

**Instructor:** Dr. Katy Greenwald (7-3266; katherine.greenwald@emich.edu)

**Organizational details:** CRN 13599 (BIO 417) and 15287 (BIO 517). Class occurs M/W 2:00 PM–4:50 PM in 111 Mark Jefferson Science Complex. Office hours are Tuesday 10:00 AM – 12:00 PM and by appointment in Mark Jefferson 401-N.

**Catalog description:** This course uses lecture, discussion, and off-campus field work to introduce foundational concepts in Conservation Biology. Topics include key threats to biodiversity loss (e.g., habitat fragmentation, overharvesting, invasive species), methods to assess and ameliorate loss, and practical or ethical impediments to conservation efforts.

**Course Goals:** The major goals of the course are for students to gain both academic and applied understanding of (a) the key threats to biodiversity conservation; (b) analytical methods used to assess biodiversity loss; (c) proposed solutions to ameliorate these losses; and (d) roadblocks (practical and ethical) facing potential implementation of these solutions. These goals will be met both through traditional classroom time (participatory lectures, discussion/debate of scientific literature) and through the Academic Service-Learning project outlined below.

**Academic Service-Learning** is a method of teaching and learning that integrates academic instruction and community service. In this course, students will participate in some aspect of conservation-related work with a local community partner (e.g., biodiversity surveys, data processing, education and outreach efforts). AS-L aims to be *reciprocal*. That is, the community partner benefits by having an authentic and self-identified need met, while the student benefits by obtaining hands-on experience to enhance the “book knowledge” of a typical lecture course. This method allows students to gain a deeper understanding of course material and its real-world applicability outside of the college campus.

Example AS-L projects are listed in the table below. These are only provided as examples; *specific projects will depend on the needs of the community partners at the time the course is offered.*

Example AS-L Project	Potential Community Partner
Conduct biodiversity surveys or water quality tests above and below dams targeted for removal	Huron River Watershed Council
Quantify, map, or remove invasive species and document response of ecological community	Ann Arbor Natural Areas Preservation
Conduct research on captive care and create educational signage for native species exhibits	Leslie Science and Nature Center

**Course Schedule**

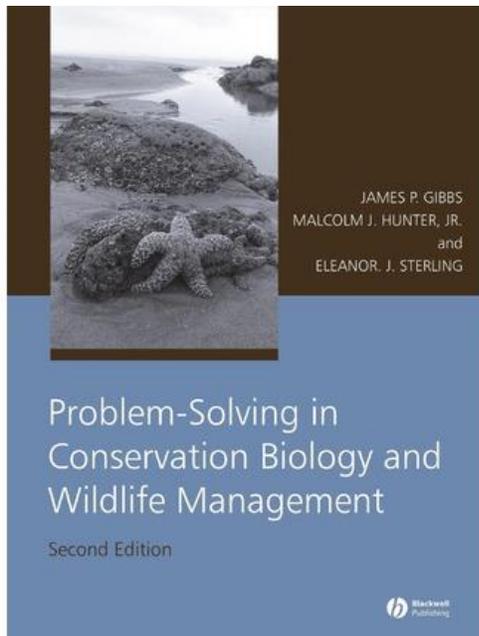
Date	Due	Topic	Reading <sup>1</sup>
4-Sep		Introduction to Conservation Biology (Ch 1) <sup>2</sup>	RS 1
9-Sep	AS-L Log 1	Biodiversity and ecosystem function (Ch 2, 3)	RS 2
11-Sep		<i>AS-L Project time</i>	
16-Sep	Quiz 1	Habitat loss, fragmentation and landscape change (Ch 4, 5)	RS 3
18-Sep		<i>AS-L Project time</i>	
23-Sep	AS-L Log 2	Overexploitation (Ch 6)	RS 4
25-Sep		<i>AS-L Project time</i>	
30-Sep	Quiz 2	Invasive species (Ch 7)	RS 5
2-Oct		<i>AS-L Project time</i>	
7-Oct	AS-L Log 3	Pollution and disease	RS 6
9-Oct		<b>Exam 1</b>	
14-Oct		Conservation genetics	RS 7
16-Oct		<i>AS-L Project time</i>	
21-Oct	AS-L Log 4	Population viability analysis (Ch 16)	RS 8
23-Oct		<i>AS-L Project time</i>	
28-Oct	Quiz 3	Conservation planning and priorities 1 (Ch 11)	RS 9
30-Oct		Conservation planning and priorities 2 (Ch 11)	RS 10
4-Nov	AS-L Log 5	Global change (Ch 8)	RS 11
6-Nov		<i>AS-L Project time</i>	
11-Nov	Quiz 4	Estimating & Preventing extinctions (Ch 10)	RS 12
13-Nov		<i>AS-L Project time</i>	
18-Nov	AS-L Log 6	<b>Exam 2</b>	
20-Nov		<i>AS-L Project time</i>	
25-Nov		Policy & advocacy (Ch 12, 13)	RS 13
27-Nov		<b>***NO CLASS--THANKSGIVING BREAK***</b>	
2-Dec	AS-L Log 7	Ethics, Consumption, Reconciliation (Ch 14, 15)	RS 14
4-Dec		Ethics, Consumption, Reconciliation (Ch 14, 15)	RS 15
9-Dec	Quiz 5	<i>AS-L Project time</i>	
11-Dec	AS-L Log 8	<b>AS-L Presentations</b>	
16-Dec		<b>Final Exam (1:30-3:00 PM)</b>	

