

Selecting Areas for Conservation: An Oral Communication Exercise

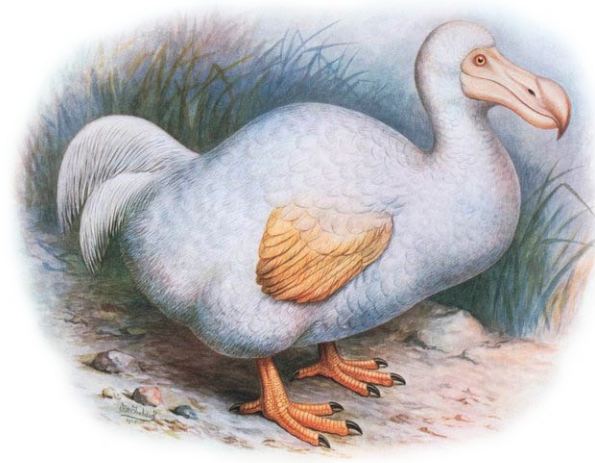
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Selecting Areas for Conservation: An Oral Communication Exercise

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ABSTRACT

Resources to implement conservation actions are very limited compared to the potential needs in a given area, which means conservationists usually have to make difficult choices and establish priorities for action. Therefore, it is important to demonstrate the value of a proposed conservation area or project for it to be considered a high priority for funding. In this exercise, you will research the importance of a specific area for conservation, and through a short oral presentation, make the case for its value and high priority for funding. The exercise should give students an enhanced understanding of the different approaches and criteria used for priority setting in conservation, and a chance to practice their oral communication skills.

1. PART 1: INTRODUCTION

1.1. Background¹

An essential role of protected areas is conserving biodiversity, by reducing threats and the risk of extinction. They may be implemented to conserve targets at multiple scales—from species, populations, and genetic diversity, to landscapes and ecosystems and their emergent ecological processes. They may also be designed to act as buffers against anthropogenic or natural uncertainty, such as climate change, and drought, floods, or storms. But in the face of widespread threats to biodiversity, which areas should be considered high priority for conservation? Areas can be set aside for conservation in response to a number of factors and criteria.

1.1.1. Protecting Specific Taxa

Many protected areas are designed to conserve specific threatened organisms. Sites may be chosen to protect taxa listed on the IUCN Red List (www.redlist.org), which includes species at risk of extinction. Focal

species may also be used as surrogates to conserve other groups and ecosystems as well. Charismatic taxa may serve as *flagship species*, garnering public attention and support that can then be used to conserve their ecosystems (Figure 1a; Caro and Doherty 1999). Another option is to focus on *indicator species*, which are species used as an indicator of the environment quality or the status of other species (Figure 1b). The conservation of communities or habitats can also be achieved by protecting *umbrella species* (Figure 1c). These are organisms, such as migratory wildebeest, whose habitat requirements and range also encompass the needs of other conservation targets (Caro and Doherty 1999). Protected areas may also be designed based on organisms that are important to ecosystems. *Keystone species* such as figs (Moraceae), mast-fruiting dipterocarps (Dipterocarpaceae) in Asia, or habitat-forming organisms like corals have important ecological roles (Figure 1d; Caro and Doherty 1999). Thus, removal of these keystone species can have significant impacts on their communities or ecosystems. A related but different concept is that of *landscape species*, such as forest elephants, which use large areas with a great diversity of habitats and have significant impacts on the structure and function of the whole ecosystem (Figure 1e; Redford et al. 2000). Because of their large area requirements, landscape species are sensitive and susceptible to human impacts. Contrary to the

¹The background information in this exercise is based on Naro-Maciel, E., E.J. Sterling, and M. Rao. 2007. *Protected Areas and Biodiversity Conservation I: Reserve Planning and Design*. Synthesis. Network of Conservation Educators and Practitioners, American Museum of Natural History. Available from ncep.amnh.org

