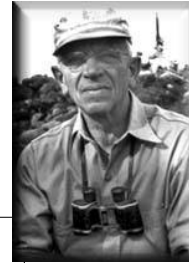


Lecture 04, 04 Sept 2008
Leopold, Ethics

Conservation Biology
ECOL 406R/506R
University of Arizona
Fall 2008

Kevin Bonine
Mary Jane Epps



LEOPOLD

Primack Ch1
pp. 64-68 of Ch3
Meine et al. 2006
Callicott 1997

Upcoming Readings

Tues 09 Sept: Primack Ch2; Myers et al. 2000

Thurs 11 Sept: Primack Ch3; Costanza EA 1997; Driessen 2004

1st Lab Fri 1230 Sep 5th west side BSE

Hat, water, sunscreen, close-toed shoes

Readings on Course Website



Study Abroad Information Opportunities, Fall 2008

Study Abroad (S.A.) Open House
Friday, Oct. 3, 2008
S.A. Office, 11am-1pm

S.A. Fall Fair
Wednesday, Nov. 5, 2008
UA Mall, 10am-2pm

Study Abroad Info Sessions :

EUROPE

Thursday, September 4th

12-1pm Student Union Agave Room

AUSTRALIA, NEW ZEALAND & FIJI

Wednesday, September 10th

12-1pm Student Union Agave Room

AFRICA

Monday, September 15th

12-1pm Student Union Agave Room

PUERTO RICO & GUATEMALA

Tuesday, September 16th

12-1pm Student Union Copper Room

ITALY

Thursday, September 18th

12-1pm Student Union Agave Room

SPAIN

Tuesday, September 23rd

12-1pm Student Union Copper Room

UNITED KINGDOM & IRELAND

Thursday, September 25th

12-1pm Student Union Agave Room

GREECE and TURKEY

Wednesday, November 19th

3-4pm Student Union Ventana Room

<http://sustainability.arizona.edu/>

http://www.eebweb.arizona.edu/news/monday_seminar_new.asp

<http://snr.arizona.edu/>

**Student Chapter of the
Tucson Herpetological
Society**

(=Reptiles & Amphibians Club)



Batrachoseps

First meeting of the semester

Thurs., September 4th

@ 6PM in Bio Sciences East

114

FREE PIZZA

First of Ten Possible Questions:

Writing Assignments (30 pts each, 120 pts total; four of ten possible assignments throughout semester; you must turn in one assignment in September, one in October, and one in November; the fourth can be at any time during the semester)

Turn in no more than two pages (typed, min. 2cm margins, min. 10 point font) **electronically via email to Mary Jane (mycota@gmail.com) as an attached word document.** Be concise, but convey sophisticated knowledge of subject matter, include relevant examples and peer-reviewed citations (at least two; use the format of the journal *Conservation Biology*), and show that you have thought about and integrated material. Two thirds of your grade will come from content, the other 1/3 from your ability to express yourself appropriately in English.

1a. Should conservation planners justify the value of biodiversity using instrumental or intrinsic terms? Why?

OR

1b. How should we respond to the question of "What good is it?" ("it" being some *'small, unimpressive plant'*)

Q1 due Thursday 11 September by midnight ³

Rachel Carson *Silent Spring* 1962

- Bioaccumulation
- Levels and scale
- Environmental degradation threaten *human health*
- Increased Public Awareness



Figure 1.6 Van Dyke 2003
Rachel Carson, U.S. Fish and Wildlife Service biologist and author of *Silent Spring* (1962), a seminal book in the modern environmental movement.

