

# Monitoring for Resilient Ecosystems

---

INSIGHTS FROM NATIONAL FOREST PLANNING AND IMPLEMENTATION OF THE 2014 FARM BILL

PETE NELSON, DEFENDERS OF WILDLIFE

COLLABORATIVE RESTORATION WORKSHOP, APRIL 26-27 2016

# Outline

---

Ecological resiliency – A unifying policy objective

- But how to define and measure?

Ecological Integrity: A framework to assess, plan, manage and monitor for ecosystem persistence

Implementation Case Study: 2014 Farm Bill

- Assessing and prioritizing for resiliency
- Collaborative, active adaptive management



# Resiliency: A unifying policy objective

---

The restoration and enhancement of ecosystem resilience is a management priority on U.S. public lands.

THE desired ecosystem condition

2012 Planning Rule

2014 Farm Bill Forestry provisions

Imagine if everyone asked: Is our program/project enhancing ecosystem resiliency?

How to evaluate success?



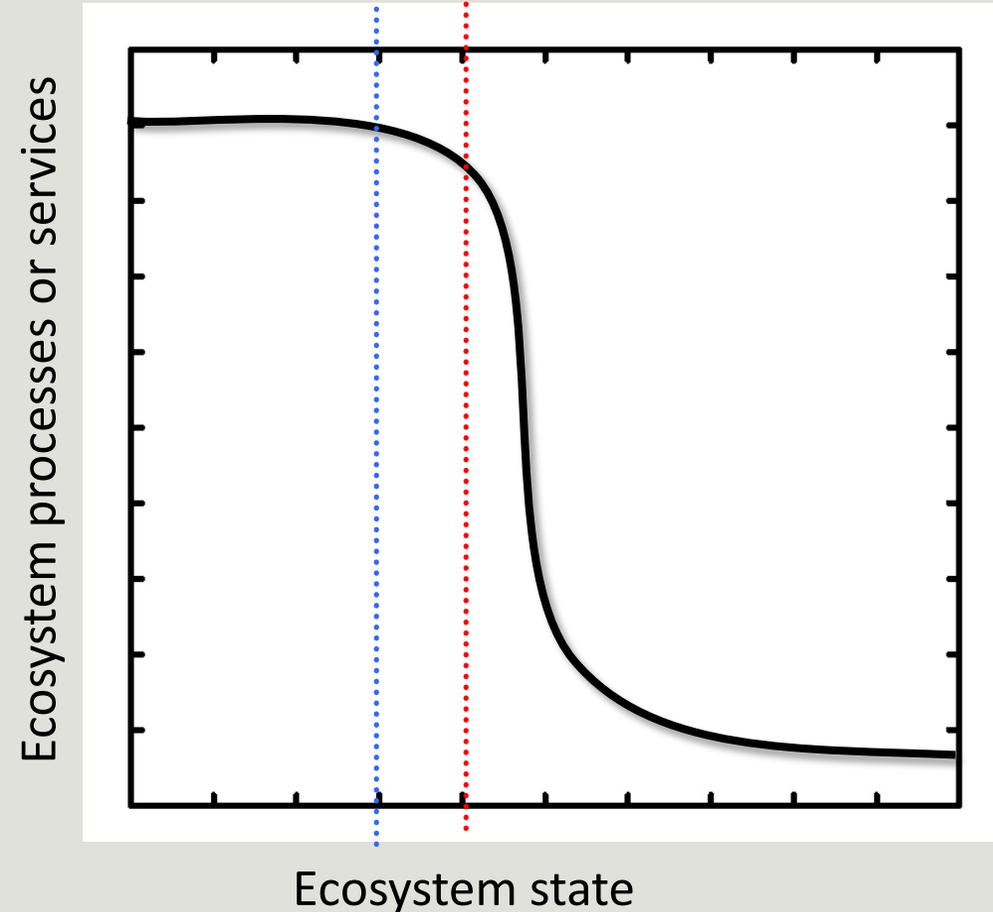
# Resiliency: Concept

“The capacity to reorganize while undergoing change so as to still retain the essentially same function, structure, identity and feedbacks” (Walker et al 2004)

Climate change, departed (unsustainable) conditions, uncharacteristic wildfire, insect & disease, drought...

Loss of ecosystems (and ecosystem services)

How to measure? What parts and processes are crucial to allow for persistence?