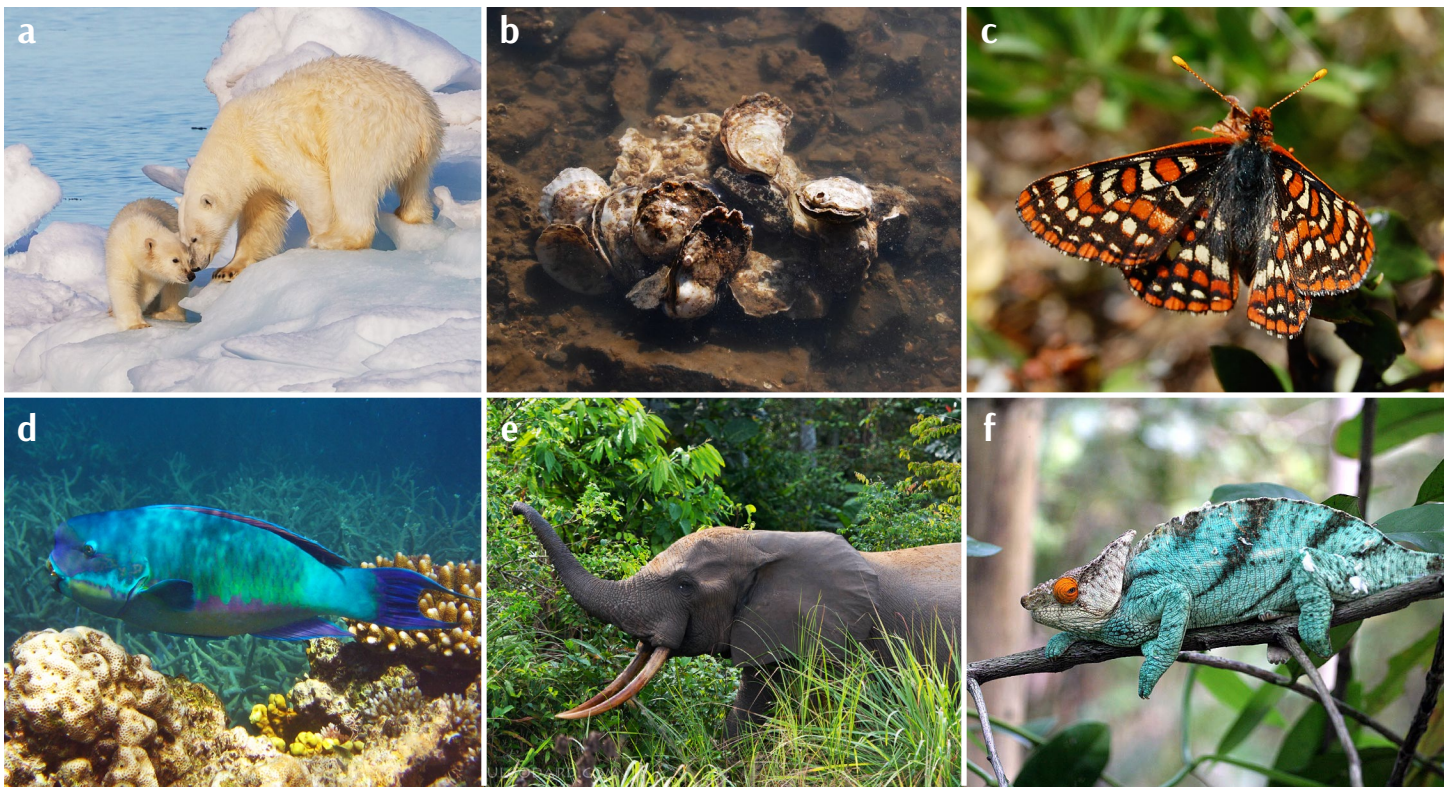


Figure 1. Examples of a) flagship species: polar bears; b) indicator species: oysters; c) umbrella species: Bay checkerspot butterfly; d) keystone species: parrotfish; e) landscape species: African forest elephant; and f) endemic species: Parson's chameleon.

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other focal species, landscape species are associated with large and also ecologically diverse areas and thus ensure the conservation of multiple species, habitats, and ecological processes that occur at the landscape level.

1.1.2. Conserving Specific Habitats

Beyond a focus on species, certain habitats with exceptional characteristics and/or threats may also be chosen for conservation. Coral reefs, the rocky intertidal, mudflats, seagrass beds, and wetlands can be considered at-risk marine systems worthy of conservation in protected areas (Airamé et al. 2003). Significant natural communities—for example, pine barrens, freshwater tidal marshes, floodplain forests, chestnut oak forests, and talus cave communities in New York (Howard et al. 2002)—may be chosen for protection in reserves. Site choice may be based on habitat characteristics, including substrates, such as hard or soft sediments, and coastline features, like sandy beach or rocky coast (Airamé et al. 2003). Depending on data availability and

scale, aspects of species distributions and demography (such as abundance, distribution, and population growth) are also considered in selecting habitats for conservation (see Airamé et al. 2003). In the absence of reliable comprehensive data, environmental, climatic, or physiographic surrogates—such as rainfall, temperature, and vegetation structure—can be employed. It is important to consider how selected sites represent the spatial area and resources used by a community of species.

1.1.3. Conserving Ecological Processes

Maintaining ecological processes or ecosystem functionality are important considerations in conservation planning. For instance, maintaining community-level interactions (such as prey-predator interactions or partners in mutualism and addressing natural levels of disturbance) are key elements of an ecological approach to foster natural processes (Scott and Csuti 1997). It is also important to consider the appropriate size and shape of an area necessary to sustain viable populations



with the adequate number of individuals. Large areas may be required to maintain metapopulation dynamics, preserve intact and/or functioning ecosystems, and to accommodate wide-ranging species.

