NATIONAL CENTER FOR CASE STUDY TEACHING IN SCIENCE

Complexity in Conservation: The Legal and Ethical Case of a Bird-Eating Cat and Its Human Killer

by
Loren B. Byrne
Department of Biology, Marine Biology and Environmental Science
Roger Williams University, Bristol, RI

Note to Instructors: This case is different from others in our collection in that there is no case, nor is there an answer key. Students are given a reading assignment which forms the basis for a role-playing activity that they will engage in in class.

For this case study, students should be provided with the following newspaper article, which is a pre-class reading assignment:

> Murphy, K. 2007. Birder Admits Killing Cat, But Was It Animal Cruelty? *The New York Times*. November 14, 2007. Available online: http://www.nytimes.com/2007/11/14/us/14cats.html

As the instructor desires, additional assignments could be provided. For example, as part of the pre-class assignment, students could be asked to do the following:

> *"After reading the newspaper story about the cat killer, write a one-paragraph response. In this response, state whether you would convict or acquit Mr. Stevenson and explain the reasoning for your decision."*

See the teaching notes for full details.

Case Teaching Notes

for

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Introduction / Background

Preventing the continued loss of biodiversity is one of our most pressing environmental challenges. The largest cause of the decline in biodiversity is habitat loss due to transformation, fragmentation, and degradation. Other major causes include overexploitation (e.g., poaching, overfishing), pollution, non-native species invasions, and climate change (Wilson 2002; Sodhi and Ehrlich 2011; Primack 2012). The science of conservation biology focuses on quantitative investigations of these causes to generate evidence-based methods for preventing population declines, increasing populations, and conserving and restoring habitats. These conservation goals exist in a wide range of environmental and sociocultural contexts; thus, both the science and practice of conservation are, by necessity, interdisciplinary and require a wide range of knowledge, tools, and perspectives to be successful (Primack 2012).

Despite the interdisciplinary nature of conservation, the average person may have a simplistic understanding of conservation practices. The traditional, and somewhat stereotypical, view sees conservation as creating clearly bounded, protected parks where wildlife will flourish without human interference. Although this approach still has a place in the conservation biologist's toolbox, the contemporary view of conservation acknowledges that parks cannot conserve all (or even most) of Earth's species; further, in some cases, biodiversity within protected areas is not actually protected due to external factors (Fraser 2009; Primack 2012). Conservation in parks, and everywhere, is influenced by economic, political, and philosophical variables that interact to affect the fate of species and ecosystems. Thus, good scientific information alone is insufficient to ensure conservation success. As such, conservation biologists now recognize that conservation science and practice must consider many human dimensions. Further, to increase the chances of success, conservation projects should help local people value and benefit from conservation efforts by integrating and, as much as possible, reconciling achievement of their needs with that of other species (Fraser 2009). As one conservationist in Africa commented, "Conservation is about managing people. It's not about managing wildlife" (cited in Fraser 2009, p. 237).

This contemporary view of conservation biology is essential to bring into biology and environmental science classrooms. Teachers should actively engage their students in examining and discussing the multidimensionality of conservation issues (especially relationships among scientific, legal, political, and ethical aspects) to help them gain deeper awareness and understanding about the real-world complexity of conservation science and practice. This approach presents a challenge to both teachers and students, especially in science courses, because the subjective, open-ended, and politically- and emotionally-charged nature of these issues may lead to ambiguity and discomfort (e.g., because there may not be "right" answers every time). Rather than avoid these issues, however, teachers can bring them into the classroom to help students develop skills for higher-level critical thinking, self-reflection, team work, and communication. These outcomes can be achieved using factual case studies, which also help make course content more relevant by connecting it to the "real world."

The purpose of this case study is to enhance student understanding about the complexity and human dimensions of conservation biology, as articulated in the learning objectives below.

Objectives

Through analysis and discussion of the case study, students should be able to:

- Analyze the situational factors, evidence, and arguments pertaining to a court case that involves environmental, legal, and ethical dimensions of a conservation issue.
- Articulate, justify, and defend their personal views and values about a controversial environmental issue.
- Recognize the complex and sometimes conflicting and tense relationships between sociocultural and environmental dimensions of conserving biodiversity.
- Discuss how the ethical, legal, and scientific dimensions of a conservation case study can or cannot be reconciled with each other to generate a synthetic perspective.
- Explain how and why conservation science and practice require an interdisciplinary approach that integrates perspectives from many fields of study.

