

Restoration ecology

“To keep every cog and wheel is the first precaution of intelligent tinkering.”  
Aldo Leopold

The first restoration ecologist?

“On this sand farm in Wisconsin, first worn out and then abandoned by our bigger-and-better society, we try to rebuild with shovel and axe, what we are losing elsewhere.”  
Sand County Almanac (1966)

Our conservation mandate?

If humans are going to cause so much ecological trouble, then perhaps we should try to fix things as best we know how  
Restoration ecology tries to ‘make it all better’  
Also see Hawken (2009)

The ultimate ecological test?

“The acid test of our understanding is not whether we can take ecosystems to bits on pieces of paper, however scientifically, but whether we can put them together in practice and make them work.”  
A.D. Bradshaw (1983)

Why is restoration necessary (1)?

Why is restoration necessary (2)?

Why is restoration necessary (3)?

When does restoration = do nothing?

Terminology (1)

**Revegetation**

Plants recolonize disturbed site, which has lost some or all of original vegetation  
Does not necessarily mean that recolonizing plants are the same as the original species

Terminology (2)

**Rehabilitation**

Visual improvements to disturbed land  
Does not necessarily mean that original species are used or original functions are restored

Terminology (3)

**Reclamation**

Preparation and enhancement of disturbed land to fulfill its former use or a new use  
Functions are restored, but not necessarily its original composition and structure

Reclamation example

"a better landscape than it was before. It's a much more diverse landscape, a savannah of fields and forests coming back. It is in some ways closer to the landscape that existed here a thousand years ago than the unmined landscape."

Secretary of the Interior Bruce Babbitt (1996)

AOC

Mining *restoration*(?)

Regurgitation?

Luminous Processors, Athens, GA

Terminology (4)

**Restoration**

Seeks to re-establish function, components, structure, and complexity  
Relies on human activity to 'nudge' the system along faster  
Tries to create a sustainable, persistent system  
(We'll look at some case studies at the end)

Putting the terminology together

Steps for restoration

Identify and deal with processes leading to degradation in the first place  
Determine realistic goals and measures of success  
Develop methods for implementing the goals  
Incorporate these methods into land management and planning strategies  
Monitor the restoration and assess success

Restoration success

Depends on four factors

Some case studies of wetland restoration

- Sandpiper Pond
- Tidal freshwater marsh
- Tijuana NERR—salt marsh
- Venus' flytrap habitats

Sandpiper Pond

- How to deal with invasive plants
- Herbicide
- Habitat restoration
- Restoring marine connectivity

Tidal freshwater wetlands

- Former rice field on the Cooper River
- Goal: restore subtidal submerged aquatic vegetation dominance
- Also need to maintain water quality standards

Proposal

New and improved (hypothetical)

Wetland restoration/mitigation

- Salt marsh restoration in CA

Do the treatments work?

- Experimental manipulation is important for long-term success

Venus' flytrap habitats

- Lack of fire increases shrubs, which reduces light for flytraps; solution?

Effectiveness?

## Putting the terminology together

