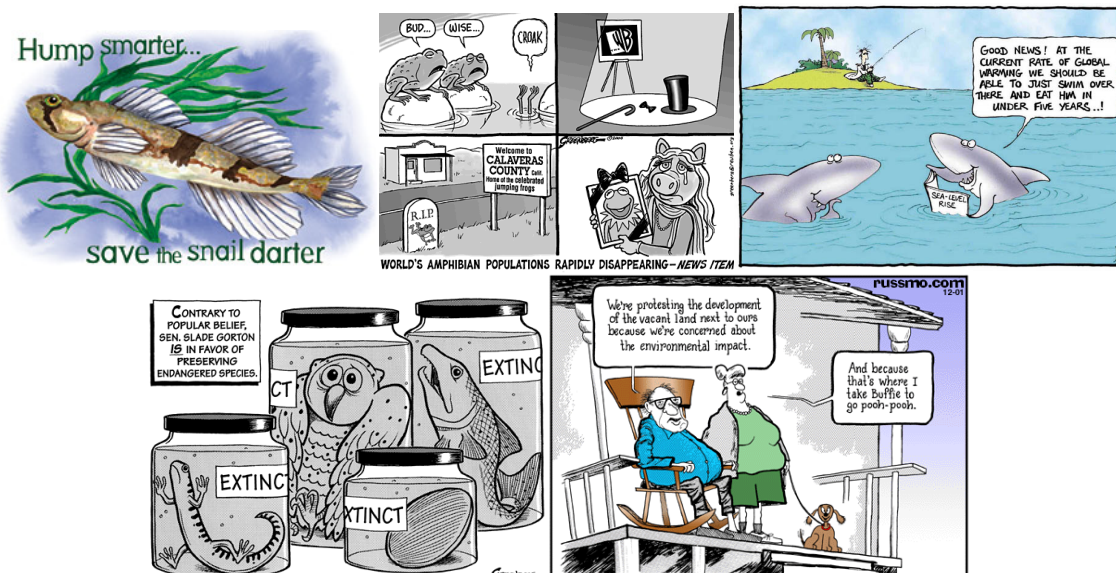


**Conservation Biology**  
**50-304-03**  
**Spring 2016 - Dr. Romi Burks**



**Class time:** Monday, Wednesday 01:30PM - 02:50PM, Cullen Building, Room 321  
**Office hours (FJS 141):** MW 10-11:30 am; Tuesday 2 – 4 pm or by appointment  
**Contact info:** [burksr@southwestern.edu](mailto:burksr@southwestern.edu); Twitter @ProfRomi; Call/Text: 512-869-8098

**Textbook:** Conservation Biology for All. 2011. N.S. Sodhi & P. R. Erlich (editors). Oxford University Press. Available free on-line: <https://conbio.org/publications/free-textbook/>

**Supplemental Materials:** *The 6<sup>th</sup> Extinction: An Unnatural History* by E. Kolbert & *Resurrection Science: Conservation, De-Extinction and the Precarious Future of Wild Things* by M. R. Connell. **Additional readings will be posted on Moodle.**

**Syllabus Inspiration:** I took inspiration for several components of this syllabus from similar courses taught by colleagues Dr. Bradley Cardinale (Grad-level class; University of Michigan) and Dr. Karen Munroe (Baldwin-Wallace University, undergrad lab course).

**Course description and context:** We live in a world experiencing massive amounts of environmental change, including loss of species faster than we can name those newly discovered. Although only one species amidst millions, the rise of *Homo sapiens* undoubtedly created the biodiversity crisis we face now. Yet, as Diane Ackerman argues in *The Human Age*, we, as humans, threaten our own extinction but also commit “extraordinary acts of hope-filled creativity” in a race to save certain species. Conservation Biology asks the questions about “how” and “why” we go about thinking of value and how we will address the mechanisms underlying biodiversity loss.