<sup>1</sup>Primary literature Reading Sets available on Canvas (see next page for more info).

<sup>2</sup>Relevant chapters in the recommended textbook; not required but provided for those seeking additional information (see next page for more info).

***Schedule is subject to change. If a class is canceled due to weather or other events, content may be rescheduled for an AS-L Project time day.***

**Required textbook:** Problem-Solving in Conservation Biology and Wildlife Management, Gibbs, Hunter and Sterling. Second Edition. Please bring to class daily for in-class activities, or bring a laptop on which you can access the electronic version ([linked here](#) and on Canvas).



**Required primary literature Reading Sets (RS 1-15; listed on pages 6-7)** are available on **Canvas**, and will form the basis for in-class discussions. Additional readings may be assigned as the semester progresses.

**Recommended textbook:** Conservation Biology for All, Navjot S. Sodhi and Paul R. Ehrlich, eds. Chapters are provided for reference to supplement lecture material, but are not required reading. This text is available on **Canvas** and for free in its entirety at: <http://www.conbio.org/publications/consbioforall/>

**Grading Procedures and Course Policies**

AS-L Project log (8 @ 10 pts each)*	80 pts
AS-L Final report	100 pts
AS-L Group Presentation	40 pts
Quizzes (5 @ 20 pts each)	100 pts
Midterm 1	60 pts
Midterm 2	60 pts
Final	100 pts
Participation	60 pts
GRAD ONLY: 3 annotated bibliographies**	60 pts

**TOTAL UG 600 / Grad 660**

*\*See pages 4-5 for more information on the AS-L course components.*

*\*\*See page 5 for additional responsibilities of graduate students.*

Percentage	Grade
93-100%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
63-66%	D
60-62%	D-
<60%	F

**AS-L Course Components: Project Log (8 @ 10 pts each)**

**Critical reflection** is a central component of AS-L learning, as hands-on experiences are not transparent (i.e., there is often no “right answer”). The value you get from AS-L involvement will come in part through direct participation, and in part through your own thinking about the project and synthesis of your experiences. Toward this end, you will keep an **AS-L Project Log** (submitted to Canvas), in which you should document important events in the **planning, development, and execution** of the project. Each entry should also include a **reflection** component. Reflections can (and should!) vary widely based on individual circumstances, but may include components such as:

- Analysis of your experiences within the broader context of course material and readings
- Challenging misconceptions you had about the course/project prior to beginning
- Comparing different/conflicting perspectives regarding approaches to conservation
- Reflecting on the value of your contribution to the community partner, ecological community, etc.