To help achieve these learning objectives, a case study lesson plan was developed using a factual story that occurred in the United States in Galveston, Texas (adapted from Murphy 2007; also see Barcott 2007). The Gulf shores of Galveston are inhabited by a population of piping plovers, a threatened bird. One of the factors causing mortality in this population is predation by cats, especially feral ones. One day in 2006, James Stevenson, a Galveston resident and passionate bird watcher, killed one of the cats with a shotgun, possibly causing it to suffer. Local prosecutors charged Mr. Stevenson with a crime based on an animal cruelty law that makes it illegal to kill an animal that belongs to someone. Testimonial evidence was presented in court that the "murdered" cat was being fed by another resident who also gave it a name (Mama Cat). Ultimately, the jury could not reach a unanimous consensus to convict Mr. Stevenson, which resulted in a mistrial. He was not tried again (Rice 2007).

This case study and its associated class activities were specifically developed for an advanced undergraduate course (junior- and senior-level) in conservation biology with 20–30 students. These activities were used for lessons on ethical and legal dimensions of conservation issues, which were addressed approximately 11 weeks into the course during a section about the sociocultural aspects and context of conservation science and practice. The majority of students enrolled in the course were biology and environmental science majors; some non-science majors used it to satisfy a general education requirement.

The case provides an opportunity to foster student reflection and discussion in any courses or lessons focused on exploring interdisciplinary aspects of environmental issues. It is based on a newspaper article that provides students with sufficient information to participate fully in the classroom activity. As such, understanding the case is fairly straightforward and does not require in-depth background knowledge of biology, conservation, or legal issues so it can be used with students from a range of backgrounds and aptitudes. It can therefore be adapted to courses across levels (introductory through advanced) and with various disciplinary foci (e.g., political science, ethics, anthropology). Depending on the interests of the instructor, additional information could be provided to students (e.g., about biodiversity issues, the biology and conservation status of the piping plover, conservation laws and/or environmental ethics) for context that can help scaffold and deepen their understanding of pertinent issues. In addition, the case lends itself well to a wide range of formal and informal assignments to extend student learning that are tailored to meet a course's specific objectives.

Classroom Management

Summary

A summary of the activities associated with the case, jury role-playing activity, and discussion is provided below. The minimum in-class time required is estimated as 30 minutes.

- Pre-class assignment: For homework, students read the newspaper article "Birder Admits Killing Cat, but Was It Animal Cruelty?" (Murphy 2007). Students are told that they need to be prepared to discuss it in small groups during the next class. *(10–15 minutes outside of class)*
- At the beginning of class, the instructor provides a brief introduction to the case with supporting information as desired. *(3–5 minutes)*
- Students are instructed to imagine themselves as jurors in the trial and discuss and debate the case in small groups of 5–7 students. Students are encouraged to advocate and defend their own view and try to convince others to agree with them. At the end of the deliberation session, each jury must vote about whether to acquit or convict the defendant. A unanimous decision is required for conviction; disagreement among the jurors results in a mistrial. *(15–20 minutes)*

- Juries report their verdicts to the whole class. These are recorded on the board. *(~2 minutes)*
- A follow-up discussion session allows students to share their views and reflections about the case and jury role-playing activity. Instructors can structure and guide this discussion as desired (see example discussion questions below, on page 4 of these teaching notes). *(10–20 minutes)*
- Additional writing, reading or project assignments can be developed to extend and deepen student reflection and understanding.