Conservation biology only started to come together as a synthetic area of study in the 1980s. The emphasis of this class will be on the biological implications of species loss in terms of structure and function across populations, communities and ecosystems. However, any course in conservation must take into account the human influence and consider how the social, economic and political landscape influences decision making about what aspects of biological diversity that we actually conserve. Ideally, this course involves critical analysis and discussion of both the conceptual and practical tools needed to minimize the global loss of biodiversity and decline in ecosystem services.

Many of us feel drawn to the field of conservation biology because we feel a strong concern for the current state of the planet. In the best way, such concern prompts scientific inquiry and the search for evidence that can be used to lobby for change and inform the process of conservation. However, when concern translate into emotional pleas, illogical arguments or personal agendas that appear counterintuitive to faculty information, then such “feelings” undermine the effectiveness of conservation efforts and hamper our ability to make education decisions that cannot avoid trade-offs. A fine line separates conservation biology from environmentalism or activism. The goal of this course will focus on seeking knowledge that has a factual basis. To that end, students need to be aware of pre-conceived notions and also critically evaluate the quality of data used to support particular management plans.

Through a mix of discussions, debates and examinations of current research, this course will focus on answering four main questions:

**1. What do we want to conserve?**

- Discussion/Debate #1: Should we renew the Endangered Species Act or propose a different conservation strategy?

**2. What threatens what we need to conserve?**

- Discussion/Debate #2: To curb extinction rates, do we pay more attention to contemporary processes (habitat fragmentation, overharvest, invasive species) or longer-term global issues (climate change)?

**3. What do we need to enact conservation plans?**

- Discussion/Debate #3: Do we have the science necessary for making de-extinction a reality?

**4. Why do we want to conserve?**

- Discussion/Debate #4: Where do we invest our funding (short-term) or (long-term) and how do we convince others to invest as well?

**CONSERVATION BIOLOGY COURSE STUDENT LEARNING OBJECTIVES:** Throughout this course, students will:

1. CONTENT: **Explain** what the term biodiversity can encompass and the applied charge behind conservation biology;
2. CONTENT: **Discover** the scientific evidence that shows global changes in Earth's biodiversity;
3. CONTENT: **Describe** the social, political and economic landscape that shapes conservation biology;
4. CONTENT: **Connect** the dots between biodiversity loss and alteration of ecosystem services;
5. CONTENT: **Identify** and advocate for best practices in management to reduce global biodiversity loss;
6. SKILL: **Synthesize** course material in an organized fashion that helps foster contributions to class discussion;
7. SKILL: **Communicate** effectively the importance to biodiversity to the mainstream public;
8. SKILL: **Hone** their debate skills to understand both sides of a controversial issue;
9. SKILL: **Reflect** and determine the most compelling reasons for their own advocacy behind conservation biology; AND
10. SKILL: **Improve** their critical analysis of both primary literature as well as mainstream sources.

### **COURSE WORKS IN CONCERT WITH BIOLOGY'S STUDENT LEARNING**

**OBJECTIVES:** Students will:

1. Understand & apply knowledge & concepts about functioning of living systems;
2. Accurately and thoughtfully identify, evaluate and critique research and research literature on biological phenomena;
3. Communicate clearly, accurately and in appropriate styles about biological phenomena and research orally, in writing and graphically;
4. Accurately, appropriately and safely perform physical techniques of biological investigation; and
5. Apply quantitative reasoning and methods to biological problems.

#### Letter Conversions:

A+ = 97.5% - 100% = 487.5 - 500

A = 92.5% and up = 462.5-487

A- = 89.5% and up = 447.5 - 462

B+ = 87.5% and up = 437.5 - 447

B = 82.5% and up = 412.5-437

B- = 79.5% and up = 397.5 - 412

C+ = 77.5% and up = 387.5 - 397

C = 72.5% and up = 362.5-387

C- = 69.5% and up = 347.5 - 362

D+ = 67.5% and up = 337.5 - 347

D = 62.5% and up = 312.5-337

D- = 60% and up = 300 - 312

F = below 300

**Course Elements:**

1. Exams (Solo)	30%	150 pts
2. Reading Guides & Class Engagement (Solo)	20%	100 pts
3. Discussion/Debates (Pairs)	15%	75 pts
4. Primary Literature (Groups)	10%	50 pts
5. Primary Literature – Abstracts and Analysis (Solo/Pairs)	10%	50 pts
6. Value Project (open)	10%	50 pts
7. Success Stories (Pairs)	5%	25 pts

