Lesson Fifteen – Stakeholders and conservation strategies

Biocompass

Where you've been

In the last lesson, you revisited the conservation case and considered it from the perspective of conservation biologists. You also learned about the basic tools that these biologists use.

Where you're going

In this lesson, you explore in detail the complexity of the decisions involved when conservation of a species is at stake. You consider the couplings between local and global systems as you learn more about conservation in the Arctic, and begin to pull together all the evidence you have gathered so far that is relevant to your conservation case.

Introduction

Many natural or human factors can reduce the biodiversity of a region. These factors, known as **drivers**, range from changes in habitat resulting from direct human interventions such as fishing, mining, and pollution, to anthropogenic but natural factors such as elements of climate change—increasing or decreasing air and water temperatures, or changes in the amount or type of precipitation. In the Arctic, species are particularly vulnerable to climate change since increasing temperatures do not only alter arctic habitat, in some cases the habitat *disappears completely* (ice floes, sheets, and glaciers.)

The strategy used to create your conservation plan will depend on the nature of your focal species. However, to create a successful plan, you need to consider many factors and influences that are interwoven in sometimes complex ways. In the science of biocomplexity, links must be found between each organism that needs conserving and the relevant factors that can be changed in order to increase populations of that organism.

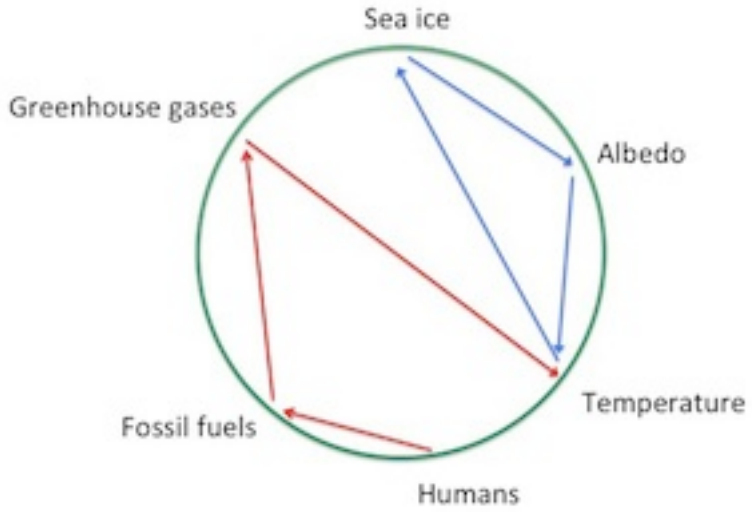
Most important, since people often live on the borders of a wildlife refuge or use the resources of a conservation area, the success of a conservation strategy may depend on including the views, needs, and concerns of humans. As you construct your conservation plan, pay particular attention to the integration of human factors.

By the end of the lesson, you will be able to answer the following questions:

- How do scientific, cultural and economic decisions factor into formulating a sound conservation plan?
- How does the study of biocomplexity relate to species conservation strategies?

Investigation

Part A – The connection circle



A connection circle shows the relationship of anthropogenic climate change (red arrows) to the positive feedback loop among sea ice melting, albedo and temperature (blue arrows).

The connection circle is a tool designed to help you think about complexity. Using a connection circle as a graphic organizer will help you focus on the conservation challenge, represent what is changing and why, and clarify linkages, coupling, and feedbacks.

Based on your work for your focal species in Lessons 8 and 11, you have already identified what is changing over time, and how it is changing. This investigation will help you visualize these changes by using a connection circle to organize your thoughts further about the conservation challenge.

Part B - Plan your species conservation strategy

1. Review the *Natural history summary* sheet, and the *Climate Disruption Impacts* sheet that you worked on earlier.

2. Make sure that you are familiar with the following:

- Habitat and range
- Reproductive cycle
- Diet and feeding behavior
- Effects of climate change on population
- Variations within the population and natural selection in response to environmental selection pressures
- Influence of human activities.

3. Discuss and identify conservation strategies that you think could be appropriately used to address the possible impacts of climate change on your focal species for each of the key factors you identified.

4. Then discuss the pros and cons of using these different strategies for your conservation plan, making sure you have a good, evidence-based rationale for your choices.

5. If necessary, go back and run the population model for your species again, using the evidence of population changes given in your species portfolio as predictors of possible population levels in the future. Also consider the capacity of your species to adapt quickly enough to climate change. Will your population persist? Why or why not?

6. Take notes as your discussion proceeds so that you can begin to finalize the evidence you will need to support your strategy or set of strategies.

Making Sense

1. If in situ methods will work, does this strategy need to be supplemented by anything else (for example, a captive breeding program because the population gets too low)?

2. If not in situ, what other strategy might work best? (Captive breeding? Translocation to a nature reserve?)

3. Consider the case in a larger context: Does the possible loss of your species population represent an irretrievable loss of genetic diversity? Do you think the species will persist elsewhere?