1.1.4. Conserving Taxonomic Diversity

Priority areas may be selected to preserve *species richness* or *species diversity*. Species richness refers to the number of species present at a site while species diversity is the species number weighted by their relative abundance. Conservation priorities can be based on abundance, rarity, threat levels, phylogenetic or evolutionary distinctiveness, the extent to which assemblages represent regional diversity, or endemism. *Endemic species* are those species whose distributions are naturally restricted to the defined region (Figure 1f). Combinations of these criteria are also employed; for example, conservation planners are increasingly interested in taxonomically rich and threatened sites that could be chosen to maximize cost-effectiveness. Concentrated, long-term, and careful effort focused on such high-priority areas may ensure that a large proportion of the world's biodiversity will escape extinction.

Currently, there are several global conservation priority-setting methods based on species distributions, threat levels, and financial considerations (reviewed by Brooks et al. 2006, Venter et al. 2014). These approaches tend to focus on irreplaceability, targeting areas with high diversity and endemism of plants or terrestrial vertebrates, and threat levels. Priority-setting approaches focusing on sites with high levels of threat are considered reactive. For instance, 36 *biodiversity hotspots* have been identified² across the globe. They occupy 2.3 percent of the earth's land surface, but hold 77 percent of the world's total vertebrate species, with 11,980 (or 42 percent) of mammal, bird, reptile, and amphibian species being endemic (www.cepf.net). They also encompass at least 150,000 endemic plant species, and half of the world's vascular plants (www.conservation.org, www.cepf.net).

²For an area to be designated as a biodiversity hotspot, it needs to contain at least 0.5% of the world's vascular plant species as endemics and have lost at least 70% of its original habitat (Myers et al. 2000, www.conservation.org, www.cepf.net)

On the other hand, priority-setting approaches focusing on sites with low threat are considered *proactive*. An example of a proactive approach is the Wildlife Conservation Society's (WCS) *Last of the Wild* (Sanderson et al. 2002, Woolmer et al. 2008). Last of the Wild areas are the largest wild, or least influenced, areas in each of the biomes of the world. They are identified using biodiversity indices in combination with threat indicators, such as human population density, accessibility of the regions to human development, and land transformation (Sanderson et al. 2002, Woolmer et al. 2008).

In some cases, the level at which conservation priority areas are defined may be too coarse for effective conservation planning, possibly failing to capture finer-scale variation (Olson et al. 2001). The entire Caribbean, for example, is considered one biodiversity hotspot (Myers et al. 2000). To address this, a hierarchical approach may be employed whereby smaller sites are evaluated in terms of their importance, sometimes within these larger areas. The World Wildlife Fund (WWF), for example, focuses on priority *ecoregions* (www.wwf.org; Olson et al. 2001). An ecoregion is "a large unit of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions" (www.wwf.org). The *Global 200 Ecoregions* are the subset of terrestrial and aquatic ecoregions with exceptional biodiversity, such as high species richness or endemism, and ecosystem representation that are considered high priorities for conservation.

2. PART 2: INVESTIGATING THE BIODIVERSITY VALUE OF CONSERVATION AREAS

Your instructor will assign you a tract of land, nature reserve, park, or land reclamation project about which to make a case for conservation. Your task is to prepare a *five minute oral presentation* to present convincing evidence that an area deserves to be considered a high priority for conservation. Imagine that your audience will be voting on which area has the highest conservation priority, and this area will be awarded \$1 million USD. You are expected to present your findings using visual aids *in no more than five minutes*.

To complete this assignment, you will need to research



information available in the literature about your assigned area. At least three of the bibliographic sources you use need to be reliable sources such as peer-reviewed journals, refereed books or book chapters, and authorized databases (e.g., IUCN website). You must provide the references on your presentation. If you are not sure about what “reliable sources” means, please ask your instructor.

Your presentation should be visually appealing, and provide the following *specific information*:

1. A description of the basic physical/geographical and socioeconomic characteristics of the area.
2. A description of the major biological communities in the area of interest, including information on endemic species, critical habitats for selected species, and other unique characteristics.
3. A description of the main threats faced by the area.
4. A description of the current conservation actions and programs taking place in the area.
5. A critical analysis of how the area of interest differs from others: what does this area offer in terms of conservation value that others do not?
6. A list of valid references.

When constructing your presentation, assume your audience knows very little about your site. Make sure you provide key information to introduce your assigned area.

You will be evaluated on your understanding of the subject, selection, and use of supportive evidence, as well as organization. In addition, delivery, use of visual aids and text, and timing will also be considered. For further details, please see the evaluation rubric provided for oral presentations (See: *Sharpen your Oral Communication Skills!*, Appendix 1, in this Issue).

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