**1. Mid-term and Final Exam** – Conservation Biology will have two exams – a mid-term and a final, each worth 75 points. The exams will include 25 points of objective material (multiple choice, matching, identifications) and 50 points that depends more heavily on interpretation (short answer, graphical interpretation, evidence-based support). Exam questions may come from reading guides as well as brainstorming sessions from the class.

**2. Reading Guides & Class Engagement** – The course design for Conservation Biology depends on students critically reading the text *before class* and coming prepared to synthesize the material *in class*. Overall, the material in this course does not lend itself to quizzing as a means of assessing reading comprehension (although this will remain an option if the discussion dynamic of the class stalls). Instead, we will adopt a template approach where students complete a reading guide for each chapter that also incorporates notes from supplementary resources. The template will ask students to supply:

- A list of key words or concepts and brief definitions
- 3 Take Home Message from the chapter
- 3 Connections within the chapter to previous classes or additional reading
- 1 “tidbit/piece” of information in the chapter that the student found surprising, dubious, alarming,
- 2 questions that will foster class discussion

Students should bring a paper copy of each reading guide to class. Reading guides will be randomly collected from five students each day and returned with basic feedback as to the quality of the work (i.e. Thriving, Stable, Recovering, Threatened). These “population” ratings will translate into 75 of the 100 points. A minimum of five reading guides will contribute to a student’s grade and each student receives “one free day” where not having a reading guide does not count against the grade.

For the remaining 25 points, students will also be asked to self-evaluate their class participation and that of their peers and also volunteer to upload a comprehensive reading guide [or class notes] to a Google Doc that synthesizes the class discussion.

**3. Debate/Discussion (Pairs)** – Class debate/discussions will help students develop considerable expertise on a topic while simultaneously providing a deeper appreciation

for the intricacies, controversies and uncertainties that plague the field of conservation biology. During class, we will foster a 'debate/discussion' posed each of the fundamental questions of the course. All students will participate in the debate discussion. Current debate topics include the following (although alternatives might be suggested):

- Should we renew the Endangered Species Act or propose a different conservation strategy?
- To curb extinction rates, do we pay more attention to contemporary processes (habitat fragmentation, overharvest, invasive species) or longer-term global issues (climate change)?
- Do we have the science necessary for making de-extinction a reality?
- Where do we invest our funding (short-term) or (long-term) and how do we convince others to invest as well?



For three of the four debates, students will work in pairs to prepare materials for support of either side of the argument. The actual assignment of students the 'pro' or 'con' side will only occur the night before the debate. Such action represents an strategic design embedded with intentionality to prompt students to then prioritize their arguments on one side and prepare for rebuttal of the other side.

**Do not wait until the night before to prepare debate materials.**

For the other debate topic, a subset of students will serve as on a "panel of judges" for the debate and decide which side made the most persuasive arguments. Each judge will be responsible for preparing one question to ask the 'pro' and 'con' teams.

Each debate/discussions will be assessed based on:

- Written preparation of talking points for both slides **10 pts**
  - Students will turn in their written preparation notes
  - Although emphasizing the side on which the student gets assigned, talking points includes information about both sides of the issue
- Strength of argument supported by evidence-based points **10 pts**
  - Points made by students reference sources and connect to course materials (takes into consideration source list from written notes)

- Points lend support to student's 'side' of the argument (as evidenced by judges contributing "dollars" for every quality point made).
- Engagement in debate process **5 pts**
  - Respectful participation that acknowledges the right to speak when recognized, does not interrupt other students, follows the dynamic of the discussion even if providing limited spoken contributions.