An entry is due **by the start of class** (and not more than 3 days early) as follows:

**Entry 1 (9/9):** Describe your expectations, assumptions, and/or concerns regarding the AS-L project. Generate at least three specific learning outcomes for yourself, and briefly outline how you plan to achieve them.

**Entry 2 (9/23):** Present a specific plan for your AS-L project. What is/are the goal(s) of the project and how will you accomplish them? What roadblocks do you anticipate, and what might be possible solutions? Please be sure to include a timeline with progress milestones.

**Entries 3-7 (10/7 to 12/2):** *What? So what? Now what?*

*What?* What did you accomplish since the last log entry? Meetings, plans, data collection, etc.?

*So what?* How does this advance your project and help achieve your community partner’s goals?

*Now what?* What are the next steps? What are your goals for the next two weeks?

**Entry 8 (12/11):** How did it all turn out? Assess achievement of the learning outcomes you generated for Entry 1. Feel free to discuss your feelings about the project, its connection to future career goals, and/or other “take-aways” from your participation in the AS-L project. Don’t just reiterate the results of your project, as these will be included in the Final Report.

Each day an entry is due, we will begin class with roundtable project updates during which you will share these responses in an informal discussion. This will allow us all to stay on track, keep up with each other’s projects, and provide input and suggestions to each other.

*Project log grading scale:*

0:	No entry submitted
5:	Entry did not provide sufficient detail/reflection
10:	Thoughtful entry with sufficient detail and reflection

**AS-L Course Components: Final Report (100 pts)**

**Final Reports** will vary based on the projects undertaken, but in general should be written in traditional scientific format (Introduction, Methods, Results, Discussion). I will provide more information and guidelines on an individual basis as the semester progresses, and a grading rubric is available on Canvas. Final Reports may be written individually or by the entire group.

The Introduction of your **Final Report** will consist of a literature review referencing (and properly citing) **primary literature** to provide background and context for your project. A wise advisor once told me: “**Your Introduction need only be 4-6 REALLY GOOD paragraphs.**” How do you get there? You should think about the type of background material needed to address your question of interest **before** you dive into the literature. I do this by breaking up background research into content areas before even beginning a literature search.

Let’s say I wanted to write a paper on conservation genetics of salamanders in fragmented landscapes (I may in fact have written such a paper). My Introduction might consist of four topics: (a) general discussion of amphibian conservation; (b) habitat fragmentation and the effects it has on populations; (c) how genetic methods are used to assess population isolation; (d) results from other studies using similar methods in related taxa. You see how these topics go from broad to specific? This is one good way to frame your study in the Introduction. You are giving the reader enough information to understand the context and the need for your study, without bogging them down in unnecessary details (e.g., I didn’t include a paragraph on effects of pesticides on amphibians; while an important topic, it is not pertinent to my study). When I start writing an Introduction, I find it helpful to actually **title each paragraph** like I did in (a) through (d) above to keep me on track.

**AS-L Course Components: Group Presentation (50 pts)**

Your AS-L group will prepare a 15-20 minute oral presentation for the last week of class describing the project objectives, methods, outcomes, roadblocks, etc. The goals of the presentation are for you to cultivate and practice public speaking skills, while also learning to work as part of a team in the distillation and dissemination of scientific knowledge to your classmates and community partners. I will provide more information and guidelines on an individual basis as the semester progresses, and a grading rubric is available on Canvas.

**NOTE TO GRADUATE STUDENTS:** Graduate students enrolled in the course will prepare three Annotated Bibliographies. You will sign up for 3 topics from the course schedule, carefully read the assigned papers, and then find and summarize 4 additional related papers for each topic. Detailed guidelines for this assignment may be found on Canvas. Bibliographies are due the day of the topic discussion. Each will be scored for a maximum of 20 points (3 x 20 = 60 pts total).

