Conservation Triage: Who should we save and why?

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Introductory Context

The explicit goal of conservation biology, as both science and practice, is to prevent species from going extinct. Unfortunately, so many species are now threatened with extinction that it may not be possible to save them all, especially in the context of limited resources (Marris 2007). This situation presents difficult scientific and philosophical questions about which species should be prioritized for conservation and why. On the flip side the question is, which species should we not invest in, thus increasing the risk of their extinction? As one journalist queried, "Which species will you save? Will you pick the rarest, the largest, or the smallest? The strongest or the weakest? The most beautiful … or just the tastiest?" (Nijhuis 2013). Akin to medical triage in an emergency situation, these issues have brought forth the idea of conservation triage: having to make difficult choices about which species should be saved and which might not be savable. The **goal of this learning activity** is to foster critical thinking skills in students as they engage in debate that mirrors one within the professional conservation community. In addition, the activity will help students learn about diverse endangered species and the factors influencing their population declines and conservation status.

Learning Outcomes

After completing this activity, students should be able to:

- Describe various factors that affect species endangerment and conservation status
- Define triage and apply the concept to examining sets of endangered species
- Discuss the information needed and factors to consider when making conservation triage decisions
- Articulate personal views about the value of different endangered species
- Explain how ethics and personal values relate to the study and practice of conservation biology

Original Course Context

One 50 minute class period with 20-30 students

Instructor Preparation & Materials

Instructors should be familiar with issues of conservation triage which can be gained by consulting the references listed below. In addition, a primary source for endangered species is needed. The one that inspired this activity is the book "100 Under 100: The Race to Save the World's Rarest Living Things" by Leslie (2012). However, other compilations of endangered species could be consulted to derive focal species to include in the activity (e.g., Goodall 2009, and the Red List and Wikipedia references below). Instructors could also invite students to generate their own choices of endangered species to use.

Prior to the in-class activity, the instructor creates **a list of endangered species** that will be subjected to triage decisions by the students. For the activity to work best, it is recommended that the list of species include a range of diverse species, including ones that vary in their popular appeal (i.e., more charismatic ones like primates, other cute mammals and "pretty" species like butterflies alongside less well-known and "ugly" species). (An example set meeting these criteria, all included in Leslie (2014), is presented in Table 2.) The number of chosen species depends on the class size and number of students assigned to each

Table 2. Species included in the triage activity and student assignments for a triage position.

Species		Argument	
Common name	Scientific name	Let it go	Save it
Alabama sturgeon	*Scaphirhynchus suttkusi*	Student 1	Student 14
Arakan forest turtle	*Heosemys depressa*	Student 2	Student 15
Armoured mistfrog	*Litoria lorica*	Student 3	Student 16
Catalina mahogany	*Cercocarpus traskiae*	Student 4	Student 17
Cat Ba langur	*Trachypithecus poliocephalus*	Student 5	Student 18
Eastern North Pacific right whale	*Eubalaena japonica*	Student 6	Student 19
Franklin's bumblebee	*Bombus franklini*	Student 7	Student 20
Hainan gibbon	*Nomascus hainanus*	Student 8	Student 21
Hawaiian crow	*Corvus hawaiiensis*	Student 9	Student 22
Javan rhinocerous	*Rhinoceros sondaicus*	Student 10	Student 23
Northern river shark	*Glyphis garricki*	Student 11	Student 24
Seychelles sheath-tailed bat	*Coleura seychellensis*	Student 12	Student 25
Thermal water lily	*Nymphaea thermarum*	Student 13	Student 26

species. Each species will be assigned to at least two students; one student will argue in favor of prioritizing the species for conservation efforts ("save it") and the other will argue that it can be "let go" (i.e., not receive conservation priority). For larger classes, more than two students could be assigned to each argument for each species. Alternatively, a third student could be assigned to take a neutral position for a species and serve as an impartial referee when each species is presented in class. Based on the list of focal species, the instructor **assigns each student a species and triage position** (for or against the species receiving conservation priority, or neutral as needed) in sufficient advance of the class meeting when the activity will occur to allow students time to complete the preparatory assignment described below.