**4. Primary Literature Group (4)** – We will follow up our class discussions of habitat fragmentation (A), overharvesting (B), invasive species (C) and climate change, (D) with a primary literature paper analysis. Each group should submit three options for discussion with justification for each choice at least one week prior to presentation (send PDFs complete with email justifying choices and including citations for papers). Dr. Burks will make the decision as to which paper the class discusses.

All choices: 1) must be experimental (or a collection and analysis of long-term data); 2) have been published in the last 5 years (2010-2016); 3) come from a journal dedicated to conservation biology; and 4) relate to the topic from the previous class period.

The group will then lead the class through the primary literature paper. This does not mean summarize or give away all of the answers. Instead, it means setting the stage to ask questions of peers (a subset of whom will have read the paper closely and the remainder of which will bring questions to class) to foster a critical analysis of the paper. To prepare adequately, the group should:

- Search for papers together or at least all contribute options
- Read the paper together after each person has first read it independently
- Dissect the strengths and weaknesses of each section of the paper
- Consider the implications of the work
- Provide a PowerPoint that includes the figures subject to discussion and includes the main points. Only show the PP slides at the end as ways to summarize take away points.
- Come to class with a number of big questions that members of the group can use to foster discussion. Some "standard" questions can include:
  - **Abstract:** How well did the abstract describe the study? How could it be improved?
  - **Intro:** Describe how the background provided by the authors set up the need for the research.
  - **Intro:** What did you identify as the study's main objective?
  - **Methods:** What limitations did the study face or acknowledge?
  - **Methods/Results:** What did the researchers measure and how did the statistical analysis explain the experimental design?
  - **Results:** How well did the study provide evidence to address the objective?

- **Discussion:** How do the results in this study compare with other work or contribute to the field of conservation biology as a whole?
- **Figure:** Identify the most important figure and assess its effectiveness in providing the key results.

Groups will be assessed on (same group per each group member):

- Timeliness & quality of primary literature options **10 pts**
  - Includes search strategies and info on consensus building
- Preparedness for discussion **15 pts**
  - Includes attention to detail, ability to respond to questions
- Team-based work **10 pts**
  - Demonstrated by equitable distribution of workload and participation and ability to sustain discussion
- Summary PowerPoint presentation **5 pts**
  - Evident by effective use as a summary tool versus crutch
- 1-page reading guide **10 pts**
  - Includes citation, abstract evaluation, research question, summary of experimental design, key figure, result synopsis, strengths and weaknesses and a statement about the implications of the study.

**5. Primary Literature Abstract and Analysis** – In addition to being part of a group that presents a primary literature paper, each student (or pair if desired; in this case, both student receive the same grade) will complete one primary literature abstract and analysis on another topic.

**A quality abstract has the following parts:**

1. Context to the work
2. Objective and/or questions that authors investigated
3. The briefest and key details of methods
4. The most important results
5. The implications of the work

What to do:

1. **Sign up for a topic** [different from the group choice] on Moodle.
2. **Download the paper** to analyze on the topic that you chose
3. Immediately **COVER UP THE TITLE AND “ABSTRACT or SUMMARY”**
4. **Read the paper carefully.**
  - a. **Take notes** on two halves of a piece of paper (or two notebook pages). On one side (left), summarize the important elements of the paper in your own words. On the other side (right), note connections that you make to the work/paper, strengths and weaknesses and questions that you have.
  - b. Then **write an abstract** as if you conducted the study. In other words, write what you think should be in the abstract from the paper.

