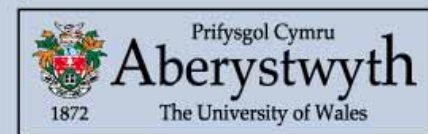


Re-wilding

Landscape-scale questions

Prof. CJ Thomas

CIRRE



Partneriaeth Ymchwil a Menter
Research and Enterprise Partnership

Prifysgol Cymru, Aberystwyth a Prifysgol Cymru, Bangor
The University of Wales, Aberystwyth and University of Wales, Bangor

Resilience and adaptability

Climate change

Land-use, agriculture

- Does the presence of 'wild' land parcels in a multifunctional landscape increase resilience/adaptability?

Adaptive Capacity

Resilience is not resistance!

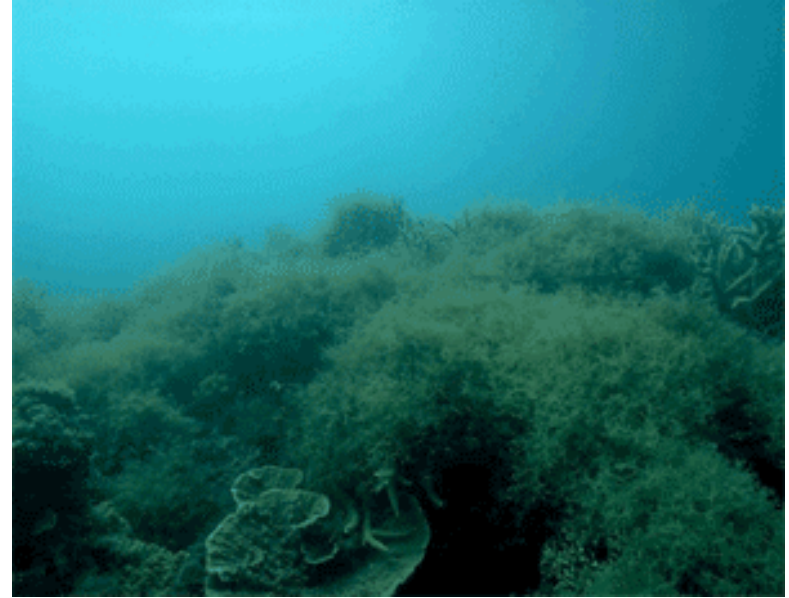
Systems with high adaptive capacity are able to re-configure themselves without significant declines in crucial functions in relation to primary productivity, hydrological cycles etc.

Adaptive capacity in ecological systems is related to genetic diversity, biological diversity, and the heterogeneity of landscape mosaics

- How will rewilding influence genetic and biological diversity at landscape scales?
- How will heterogeneous landscapes arise? Scales?
- Will rewilded landscapes be better able to provide ecosystem services?

Ecosystem resilience

- Ecosystem resilience is the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes.
- Multiple stable states and catastrophic regime shifts may be possible – **when are we dealing with this phenomenon?**



