**First Meeting of the Long-Term Resilience Group**  
**Participants:** Neil, Valentina, Eric, Zabdi, Willy, Ruben (via Zoom)  
**Discussion Topic:** Van Meerbeck Paper

**1. Introduction**

Each participant introduced themselves. Ruben provided an example of their work in collaboration with Lizzie.

**2. Summary of the Van Meerbeck Paper**

Presented by Ruben, highlighting the key points and framework proposed by the paper.

**3. Discussion on Strengths and Future Directions:**

* The group appreciates the effort and framework outlined in the paper.
* Agreement on the usefulness of the provided definitions in streamlining future research efforts.

**4. Key Discussion Topics**

**4.1 Shifting Equilibriums**

* Identified as a crucial topic, especially in the context of climate change.
* Existing efforts on this topic noted in the work of Peter Chesson and Stephen Jackson (referenced articles in the GitHub repository, worth probably to ready ahead).

**4.2 Approaching Scale Systematically**

* Two dimensions not specifically addressed in the paper:
  + **Temporal dimension:** How resilience and stability manifest in short-term vs. long-term responses.
  + **Spatial dimension:** How resilience/stability differs from ecophysiology to ecosystem levels.
* Example by Neil: **White oak** exhibits high short-term resistance to drought but faces significant long-term mortality driven by drought.
* Potential to address this from paleo reconstructions? Influence of environmental conditions on the variability of the ecosystems changes?

**4.3 Species Pools and Long-Term Stability**

* Discussion on how species pools influence long-term resilience.
* Eric suggested using island systems as a study model, though Willy pointed out limitations in paleo data for such systems.
* Noted that there is extensive literature on critical transitions in drylands and their indicators that may be useful to tap into.

**4.4 Stability Through Species Shifts**

* Willy raised the contrast between community ecology’s view of stability (via species asynchrony) and paleo/population ecology perspectives.
* Question: At what point does an ecosystem fundamentally change due to too many species shifts? This is not a common consideration in community ecology.

**4.5 Metrics of Stability and Resilience**

* Is **productivity** a reliable metric for stability? While historically significant, its interpretation can be challenging.
* Should **management for short- to medium-term stability** be a priority, or could this reduce long-term adaptability? (Referencing Scherrer’s work.)
* Investigating the relationship between **disturbance intensity and resilience**—can tree rings provide insights here from the datasets of neil and zabdi?

**4.6 Climate Change and System Predictability**

* Climate change reduces system predictability.
* Can we establish clear **reference states and baselines**?

**4.7 Repeated and Compound Disturbances**

* The paper does not thoroughly explore these disturbances.
* Questions raised:
  + How do repeated disturbances impact reference baselines?
  + Can succession theory be applied, or does succession fundamentally change under repeated disturbances?
  + Is this analogous to Neil’s **spaghetti monster plot**?

**4.8 Storage Theory and Demographic Dynamics**

* Neil highlighted the **potential of storage theory**, particularly regarding demographic dynamics.
* Noted experience of **lack of regeneration in many U.S. forests**, raising concerns for long-term resilience but better understood contextually by long-term dynamics.

**5. Next Steps**

* Further exploration of shifting equilibriums.
* Deeper investigation into the intersection of climate change, resilience metrics, and long-term adaptability.
* Addressing gaps in repeated and compound disturbance research.
* The group agrees there is a lot of potential and things to say but agree on slow building of something useful across scales.
* Ruben will send poll to decide next steps ahead and find a future meeting date.

## 1st meeting of the Long-term Resilience:

## Neil, Valentina, Eric, Zabdi, Willy, Ruben

(via zoom, discussion of Van Meerbeck paper).

Introduction by each and example of work with Lizzie.

Summary of the Meerbeck paper by Ruben.

Discussion of strong and soft points and future directions:

* The group likes the effort of the paper and the framework it tries to put up.
* We agree of the usefulness of using their definitions to streamline future efforts
* Discussion on shifting equilibriums and how that could be a point that is most urgently needed (specially given climate change).
* Some efforts on shifting equilibriums on Peter Chesson’s work and Stephen Jackson (see ‘interesting articles’ folder in the github repo).
* Discussion on systematically approaching scale: 2 dimensions not specifically addressed: temporal dimension (short to long.term responses) but also spatial (what resilience/stability means from ecophys to ecosystems?). How to address this.
* Neil, example of white oak which have a very contrasting responses to drought over the short term (super resistant) and long term (one of the first excluded via drought-related mortality). !!
* Species pools influencing long-term stability, idea of using Island systems by Eric (paleo data not super good on those, according to Willy).
* A lot of existing literature on critical transition on drylands and their indicators.
* Willy remarks the difference on considering species shifts, contrasting the community ecology view of stability (stability via species asynchrony) and many on paleo or population. As well, at which point the ecosystem changes if too many species shift? (not a situation community ecology usually considers).
* About metrics? Is productivity a good metric. It has historical roots and significance but also challenging to interpret and give irrefutable significance.
* Management for stability (look at Scherrer work), is managing for short-medium term stability going to make the ecosystem less adaptable over long-term?
* Can we investigate the relationship between intensity of the disturbance and the resilience expressed? (is this something that tree rings can give a hint on?).
* With Climate change, predictability of the system decreases, can we agree on reference states and baselines?
* Another aspect that they realy don’t flesh out are repeated disturbances and compound disturbances. What do we do there? Is it reasonable to expect them to affect baselines? Can succession theory be applied here? Can succession change completely and become more like the spaghetti monster plot by Neil?
* Neil points at storage theory and the potential to apply to here, specially on demographic dynamics (experience from lack of regeneration in the US in many forests)