001-2-3092 The use of animal cognition principles in conservation

Concentrated course (1 week), 2 credits

Prerequisite: 001-2-3089 Animal behavior and conservation (highly recommended)

In a world that keeps changing at an ever-increasing rate, effective conservation work depends on our ability to not only recognize anthropogenic impacts on wildlife and ecosystems, but also to anticipate, manipulate and even reverse their effects. A mechanistic approach to conservation can provide conservation practitioners and decision makers with much needed tools that will enable them to predict wildlife population trends and devise effective conservation interventions.

Animal behavior serves as a mediator between an organism and its environment. It provides organisms with flexibility that helps organisms maintain a positive fitness over a wider range of environmental conditions. Knowledge of behavioral attributes provides, therefore, important insights into how anthropogenic disturbances can impact organisms, populations and communities, and indicate what actions can be taken to minimize these impacts. For example, researchers and managers may use their knowledge of animal behavior to understand why some animals are attracted to anthropogenic resources and to find efficient ways to prevent or even reverse this attraction to reduce human-wildlife conflict. Another example is the proactive manipulation of behavior so animals would increase the usage of conservation corridors and avoid harmful interactions with invasive predators or prey, or the risk of animal-vehicle collisions.

But what ultimately shapes behavioral patterns? Behavior is an interaction with the environment stemming from what animals **perceive, learn, remember, and decide to do**; all of which make up cognition in its widest sense. Cognitive mechanisms therefore underlie behavioral responses, and are central to our ability to understand behavior in conservation contexts and consequently, our ability to manipulate animal behavior.

Students of this concentrated course will learn the basics of animal cognition theory, and explore the various ways in which the principles of cognition theory can improve the efficacy of conservation plans and interventions. They will then apply this knowledge in the field by designing and conducting field experiments that will investigate aspects of animal cognition theory in field conservation contexts.

General course schedule:

Day 1-2: Lectures in classroom

Day 2-5: Field experiments (work in small groups), analysis of results and presentation of the results to the rest of the group.

Day 1

9:00-11:00 Introduction: the necessary role of animal cognition in explaining conservation failures and successes

11:00-13:00 Perception, attention, and concept formation

13:00-14:00 Lunch

14:00-16:00 Learning

16:00-17:00 Memory

17:00-18:00 Advanced cognitive processes (e.g., spatial cognition, communication)

Day 2

9:00-12:00 Cognitive processes and conservation, including human-wildlife conflict mitigation, conservation translocations, and invasive species management.

12:00-13:00 Overview of possible field projects

13:00-14:00 Lunch

14:00-17:00 Choosing and designing field projects

17:00-18:00 Presentations of project ideas

Day 3-5

Guided execution of field projects (including data analyses). Project results will be presented to the group at the end of day 5.

Course requirements and grade components:

Full attendance
Field project:
Oral presentation of project's results – 20%
Written assignment on project's results – 80%

Recommended reading:

- Berger-Tal O, Polak T, Oron A., Lubin Y, Kotler BP, Saltz D. 2011. Integrating animal behavior and conservation biology: a conceptual framework. *Behavioral Ecology* 22:236–39.
- Greggor AL, Clayton NS, Phalan B, Thornton A. 2014. Comparative cognition for conservationists. *Trends in Ecology & Evolution* 29:489–95.
- Roth TC II, Krochmal AR. 2017. Cognition-centered conservation as a means of advancing integrative animal behavior. *Current Opinion in Behavioral Sciences* 6:1-6.
- Shettleworth S. 2010. *Cognition, Evolution, and Behaviour*. New York: Oxford University Press