

**Scheffer 2012**

- 1) How is robustness different than resilience?
- 2) The authors bring up how it was advised that the financial market diversify and modulate before the 2008 crash. How would we humans help wild/managed ecosystems “modulate and diversify”?
- 3) Do generic early warning signs exist that should, in principle, hold for any complex system exist?
- 4) How might we use the opportunity of an upcoming transition to encourage the transition to a more "desired" state?

**Hughes et al. 2013**

- 1) See fig. 1 - Hysteresis curve for a global scale. How do you identify a planetary boundary?
- 2) Ecological change over evolutionary time has usually been driven by shifts and shocks (climate warming and cooling, bolide impact, etc), as well as “intrinsically generated instabilities” (destabilizing feedbacks). A growing number of paleoecologists have accepted this and visualize life as a succession of alternate stable states, visualized by mass extinction events or speciation explosions. *“An alternative hypothesis, that the Earth then and now is in constant flux due to waxing and waning drivers and, therefore, lacks clearly definable states, can be rejected.”* Can it?
- 3) Result vs cause. Ex: Crown-of-Thorns outbreaks, bleaching, general ill-health of reefs in the Indo-Pacific are slated to be the result of anthropogenic effects, and not the cause of the decline of the reefs. Does panning out to such a wide view make us lose sight of important (maybe fixable) issues?
- 4) The domino effect and ecosystems: how do we protect ecosystems from downstream climate effects (giant scale like ENSO effect on the Amazon)? Or, if untenable, how do we adjust to the next stable state we will arrive at?