**Primary Literature Reading Sets (pdfs available on Canvas):****RS 1.**

- Living Planet Report, 2012.
- Useless Creatures:  
<http://mobile.nytimes.com/blogs/opinionator/2014/09/13/useless-creatures/?smid=pl-share>

**RS 2.**

- Mace, G. et al. 2012. Biodiversity and ecosystem services: a multilayered relationship. *Trends in Ecology and Evolution* 27: 19-26.
- Naeem, S. et al. 1999. Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes. Ecological Society of America *Issues in Ecology* 4. (SKIM)
- “Wardle versus Naeem” response and counter-response in the ESA Bulletin, 2000. (SKIM)
- Loreau, M. et al. 2001. Biodiversity and Ecosystem Functioning: Current Knowledge and Future Challenges. *Science* 294: 804-808. (SKIM)

**RS 3.**

- Fischer, J. and D. B. Lindenmeyer. 2007. Landscape modification and habitat fragmentation: a synthesis. *Global Ecology and Biogeography* 16: 265-280.
- Krauss, J. et al. 2010. Habitat fragmentation causes immediate and time-delayed biodiversity loss at different trophic levels. *Ecology Letters* 13: 597-605.

**RS 4.**

- Hardin, G. 1968. The tragedy of the commons. *Science* 162: 1243-1248.
- Berkes, F. et al. 1989. The benefit of the commons. *Nature* 340: 91-93.
- Rowcliffe, J. M. et al. 2005. Do bushmeat consumers have other fish to fry? *Trends in Ecology and Evolution* 20: 274-276.

**RS 5.**

- Rodrigues, A. S. L. et al. 2006. The value of the IUCN Red List for conservation. *Trends in Ecology and Evolution*, 21, 71-76.
- Gurevitch, J. and D. K. Padilla. 2004. Are invasive species a major cause of extinctions? *Trends in Ecology and Evolution* 19: 470-474.
- Clavero, M. and E. Garcia-Berthou. 2005. Invasive species are a leading cause of animal extinctions. *Trends in Ecology and Evolution* 20: 110.

**RS 6.**

- Daszak, P. et al. 2000. Emerging infectious diseases of wildlife: threats to biodiversity and human health. *Science* 287: 443-449.
- Eriksen, M. et al. 2013. Microplastic pollution in the surface waters of the Laurentian Great Lakes. *Marine Pollution Bulletin* 77: 177-182.

**RS 7.**

- Allendorf, F. 2017. Genetics and the conservation of natural populations: allozymes to genomes. *Molecular Ecology* 26: 420-430.
- Baker, C. S. 2010. Genetic evidence of illegal trade in protected whales links Japan with the US and South Korea. *Biology Letters* 6: 647-650.

**RS 8.**

- Taylor, B. L. 1995. The Reliability of Using Population Viability Analysis for Risk Classification of Species. *Conservation Biology* 9: 551-558.
- Brook, B. W. et al. 2000. Predictive accuracy of population viability analysis in conservation biology. *Nature* 404: 385-387.

**RS 9.**

- Margules, C. R. and R. L. Pressey. 2000. Systematic conservation planning. *Nature* 405: 243-253.

**RS 10.**

- Myers, N. et al. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 853-858.
- Wilson, K. A. et al. 2016. Conservation research is not happening where it is most needed. *PLoS Biology* 14: e1002413.

**RS 11.**

- Sheffers, B. R. et al. 2016. The broad footprint of climate change from genes to biomes to people. *Science* 354: 719-730.
- Building an ark for the Anthropocene:  
<http://www.nytimes.com/2014/09/28/sunday-review/building-an-ark-for-the-anthropocene.html>

**RS 12.**

- Pimm, S. L. and C. Jenkins. 2005. Sustaining the variety of Life. *Scientific American*, September, 66–73.
- Pimm, S. L. et al. 2014. The biodiversity of species and their rates of extinction, distribution, and protection. *Science*, 344: 987.

