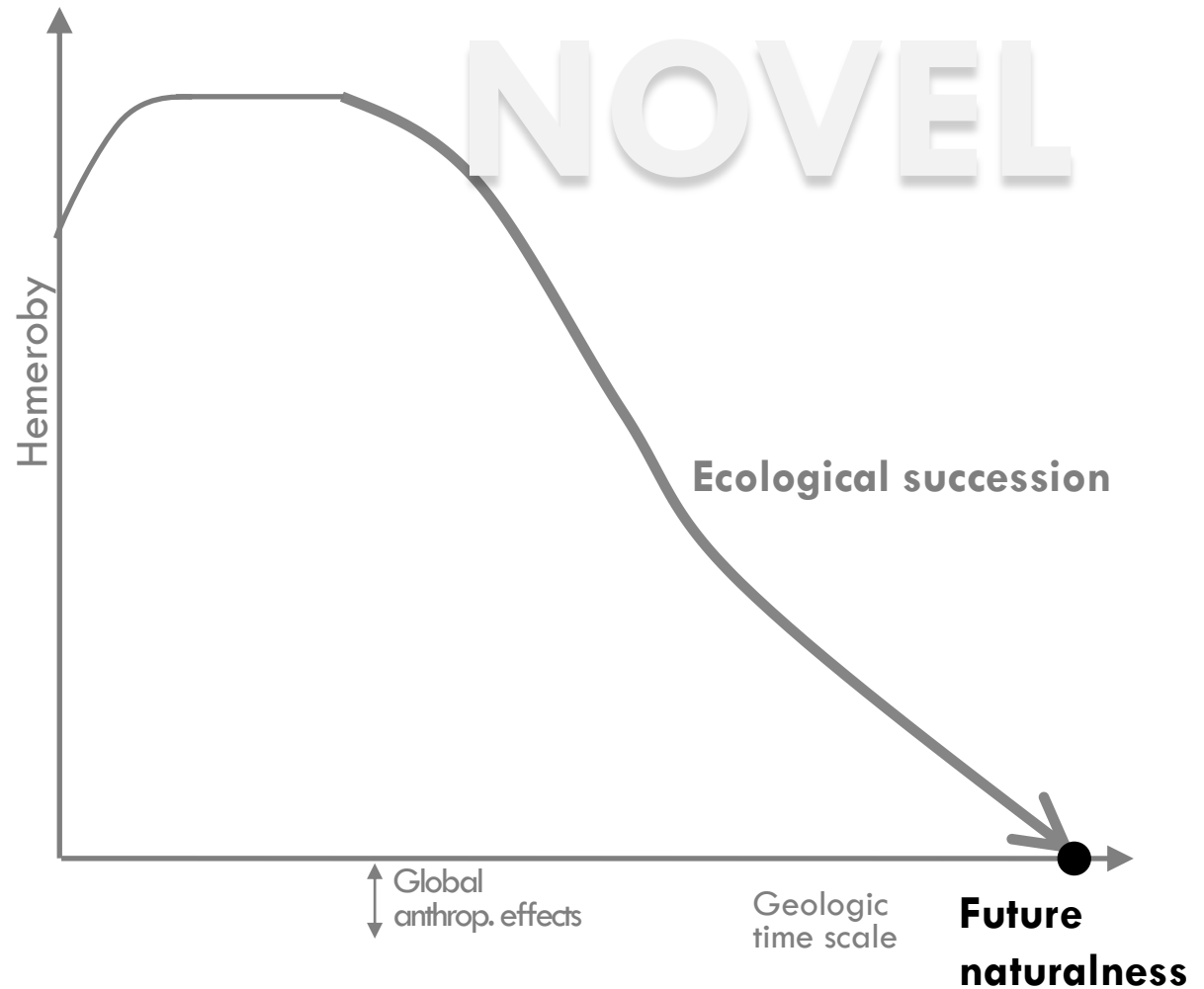
3/5 Reference concepts

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