Lecture 20

- Furthering your Ecology & Evolution education
- Principles of Conservation Biology

Classes

- Biology 318. Writing Appalachian Ecology Summer(Fallon/Peterjohn)
- Biology 338. Behavioral Ecology Fall(Raylman)
- Biology 339. Animal Communication Fall(Marsat)
- Biology 340. Invertebrate Zoology
- Biology 341. Ichthyology (fish)
- Biology 361. Plant Ecology Fall(Fowler)
- Biology 363. Plant Geography Fall(Studlar)

More Classes

- Biology 420. Genomics Fall(Hawkins)
- Biology 430. Bioinformatics.
- Biology 433. Herpetology (reptiles & amphibians)
- Biology 438. Animal Behavior
- Biology 446. Freshwater Ecology
- Biology 450. Plant Systematics Fall(Ford-Werntz)

Even More Classes

- Biology 455. Evolution of Infectious Diseases
- Biology 456. Microbial Symbiosis
- Biology 461. Principles of Evolution
- Biology 463. Global Ecology
- Biology 464. Population & Quantitative Genetics
- Biology 477. CNS Evolution & Development Fall(Farris)
  - *Hidden Courses:*
- Biology 493A. Plant Microbial Interactions Fall(Brzostek)
- Biology 493D. Conservation Biology Fall(Barry)

What Makes Species 'Special'

From 'unselfish' to 'selfish' reasons

Why Conserve Biodiversity?

- Intrinsic value argument
- Ethics - moral imperative
- Legal – rights of nonhuman species
- Philosophical – Stewardship
- Religious – Dominion
- Biophilia – E. O. Wilson
- *Homo sapiens*-centric reasons (economic, ecosystem 'services', recreation, indicator species, cultural, inspirational)

Conservation Biology

- *"To save every cog and wheel is the first precaution of the intelligent tinkerer"*
- *The philosophy of the intelligent tinkerer. Aldo Leopold, 1949, A Sand County Almanac*

'Thinking Like A Mountain' - Aldo Leopold'

"In wildness is the preservation of the world."
-Thoreau

Rachel Carson – author of Silent Spring

Two icons of Appalachia, inextricably linked*

*Ginseng (*Panax quinquefolius*) and Wood thrush (*Hylocichla mustelina*)

Conservation Biology

- Mission Statement: The application of ecological and genetic principles to the goal of preservation of biodiversity for future generations.

Some fundamental concepts:
•MVP; minimum viable population size - that population size required to ensure the existence of a population with X% probability for Y years.
•MDA; minimum dynamic area - the land area required to maintain an MVP.
•PVA; population viability analysis - the suite of demographic and genetic studies required to determine quantities such as MVP and MDA

Sample Questions Conservation Biologists Ask

- What is the smallest population that will be viable (e.g., 95% probability of existence) after 100 years (or 1000 years, or…)? Determine MVP - minimum viable population size.
- Example: *How large must a population of ginseng be in order to have a 95% chance of still being present after 60 years of climate change?*

Sample Questions Conservation Biologists Ask

- How much land area is needed to ensure population viability for a long period of time? (e.g., 100 y) - Minimum Dynamic Area

How much land must be preserved around Yellowstone National Park as grizzly bear habitat before it is safe to remove them from the Endangered Species List?

Sample Questions Conservation Biologists Ask

- How genetically diverse does a population have to be to ensure long-term viability?

Are the nearly genetically uniform kit foxes of the Channel Islands off the coast of California safe from extinction?

Sample Questions Conservation Biologists Ask

- Can populations survive through adaptation, acclimation or migration in the face of a directionally-changing climate?