Teacher’s Notes

## Module Materials

This module contains a word document and several cheatsheets. As students may be unfamiliar with climate change projections models, the cheatsheets can be posted to help explain Representative Concentration Pathways (RCPs) and Socioeconomic Pathways (SSPs).

## Module Goals

1. Awareness of online repositories for biodiversity data and climate change scenarios. Often those two topics are available in different online tools (e.g., GBIF and WorldClim). Map of Life is a nice tool to bridge these two concepts.
2. Gain a broad understanding of the relationships between thermal tolerances of a species and its distribution.
3. Apply quantitative reasoning and critical thinking to explore future relationships between changing climates and potential species ranges.
4. Understand the importance of habitat suitability for extinction risk of species.

## Learning objectives

Upon completion of the module, students will be able to:

* Explore and learn the possible factors that influence the distribution of animal species
* Evaluate and report several ways in which temperature regulates the range of an animal species
* Diagnose and report the potential impacts of climate change scenarios on bird species with contrasting habitat requirements

## Lesson Plan:

* A brief overview of species ranges and distributions
* The format of the module will depend on available time:
  + Lecture time slots: often students can finish the Part 1 of the module and start Part 2 before the class ends. I usually run an example of the SSP projections in class, so students are prepared to finish on their own.
  + Lab slots: The module could easily be completed in a laboratory or longer class period.
  + This assignment could also be assigned as homework. I would suggest some posted videos that walk students through how to use Map of Life
* If in class, module will work best in small groups with one computer. However, individuals can easily complete the module. Usually, some amount of problem solving is needed with the use of Map of Life.
* Follow-up: Have students pick an invasive species that is of concern locally. Use Map of Life to project distributions of the species into the future. Ask the students to evaluate the habitat requirements and life history traits of the species in order evaluate the resulting projections.

## Modifications

Many modifications are possible with species choice, especially in part 1. Some species may have thermal tolerances published in the literature, so Part 1 could be altered with more concrete science. Part 2 works great with the choice of 3 species with different habitat requirements, however, there are lots of other combinations possible. As mentioned in the follow-up, the module would also work great as an examination of species invasions.