Teaching the Case

The case of the "cat killer" was used to create a role-play classroom activity in which students were asked to be members of a jury who discuss the case and collectively decide whether to convict the defendant. To prepare for this activity, students were assigned to read for homework a short newspaper article from *The New York Times* that summarizes the case and evidence presented in the real trial (Murphy 2007; for additional details see Barcott 2007). When given the reading assignment, students were told that they would be held accountable for completing it before the next class because they would have to complete an activity and participate in a group discussion about it to receive that day's "in class" points. However, they were not told about the role-playing activity to prevent them from thinking about and discussing the case in that context before the activity (and to maintain an element of "surprise" for the role-playing). Alternatively, instructors could ask students to decide whether they would acquit or convict Mr. Stevenson before the class and/or tell them about the role-playing activity and ask them to prepare discussion points, either informally or formally as a written statement to hand in.

At the beginning of class, a brief introduction was made about the case using PowerPoint slides. Photos of Mr. Stevenson, a feral cat (both from the newspaper article), and a piping plover (obtained from an online search) were pasted on the first slide underneath text of the title from the newspaper article. With this slide, the instructor made a few introductory comments to summarize the main outline of the case to remind students about it. A second slide contained general information about the piping plover (see Blocks of Analysis below) to provide students with some scientific content and context that could inform their deliberations. A third slide contained the same images as the first slide with the text at the top changed to: "Ladies and gentlemen of the jury, should Mr. Stevenson be convicted of animal cruelty, be fined up to $10,000 and spend up to two years in jail?" This question was read aloud to introduce the role-playing activity and then followed by an explanation of what the students were to do.

Students were invited to imagine that they were jurors in this court case. They were asked to discuss and analyze the details of the case along with their own personal views of it in small groups of five to seven jurors. Their goal would be to reach a unanimous decision about whether to convict or acquit Mr. Stevenson of the charge of animal cruelty and killing a cat that belongs to another; this issue of "belonging to another" was the key legal criterion for evaluating evidence in the real case, as explained in the newspaper article. To this end, students were told that they should present and defend their own views to try to convince other jurors to agree with them. It was made clear that they could change their mind during the deliberations if they were convinced by others' arguments, but that they should not feel unduly pressured to do so if they felt strongly one way or the other; instead they should defend their position. Unlike a real trial, they were told that they would only have 10–15 minutes for deliberation, at which time a jury foreman would report their collective decision to the "judge" (the instructor). They were instructed that, if they could not reach a unanimous decision and became deadlocked, they could report this outcome but would need to give the number of votes for acquittal and conviction. After giving these instructions, groups were formed (based on location for expediency), and students were told to begin deliberating.

As part of these instructions, two alternative methods have been used about how to guide students' individual decisions for acquittal or conviction. The first was to tell them to make an independent decision before jury deliberations based on the newspaper article, introductory slides, and their personal views; in this way they could formulate their own ideas about the case individually and enter the discussion with a pre-identified decision to defend. As other jurors made arguments, they could weigh the issues, reconsider their initial decision, and change their mind as desired. A second approach was to assign students a decision to argue for by giving them note cards before the deliberations with "acquittal," "conviction," or "your own decision" written on them. By assigning a mix of these three decisions to each group, it was ensured that each jury would have defenders of each

view so that students would have to debate the issues. Students were instructed to not reveal their assigned view (to leave it unclear who was arguing their own view or an assigned view) and strongly argue only for that view for at least 8–10 minutes. They were told that, at the end of the deliberation, they could "release" themselves from the assigned view and cast a final vote for a verdict that reflected their personal view.

At the end of the deliberation period, each jury was asked to take a final vote, with each student stating their final decision to "acquit" or "convict" Mr. Stevenson. After all groups completed this, the class was brought back together and a representative from each group stated their jury's verdict. These were tallied on the board, recording unanimous decisions separate from the individual-vote results of deadlocked juries. This indicated the level of disagreement for the verdict among the whole class and whether the class as a whole leaned one way or another in its collective view. This provides an additional way to help students recognize divergence of views in case they were part of groups that started the deliberation with consensus by chance or were able to reach a unanimous decision.