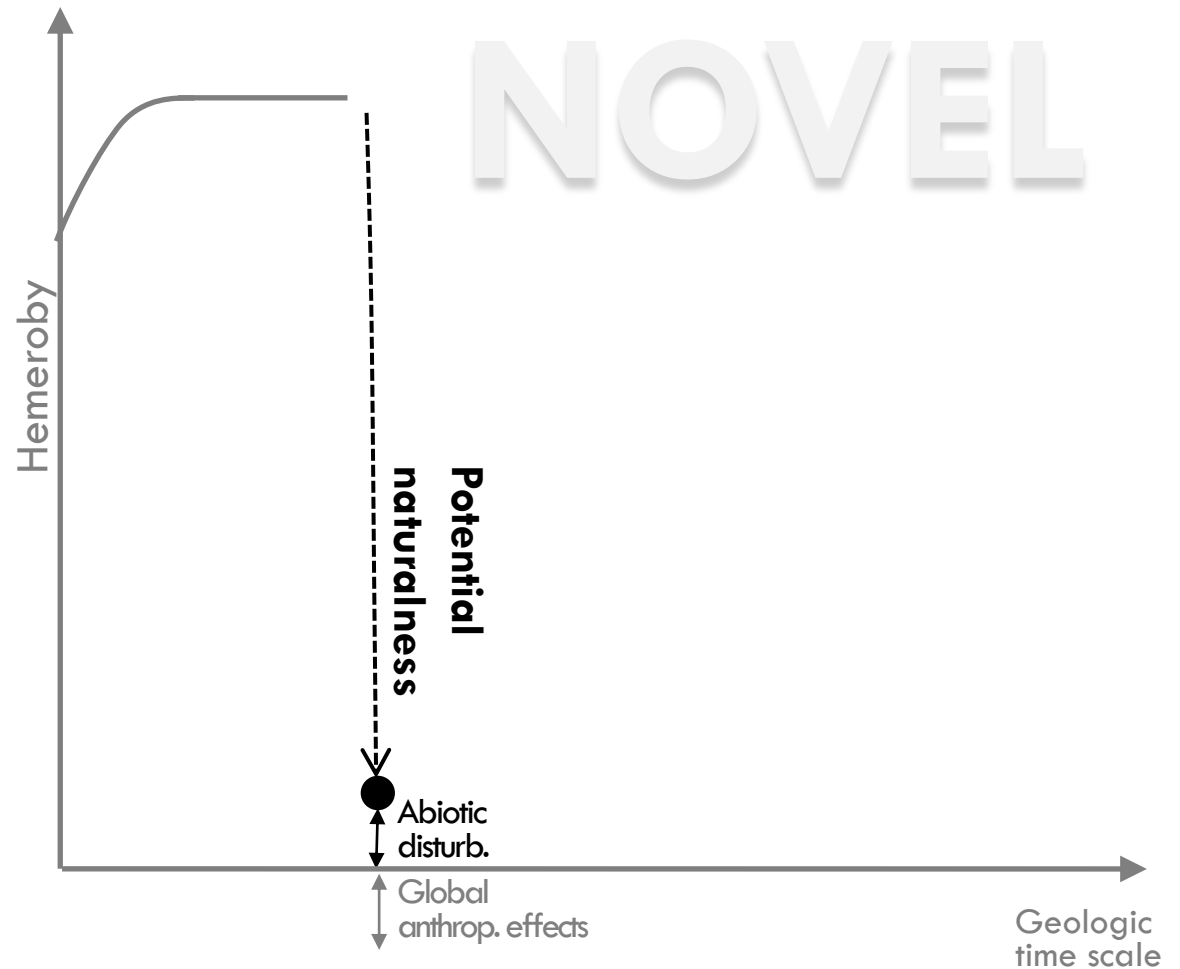
3/5 Reference concepts