# *Ecological integrity*: A framework for measuring ecosystem condition

---

The primary conservation framework of the 2012 Planning Rule

Multijurisdictional/all lands (ecosystem is the unit of analysis)

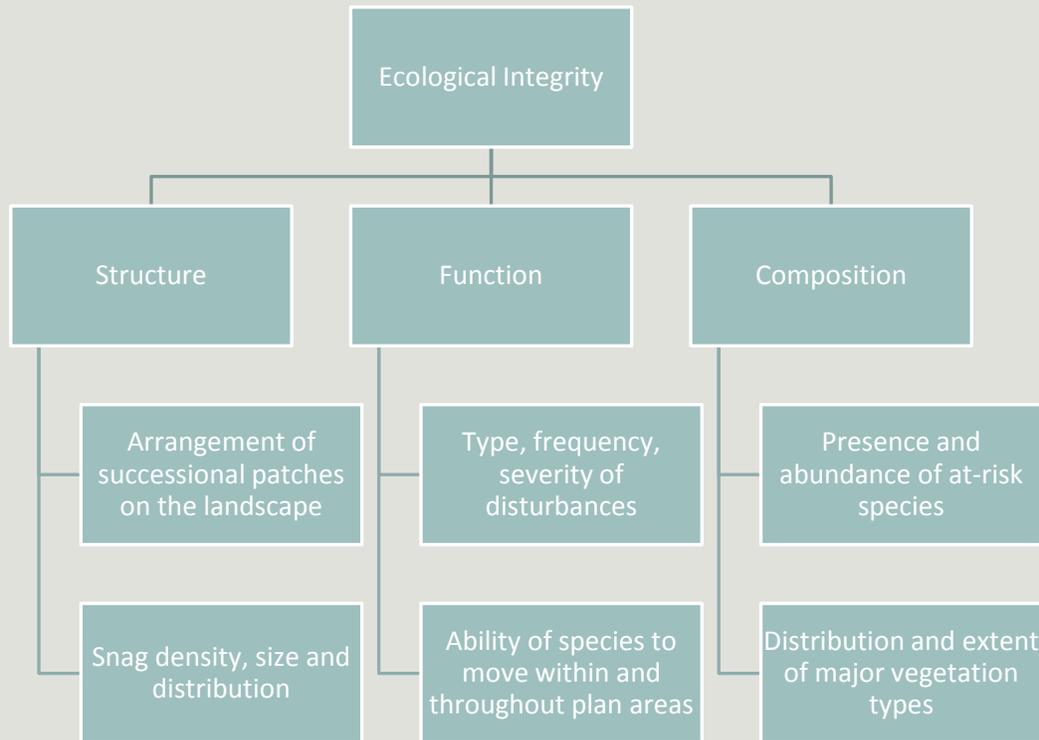
Replicable across space and time (powerful)

1. Describe ecosystems based on parts (composition), arrangement (structure), and process
2. Use reference conditions to estimate current ecosystem departure to prioritize actions and establish desired conditions



# Portraying an ecosystem

---



Development of multiple metrics to describe an ecosystem (and multiple hypotheses about what is most important)

Consistent (replicable) method for portraying and measuring complex ecosystems, documenting assumptions, uncertainty and collecting ecological information

Opportunity for stakeholders to see their values “represented” in an ecosystem (good in collaborative settings)

