Why is resilience ecology a social science?

Don Falk
1. Severe disturbance is both an ecological response and a multiplier of other drivers, leading to instantaneous change and strong feedbacks.

Near-total overstory tree mortality and large ($10^4$ ac) high-severity patches, 2011 Las Conchas Fire, Jemez Mountains, NM
2. Wildfire is a major wild card in ecological change, and largely the outcome of our land-management decisions and effects on climate.
3. The consequences of extreme degradation are social and economic, not merely ecological.
4. Even in a changing world, many of the reasons ecosystems are pushed beyond their limits are the "old" causes of degradation.
5. Ultimately, we need to map the ecology of resilience onto ecosystem restoration and management – a social activity.

- Promote **resistance and persistence**
- Increase **recovery capacity**
- Assist ecosystems to **respond and reorganize**

Millar et al. 2007; Falk & Millar 2016
Ecological tipping points

1. Generally initiated by some combination of climate stress, ecological interactions, and disturbance
2. System moves into a new metastable state (e.g. forest to shrub- or grass-dominated ecosystem)
3. System is then resilient in its new state.
Same toolbox, different times and places?
Not all stasis is **adaptive**; not all **change** is bad. Can we make the distinction?

Do we understand the **mechanisms of persistence, recovery, and reorganization** that govern ecological trajectories?

Can we **use restoration to expand the resilience space** in which ecosystems can adapt in rapidly changing environments?
Resilience ecology means accepting (and even promoting) adaptive change

1. Which kinds and degrees of change are adaptive, and which are destructive of biodiversity and ecosystems?

2. Can we anticipate ecological consequences well enough to inform decisions and actions on the ground?

3. Are we prepared to let go of some current ecosystems, or would doing so violate our core principles?
World Economic Forum, Global Risks Report 2016, Figure 1
https://www.weforum.org/reports/the-global-risks-report-2016/