29



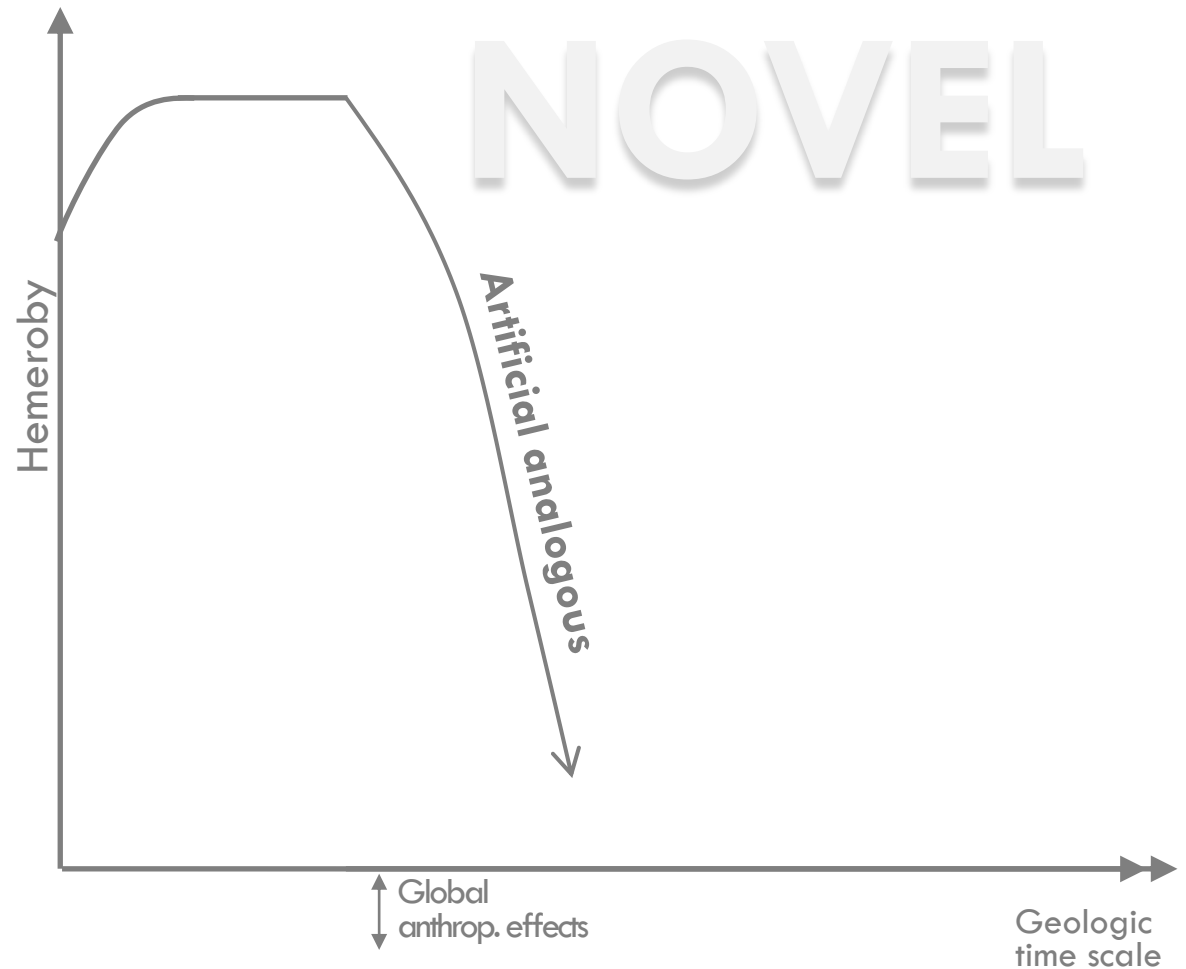
3/5 Reference concepts

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