

Herpetology (BIO 484/584) Syllabus

Instructor: Dr. Katherine (Katy) Greenwald (email: katherine.greenwald@emich.edu)

Course description: Taxonomy, distribution, life histories, behavior and ecology of amphibians and reptiles with an emphasis on local species.

Organizational details: The class meets **ALL DAY** (8 a.m. to 5 p.m. plus occasional evening field trips) Thursday, Friday and Saturday every second week, as follows:

Session 1: May 14-16 – EMU Fish Lake facility (Lapeer, MI)

Session 2: May 28-30 – OSU Stone Lab facility (Gibraltar Island, OH)

Session 3: June 4-6 – EMU Fish Lake facility (Lapeer, MI)

A van will be available for transportation from Ypsilanti for all sessions.

Course Goals: Students will get an in-depth experience in field herpetology and research, with heavy emphasis on the reptiles and amphibians found in the Great Lakes region. The class will cover the biology, life histories and taxonomy of Michigan's herpetological fauna. Students will be exposed to several different types of current data collection techniques including sampling methodology, mark-recapture and tissue sampling. Additionally, students will have the opportunity to meet and work with experts in the field. Daily field trips are planned to both Michigan and Ohio study sites. Students should be prepared for an exciting and intense hands-on experience in field collection, monitoring and surveying techniques, field identification and taxonomy, and conservation strategies used in herpetology.

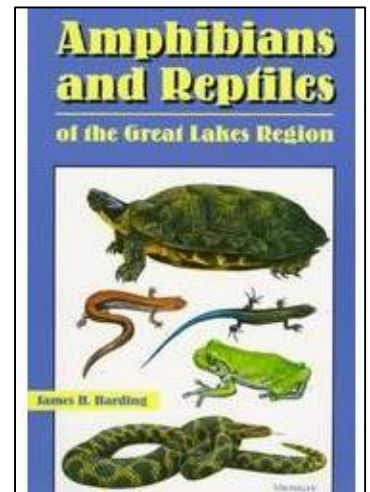
Please note! This is a FIELD COURSE. This means it is A LOT of fun, but that you will be outside almost all day. You **WILL** get dirty and wet, you **WILL** encounter insects and other invertebrates, and you **WILL** most likely get bit/slimed/musked/pooped/barfed on. If this does not seem manageable, please reconsider your enrollment in this course!

Required Text: [Amphibians and Reptiles of the Great Lakes Region](#)
James H. Harding; University of Michigan Press (1997)

Also recommended: [Reptiles and Amphibians](#), Conant and Collins; Peterson Field Guide (1998)
[Herpetology](#), Vitt and Caldwell; Elsevier Inc. (2009)
James H. Harding's other books (Michigan Snakes, Michigan amphibians, etc.)

Other supplies: Field Notebook (I recommend Rite-in-the-rain); pencils and pens
Hiking boots, waterproof boots/shoes/sandals (like Keens) if you have them
Appropriate field clothes (**you will get dirty!**)
Sunscreen, insect repellent, hat, camera, water and snacks

See page 3 for more packing and attire tips!



Field Trips and Course Schedule

Note: Activities are weather-dependent and subject to change.

Date	Time	Lecture topic	Readings	Field activity
14-May	a.m.	Evolution and Diversity (V&C 1, 3)	Harding 1997 (pp 1-35) ¹ ; Brodie 2011	Forest walk (terrestrial survey/set traps in wetlands)
	p.m.	Field techniques	Heyer 1994 (Intro, sections 2, 4, 7, 10; other pp of interest)	Bog; green frog & hylid ponds (set traps)
15-May	a.m.	Ecology (V&C 10, 12, 13)	Werner et al. 2007	Check minnow traps; tadpole/larva ID
	p.m.	Behavior (V&C 8, 9, 11)	Jaeger et al. 1993; Burghardt & Greene 1988	Hogbacks area
16-May	a.m.	Conservation (V&C 14)	Collins 2010; Gibbons et al. 2000	Project brainstorm/setup
	p.m.	Reproduction and Sexual Selection (V&C 4, 5)	Shine 1999; Welch et al. 1998	Project time
28-May	a.m.	Toledo Zoo <i>Guest: Kent Bekker</i>	Wiese & Hutchins 1994	Toledo Zoo trip
	p.m.	Resthaven Wildlife Area	King et al. 1997	Resthaven; travel to Stone Lab
29-May	a.m.	Lake Erie Watersnakes <i>Guest: Kristin Stanford</i>	King et al. 2006	LEWS, Gibraltar Island
	p.m.			LEWS, South Bass Island
30-May	a.m.	Unisexual Ambystoma	Bogart et al. 2007	Kelleys Island
	p.m.			
4-June	a.m.	Urban Conservation <i>Guests: Steven Parrish and Patrick Terry</i>	Moore & Gillingham 2006	Matthaei Botanical Gardens
	p.m.			NAP canoe turtle survey
5-June	a.m.	Hogbacks/Murphy Lake <i>Guest: Teresa Yoder</i>	Carlson & Szuch 2007	Zucker Sanctuary
	p.m.			Murphy Lake State Game Area
6-June	a.m.	Review session		Project time
	p.m.	Presentations Final exam		