5. **Next, edit, add or refine information** in the abstract until you reach approximately 250 words. Actual statistics usually do not appear in abstracts; include significant results but stick to trends.
6. After completing the abstract, **propose an engaging title** with justification.
7. After writing an abstract and proposing a title, briefly **compare and contrast** (similarities and differences) what you included in the abstract and title versus the actual authors. Identify areas in which your abstract may have contributed something missing in the authors' abstract as well as places in which the authors did a better job making a particular point than the student abstract.
8. At the end of your abstract analysis, **provide these three things**:
  - a. 3 strengths and weaknesses of the study
  - b. The complete citation in proper form
  - c. A quality question for discussion

Groups will be assessed on (same group per each group member):

- Abstract quality **15 pts**
  - Engaging and follows hour-glass form
  - Context present at beginning and end
  - Sufficient depth in presentation of results
- Compare and Contrast **15 pts**
  - Similarities and differences in abstract content or emphasis
  - Strengths compared to author's efforts
  - Weaknesses compared to author's effort
- Follow-up materials **10 pts**
  - Quality strengths and weaknesses, citations and question
- Writing quality **10 pts**
  - Free from grammatical errors; active voice

**6. Value Project** – Any number of reasons exist to value biodiversity but the impetus to enact change often depends on personal values, interests and priorities. As a means of pushing you to think creatively (the field of conservation biology will depend on creative solutions in the future), the form of value projects will remain pretty wide open [persuasive essay, panel discussion, informative educational flyer, art piece, social media campaign, video, etc...] but must address the question “Why Care about X” in terms of biodiversity in an engaging and informative way that utilizes evidence-based sources and a philosophical approach. Although a focus on vertebrates can be made, avoid common causes (i.e. no pandas, rhinos or spotted owls) and consider thinking more broadly in terms of species diversity. Students may complete their projects alone or do a project in a small group.

For one excellent example of a creative “value” project, watch this video:

<https://www.youtube.com/watch?v=Vsv52MTKe5Y>



Our goal will be to present these projects together at the Creative Works Symposium on Tuesday, April 12<sup>th</sup>. All students will propose **an idea (5 pts)** on which they will receive feedback and approval, write an **abstract (250 words)** outlining their projects (**10 pts**) and then create a finished product for **presentation (25 pts)** accompanied with a post **reflection** that outlines the intention and perceived success of the project (**10 pts**). Only projects meeting a certain standard of quality will be approved for inclusion in the CWS.

**7. Success Stories** – Studying Conservation Biology as a discipline could become a tad depressing. To combat that feeling, we will start out several weeks (Mondays) with success stories. As pairs, students will present a “success story” in conservation biology to the class that [ideally] relates to the topic of the day. The qualifications for deeming the story a “success” should be identified (de-listing, reached set population size, raised X amount of money, etc...) as well as the elements that fostered the success (planning, awareness, legislature, etc...). Success stories will be scored on a scale from inspiring/aspirational (25 pts) to promising/promotes positive feelings (20 pts) to only slightly encouraging (15 pts).

For an example of a success story, see this article:

<http://www.smartbrief.com/s/2016/01/scientists-stop-deadly-fungus-majorcan-midwife-toads>.

## **POLICIES:**

### **OPEN RESPECTFUL COMMUNICATION**

Students are expected to discuss questions and areas of concern with me.

### **EMAIL**

I will frequently email to remind you of deadlines or to clarify points from a lecture. Please check your e- mail daily. You may also receive emails from Moodle.

**LATE POLICY:** Due to the discussion nature of the class, a provision to accept late work does not provide a fair learning environment for students. Students must complete assignments before covering the material in class. At most, reading guides and primary literature abstract analyses will not be accepted ½ hr. past class time.

**WORKLOAD/ENGAGEMENT/ADVICE FOR SUCCESS:** To do well in Conservation Biology, students will likely need to spend an average of 10-11 hours per week attending class (2.67 hours) and reading and preparing for classroom discussion and activities (+8 = 2.67 in class x 3 hrs out of class). Preparing for debates and primary literature presentations may take additional time. I expect students in Conservation Biology to actively engage with the material.

Due to the integrated nature of the material, the reading expectations of this class may be described as heavy. In most cases, the ‘heavier’ readings days and debates will be

Mondays, providing more time to access the material. Wednesdays will usually be reserved for supplemental resources.