www.resalliance.org

Hysteresis

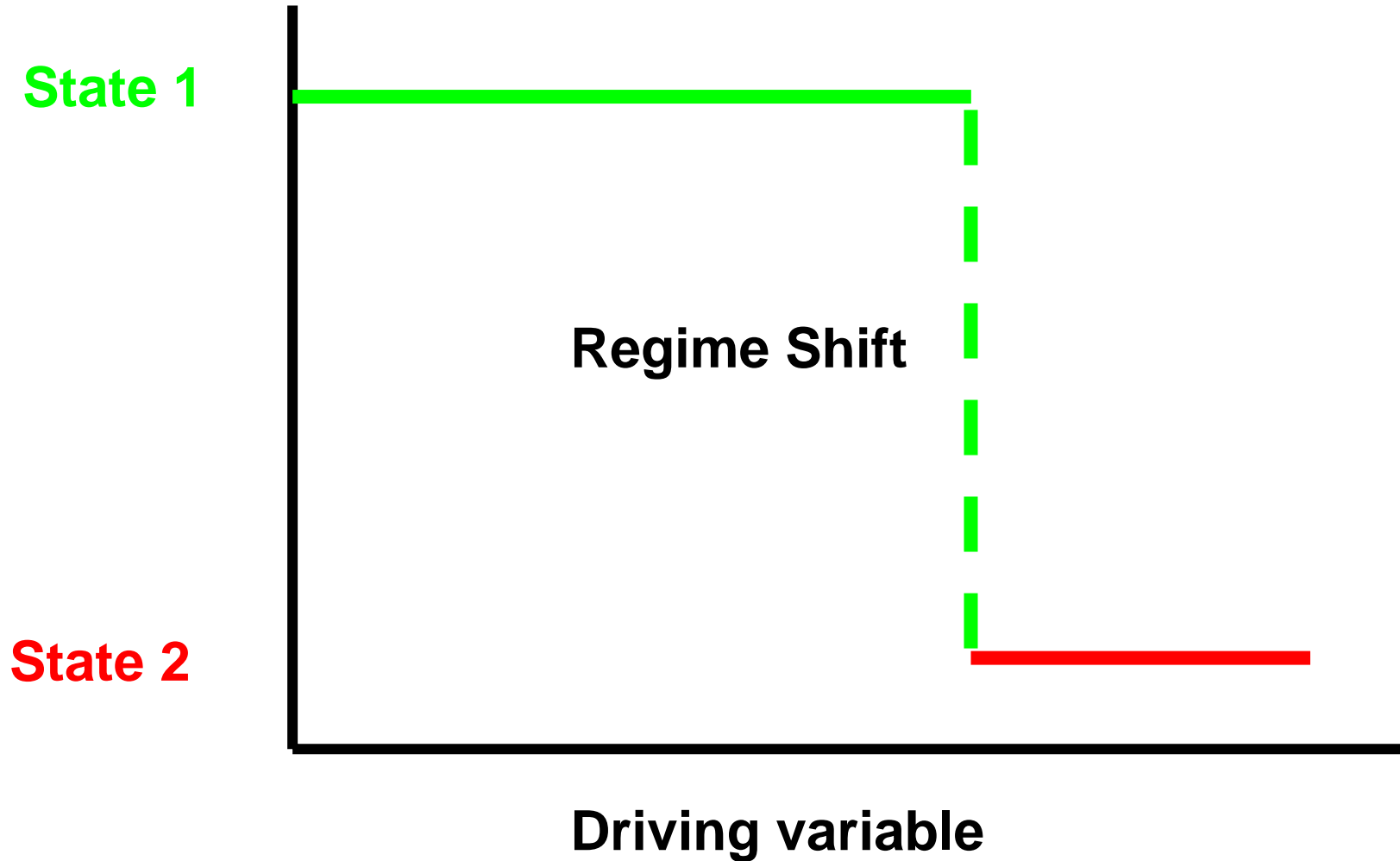
State 1



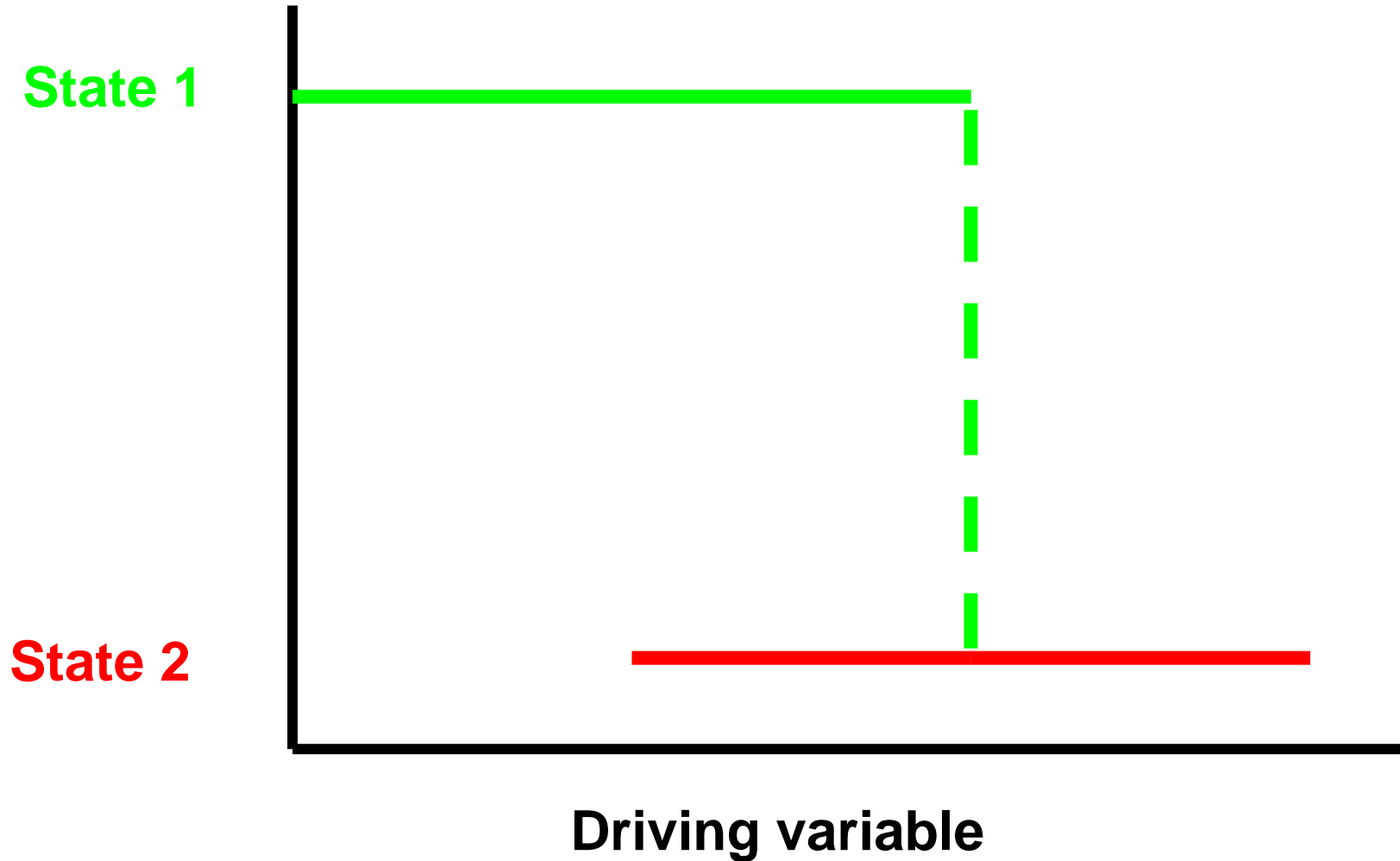
State 2

Driving variable

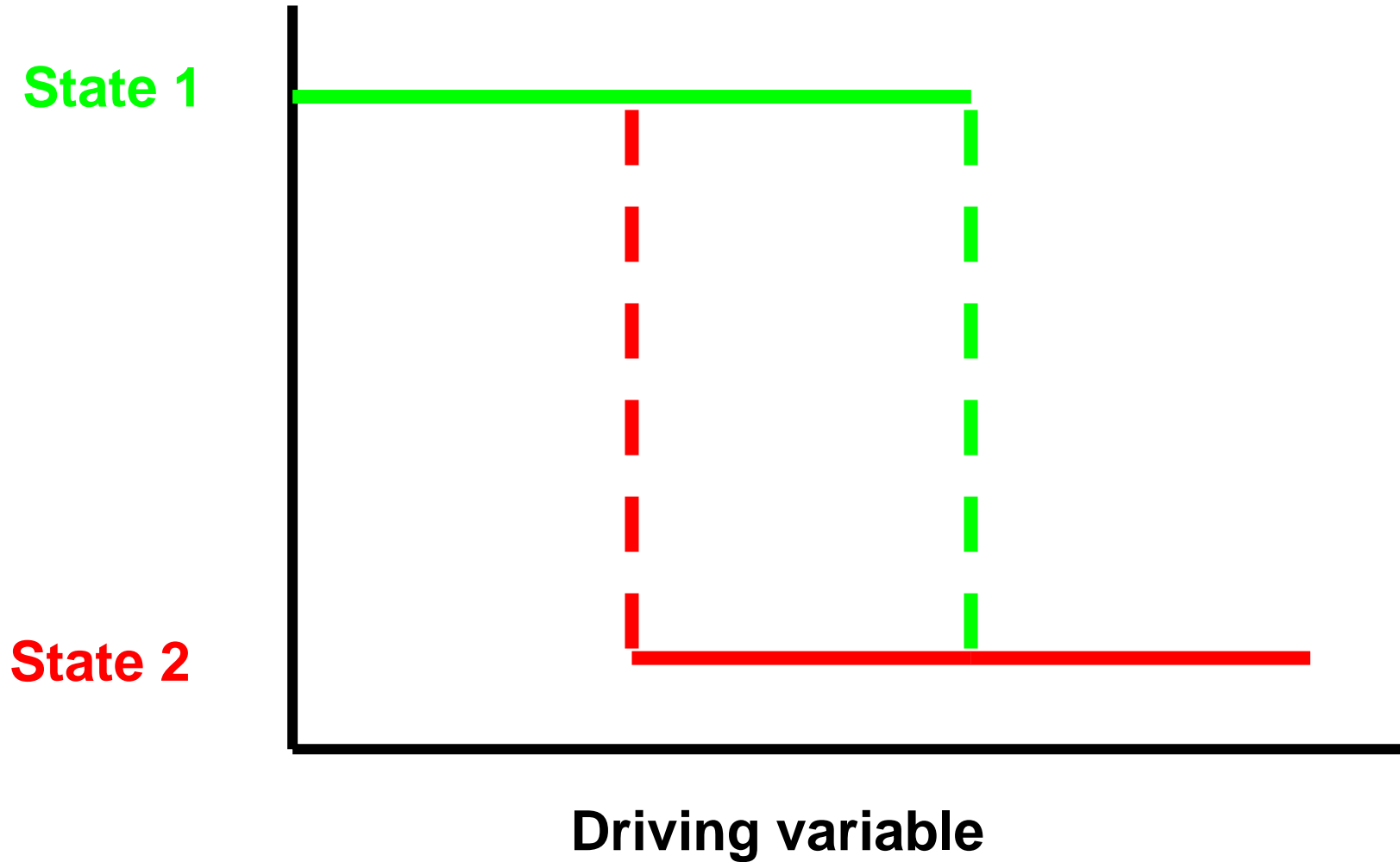
Hysteresis



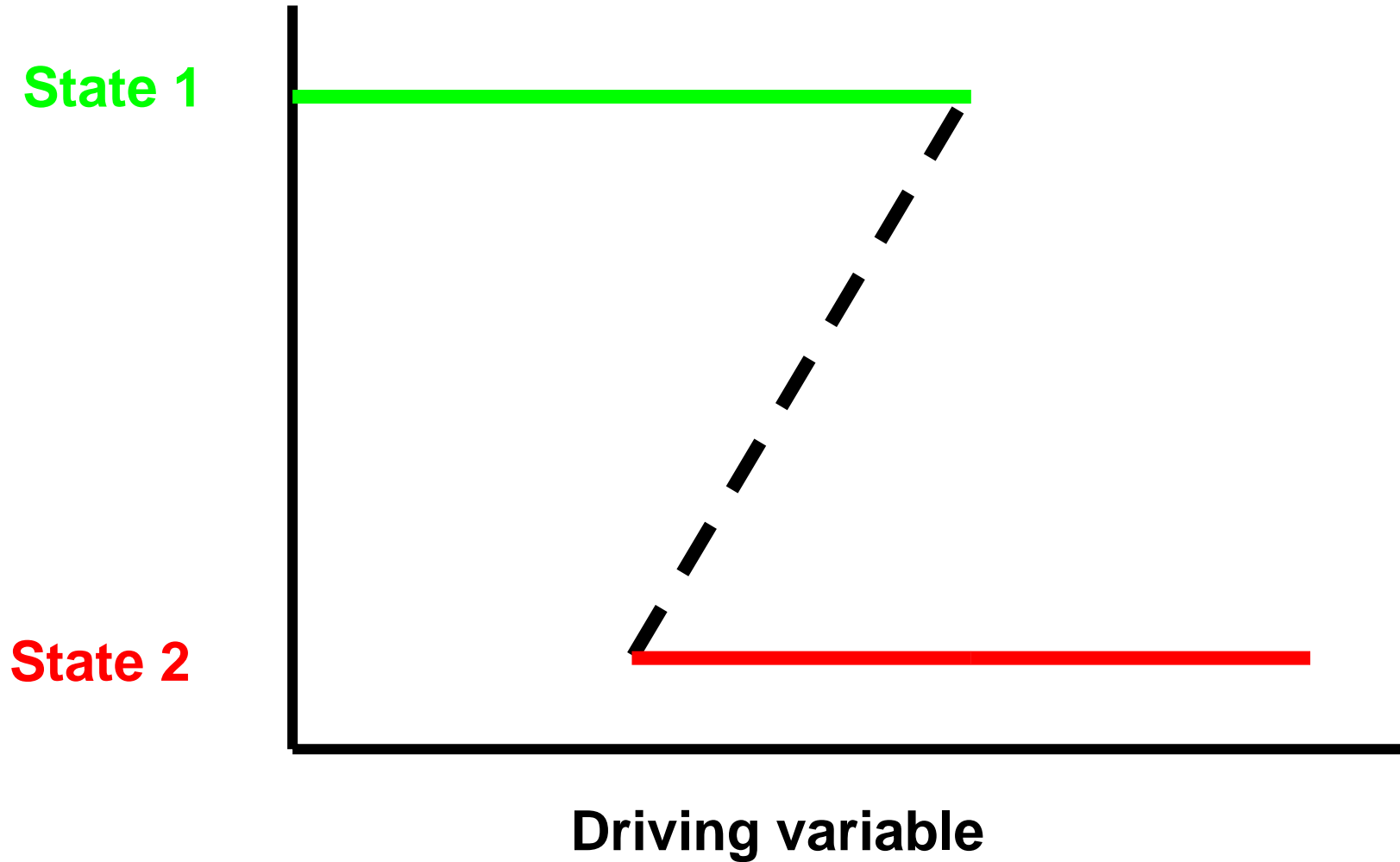
Hysteresis