Environmental Ethics (pp. 64-68 of Primack Ch3)

1. Environmental 2. Economic 3. Social Justice

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

-US EPA

6

PHYTOREMEDIATION OF CHICAGO'S BROWNFIELDS: Consideration of Ecological Approaches and Social Issues

-Phytoremediation -Brownfield

Lynne M. Westphal
USDA Forest Service
North Central Research Station
845 Chicago Ave., suite 225
Evanston, IL 60202
westphal@fs.fed.us

J.G. Isebrands
USDA Forest Service
North Central Research Station
5885 Highway K
Rhinelander, WI 54501
jisebrands@fs.fed.us

Westphal, Lynne M.; Isebrands, J.G. 2001.
Phytoremediation of Chicago's brownfields:
consideration of ecological approaches and
social issues. In: Brownfields 2001 proceed-

Abstract:

Phytoremediation is an emerging technology for remediating brownfields, landfills, and other contaminated sites. Many laboratory and field tests have demonstrated that trees and other vegetation can absorb, transform, or contain a variety of contaminants, including soft and heavy metals and volatile organics through hydraulic control, absorption, and mycorrhizal activity in the root zone. But phytoremediation can not be applied in an "off the shelf" fashion because plants grow differently on different soils, different microenvironments, and different types of contaminants. Site- and contaminant-specific protocols are needed to effectively use phytoremediation.

But trees and other plants do more than remediate pollutants. In many cases, a landscape with trees and other plants can have a significant impact on humans. For instance, a green landscape can reduce stress, reduce violence, and strengthen neighborhood ties. And because of the deep attachments many people have to trees, tree removal—sometimes an element of phytoremediation—can be problematic.

What are the implications of these ecological and social functions of vegetation for brownfield redevelopment? We address how to combine the biological and ecological issues of phytoremediation to maximize effectiveness as a clean-up technology while also outlining the potential for significant social implications of a greener human environment. A new phased phytoremediation strategy is outlined and specifics from an experiment in the Calumet region of Chicago are presented as a case study to illustrate ways to develop site specific phytoremediation protocols. Potential social implications of this and other phytoremediation applications in Calumet are also addressed.

7

How Healthy is Your Town - Superfund Sites

ChicagoMag.Com (Oct 2005)

1. Yeoman Creek Landfill

Location: Southeast Waukegan

Backstory: From 1959 to 1969, a 70-acre landfill with no protective liner

Damage: PCBs (highly toxic, cancerous materials), industrial solvents, lead, zinc, explosive landfill gases

2. Joliet Army Ammunition Plant

Location: Between Interstate 55 and Illinois State Route 53

Backstory: By 1945, the largest munitions factory in the world

Damage: Unexploded ordnance, TNT, dynamite, and metal in soil and groundwater

3. Outboard Marine Corp.

Location: North end of Waukegan Harbor

Backstory: Site once housed a sport engine manufacturer and a coke and gas plant.

Damage: PCBs in harbor sediment and soil

4. Lenz Oil Service

Location: Route 83 in Lemont

Backstory: From 1961 to 1985, an oil and solvent recycler

Damage: A contaminated oil layer underground threatens the nearby Des Plaines River.

5 & 6. Kerr-McGee (two out of four still in cleanup)

Location: West Chicago to south of Warrenville

Backstory: A lighting company that worked with the federal atomic energy program

Damage: Radioactive byproduct in Kress Creek, the DuPage River, yards, parks



Did Obama
volunteer NW
Chicago or SE
Chicago?
Why?

8

308 PART TWO Environmental Problems and the Search for Solutions

The Science behind the Story

Pesticides and Child Development in Mexico's Yaqui Valley

With spindly arms and big round eyes, one set of pictures shows the sorts of stick figures drawn by young children everywhere. Next to them is another group of drawings, mostly disconnected squiggles and lines, resembling nothing. Both sets of pictures are intended to depict people. The main difference identified between the two groups of young artists: long-term pesticide exposure.

Children's drawings are not a typical tool of toxicology, but Elizabeth Guillelte, an anthropologist, wanted to try new methods. Guillelte was interested in the effects of pesticides on children. She devised tests to measure childhood development based on techniques from anthropology and medicine. Searching for a study site, Guillelte found the Yaqui Valley region of northwestern Mexico.

