

Conservation Biology Introduction:

I. The usual stuff you need to know:

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II. Web page(s):

<http://mason.gmu.edu/~alaemmer/consbiol/consbiol.html>

<http://mason.gmu.edu/~alaemmer/consbiol/cblecture.html>

III. Text:

Text: Conservation Biology in Theory and Practice, Caughley, G. and A. Gunn, 1996. Blackwell Science. ISBN 0-86542-431-4.

Comments:

There don't appear to be a lot of good Conservation Biology texts out there.

Many are either written at a very introductory level (aimed not just at biologists), or are a collection of chapters/papers written by different authors (meaning they don't present the material in a nice comprehensive way).

This text is a little older than some and only deals with animals, but it avoids both extremes. We should be able to fill in any missing pieces from other sources.

IV. Grading:

There will be three grades, equally divided (33 1/3 % each) amongst:

A mid-term - The mid-term is on March 4th and will cover the material up

through March 2nd. It will be mostly short answer/definitions, with perhaps a few fill in the blanks, and maybe a longer essay question. More details will be provided as it gets closer.

A final - The final is on May 6th and will concentrate on the material since the mid-term, but is comprehensive. It will follow the same format as the mid-term.

A paper - The course will require a paper giving the status of an endangered non-animal organism (since our text deals solely with animals!). This paper must be well referenced, and discuss such things as:

- The basic biology/natural history of the organism
- The reason the organism is endangered
- What is being done about it (this includes a thorough critique)
- Past successes and failures
- Comparisons with other similar organisms

Students who are registered under 518 need to do a little more work. You have a choice of either:

- Two papers, or
- A class presentation of your paper

Note: a lot of folks hate giving a presentation, but it's probably a lot less work than doing a second paper. It's up to you.

For students in 518, their grade on the paper will be equally divided amongst either 1) the two papers or 2) the paper and presentation.

A paper topic will be due by March 16th. A rough draft for critiquing will be due on April 13th. The final paper is due on the last day of class, April 29th.

More details (length, # of references, etc.) on the paper will be available soon.

V. Miscellaneous topics

The honor code is in effect. Each person needs to do his or her own work on all graded work (you can help each other find references, though).

Please - ask questions if you don't understand something.

What is Conservation Biology?

- A confession - I had no idea that the subject matter covered by this had actually evolved to a “discipline” in it’s own right.
 - Until recently, many of these topics came under such headings as “Ecology” or “Wildlife Management”.
- In a nutshell, we’re interested in how to conserve (protect/preserve) organisms - to prevent them from becoming extinct. This can imply:
 - Protecting natural resources
 - Creating preserves
 - Protecting animals in zoos
 - Increasing genetic diversity
 - Teaching
 - Convincing folks of the value of conservation
- But to do this, we need to understand the problems leading to the need for conservation.
- Many of these issues are also political, for example:
 - Rights of loggers vs. other people
 - Global warming (show cartoon)
 - Birth control (i.e., the Catholic Church)
 - We will try to avoid getting too political in this class.
- This course is divided roughly in half:
 - The first half deals with causes of extinction, how to measure these, and numerous examples of extinction and near extinctions.
 - The second half deals with the list above.
- A quick review of the syllabus.
- When finished with this course, we should all know something about the problems caused by extinction and what, if anything, can be done about them.

A first example of some of the problems: The American Chestnut.

- The American Chestnut (*Castanea dentata*) was one of the most important tree species on the east coast.
 - Range went from Main to Mississippi, along the Appalachians, and down through the midwest.
 - Flowered in mid summer
 - Fruit was desirable to wildlife and humans
 - Timber was highly valued due to being rot-resistant (used in poles, fences, cabins, furniture, etc.). The trees also grew very straight for considerable length.
 - Some specimens grew up to 100 feet tall, particularly in the southern Appalachians
 - Leaf dentate, similar to “Chestnut Oak”
 - One of the most common trees in forests. Estimates indicate up to 4 *billion* American Chestnuts were extant throughout its range. Now there are only shoots.
- What happened?
 - People have been interested in Chestnuts for a long time. As a result, many foreign Chestnuts were imported throughout the years.
 - The exact origin of the Chestnut blight (*Cryphonectria* (formerly *Endothia*) *parasitica* is unclear. What we do know is that this disease was discovered in New York City in 1904.
 - Presumably came in with Asian or Japanese chestnut trees. Recent research seems to point the finger at the Japanese chestnut.
 - Chestnut blight has two types of spores:
 - dry disc, wind dispersed
 - larger, sticky, water dispersed
 - Chestnut blight enters the tree through openings or sores in the bark:
 - spreads throughout the inner part of the tree, and winds up killing the cambium.

- everything above this point dies, and so the tree mostly dies.

- root stock is still healthy, and starts sending up new shoots.

- new shoots get to about 10 to 12 feet in height, then are overtaken by the blight.

- End result - on the east coast there are basically no healthy “adult” Chestnut trees. A few larger trees survive out west where they were planted as “imports”.

- Some comments:

- People realized what was happening. By 1912 - 1913, it had started to spread through out much of the northeast.

- Funds were appropriated to study the problem.

- Fungicides, tree surgery, chemical agents did not work. Neither did trying to isolate areas from the blight (wind borne spores!).

- Eventually blight reached Georgia, and then World War I intervened (funds were re-allocated).

- Essentially, within 40 years the American Chestnut in the East was mostly destroyed.

- This represented 50% of the value of Eastern Hardwood timber.

- Because the wood was of such high quality, large dead trees continued to be visible for decades after it was all over.

- Recovery efforts are ongoing:

- In general most hybridizing efforts have failed. The Chinese Chestnut seems resistant to the blight, but so far efforts to cross or graft the species have not borne fruit (no pun intended).

- Some new fungicides might be promising

- A newer, less virulent strain of the blight has been found. It's spreading, and hopes are that it will displace the original blight, allowing some trees to start growing again.

- Some web sites of interest (sources for most of the above):

<http://ncnatural.com/NCNatural/trees/chestnut.html>

<http://www.thewoodworkingcatalog.com/magazine/mar96/chestnut/chestnut.html>

<http://chestnut.acf.org/>

- Discussion:

- What happened? Could this have been prevented? How?

(The result of this was a strengthening of the laws regarding plant importations)

- What lessons have been learned?