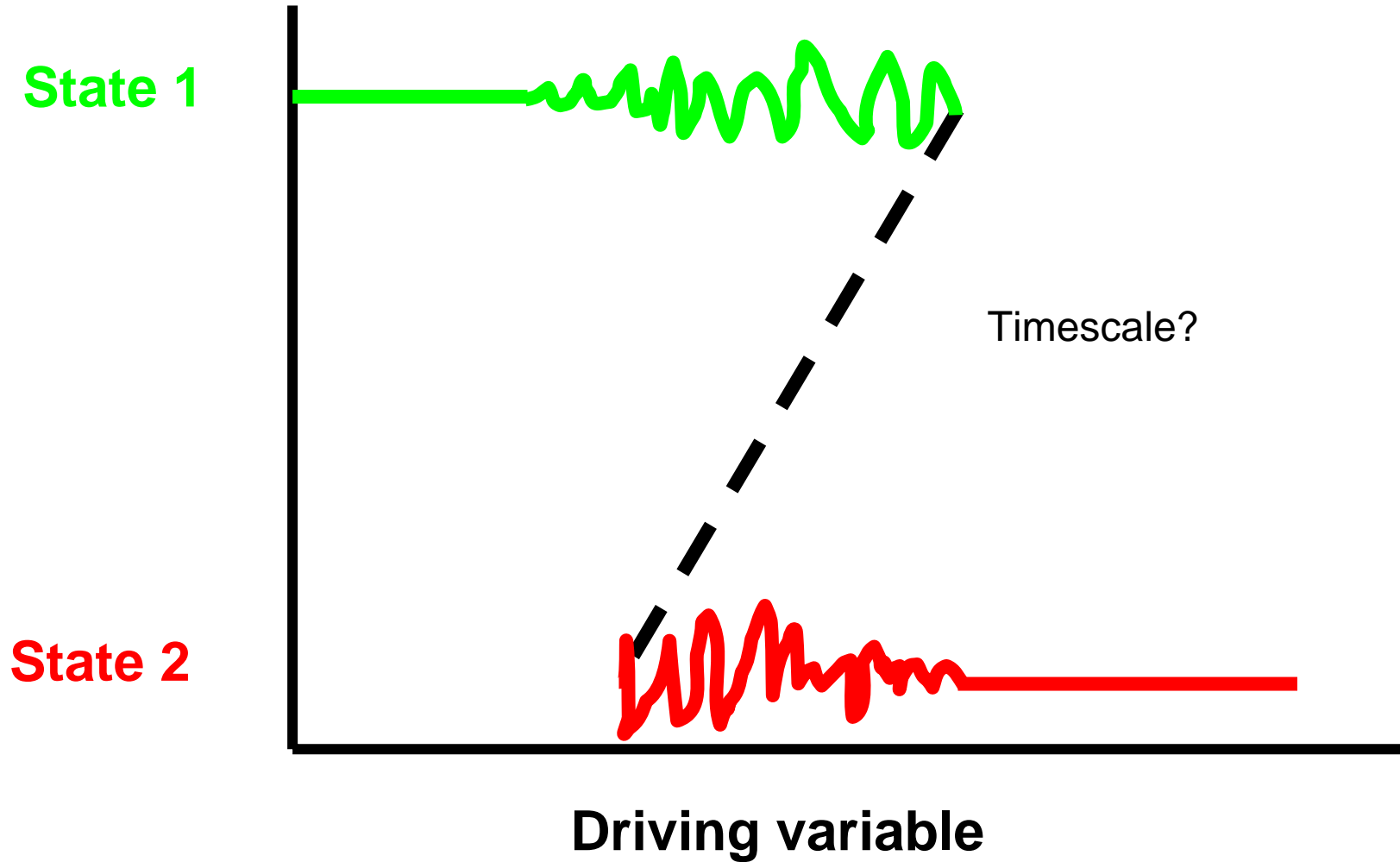
Hysteresis



Hysteresis



Hysteresis



Is re-wilding a regime shift?

- How much will we have to manipulate the system to move into the desired state?
- After regime shift, can manipulation /maintenance stop (i.e. system is resilient in the new state) ?
- How do we know where we are on the curve?
- How does landscape complexity & connectivity mediate stability and resilience?

Patch size & connectivity

- Can 'wild' land exist as parcels in a multifunctional landscape?
- Is UK 'big', big enough, or can all rewilded land be considered a patch in a matrix?
- Spatial scale? Patches within patches.....

evidence suggests this is so, therefore

networks

corridors

matrix – the background habitat

Networks of patches

Non-linear spatial population dynamics

Large-scale emergent properties can arise from small-scale processes

spatial synchrony & travelling waves

disease transmission

invasion dynamics

Location location location : Topology matters

>>> optimal networks for rewilded landscapes?