The Yaqui Valley is farming country, worked for generations by the indigenous group that gives the region its name. Synthetic pesticides arrived in the area in the 1940s. Some Yaqui embraced the agricultural innovations, spraying their farms in the valley to increase their yields. Yaqui farmers in the surrounding foothills, however, generally chose to bypass the chemicals and to continue following more traditional farming practices. Although differing in farming techniques,

Drawings by children in the foothills

Drawings by children in the valley

Elizabeth Guillelte's study in Mexico's Yaqui Valley offers a startling example of apparent neurological effects of pesticide poisoning. Young children from foothills areas where pesticides were not commonly used drew recognizable figures of people. Children the same age from valley areas where pesticides were used heavily in industrialized agriculture could draw only scribbles when asked to draw people. Adapted from Elizabeth A. Guillelte, et al., *Environmental Health Perspectives*, 1998.

Yaqui in the valley and foothills continued to share the same culture, diet, education system, income levels, and family structure.

At the time of the study, in 1994, valley farmers planted crops twice a year, applying pesticides up to 45 times from planting to harvest. A previous study conducted in the valley in 1990, focusing on areas with the largest farms, had indicated high levels of multiple pesti-

Brennan and Withgott 2005

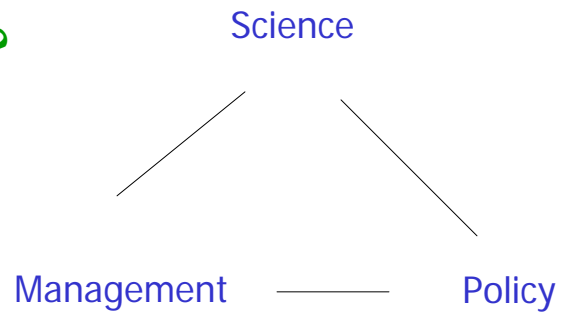
9

What is Conservation Biology?

Primack Ch1, Meine et al. 2006, Callicott 1997

Discipline defined by its goal?

Is it Science?



11

Van Dyke Chapter 1 (p. 5)

“Genuine and enduring conservation can occur only when humans knowingly use resources at less than maximum sustainable rates or forgo the use of some resources altogether.” [RESTRAINT]

12

Aldo Leopold

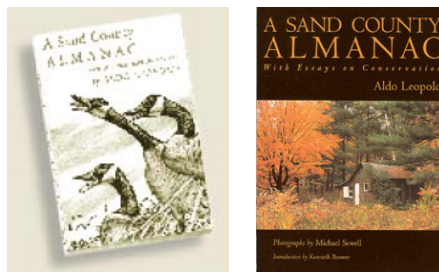
“An ethic, ecologically, is a limitation on freedom of action in the struggle for existence.

An ethic, philosophically, is a differentiation of social from anti-social conduct.”

(p. 238)

13

1887-1948



<http://www.aldoleopold.org/Biography/Biography.htm>

Aldo Leopold Foundation

Leopold, A. 1966 (1949). *A Sand County Almanac with Essays on Conservation from Round River*. Oxford Univ. Press.

Leopold, A. 1999. *For the Health of the Land: Previously Unpublished Essays and Other Writings*. Island Press.

15

Aldo Leopold:

Thinking Like a Mountain
Escudilla

The Land Ethic

The Outlook for Farm Wildlife
The Land-Health Concept and Conservation

16

How does this quote from Leopold sit with the idea of intrinsic value?

For one species to mourn the death of another is a new thing under the sun. The Cro-Magnon who slew the last mammoth thought only of steaks. The sportsman who shot the last pigeon thought only of his prowess. The sailor who clubbed the last auk thought of nothing at all. But we, who have lost our pigeons, mourn the loss. Had the funeral been ours, the pigeons would have hardly mourned us. In this fact . . . lies objective evidence of our superiority over beasts (Leopold 1966:117).

17

Objectivity is possible only in matters too small to be important, or in matters too large to do anything about.