Evaluation of long-term effectiveness and short-term impacts

# Manage for multiple characteristics, with ranges of desired conditions

Define the ecosystem of interest

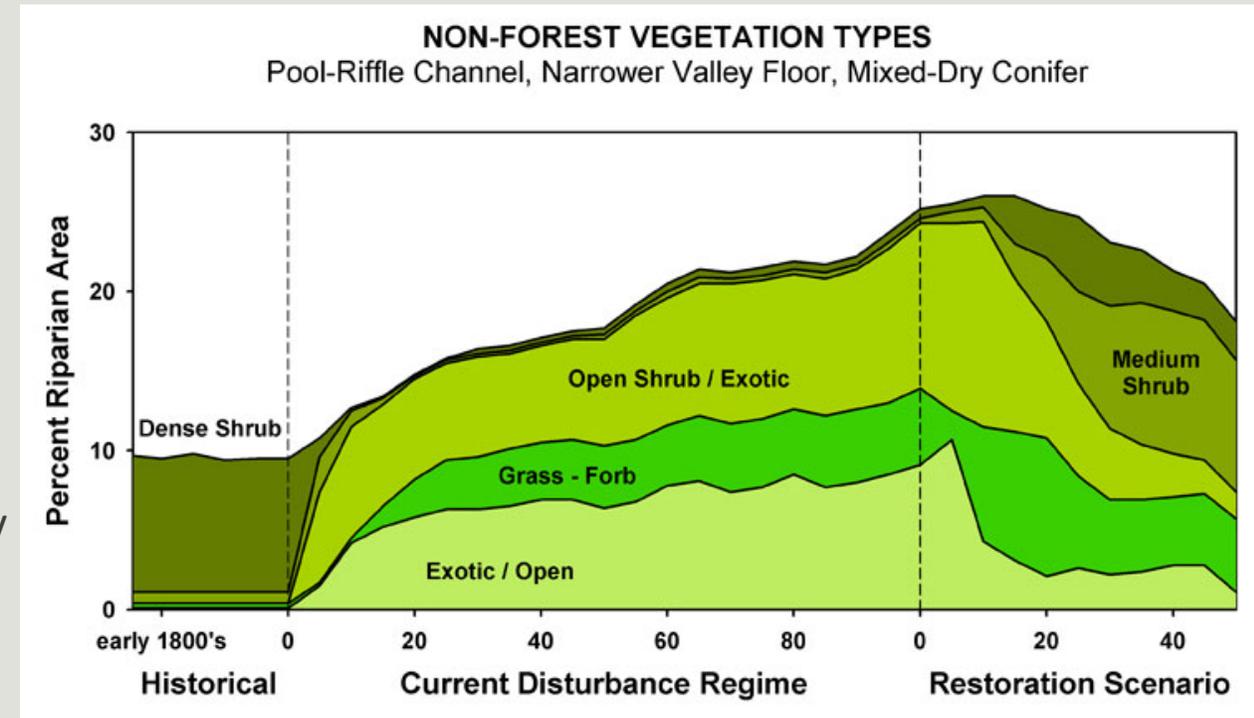
Select multiple key characteristics of integrity thought to be most essential (based on relevant science)

Estimate a reference condition (using historical information and projecting future scenarios)

Hypothesis: Characteristics departed from reference conditions are of resilience concern (at risk or vulnerable)

Establish a range of desired conditions for each key characteristic of integrity (no single DC)

Manage the ecosystem for those conditions and monitor



# Implementing the 2014 Farm Bill

---

2014 Farm Bill Forestry provisions designated  
44+ million National Forest

Risks to resiliency due to insect & disease

Collaboration, categorical exclusions

Best available science to maintain or restore  
ecological integrity (structure, function,  
composition)

An opportunity to evaluate the effectiveness  
of a national program to enhance ecosystem  
resiliency



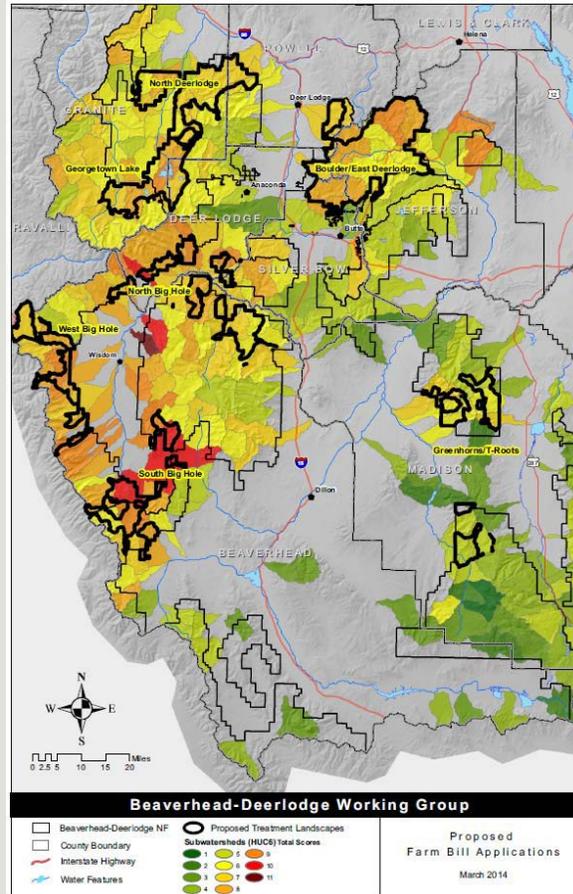
# Using ecological information to prioritize landscapes for resiliency

1M acres impacted by MBP, enhanced fire risk, loss of ecosystem services

Recommended 7 landscapes for designation using multiple metrics

- Insect & disease risk
- Fire regime condition class/uncharacteristic wildfire risk
- Watershed condition class
- WUI

Collaboratively develop and monitor resiliency projects within priority landscapes



# Active Adaptive Management

---

Useful when cases of high uncertainty/low consensus on resiliency actions (e.g. mixed severity/stand replacing fire regimes)

Compare multiple alternative resiliency treatments using principles of experimental design (not research)

Untreated controls (no action/trust building for skeptics)

Hedging: Multiple treatments for resiliency (heterogeneity/range of resilient conditions)