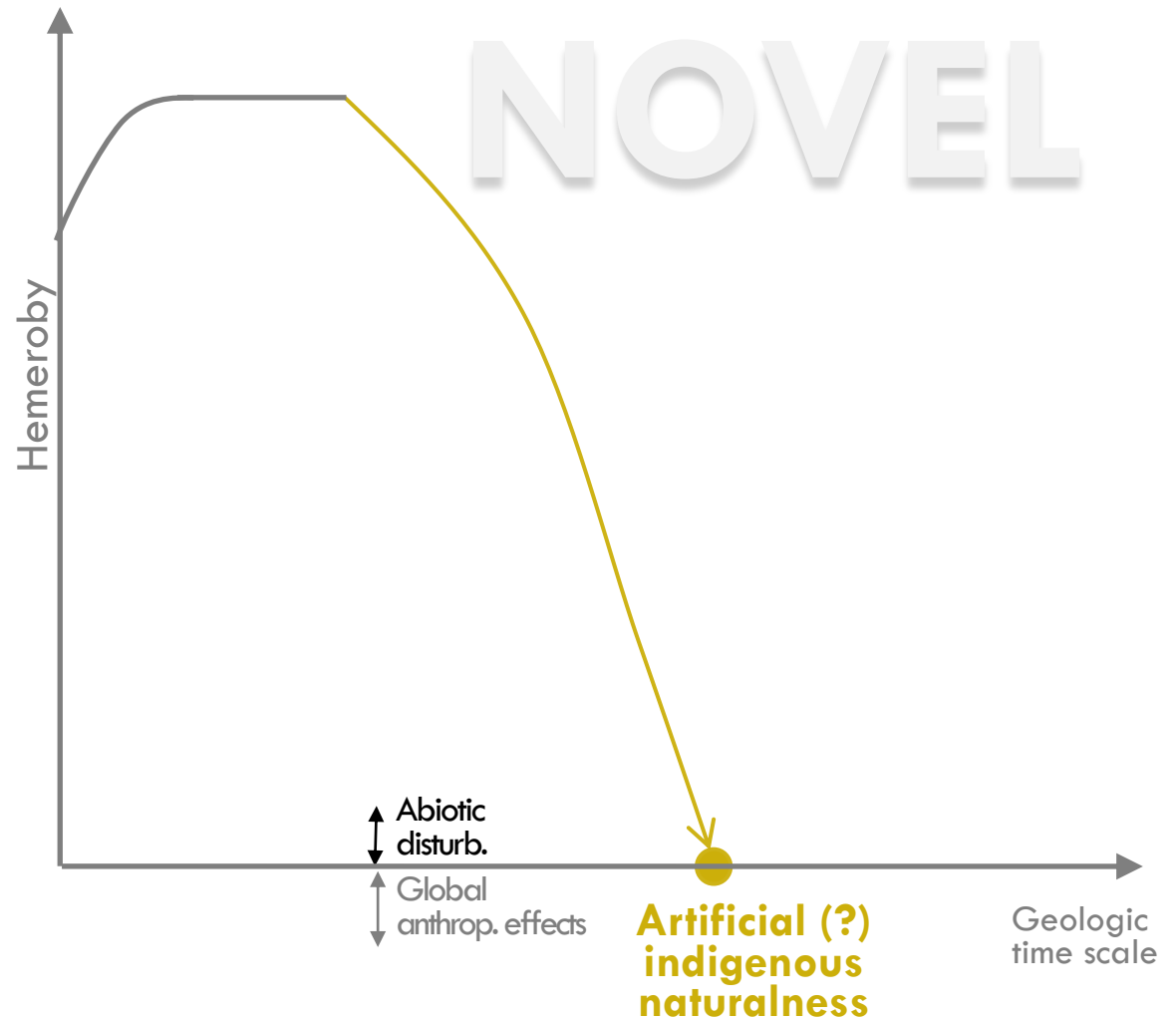
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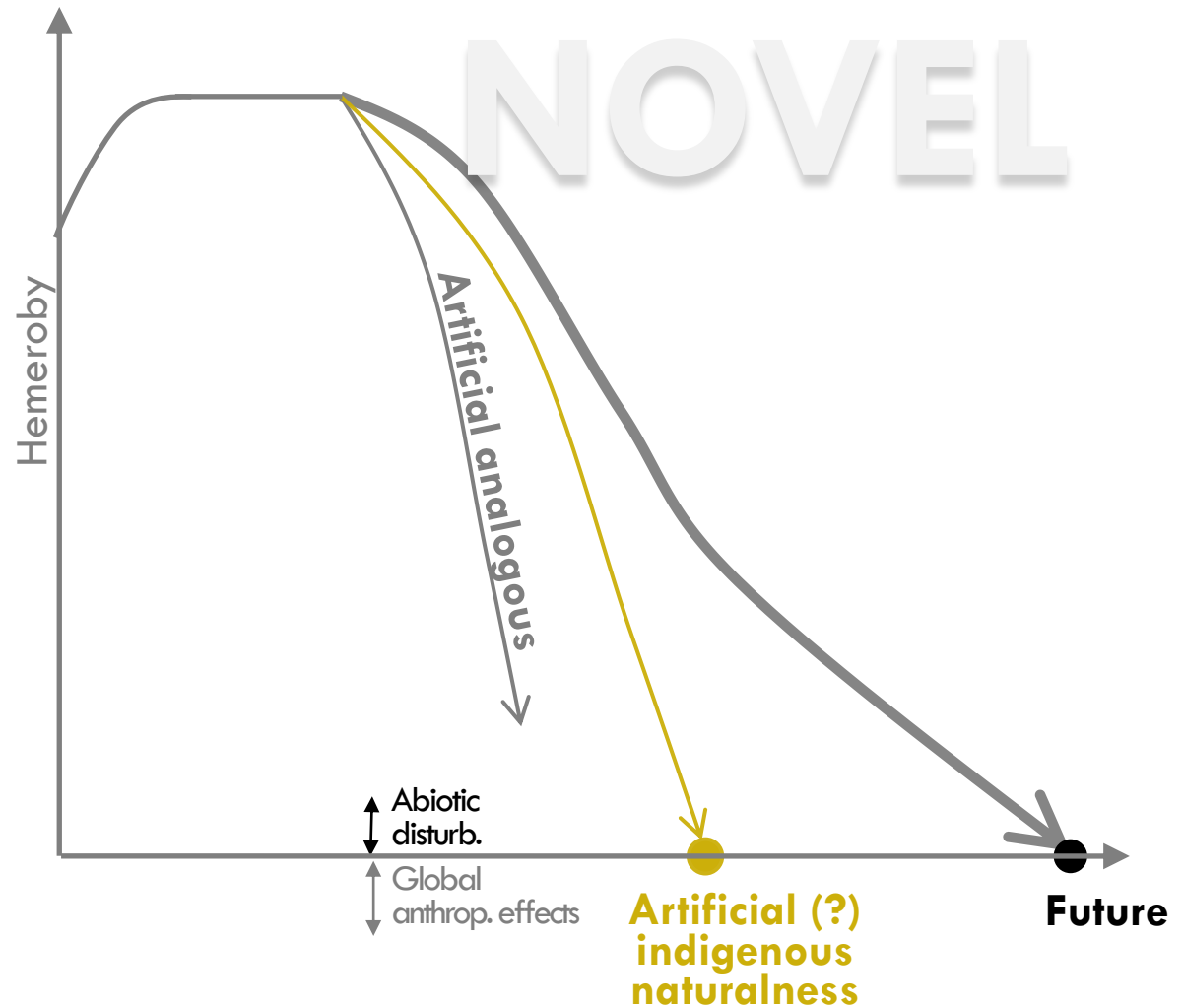
3/5 Reference concepts