**RS 13.**

- Nelson, M. P. and J. A. Vucetich. 2009. On advocacy by environmental scientists: What, whether, why, and how. *Conservation Biology* 23: 1090-1101.
- Parsons, E. C. M. 2013. So you want to be a Jedi? Advice for conservation researchers wanting to advocate for their findings. *Journal of Environmental Studies Science* 3: 340-342.
- New Yorker article on Tyrone Hayes:  
[http://www.newyorker.com/reporting/2014/02/10/140210fa\\_fact\\_aviv?currentPage=all](http://www.newyorker.com/reporting/2014/02/10/140210fa_fact_aviv?currentPage=all)
- Scientific American commentary by Karen Lips:  
<http://blogs.scientificamerican.com/guest-blog/what-if-there-is-no-happy-ending-science-communication-as-a-path-to-change/>

**RS 14.**

- Myers, N. 1998. Lifting the veil on perverse subsidies. *Nature* 392: 327-328.
- James, A. N. et al. 1999. Balancing the earth's accounts. *Nature* 401: 323-324.
- Adams, W. M. et al. 2004. Biodiversity conservation and the eradication of poverty. *Science* 306: 1146-1149.

**RS 15.**

- Bennett, E. M. et al. 2016. Bright spots: Seeds of a good Anthropocene. *Frontiers in Ecology and the Environment* 14: 441-448.
- Machinova, B. et al. 2015. Biodiversity conservation: The key is reducing meat consumption. *Science of the Total Environment* 536: 419-431.

**Course Policies:**

**Policy on late assignments and attendance:** Late project log entries will receive a maximum grade of 5 points. For all other graded items, there is a 10%/day deduction for late assignments. Quizzes and exams may only be made up with a valid, documented excuse (e.g., medical issue, family emergency). You may miss one lab activity with no penalty to your participation grade; further unexcused absences will result in deductions.

**Statement on disability:** I will gladly work with any student who may need accommodations for the effects of an appropriately documented disability. Please contact me to discuss specific needs. For support services, please contact the Students with Disabilities Office (734-487-2470; <http://www.emich.edu/drc/>).

**Statement on diversity:** In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. In this class, we will make an effort to read papers from a diverse group of scientists, but limits still exist on this diversity. I acknowledge that it is possible that there may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science. I would like to discuss issues of diversity in Conservation Biology as part of the course from time to time. Please contact me (in person or electronically) or submit anonymous feedback if you have any suggestions to improve the quality of the course materials.

Furthermore, I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.). To help accomplish this:

If you have a name and/or set of pronouns that differ from those that appear in your official records, please let me know!

If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. Remember that you can also submit anonymous feedback (which may lead to me making a general announcement to the class, if necessary to address your concerns).

If you prefer to speak with someone outside of the course, the Department of Diversity and Community Involvement (734-487-3118; <https://www.emich.edu/dci/>) is an excellent resource.

I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option.)

As a participant in course discussions, you should also strive to honor the diversity of your classmates.

**Statement on academic integrity:** The University's Code of Student Conduct outlines three examples of academic misconduct: cheating, falsification, and plagiarism. **Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct.** You will find that this course offers ample opportunity for collaboration and that joint efforts will often be encouraged. However, certain assignments will require that you do your OWN work. If you have any question as to whether your level of cooperation with your peers (or the similarity of your work to that of others) is acceptable, you must contact me to discuss the matter BEFORE handing in the assignment. ***Academic misconduct will result in failure of the course.***

**Class schedules and policies are subject to change. Students are responsible for changes announced in class or online.** If you have read this syllabus in its entirety, please find the "Syllabus" assignment on Canvas, and upload a picture of your favorite living organism. If you do this before the start of our first class, you'll earn 3 bonus points.

In addition to the articulated course specific policies and expectations, students are responsible for understanding all applicable University guidelines, policies, and procedures. The EMU Student Handbook is the primary resource provided to students to ensure that they have access to all university policies, support resources, and student's rights and responsibilities. Changes may be made to the EMU Student Handbook whenever necessary, and shall be effective immediately, and/or as of the date on which a policy is formally adopted, and/or on the date specified in the amendment. Please note: Electing not to access the link provided below does not absolve a student of responsibility. For questions about any university policy, procedure, practice, or resource, please contact the Office of the Ombuds: 248 Student Center, [734.487.0074](tel:734.487.0074), [emu\\_ombuds@emich.edu](mailto:emu_ombuds@emich.edu), or visit the website: [www.emich.edu/ombuds](http://www.emich.edu/ombuds)