**ATTENDANCE:** Always come to class unless ill or due to a University-sanctioned event.

**PARTICIPATION:** Regular class participation is the default circumstance for students in upper level Biology courses. Class participation involves discussing primary literature, posing questions about class materials, following thru exercises and working well in groups.

- **Outstanding** = Particularly noteworthy class participation will grant you a 1% benefit of the doubt at final grade time. In other words, an 89% B+ would end up as a 90% A-.
- **Acceptable** = Regular class participation assures course standing (no change)
- **Below Average** = Less than frequent class participation/poor attendance (i.e. 2 unexcused absences) lowers your grade by 1/2 letter (i.e. B+ = B)
- Unacceptable Number of unexcused absences (> 3) or extreme lack of participation will result in course failure. I will notify you of your status half way through the course (in case improvement is needed).

If you are curious at any other time, just ask. Please note that 2 accounts of being late = 1 unexcused absence. Please be on time.

**WRITING EXPECTATIONS:** Write all formal submitted assignments **in active voice**. For all work, take into consideration advice from the Biology Department's Writing Guide: <http://www.southwestern.edu/live/files/4637-biology-department-writing-guide>

For citations, apply format from Conservation Biology & Ecology (see Burks Citation Guide 2015)

- **SINGLE AUTHOR**

Gosner, K. L. 1960. A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica* 16:183-190. **In-text citation:** Gosner (1960) **Or** (Gosner 1960).

- **TWO AUTHORS**

Barron, J. N., and G. M. Andraso. 2001. The influence of fall foraging success on follicle number in the northern water snake, *Nerodia sipedon*. *Journal of Herpetology* 35:504-507. **In-text citation:** (Barron and Andraso 2001) **or** Barron and Andraso (2001) argued...

- **MULTIPLE AUTHORS**

Martins, E. P., A. Bissell, and K. Morgan. 1998. Population differences in a lizard communicative display: evidence for rapid change in structure and function. *Animal Behaviour* 56:1113-1119. **In-text citation:** (Martins et al. 1998) **or** Martins et al. (1998) examined...

For an additional resource on how to cite correctly, watch this ProfRomi video:

<https://www.youtube.com/watch?v=EOgpKhdQW9c>

### **COURSE MANAGEMENT SYSTEM:**

Moodle represents the learning management system used by Southwestern. This web-based, open source program will be instrumental to this class. You sign into Moodle with your regular su-ID and password either through the SU-Portal or at the website: [lms.southwestern.edu](https://lms.southwestern.edu). This interactive system will enable you to:

- Download files (primary literature, assignment instructions/rubrics, etc...)
- Keep track of your grades
- Submit assignment and get on-line feedback
- Keep a calendar and view each week and the upcoming activities and/or assignments
- Communicate with your peers

### **IMPORTANT DATES**

- **1/18 – MLK day; no class**
- **2/15 -- drop without record**
- **3/14 and 3/16 – Spring Break – no class**
- **3/28 -- drop with a "W"**
- **4/6 – Wednesday, no class --- PBK Speaker accommodation**
- **4/8 – Friday – CLASS**
- **4/12 – Tuesday, Creative Works**
- **4/27 – Wednesday, Last Day of Classes; All work due**
- **5/2 – Monday, 1:30 – 4:30 Final Exam Due**

### **HONOR CODE**

All course work is to be done independently unless otherwise noted. You should type in the Honor Code on electronic assignments or fill out the questions on quiz items. Please write out and sign the honor pledge IN FULL according to the following:

*I have acted with honesty and integrity in producing  
this work and am unaware of anyone who has not.*

If you are unclear on the concept of plagiarism or cannot sign the honor code in good faith, please see Dr. Burks immediately. When in doubt, paraphrase and cite using Name and Year methods (Burks 2003). Any perceived impropriety will be discussed with the student and then the appropriate action pursued.