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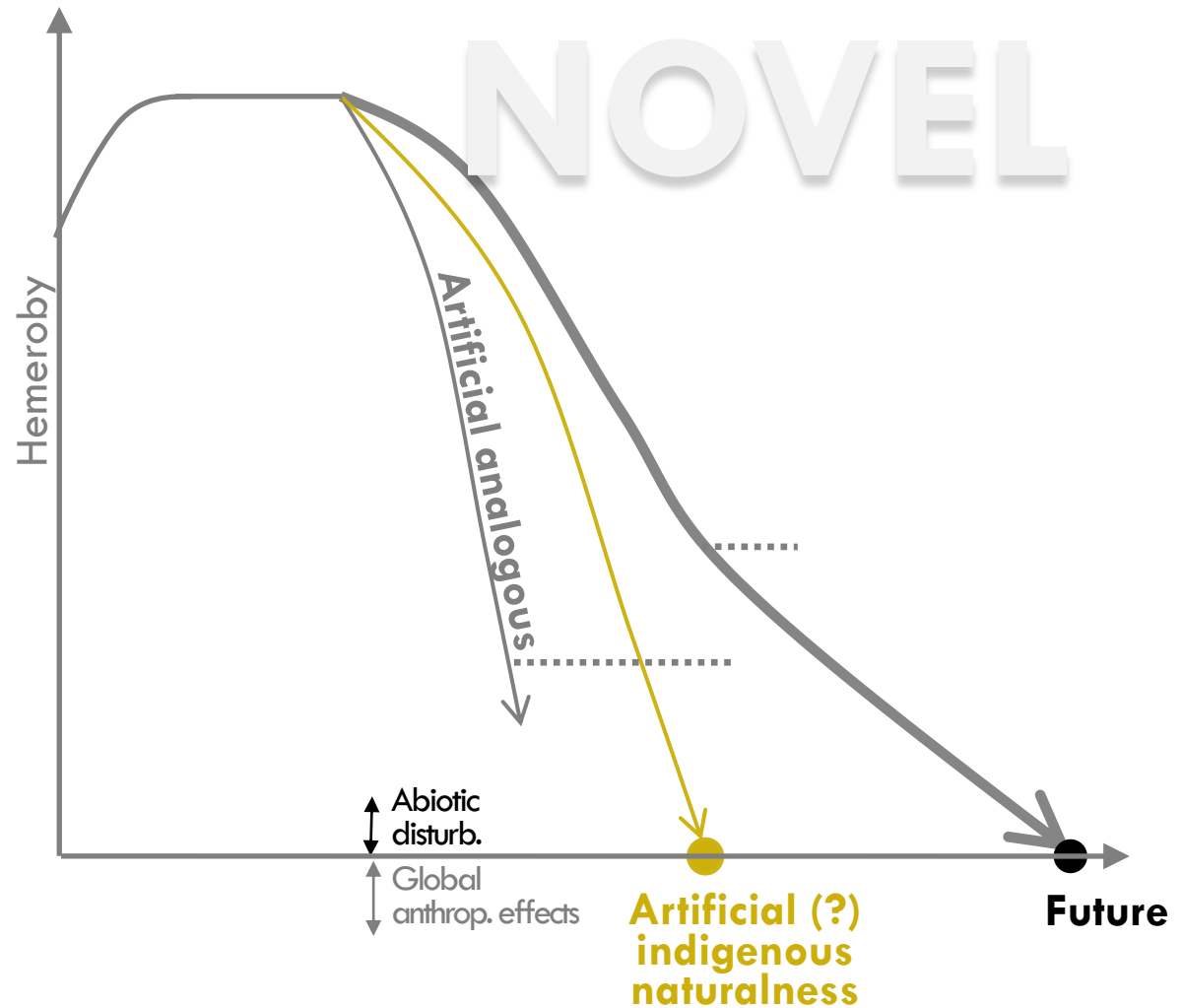
3/5 Reference concepts