The Land Health Concept and Conservation
-Leopold, 1999

Ecological Conscience

18

Aldo Leopold Land Ethic

- social evolution (social disapproval for wrong actions)
- land ethic enlarges the community to include biota

- human as plain member and citizen, not ruler
- ↙
- Conquerer self defeating because falsely thinks s/he understands how the system works and can control it

19

Leopold Land Ethic

- Property vs. propriety

- Role of land [biology] in human history (Diamond, Guns Germs and Steel)

- Sacrifice
- Obligation of private landowner
- Livestock, Violence

- Economics?
Farm as Factory or Place to Live?

20

Aldo Leopold Land Ethic

-What is "land-health?"

-processes
-evolutionary/ecological biology

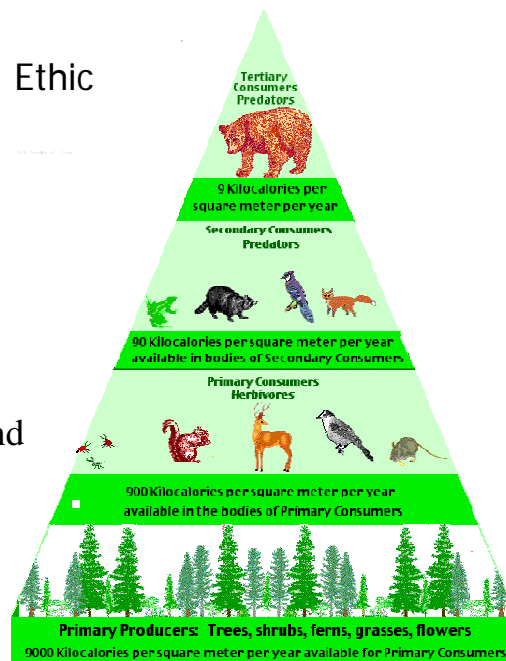
-complexity & quality
-invasives

21

Aldo Leopold Land Ethic

-land pyramid

“We are lopping off the tops of these pyramids and shortening food chains”



“a thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise”

Aldo Leopold

Climax community?

23

“In our attempt to make conservation easy we have made it trivial” (p.246)

-Leopold

24

From "The Land-Health Concept and Conservation"

Conservation is a series of ecological predictions made by beginners because ecologists have failed to offer any.

Leopold, p. 220

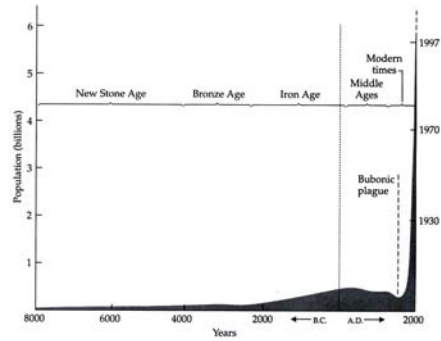
Crisis discipline?

25

"Whether you will or not
You are a King, Tristram, for you are one
Of the time-tested few that leave the world,
When they are gone, not the same place it was.
Mark what you leave."

As quoted in Leopold, 1949
p. 261 (The Land Ethic)

Human Population?



27

Leopold

Thinking like a mountain

" a mountain lives in mortal fear of its deer"

"...a deer herd dead of its own too much."

Escudilla

Spaniards killing Indians = managers killing bears/wolves?
progress?

"It's only a mountain now."

The planet will survive, will we?

28

“...rivers washing the future into the sea...”

“In wildness is the salvation of the world.”

-Thoreau

Thinking Like a Mountain

-Leopold, 1949

29

“We strive for safety, prosperity,
comfort, longlife, and dullness”

Thinking Like a Mountain

-Leopold, 1949

Peace vs. freedom?

30

To build a road is so much simpler than to think of what the country really needs.

Leopold 1949, Marshland Elegy

Do economists know about lupines?

Leopold 1949, The Sand Counties

31

On your college experience...

There are men charged with the duty of examining the construction of the plants, animals, and soils which are the instruments of the great orchestra. These men are called professors. Each selects one instrument and spends his life taking it apart and describing its strings and sounding boards. This process of dismemberment is called research. The place for dismemberment is called a university.



Leopold 1949, Song of the Gavilan

32