After all juries reported their verdicts, the instructor made a few brief remarks based on the class results as a way to transition into an open discussion session. (In general, it can be expected that disagreement will be evident, perhaps with a few deadlocked juries and a majority of unanimous verdicts and individual votes for one of the decisions.) Then students were invited to share their reflections about and discuss the case and deliberation process. Depending on the particular students, the instructor may or may not need to provide additional encouragement and guidance for the discussion to begin and be sustained. With advanced students, it has been observed that the discussion proceeds organically with lots of students willing to speak about their reflections and reasons for their decisions; in particular, some are willing to provide rebuttals and counterpoints to other students, often referring to details from the case, which provides for engaging round-table debate. However, if needed, the instructor could pose specific questions to help foster reflection and additional discussion. Examples of questions that can be used to guide student discussion are provided below:

- Did you change your minds during the deliberation? Why?
- Which argument or evidence do you think was most important in this case?
- Who is a cat-lover and is disgusted by Mr. Stevenson's action?
- How would you feel if it was your cat that was killed?
- Who cares more about conserving plovers than cats and why?
- Why should anyone care if the piping plover goes extinct?
- Is it acceptable (or ethically right) to kill one individual animal to save another?
- Are some individual organisms/animals/species more valuable than others? Why?
- Rather than kill the cat, what else could Mr. Stevenson have done?
- Whose responsibility is it to protect threatened and endangered species?
- Is it acceptable to let species go extinct or become endangered?
- What are the trade-offs in this case between human and environmental issues?
- Are there any compromises that can be made to protect both the cats and birds?
- Is it possible to reconcile cats' and their owners' rights with those of conservationists and other species? How? Or should cats or conservation take priority?

In addition, specific quotes and issues mentioned in the homework reading or other articles could be highlighted to focus students' attention on analyzing specific aspects of the case. (In particular, impassioned comments made online about this case and Mr. Stevenson can be used to provoke student responses and reflections about the role of civility in discourse about controversial issues; see http://www.fishmojo.com/forums/printthread.php?t=13519 or http://209.157.64.200/focus/f-news/1926893/posts). Based on a particular course's context and the instructor's objectives, additional discussion points and questions could be raised to guide students toward specific learning outcomes and ideas pertaining to a wide range of issues. Other possible foci for guiding the discussion are provided below (see Blocks of Analysis below).

Throughout the discussion, it is helpful to write notes on the board based on student comments to help organize and guide the discussion. These were used by the instructor to make connections among points and bring forth other questions. At the end of the discussion session, board notes were also used to develop a concluding statement or take-home message related to the lesson's objectives (e.g., "many factors

affect the conservation of a species" or "conservation is often complex because it requires navigating people's conflicting values and priorities"). The duration of the discussion could be shortened and narrowly focused or lengthened and broadened depending on the students' engagement level, length of the class period, and instructors' desires for content and variety of discussion points. In a conservation biology course with junior and senior undergraduates, the discussion lasted 10–15 minutes before the instructor brought it to a close. An appropriate way to conclude the lesson is to reveal the outcome of the real case to the students. This can be done in an engaging way by asking "Do you want to know what happened to Mr. Stevenson?" to which students are sure to eagerly reply "yes!" The final vote tally of the real jury can be given (eight for conviction and four for acquittal, resulting in a mistrial and lack of conviction) along with quotes and information contained in a news report (Rice 2007). As time permits and students are interested, additional discussion may be permitted to reflect on and analyze this outcome and compare it to those of the student-jury verdicts.

This case study and associated activities have been used in three sections of a conservation biology class; in each, the discussion session was very engaging, productive, and often lively, with a majority of students voluntarily sharing a wide range of opinions and personal stories. The students' contributions and instructor's guidance satisfactorily helped students meet the learning objectives (which were also supported by other lessons and assignments). Thus, no writing or follow-up assignments have been prepared to accompany this case study because students' oral remarks have been deemed sufficient to provide formative assessment. (Instructors could extend and guide the discussion as needed to generate sufficient evidence of achieved outcomes to their own satisfaction.) Alternatively, instructors could develop in-class or follow-up assignments to extend student analysis of the case and generate products for additional formative or summative assessment of student learning outcomes. The case certainly lends itself well to additional projects or assignments in which students formalize their thoughts (e.g., a reflective essay defending their views on the case) and further explore issues discussed in-class (e.g., they pretend to be a defense lawyer or prosecutor who has to write closing remarks for the trial; investigate conservation laws around the world; or conduct a literature review about research on feral cat control). As such, this case study provides a useful focus for helping students gain deeper understanding about the sometimes controversial and always complex multidimensional realities of conservation science and practice.