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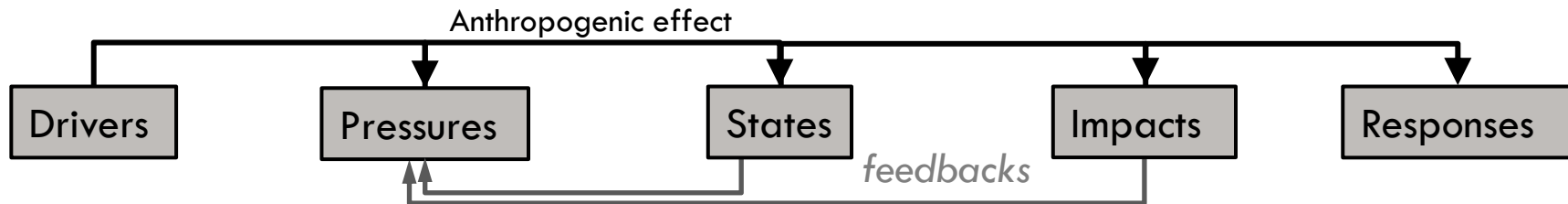
3/5 Reference concepts

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4/5 Assessment variables

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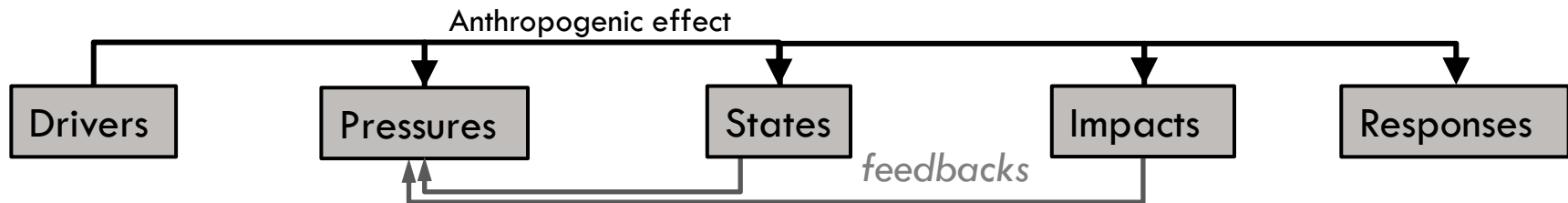