¹See page 5 for complete list of reading citations. Primary literature is posted at canvas.emich.edu

Notes on Food and Attire

Unless otherwise noted, wear/bring every day:

- Long pants (thorns! bugs!) and temperature-appropriate layers
- Hiking boots or Keens/Tevas-type hiking sandals
- Pack a poncho/raincoat for every trip just in case
- Sunscreen, insect repellent, hat, camera, field notebook

Pack SNACKS and WATER every day!

More specifics on MEALS:

Date	Location	Breakfast	Lunch	Dinner
14-May	Fish Lake	Home	FL Lunch* or pack	Pack or restaurant
15-May	Fish Lake	Pack/bring	FL Lunch or pack	Pack or restaurant
16-May	Fish Lake	Pack/bring	FL Lunch or pack	Home
28-May	Toledo Zoo	Home	Pack or buy	Provided (prepaid)
29-May	Stone Lab	Provided (prepaid)	Provided (prepaid)	Provided (prepaid)
30-May	Stone Lab	Provided (prepaid)	Provided (prepaid)	Home
4-Jun	Ann Arbor sites	Home	Pack for day trip	Home
5-Jun	Murphy Lake (day trip)	Home	FL Lunch or pack	Pack or restaurant
6-Jun	Fish Lake	Pack/bring	FL Lunch or pack	Home

**Fish Lake lunch; may be purchased for \$8/day (charged to your student account on first day of class)*

More specifics on ATTIRE:

Date	Location	Attire notes
14-May	Fish Lake	See "Wear every day" notes above
15-May	Fish Lake	See "Wear every day" notes above
16-May	Fish Lake	See "Wear every day" notes above
28-May	Toledo Zoo	Be ready to get wet if it's warm out (bathing suit/shorts/Keens/etc)
29-May	Stone Lab	Be ready to get wet if it's warm out (bathing suit/shorts/Keens/etc)
30-May	Stone Lab	See "Wear every day" notes above
4-Jun	Ann Arbor sites	a.m. NO OPEN-TOED SHOES / p.m. Be ready to get wet (canoe trip)
5-Jun	Murphy Lake (day trip)	See "Wear every day" notes above
6-Jun	Fish Lake	See "Wear every day" notes above

Grading Procedures

Grades will be based on the following scheme (**total=1000 points**).

Dichotomous key (100 points): You will make a **dichotomous key** for all reptile and amphibian fauna of Michigan (see example on page 6 of this syllabus). The key is due by the **beginning** of the second session (**May 28**). A species list can be found at <http://www.michigan.gov/dnr/>

Research presentation (100 points): You will conduct a **group** research project at Fish Lake, concluding with a 10-15 minute oral presentation on the last day of class. Please be sure to provide background/rationale; description of methods, results and conclusions; and recommendations for future research and/or improvement of the study. All group members must participate!

Natural history report (200 points): Teach me something cool about a herp species! You can summarize research on several topics (e.g., ecology, behavior, anatomy/physiology), or you can take a more in-depth look at a single topic if your species is well-studied. Minimum 5 pages; must cite at least 8 primary research papers. Due to me (via email) by the end of the day **June 10**.

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

Final exam (200 points): Questions will come directly from the lectures and field presentations. Identifications (common and scientific names) may include any species seen during the course (undergraduates), or any species in Michigan (grad students).

Field Participation (400 points): This course is designed to provide you with a terrific opportunity to learn field techniques and participate in field research projects. It is the students' responsibility to take advantage of this opportunity by listening, participating when necessary and asking intelligent questions during these trips, not just at the end of the class prior to the final exam. **NOT JUST ATTENDANCE BUT GOOD PARTICIPATION IS MANDATORY TO PASS THIS CLASS.**

GRADUATE STUDENTS ONLY: Fish Lake Species Map and Herp Atlas Entries will be required as part of your field participation grade. More information on these assignments will be provided on the first day of class.