Blocks of Analysis

Biodiversity Loss

One of the Earth's most unique and amazing characteristics is its diversity of life. Biologists have estimated that upwards of 10 million species presently exist, although only a small fraction (~14%) of these has been given names (Mora et al. 2011). In addition to species, biodiversity also refers to the variation in types of ecosystems around the world (e.g., tropical rain forests, savannahs, tundra) and the diversity of genes within populations of a species (Primack 2012). These three levels of biodiversity are interrelated. For example, genetic diversity among distinct populations of a species has an important role in ensuring the long-term viability of the species; loss of too many individuals and populations can have negative consequences for conserving biodiversity at the species level (Primack 2012). (This point is especially salient to piping plover conservation in which the loss of too many individuals to cat predation can have larger consequences.) Similarly, ecosystem diversity forms the range of habitats needed to support the existence of a wide diversity of species. As such, conservation biology's general goal of preserving biodiversity encompasses conservation at all three of these levels (Primack 2012).

A major concern for Earth's biodiversity is the rate at which humans are reducing it at all three levels. Recent rates of species loss, in particular, are much higher than "normal" background rates of natural extinction, which is causing a sixth mass extinction event (comparable, for example, to the period of dinosaur extinctions) (MEA 2005; Barnosky et al. 2011). Since 1600, 136 bird and 79 mammal species extinctions have been documented, with a strong trend of increasing number of species extinctions over time (Primack 2012). Similarly, the number of species that is threatened with extinction (because their global populations have shrunk to levels that endanger their long term persistence) is also increasing. It is expected that some, if not many of these, may become extinct soon, especially without sustained conservation actions. The International Union for the Conservation of Nature (IUCN) maintains the authoritative, official "Red List" of species threatened with extinction (IUCNa 2012); it currently contains 21, 27, and 36% of the world's bird, mammal, and

amphibian species (Primack 2012). Specific to this case study, the piping plover is listed as "near threatened" with a trend of increasing (global) population size (IUCNb 2012).

For many people, especially non-biologists, critical questions often arise concerning biodiversity loss: Why should anyone care if species go extinct? What value does species X have to me? Wouldn't conservation monies be better spent on things that benefit people? Several arguments have been advanced about how to justify biodiversity conservation (Wilson 2002; Primack 2012). The one to gain greatest prominence over the past decade is focused on the relationship between biodiversity and ecosystem services. Ecosystem services are defined as the benefits that humans receive from ecosystems and other organisms via their natural processes (e.g., water purification by wetlands, decomposition of wastes, regulation of climate) and products (e.g., food, lumber, fibers, medicines) (Wilson 2002; MEA 2005; Sodhi and Ehrlich 2011). Thus, the argument goes, humans need biodiversity to support our lives and well-being; the degradation and loss of biodiversity threaten the sustainability of human societies and economies (with dollar values increasingly being placed on ecosystem services). In addition to supplying us with basic needs, biodiversity and ecosystems contribute to our overall happiness, enjoyment of life, and mental satisfaction; these dimensions are termed cultural ecosystem services. Although their value may be hard to quantify, especially in monetary terms, cultural services are nonetheless highly valued by many people (e.g., as reflected by widespread appreciation for pets, zoos, national parks, urban green spaces, and natural wonders).

A third line of argument to justify the conservation of biodiversity is more philosophical and ethical, e.g., other species have a right to exist and humans do not have a right to cause their extinction. As this ethical perspective pertains most directly to the case of the cat killer and piping plover, it will be discussed in more detail in a following section. For in-depth overviews of arguments about how to justify biodiversity conservation and negative consequences of biodiversity loss for humanity, readers are encouraged to consult with references cited throughout the text (especially Wilson 2002; MEA 2005; and Primack 2012). These broader issues frame the case of piping plover conservation and can be used to help students connect the specific case study to more general conservation and environmental concerns.