In addition, the instructor may wish to **create a set of slides** with images of the chosen species to be displayed as each species is discussed by the students. Within the set of slides, "emergency triage" slides can be inserted after every two or several species (see slides with the online supplementary materials); as described below, these slides will indicate the moments when the class will decide which species to save and which to let go. The sequence of the species presentations should be organized so as to present easier and then successively harder triage decisions for pairs or groups of species. For example, using the species in Table 2 the first triage decision could be between the Catalina mahogany (a non-descript shrub endemic to one island) and the Cat Ba langur (a fuzzy and cute primate with adorable orange babies); most students will probably easily choose to prioritize the langur. However, the choice between the Javan rhinoceros and the armoured mistfrog may be less straightforward and engender more personal conflict and passionate debate among students.

Activities

Students investigate some of the basic biology and conservation status of their assigned species, using the Leslie (2012) book, other key references provided by the instructor (e.g., Goodall 2009, Red List) and/or through online searches. (If all the assigned species are from Leslie (2012), it could be helpful to have a copy of it for students to access (i.e., in closed reserve in a library); alternatively, pages relevant to chosen species can be copied and given to the students to use alongside other resources.) In particular, students should look for information that relates to the feasibility of conserving the species in perpetuity, choosing to highlight factors that relate to their assigned triage position (e.g., a species does not breed well in captivity so it should be let go; the population is increasing so it should not be abandoned). The instructor may wish to require that the students complete this as a written assignment and turn something in for a score or participation credit.

In the classroom, the instructor can introduce the concept of triage and other context as desired before the activity. Then, in turn, each pair (or more) of **students presents the pro and con views for their respective species**, essentially justifying to their classmates why their assigned species should be conserved or not. The duration of each presentation and whether or not to include follow up discussion is at the discretion of the instructor based on the class length and duration.

To foster tough decisions, the instructor should intermittently—and without warning to cultivate a sense of surprise, just like in the real world—call for a class **triage "vote"** about which of the previously presented species should be saved—because not all of them can! (The prepared "emergency triage" slides described above can signal this.) Allowing students to briefly advocate and debate their triage decisions before each vote is taken will help contribute to an energized and engaging classroom dynamic.

With each successive emergency triage vote, the original set of assigned species will be whittled down to the "winners" of each triage decision. At the end of the presentations, a final triage vote can be requested to identify the final winner: the one species from the original list that will receive conservation prioritization. Although this may be a tough reality for students to consider—that only one of many endangered species might be effectively conserved—forcing such a decision reflects the reality that conservation organizations must face all the time, i.e., where to allocate scarce resources.

Follow-up Engagement
- What types of species do we care most about conserving and why?
- When a species goes extinct, does anything really change? If not, is it ok to let species go extinct?
- Ask students to list the many criteria on which triage can be based and then rank them based on importance and value

- Is it ever ok to "give up" on a species? Under what conditions might it be best to do so?
- Assign students a triage article for homework and write a personal response to it
- Introduce the "Alliance for Zero Extinction" and debate whether the name reflects a realistic goal

Making Connections
- Discuss this lesson in connection to the causes of species endangerment.
- Relate this lesson to themes of ecosystem services and economics; should we prioritize species that provide tangible benefits to humans?
- How does a person's worldview and environmental ethics affect how they view triage decisions?
- Thinking to the future: If species can be brought back from extinction (de-extinction), does that provide an argument for letting them go?
- What political considerations relate to triage decisions?
- Once a decision is made to conserve a species, what other issues must be considered? What are the best ways that conservation practice should be done in context of local human communities?

Online Supplemental Materials
- Powerpoint slides illustrating the flow of student presentations for species shown in Table 2 and emergency triage votes
- An online search with the phrase "100 most endangered species" provides many resources

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