4/5 Assessment variables

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VARIABLES

Economy
Population



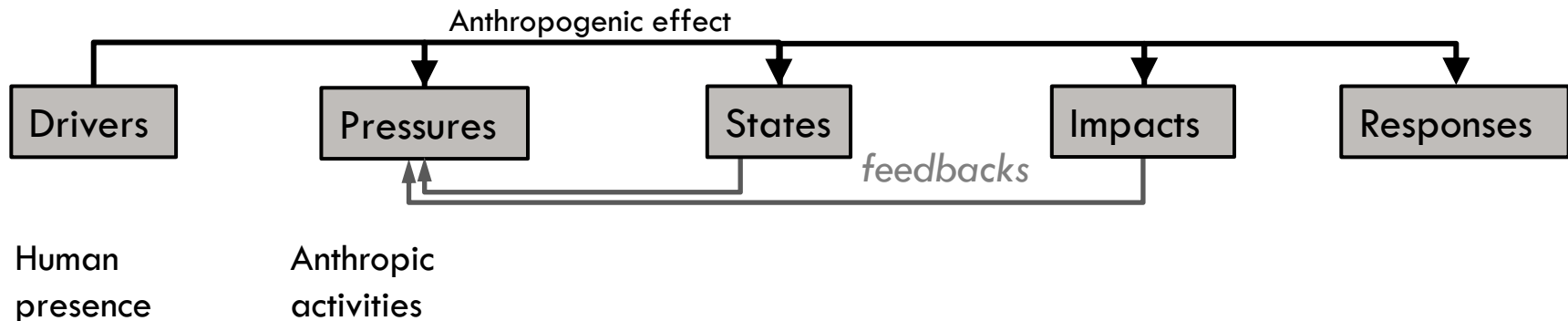
Human
presence

4/5 Assessment variables

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VARIABLES

Economy Infrastructures
Population Disturbance type

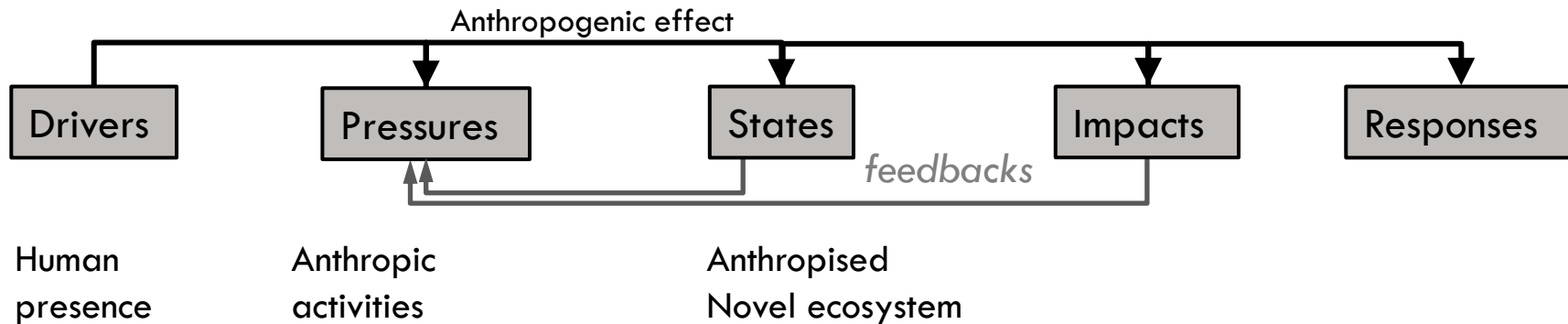


4/5 Assessment variables

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VARIABLES

Economy	Infrastructures	Land use/cover
Population	Disturbance type	Biotope

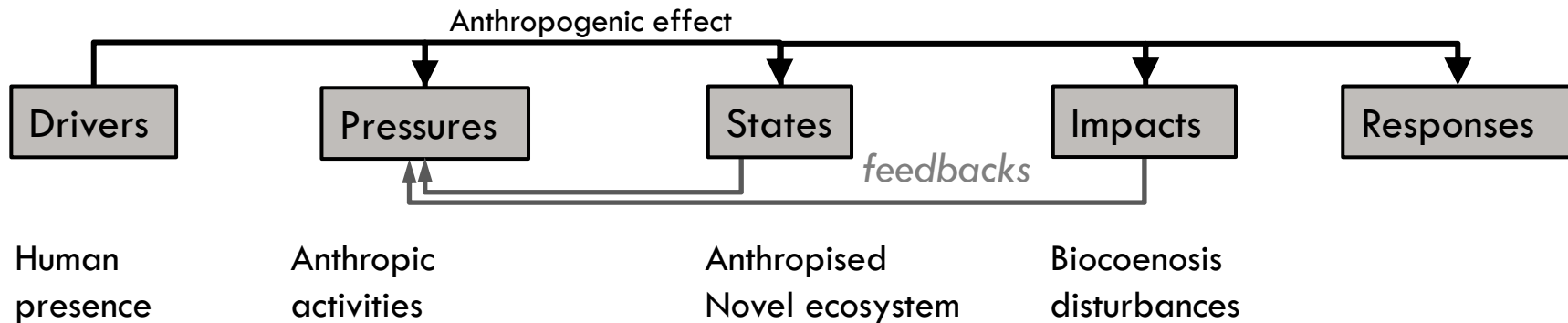


4/5 Assessment variables

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VARIABLES

Economy	Infrastructures	Land use/cover	
Population	Disturbance type	Biotope	Biocoenosis

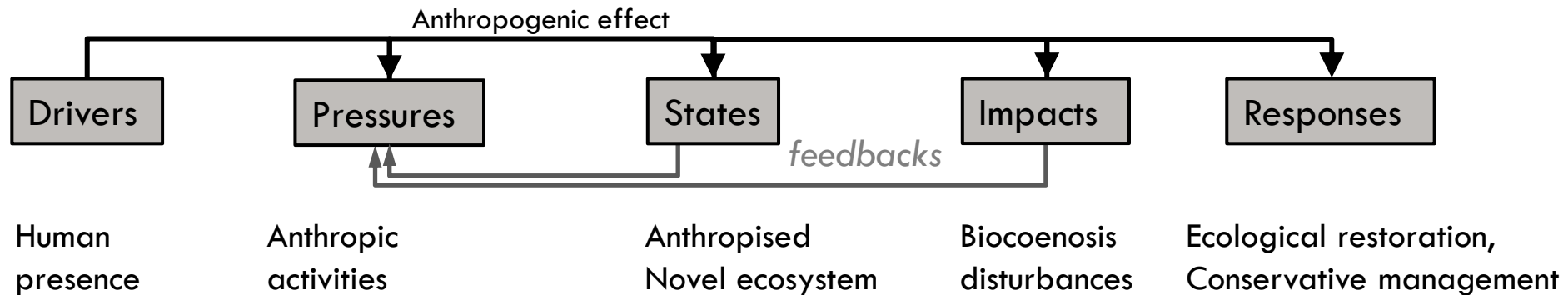


4/5 Assessment variables

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VARIABLES

Economy	Infrastructures	Land use/cover	
Population	Disturbance type	Biotope	Biocoenosis