The Complexity of Conservation

Effective biodiversity conservation is extremely challenging. Many scientific and sociocultural variables, some direct and others indirect, must be considered as part of conservation plans for any focal population, species, or ecosystem (e.g., see stories in Fraser 2009). A central goal of a conservation biology or general environmental science/studies course should be to help students recognize and analyze the complexity of conservation science and practice. Two main themes can help focus attention on this goal: multivariate, synergistic causes of species endangerment, and trade-offs.

The main causes of biodiversity loss, especially species extinction and endangerment, have been summarized by Wilson (2002) with the acronym HIPPO, which stands for: habitat changes, invasive species, pollution, people (i.e., their activity and increasing population size, which affects all the other variables), and overexploitation (also see Sodhi and Ehrlich 2011). Although these causes are often listed and discussed separately, many species and locations are simultaneously affected by more than one of these factors alongside other possible concerns (e.g., emerging diseases, altered food webs, accidental deaths such as road kills). Further, interactions among variables can exacerbate negative effects. For example, amphibians—which are being negatively affected by nearly all of these variables simultaneously—are more susceptible to diseases when their habitat is degraded by pollution (Kiesecker 2011; also see Blaustein and Kiesecker 2002 and Hof et al. 2011). Similarly, the piping plover's population decline has been caused by many factors, most of which alter their habitat (e.g., beach development, rising ocean levels, harassment) (IUCNb 2012). Alone, any of these causes may not have much effect on the population; however, together they result in a larger collective threat. The complexity of conservation science and practice arises from trying to understand and respond to all of the factors that contribute to biodiversity loss in total and, in particular, to declines of individual populations, species, and ecosystems.

An additional level of multivariate complexity in conservation arises from relationships among sociocultural and ecological systems. For example, human opinions and decisions about managing their cats (which are determined by many factors) can impact bird populations even if people are unaware of this relationship. (A study in Michigan found that outdoor pet cats kill 16,000 to 47,000 birds annually (Lepczyk

et al. 2003). For additional research on domestic cat predation, also see the kittycam project at the University of Georgia (UGA 2012).) In the case of the cat killer and piping plover, an emotional response by humans (i.e., concern for the well-being of feral cats) contributed to a perhaps unintended ecological consequence (i.e., predation on threatened birds). Given that some people will care more about cats than birds, even threatened ones (and vice-versa), the conservation of birds can become more complicated by sociocultural variables that do not directly relate to strict scientific questions (e.g., how much habitat a species requires to persist). Understanding how to assess and navigate the competing views and needs of humans is thus a key component for conservation success (Fraser 2009; Primack 2012). To this end, an interdisciplinary and multivariate perspective that acknowledges the complex interactions among diverse variables in sociocultural and ecological systems is needed to fully respond to biodiversity loss.

When integrating human and ecological aspects of conservation into a coherent perspective, complexity arises when the needs of humans directly conflict with the needs of other species. This brings forward the concept of trade-offs—when something must be sacrificed so that another outcome can be achieved. Although many conservationists like to highlight "win-win" situations in which both humans and biodiversity benefit from a conservation program, in some instances this may be impossible (McShane et al. 2011). Instead, it may be necessary to evaluate the balance of benefits versus risks or problems for a given range of possible choices. In the case of the cat killer and piping plover, Mr. Stevenson weighed the trade-off between the lives of the plovers and the cats; he decided that the benefit of killing the cats outweighed the risk of losing individuals of a threatened species. Others, including the person feeding the feral cats and members of the jury, weighed the trade-off and concluded that the cat's life was more valuable; thus, they indirectly (or intentionally) traded the plovers' lives for the cats'. As McShane et al. (2011) point out, this "new conservation debate challenges conservationists to be explicit about losses, costs, and hard choices so they can be openly discussed and honestly negotiated." Framing the case of the cat killer in this context can provide students with a valuable lesson about how to think about and discuss the complexities that arise from conservation practice in a world with humans that hold diverse values and opinions.

Piping Plover Biology and Conservation

This case study provides an opportunity for students to learn about the basic biology and ecology of the piping plover *(Charadrius melodus)*. Presenting them with this information before the role-playing activity can help them frame their analyses and arguments. For example, they may wish to evaluate the relative level of threat to the plover as part of their decision-making process: Is extinction imminent such that conserving every individual is critical? Or is the loss of a few individuals in Galveston not likely to cause significant concerns—at least concern enough to justify the killing of another animal?