Reading List

All papers available on the class website at canvas.emich.edu

- Bogart, JP, K Bi, J Fu, DWA Noble and J Niedzwiecki. 2007. Unisexual salamanders (genus *Ambystoma*) present a new reproductive mode for eukaryotes. *Genome* 50: 119-136.
- Brodie, ED, III. 2011. Patterns, process, and the parable of the coffeepot incident: Arms races between newts and snakes from landscapes to molecules, pp. 93-119 *In* JB Losos (ed.), *In the Light of Evolution*. Roberts and Company Publishers, Greenwood Village, CO.
- Burghardt, GM and HW Greene. 1988. Predator simulation and duration of death feigning in neonate hognose snakes. *Animal Behaviour* 36: 1842-1844.
- Carlson, T and E Szuch. 2007. New (un-weathered) artificial cover objects effectively sample terrestrial salamanders in Michigan. *Herpetological Review* 38: 412-415.
- Collins, JP. 2010. Amphibian decline and extinction: What we know and what we need to learn. *Diseases of Aquatic Organisms* 92: 93-99.
- Gibbons, JW, DE Scott, TJ Ryan, et al. 2000. The global decline of reptiles, déjà vu amphibians. *BioScience* 50: 653-666.
- Harding, JH. 1997. *Amphibians and Reptiles of the Great Lakes Region*. University of Michigan Press, Ann Arbor, MI.
- Heyer, W. R., editor. 1994. *Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians*. Smithsonian Press. 364 pages.
- Jaeger, RG, D Fortune, G Hill, A. Palen and G Risher. 1993. Salamander homing behavior and territorial pheromones: Alternative hypotheses. *Journal of Herpetology* 27: 236-239.
- King, RB, MJ Oldham, WF Weller and D Wynn. 1997. Historic and current amphibian and reptile distributions in the island region of western Lake Erie. *American Midland Naturalist* 138: 153-173.
- King, RB, JM Ray, and KM Stanford. 2006. Gorging on gobies: Beneficial effects of alien prey on a threatened vertebrate. *Canadian Journal of Zoology* 84: 108-115.
- Moore, JA and JC Gillingham. 2006. Spatial ecology and multi-scale habitat selection by a threatened rattlesnake: the Eastern Massasauga (*Sistrurus catenatus catenatus*). *Copeia* 4: 742-751.
- Shine, R. 1999. Why is sex determined by nest temperature in many reptiles? *Trends in Ecology and Evolution* 14: 186-189.
- Weise, RJ and M Hutchins. 1994. The role of zoos and aquariums in amphibian and reptile conservation, p. 37-45 *In* JB Murphy, K Adler, and JT Collins (eds.), *Captive Management and Conservation of Amphibians and Reptiles*. Society for the Study of Amphibians and Reptiles, Ithaca NY. Contributions to Herpetology, volume 11.
- Welch, AM, RD Semlitsch and HC Gerhardt. 1998. Call duration as an indicator of genetic quality in male gray tree frogs. *Science* 280: 1928-1930.
- Werner, EE, DK Skelly, RA Relyea and KL Yurewicz. 2007. Amphibian species richness across environmental gradients. *Oikos* 116: 1697-1712.

Dichotomous Key Example

(Taken from: <http://www.schools.utah.gov/curr/Science/core/7thgrd/sciber7/Classify/html/TAXOKEY.HTM>)

Classification Key of Evergreen Trees in Utah

1.
 - a. Leaves scaly-like; cones are small, blue and berry-like.....go to 2
 - b. Leaves needle-like; cones are large and brown.....go to 3

2.
 - a. Leaves rough; berry-like cones are about 1 inch in diameter; trunk is forked..... Utah Juniper
 - b. Leaves smooth; berry-like cones less than 1 in.; trunk has central stem Rocky Mtn. Juniper

3.
 - a. Needles are in bundles of two or more; cone scales are woody.....go to 4
 - b. Needles are not in bundles, they are single; cone scales are papery.....go to 5

4.
 - a. Needles are about 2 inches long and twisted; cones are 1.5 inches long; trunk grows straight and tall..... Lodge pole Pine
 - b. Needles less than 2 inches long; cones 1-3 inches with large edible seeds, trunk is short and bushy..... Piñon Pine

5.
 - a. Needles are flat and blunt; not sharp to touch.....go to 6
 - b. Needles are square; stiff and sharp to touch..... Blue Spruce

6.
 - a. Needles point outward from twig; cone scales have fork-like tongue attached..... Douglas Fir
 - b. Needles bend upward from twig..... White Fir

Statement on disability: I will gladly attempt to accommodate any student who may have special needs or concerns. Any student who may need accommodations for the effects of a disability should contact me to discuss specific needs. For support services, please contact the Students with Disabilities Office (734-487-2470; <http://www.emich.edu/disabilities/index.html>).

Statement on diversity: I am committed to the goals of creating a welcoming climate for all students and promoting a shared, inclusive understanding of diversity. If you have any concerns about diversity-related issues, please contact the instructor or the Office of Diversity and Affirmative Action (734-487-1166; <http://www.emich.edu/diversity/>).

Statement on academic integrity: Academic dishonesty is defined as the attempt to secure unfair advantage for oneself or another in any academic exercise. 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. Academic misconduct will result in failure of the course.*