From slippery concept to effective tools: developing an operational approach to resilience in ecosystem management and restoration

Richard Hobbs
Rachel Standish
Resilience: A concept with multiple meanings
Life is not about how fast you run or how high you climb but how well you bounce.

~Vivian Komori
Resilience
The Courage to Come Back
Real Gulf Coast Recovery Requires Resilient People, Communities and Ecology
October 11, 2010 — hiphone

Now that the BP oil hole has finally stopped gushing, people and communities in the Gulf region will need ongoing assistance as they recover and rebuild. Research shows that certain people tend to come through disasters such as this and Katrina in better shape than others. The ability to withstand and even thrive under adversity is known as resilience. This article starts with tips for building resilience within people and communities; followed by summaries of key articles about disaster from the journal *Science*. Finally, there are quotes from philosophers, athletes, politicians and others about resilience and how it can be achieved.

Click below to learn important lessons about resilience:

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Resilience is the ability to deal with trouble in such a way that people come through it unharmed or even better for the experience. Resilience is the quality that allows people to rebound from misfortune, hardships and traumas. People who have a clear sense of identity and purpose are more resilient, because they can hold fast to our vision of a better future. Much of

http://oilygulf.wordpress.com/2010/10/11/resilience
Resilience as a current policy buzzword

“Australia's biodiversity is healthy and resilient to threats, and valued both in its own right and for its essential contribution to our existence”.

Australia’s Biodiversity Conservation Strategy 2010-2030

Caring for Our Country aims to achieve an environment that is healthy, better protected, well-managed, and provides essential ecosystem services in a changing climate”.

Caring for Our Country Program

BUT!!!

“We cannot assess resilience quantitatively, based on our current understanding, information and modelling capabilities.”

Australia: State of the Environment 2011
Resilience
Perspective

Resilience in ecology: Abstraction, distraction, or where the action is?

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Lake Toolibin, Western Australia. Ramsar freshwater wetland
Lake Tarbleen, Western Australia. Salinized wetland
Maintain helpful resilience

Intervention

Overcome unhelpful resilience

Decline

Recover

Desirable

Ecosystem state

Degraded

Ecosystem attributes
Altered species composition and function

Ecosystem attributes
Altered species composition but function unaltered

Ecosystem attributes
Altered species composition, function and abiotic conditions
Can ecological resilience help management?

a) Ecosystem is resilient
b) Ecosystem is not resilient

Disturbance

After Holling 1973; Pimm 1984
Thresholds between multiple states on Galapagos

Trueman, Standish & Hobbs 2014 *Biological Conservation* 172: 37–48
Experimental data needed to locate thresholds

Recovery of ecosystem state variable e.g., species composition

Disturbance intensity

But disturbances of global concern are long-term and large-scale...

Land-use change

Climate change

CO$_2$ enrichment

Nitrogen deposition

Biotic invasion

Synergistic effects

Proxy measures of resilience: Trait-based indices

- Growth form
- Regeneration capacity
- Seed production

- Seed dispersal
- Regeneration capacity
- Palatability

Proxy measures of resilience: Connectivity

Proxy measures of resilience: Scale

a) Scale of disturbance

b) Contribution to response diversity

c) Implications for management
Thresholds, traits, connectivity and scale

<table>
<thead>
<tr>
<th>Thresholds known</th>
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<td>2. Local &amp; regional intervention</td>
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Short-term small scale disturbance | Long-term large scale disturbance

- Thresholds unknown
- Management options
- Experimentation
- Assess proxies
- Local intervention
- Local & regional intervention
- Short-term small scale disturbance
- Long-term large scale disturbance
Work in Progress
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Work in progress!!
check back soon...
Thanks for listening!