The United State Fish and Wildlife Service and the IUCN Red List provide detailed information and references about the biology, ecology, and conservation status of the piping plover, including historical aspects. These resources provide the following list of "talking points" that were shared with students on a PowerPoint slide before the role-playing activity:

- 3 sub-populations in the U.S.: Great Lakes, Central Plains and Atlantic/Gulf Coast
- ~3300 pairs in Atlantic population; increasing
- Breed in summer in North; overwinter in South, NC to TX
- Nests and feeds in sandy shores of ocean and lakes
- Protected under the U.S. Endangered Species Act in 1986; designated as threatened
- IUCN Red List: near threatened
- Continued management is needed to ensure conservation
  - $3 million annually is spent for Atlantic pop.
  - e.g., placing fences around nests
- Threats include beach development, human disturbance & pets

For more information about the plovers, instructors are encouraged to consult the following websites:

- *Piping Plover, Atlantic Coast Population: Overview of Biology and Threats,* U.S. Fish & Wildlife Service. http://www.fws.gov/northeast/pipingplover/overview.html.
- *All About Piping Plovers,* U.S. Fish & Wildlife Service. http://www.fws.gov/plover/facts.html.
- *Piping Plover Critical Habitat: Questions and Answers,* U.S. Fish & Wildlife Service. http://www.fws.gov/plover/q&a.html.
- *Species Profile: Piping Plover (Charadrius melodus),* U.S. Fish & Wildlife Service. http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B079.

- *Charadrius melodus (Piping Plover),* The IUCN Red List of Threatened Species. http://www.iucnredlist.org/details/106003127/0.
- *Piping Plover* [in Texas]. http://www.tpwd.state.tx.us/publications/pwdpubs/media/pwd_bk_w7000_0013_piping_plover.pdf.

Ethical Considerations

Following his trial, Mr. Stevenson was quoted as saying: "What I did was not only legal, it was right" (Barcott 2007). Was it? On what ethical grounds can he claim that killing a cat was acceptable? This and related questions can be used to engage students in reflecting on and discussing the ethical context of biodiversity conservation.

As a framework to guide the discussion, Primack (2012) suggests that the study of environmental ethics can be viewed as a nested set of hierarchical "spheres of concern." The smallest sphere focuses on the self, which leads to a selfish, egocentric ethical view. The next set of larger spheres, which still focus solely on humans as the determinant of ethical concerns (i.e., anthropocentric views), encompass family members, small social groups (e.g., tribes, local communities), larger social groups (defined by race, nation, or religion), and then all people. Extending ethical consideration to other animals occurs at the next level, followed by including other species (biocentric perspectives). The largest sphere of concern (ecocentric) recognizes ecosystems and, perhaps, the whole Earth system as worthy foci for determining ethical decisions. (Aldo Leopold's famous land ethic represents this largest view.) Those who accept bio- and ecocentric ethical arguments tend to recognize that other species and ecosystems have intrinsic value, i.e., have worth just because they exist whether or not they are deemed valuable by humans (Primack 2012). As such, humans have a moral obligation to protect species and prevent ecosystem degradation. In the case of the cat killer, this argument seems to describe Mr. Stevenson's views. In class discussion about the case, students could be asked about where their views fall within the levels of "spheres of concern." If students express anthropocentric values, they may exhibit more concern for the cats because these animals have stronger connections to humans than the plovers; thus, a cat's life would be prioritized. Allowing students an opportunity to discuss this framework and the logical outcomes from different spheres of concern can help students gain critical thinking skills while recognizing that there may not be one "right" answer when it comes to decisions about conserving biodiversity. Disagreements should be expected and can be analyzed in terms of the sphere of concern from which people are analyzing an issue.