4/5 Representation methods

41

Simple measures



Hemeroby scales



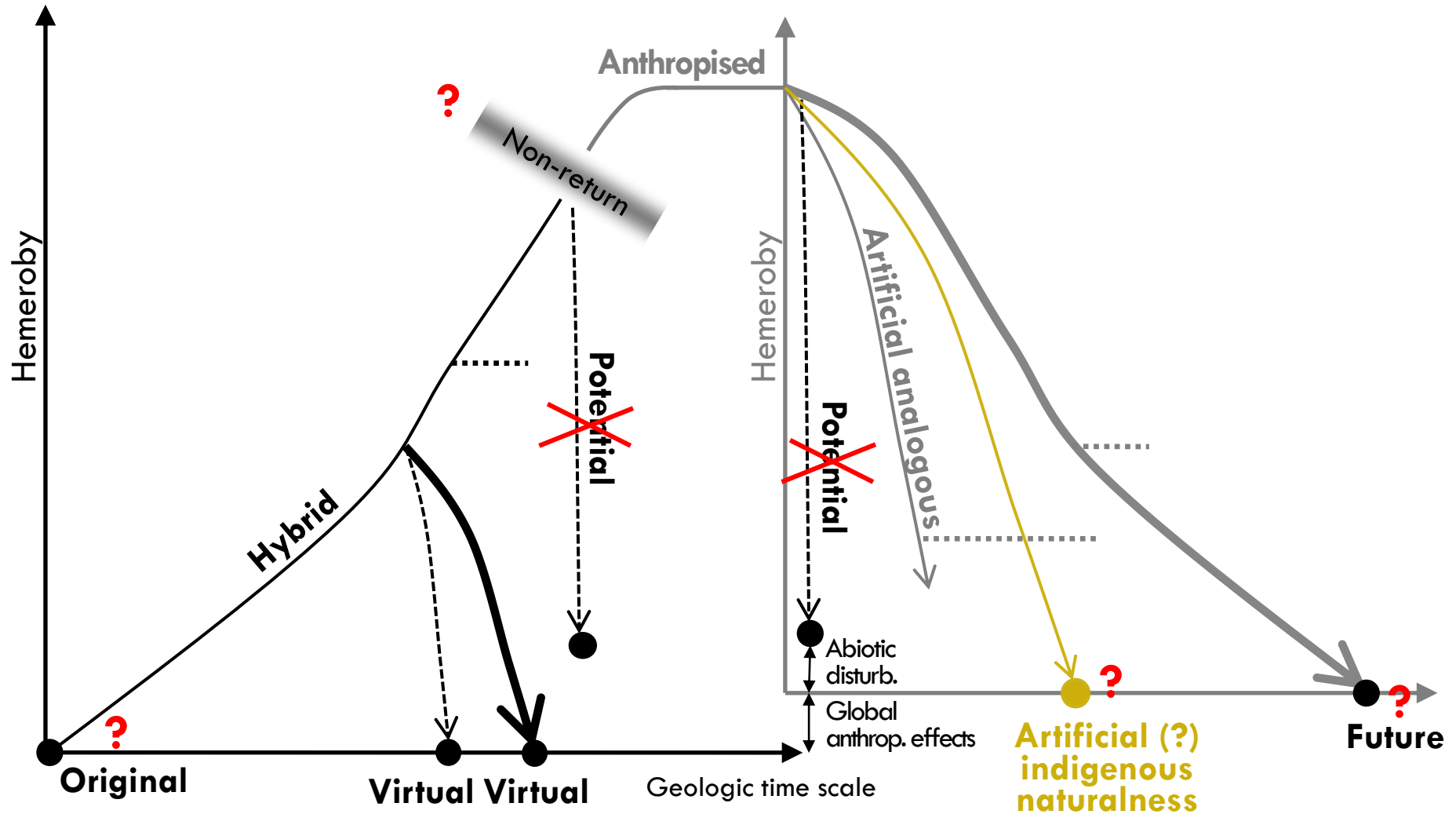
Qualitative data



Composite indexes



5/5 Take home message



5/5 An attempt to map the hemeroby of a landscape...

André, M.*, Vranken, I.*, Boisson, S., Mahy, G., Rüdissier, J., Visser, M., Lejeune, P., & Bogaert, J. (in press) Quantification of anthropogenic effects in the landscape of Lubumbashi. In G. Mahy, G. Colinet, & J. Bogaert (eds.) *Anthropisation au Katanga*. Gembloux: Presses Universitaires de Gembloux

THANKS FOR YOUR ATTENTION!

