

Lecture 25, 13 Nov 2007  
[Restoration etc.](#)

Conservation Biology  
ECOL 406R/506R  
University of Arizona  
Fall 2007

Kevin Bonine  
Cathy Hulshof



### Upcoming Readings

today: [Ch 11 and weblinks \(Restoration, Reconciliation\)](#)

Thurs 15 Nov: Ch 12, and web-links (Economics)

Thank: Rob Robichaux, Cathy Hulshof  
[Q4 due TODAY](#)

Exam 3: mean 82.4, median 84, max 93, min 60, before bonus

### Conservation Biology Lab 406L/506L

[Friday 30 Nov 1230 -> 1530, Wrap Up](#)  
[Meet 1230h southwest corner of BSE](#)

[See lab website for more information](#)



Debate 15 November 2007, **MOVED TO 27 NOV.**  
RE: Galapagos Conservation

Three groups – one will debate, another will evaluate, third will observe, then we rotate.

406	Debate 1 (20 Sept.)
	Group A debate
	Group B evaluate
	Group C observe
	Debate 2 (23 Oct.)
	Group A observe
	Group B debate
	Group C evaluate
	Debate 3 (27 Nov.)
	Group A evaluate
Group B observe	
Group C debate	

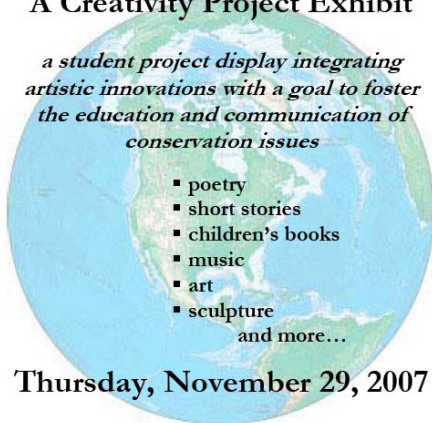
Debate 1 (20 Sept.)  
506 A assist  
506 B assist  
506 C observe  
Debate 2 (23 Oct.)  
506 A observe  
506 B assist  
506 C assist  
Debate 3 (27 Nov.)  
506 A assist  
506 B observe  
506 C assist

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Fall 2007 Conservation Biology course  
presents....

### A Creativity Project Exhibit

*a student project display integrating  
artistic innovations with a goal to foster  
the education and communication of  
conservation issues*



Thursday, November 29, 2007

Forbes lobby  
2-3 pm

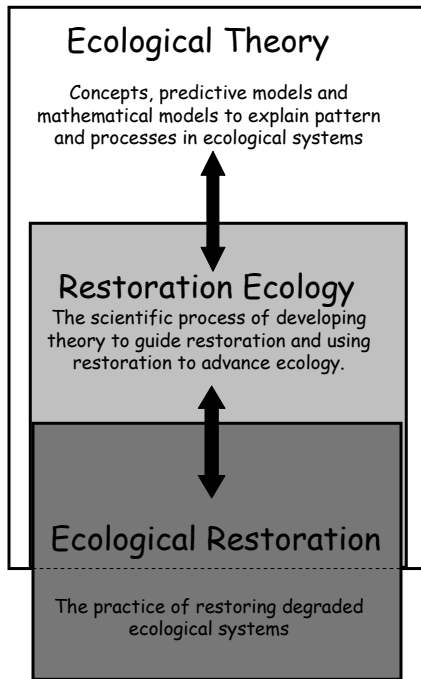
### Grading Criteria due 27 November

Out of 100 points.

15 points for your  
grading effort of  
other pieces.

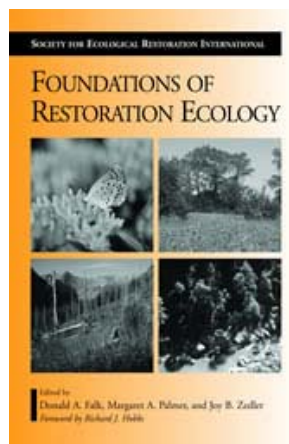
Also, tell us soon  
what resources  
(table, vertical  
board, power  
supply?) you will  
need

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Don Falk

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Falk et al. 2006

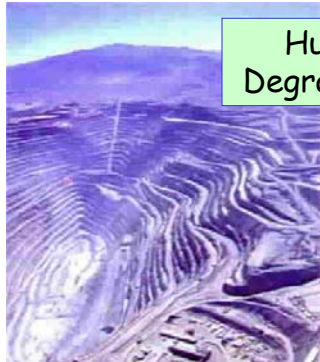


<http://www.ser.org/>



<http://web.utk.edu/~grissino/>

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Human Degradation



Altered ecological processes



Disturbance

## Restoration Candidates

Three fundamental elements of restoration:

1. Defined *reference* condition.
2. *Disrupted* ecosystem.
3. Desired *future* condition.



## Ecological Restoration:

"The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed."