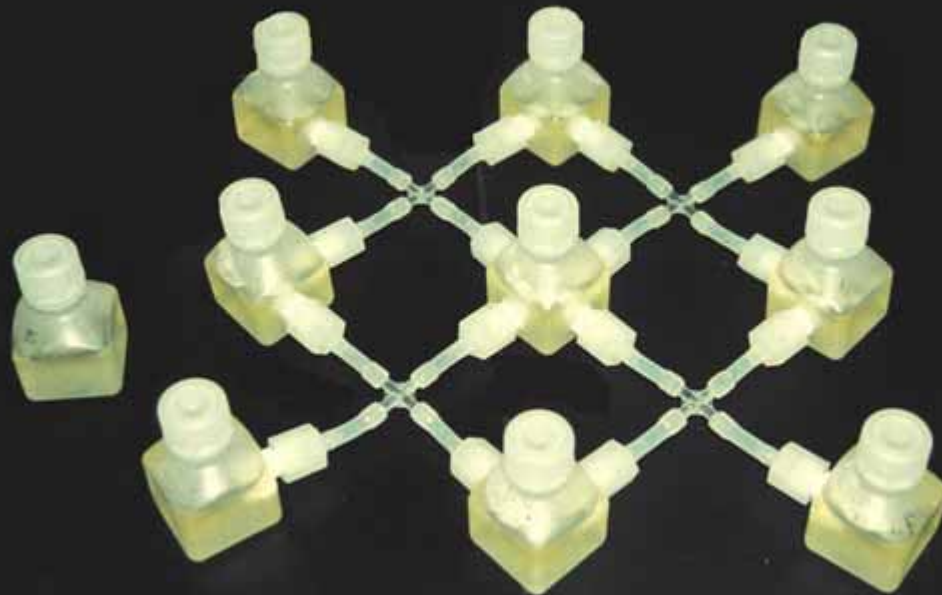
Network Topology

Hollyoak - Predator-prey Metapopulations

Prey: *Colpidium*

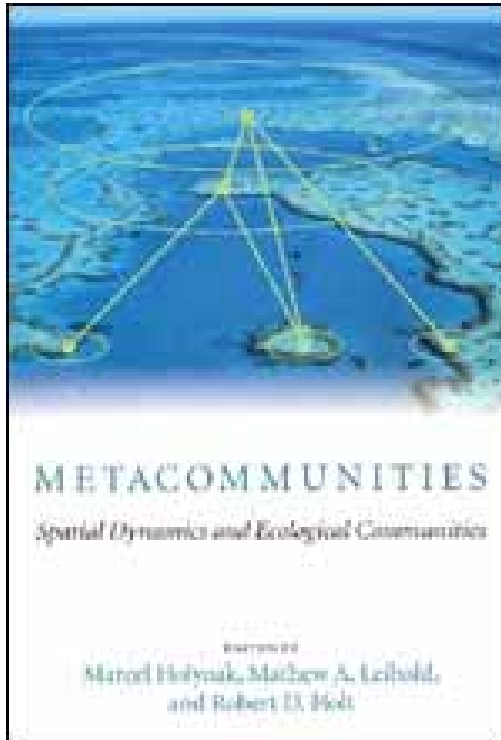


Predator: *Didinium*



Marcel Holyoak, 2001

Metacommunity dynamics



seeks to understand how communities work in fragmented landscapes

Metacommunities urges ecologists to expand the spatiotemporal scales of their research.

Continuous corridors?

Large herbivores



Other species can traverse diverse, fragmented landscapes – including some large predators

How connected does a corridor have to be to be viable for rewilded landscapes?



At what nested scales?

Megalinkages?

Corridors and networks within corridors?

The Matrix

quality of matrix generally more important than corridors in promoting patch viability

- Can rewilding be successful without also 'softening' the matrix?
- Can agri-environment schemes be utilised to achieve this? (Donald & Evans, J. Applied Ecol, 2006)
- Does rewilding need a different approach to matrix softening than managed conservation?