A second line of ethical analysis that applies to this case is that of an individual organism's welfare, independent of other environmental concerns. On the surface, it seems curious that Mr. Stevenson's ethical views allowed him to kill a cat without feeling guilty; how could an apparent animal-lover tolerate, much less engage in, any sort of cruelty to any animals? In an article about this case, an environmental philosophy professor, J. Baird Callicott, provided this perspective: "From an animal-welfare perspective, confining cats and shooting the cat, in the Galveston example, is wrong. (However) from an environmental-ethics perspective it's right, because a whole species is at stake. Personally, I think environmental ethics should trump animal-welfare ethics. But just as personally, animal-welfare ethicists think the opposite" (Barcott 2007). Thus, Mr. Stevenson was prioritizing a larger concern (the persistence of a whole species) over concern for a smaller biological entity (i.e., an individual organism); this provides the ethical dimension to the discussion of conservation trade-off when some individuals/species may have to "lose" for others to "win" (see above). In the classroom, highlighting divergent ethical arguments and views (see Barcott 2007) can help students analyze and formalize their own ethical sensibilities. In addition, students could be encouraged to try to see the issues from other perspectives while helping them develop deeper critical thinking, group-work, and communication skills.

Conservation Laws

Legal protection of the piping plover was first established by the federal Migratory Bird Treaty Act in 1918. This law allowed the species to recover from significant declines due to hunting it for feathers to be used in the fashion industry (USFWS 2012). In 1986, the species was added to the list of threatened species under the federal Endangered Species Act (ESA; passed in 1973). In general, these laws forbid activities that would harm the species or individuals, including habitat alteration, killing, or removal from the wild. Further, the ESA directs the U.S. Fish and Wildlife Service to make plans and take actions for conserving critical habitats and promoting increases in the populations; these have been done for the piping plover (see documents here: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.

action?spcode=B079). Related to cat predation in Texas, one recovery plan recommends the following actions:

> "10. Determine the extent that human and pet disturbance limits piping plover abundance and behavioral patterns in the wintering and migration habitats.
>
> 11. Determine the effect of human and pet disturbance on survival and reproductive fitness" (USFWS 2009).

As an interesting point of discussion, the plan does not refer to cat predation as a major concern; dog activity is mentioned explicitly more often. Further, the recovery plan focused largely on evaluating and protecting habitat. Thus, it is currently unclear whether or not feral cats are a significant factor affecting the conservation of piping plovers. Nonetheless, the role of the ESA in helping conserve the piping plover is clear. An article about the positive effects of the ESA for conservation concluded that "If not for the Endangered Species Act, the beleaguered piping plover might be extinct" (Di Silvestro 2004). For more information about the ESA that can be used as part of this lesson, instructors are encouraged to consult the thorough overview provided by Saundry (2009).

Because the ESA is a federal law, the populations of plovers that overwinter in Texas are subject to protection under it. In support of this, the Texas Parks and Wildlife Department designates it as threatened at the state level and maintains a website about the plovers to alert Texas residents to the conservation considerations of this species (http://www.tpwd.state.tx.us/huntwild/wild/species/piplover/). A section of the Texas Parks and Wildlife Code (http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.64.htm#64.002) contains language pertaining to the protection of the plovers:

"Sec. 64.002. PROTECTION OF NONGAME BIRDS.

(a) Except as provided by this code, no person may:

(1) catch, kill, injure, pursue, or possess, dead or alive, or purchase, sell, expose for sale, transport, ship, or receive or deliver for transportation, a bird that is not a game bird;

(2) possess any part of the plumage, skin, or body of a bird that is not a game bird; or

(3) disturb or destroy the eggs, nest, or young of a bird that is not a game bird."

Interestingly, the Texas law refers explicitly to people but is silent about cats. In the context of wildlife and environmental laws, students could be asked to discuss whether or not laws need to be updated to reflect more complex issues of conservation, such as managing feral cats. For example, the Texas law pertaining to animal cruelty that was used to prosecute Mr. Stevenson was changed even before his trial concluded. Instead of referring to animals that "belong to another," the law now states that it is illegal to kill any cats, even feral ones not being cared for (Murphy 2007). Whether or not this will have negative impacts on the piping plovers in Texas remains to be seen. In the meantime, such legal and political aspects provide excellent foci for engaging students in thinking about the complexity of conservation science and practice.

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