## Restoration Ecology:

1. The study of relationships among organisms and the abiotic environment, in a context of ecological restoration. 2. The scientific study of patterns and mechanisms operating in ecological restoration." - Don Falk *et al.*, 2006

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## Ecological Restoration Goals

- Restore ecosystems to conditions consistent with their **evolutionary** environments
- Connect sustainable **human communities** with sustainable wildlands
- Conserve wildlands for present and **future** generations

Covington, 2000

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## Ecological Restoration: Criteria for Success

- Sustainability
- Resistance to Invasion
- Productivity
- Nutrient Retention
- Functional Relations
- Genetic Appropriateness

Therefore, monitor!

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Restoring functioning  
ecological communities



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# Example: Restoring species interactions

- Pollination
- Dispersal
- Herbivory & Predation
- Competition
- Trophic Structure and Dynamics



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**National Park Service** National Park Service U.S. Department of the Interior 

Everglades



**South Florida National Parks**



**Everglades Restoration**

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# Everglades Restoration Flows, Timing, Quality

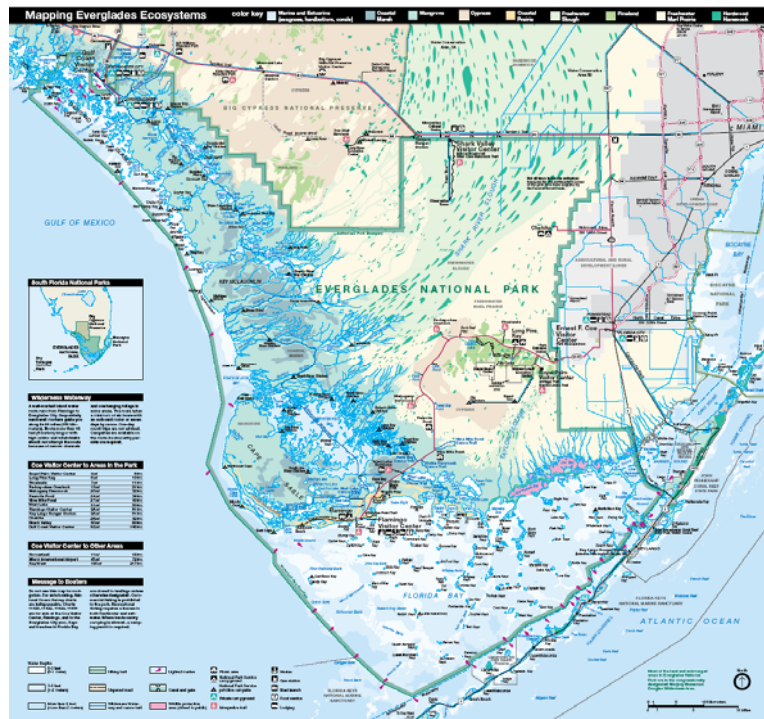
\$3.3 Billion

Water Quality and Agriculture  
Phosphorous

Land Acquisition

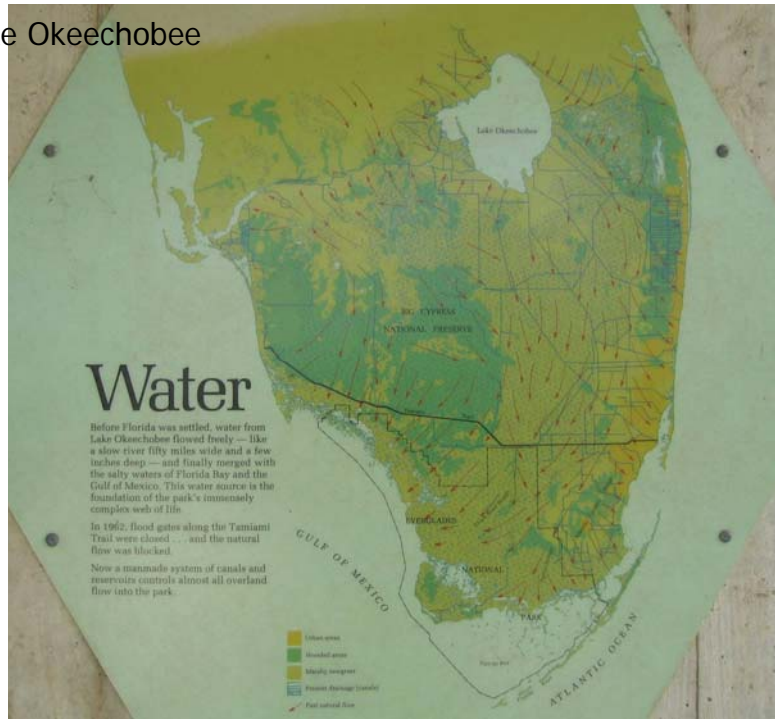
Stormwater Treatment

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Lake Okeechobee



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Coopertown, FL



Shark Valley, Everglades, FL



Native?  
Invasive?  
Alligators  
Crocodiles  
Pythons



Southwest  
Watersheds

Beaver Dams

Gabions



# Grand Canyon



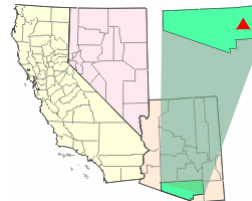
Historic Flood  
Regime  
vs.  
Kanab Amber Snail  
(ESA)

Goals in conflict?



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## EPA SuperFund Sites in Arizona

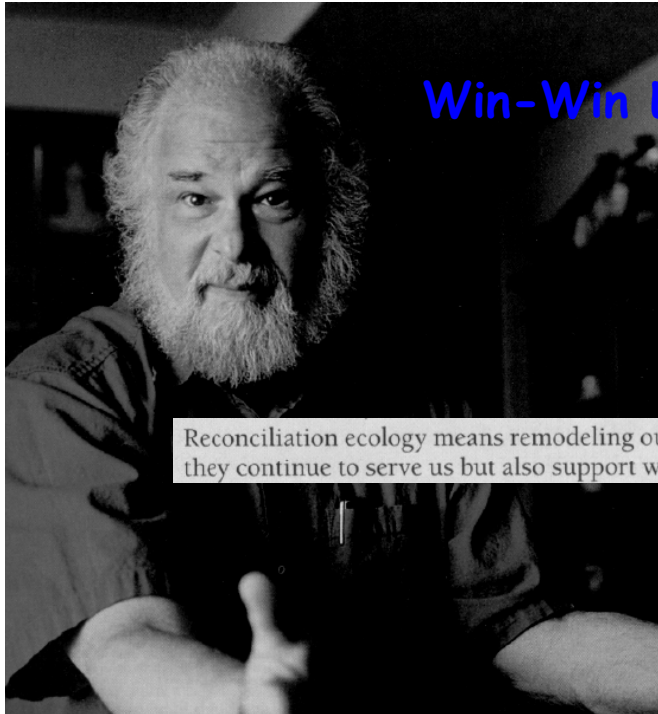


<http://www.epa.gov/region09/cleanup/arizona.html>

## TIA:

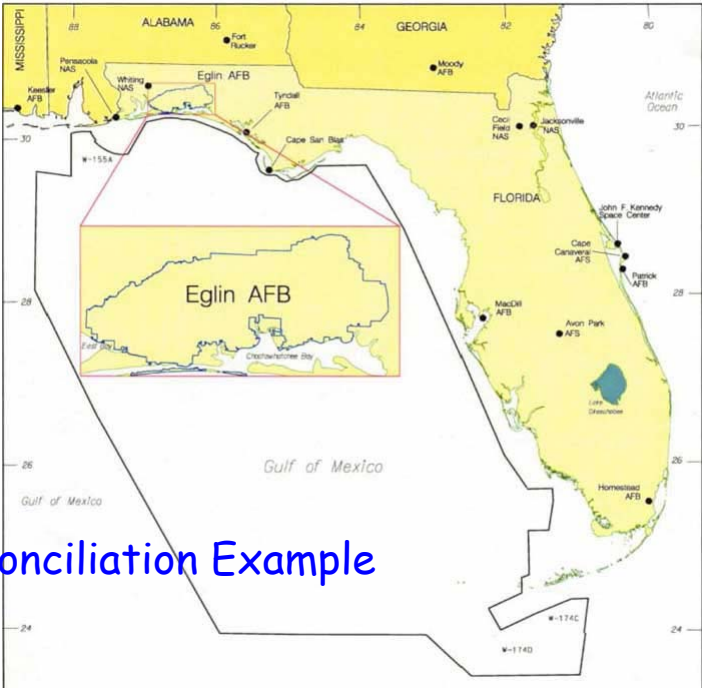
<http://vosemite.epa.gov/r9/sfund/r9sfdocw.nsf/vwsoalphabetic/Tucson+International+Airport+Area?OpenDocument>

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# Win-Win Ecology

Reconciliation ecology means remodeling our habitats so that they continue to serve us but also support wild species.



# Reconciliation Example

## Eglin Air Force Base

Longleaf Pine (90 million → 5k acres)

Fire (germination, reduce competition)

Red-Cockaded Woodpecker (ESA)



## Monitoring

- What to monitor to measure **success** of restoration or management efforts?



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