**ACCOMMODATIONS** - Southwestern University will make reasonable accommodations for persons with documents disabilities. Students should provide documentation and

schedule an appointment with Jennifer Smul ([smulj@southwestern.edu](mailto:smulj@southwestern.edu)) with the Office of Student Success.

**FACEBOOK** - I'm happy to be "A Friend" with SU students with the knowledge that I am a faculty member at Southwestern first. I will not ask students to be Friends because I do not want to exert inappropriate pressure. As a "friend" and professor, I have a vested interest in students and an obligation to the University to take any concerns that catch my attention seriously. I'm not in the habit of checking up on students but I cannot help but read updates when posted. So, if there were something posted in an update that spoke to a personal concern or threat to any other student, then I feel obligated to follow up on the post. In what I hope to be rare instances, my follow-up actions may take the form of a message from me or a call by me to appropriate University personnel better equipped to handle dramatic situations. I think it important that you know this ahead of time. My Profile page serves as an all-inclusive insight into my life for my friends, family and some students. I do not post anything there that I am not willing to publicly share (this is good advice). If you are happy with this "condition," then great. If it makes you at all uncomfortable, then feel free to Defriend - will not take it personally at all.

**CELL PHONES** - Please turn all cell phones to SILENT/VIBRATE during class. You should not be actively texting or e-mailing in class. In the case that you need to be in contact with another party (family emergency, etc...), then quietly and unobtrusively leave the room to respond to a call if received. Violation of such policy will reduce your participation score in class.

**LAPTOP COMPUTERS** - If such activity enriches your material retention, feel free to take notes during class on a laptop computer. In some classes, we will utilize laptops in class for interactive exercises. At all times, your focus should be on the class activity and not on alternative activities (i.e. Facebook, e-mail, etc...). Violation of such policy will lower course grade by 3% per incident.

**Tentative Schedule**

Date	Wk	Topic	Read	Activities	
<b>What do we want to conserve?</b>					
M 1/11	1	Intro to Con Bio			
W 1/13		Historical Context	1; 14.1-2	Timeline	
M 1/18	2	<b>MLK – No class</b>			
W 1/20		Defining Biodiversity	2	Debate 1 Prep	
M 1/25	3	Ecosystems Services	3		
W 1/27		Endangered Species	12	Success Story	
M 2/1	4	<b>Debate/Disc #1: Policy</b>			
<b>What threatens what we need to conserve?</b>					
W 2/3		Book Club Discussion		Value Ideas	
M 2/8	5	Habitat Fragmentation	4, 5	Success Story	
W 2/10		Primary Literature A			
M 2/15	6	Overharvesting	6	Success Story	
W 2/17		Primary Literature B			
M 2/22	7	Invasive Species	7	Success Story	
W 2/24		Primary Literature C		Debate 2 Prep	
M 2/29	8	Climate Change	8	Success Story	
W 3/2		Primary Literature D			
M 3/7	9	<b>Debate/Disc #2: Priorities</b>			
W 3/9		Exam Review			
3/14-16	10	<b>Spring Break</b>			
M 3/21	11	Mid-term Exam			
<b>What do we need to enact conservation plans?</b>					
W 3/23		Conservation Planning	11		
M 3/28	12	Human-modified Landscapes	12	Success Story	
W 3/30		Extinctions	10	Debate 3 Prep	
M 4/4	13	Conservation Science/Genetics		Success Story	
W 4/6		<b>No Class</b>		Value Projects	
F 4/8		<b>Special Class: PBK</b>			
M 4/11	14	<b>Debate/Disc #3: De-Extinction</b>			
<b>Why do we want to conserve?</b>					
W 4/13		Ecological Economics and Value	14	Debate 4 Prep	
M 4/18	15	Conservation in Anthropocene	13	Success Story	
W 4/20		Zoos, Wildlife Parks & Refuges			
M 4/25	16	<b>Debate #4: Strategies</b>			
W 4/27		Exam Review/Course Evaluations			
M 5/2	E	Final Exam			