Transformation, Resilience & SEA

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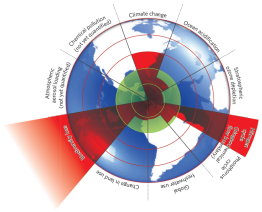
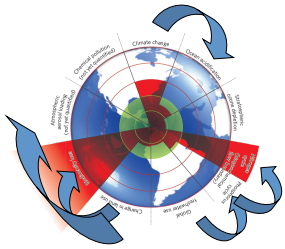
ResilienceAlliance

Planet Under Pressure



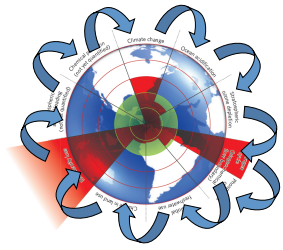
A first attempt at defining a safe operating space for mankind by defining thresholds of acceptable change at a global level. Rockstrom (et al., 2010)

Planet Under Pressure



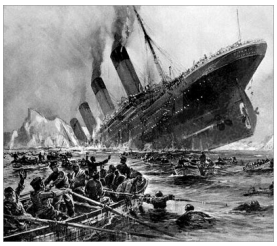
Natural dynamics of the planet couple groups of boundaries (Source Finnegan 2011)

Planet Under Pressure



Food production, urbanisation and economic growth driven by population growth and human aspiration dynamically couple all these processes (Source Finnegan 2011)

Engineering vs. Ecological Resilience



- Engineering resilience is concerned with "fail-safe" design and efficiency of function within a predictable ecosystem state.
- Ecological resilience is concerned with "safe-to-fail" design and existence of function under unpredicted ecosystem conditions (Holling 1996)

In general, ecosystem management has been aimed at engineering resilience, creating brittle systems that are prone to collapse BUT also creating opportunities for transformation, PROVIDED the potential for change can be harnessed.

Transformation: Some Propositions From Resilience Research

1. Resilience thinking can help us understand how to initiate and navigate large-scale transformations in social-ecological systems.
2. Transformations involve incremental as well as abrupt change at many different scales.
3. There are at least three recognizable phases of transformation in social-ecological systems.
4. Institutional entrepreneurship and transformational leadership play an important role in moving through these multiple phases.
5. Shadow networks play an important role in experimenting and finding new solutions to global environmental problems.
6. There is a clear link between crisis and opportunity for creating radical shifts and transformations in social-ecological systems.
7. Innovations can break self-reinforcing feedback loops that keep social-ecological systems on an undesired trajectory or in a lock-in trap.

Resilience and Complex Adaptive Systems

Resilience is one of three properties that enable systems to function and persist (Meadows, 2008).

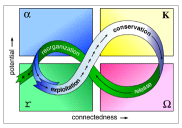
Self-Organization: The ability of nature to continually create the novelty that led to the evolution of millions of species from a pool of organic chemicals; the development of society from hunter-gathers to space travelers.

Hierarchy: Self-organization tends towards hierarchy from DNA to cells to organs to organisms to families, communities, cites, and states. Sub systems tend to function independently and serve the needs of the larger system.

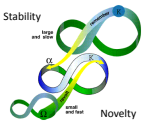
Resilience: The ability of a system to bounce back from stress and disturbance. Resilience is enhanced by the stability of hierarchy and the novelty of self-organization.

Resilience thinking incorporates each of these properties in three simple models of change in complex adaptive social-ecological systems

Core Models of Resilience Thinking



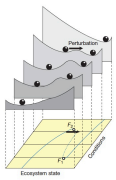
1. Change within systems: Adaptive Cycle (Holling 2004)



2. Interactions between systems: Panarchy (Holling 2004)

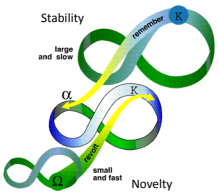
Transition between system states is moderated by:

1. the phase of the system in the adaptive cycle; and
2. its interactions with subsystems and larger scale systems



3. Transitions between system states (Scheffer et al., 2001)

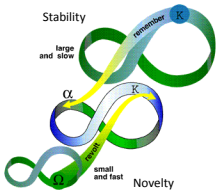
Adaptive Cycle: Resilient System

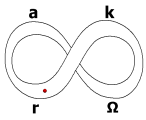


Novelty is low, stability is high, the system is resilient. It returns to its original structure and function after disturbance.

(Animation from Cumming & Collier, 2005)

Adaptive Cycle: Transformed System

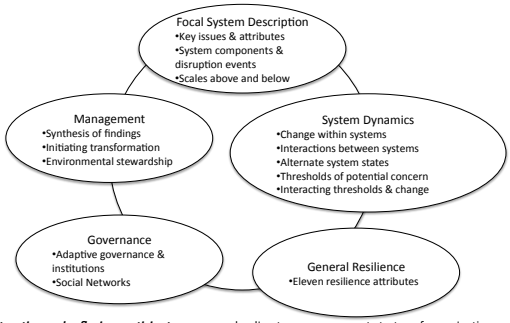




Novelty is high, stability is low, the system has lost resilience. Disturbance changes its structure and function. It is transformed into a new system.

(Animation from Cumming & Collier, 2005)

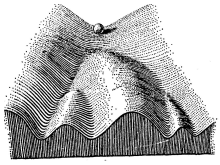
Resilience Assessment



An ***iterative and reflexive participatory process*** leading to a management strategy for navigating transformations (Resilience Alliance Workbook for Practitioners)

Alternative Strategies: Which System State?

Either maintain a system within a desired state by:
- Adjusting drivers to maintain or increase the resilience of the desired state; and
- avoiding rigidity and poverty traps

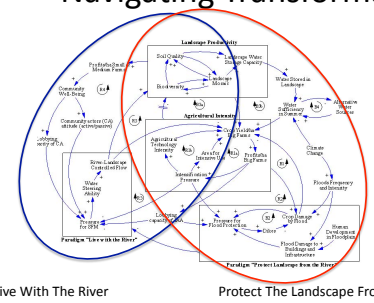


Or transform a system to a desirable state by re-defining the its structure and function (changing rules of governance, physical and ecological components of the system)

In both cases manage adaptively by identifying and testing the assumptions underlying management decisions (objectives, activities & monitoring)

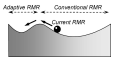
Chapin, Kofinas & Folke (2009)

Navigating Transformation



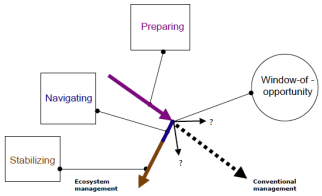
Live With The River

Protect The Landscape From The River



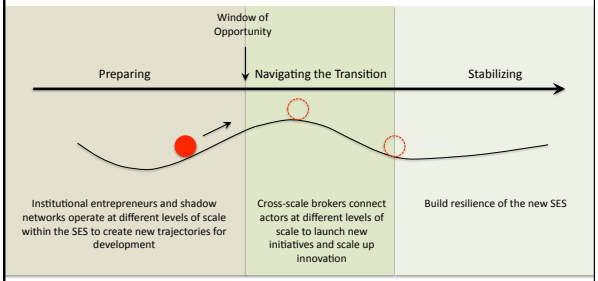
Sendzimir et al., (2007)

Navigating Transformation



Olsson, Folke & Hahn (2004)

Navigating Transformation



Some Questions For Discussion

- Where does the RT-SEA community look for windows of opportunity to change from conventional management to ecosystem management?
- What do we need to do next as a change movement within the SEA/IAIA community?
- How do we integrate social-technological systems into our models for social-ecological systems?

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