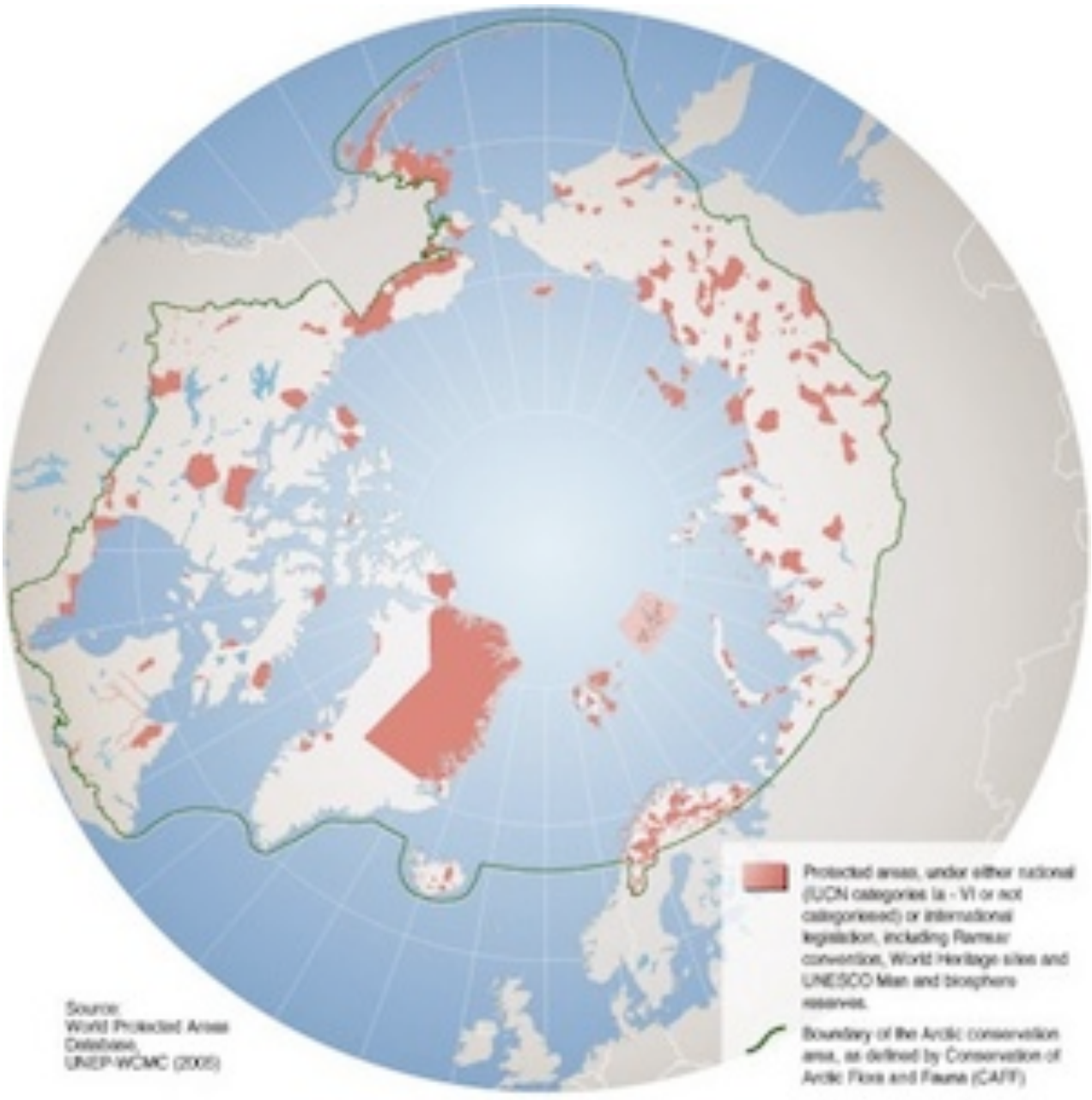
Reading: Management and conservation in the Arctic

Introduction

The goal of conservation in the Arctic is to maintain the health of its many ecosystems and ensure the protection of Arctic biodiversity. This requires the identification of habitats that are critically important to Arctic species, involving not only comprehensive habitat inventories but also assessment of all existing and proposed land uses.

Responsibility for local management and conservation of wildlife in the Arctic has rested on Arctic residents, who have become recently empowered through treaties, and the settlement of land claims. It also rests on the global community that benefits increasingly from the exploitation of arctic resources, and perhaps appreciates the arctic environment.

Conservation efforts, generated largely by groups outside the Arctic, have resulted in the establishment of many protected areas. In 2000, nearly 400 protected areas greater in size than 10 square kilometers were established throughout the Arctic, totaling over 2.5 million sq km. These conservation efforts so far have tended to focus on the conservation and management of wildlife as a separate issue from that of ecosystem or land use management.



Protected areas in the Arctic, shown in red.

However, this emphasis has seemed incomplete to many arctic indigenous peoples dependent on sustainable harvest of arctic wildlife. Instead, they argue that there is a great need in much of the Arctic for integrated plans for land, coastal, and oceanic management.

This is an excellent example of a “biocomplex” issue because it involves the "coupling" or interdependent functioning of human and non-human systems.

"Coupling" between human and non-human systems

Indigenous Arctic peoples include the marine mammal hunting Inupiaq and Inuit of Alaska, Canada, and Greenland; the Dene who hunt the caribou herds of arctic Canada; the hunting, fishing, and reindeer herding Sami of the arctic regions of Fennoscandia (the Scandinavian peninsula and Finland) and adjacent Russia; the reindeer herding and woodland hunting Dolgans of the central Siberian Arctic; and nearly twenty other cultural groups present throughout the circumpolar region. (Caribou and reindeer are different common names for the same species, *Rangifer carandus*.)

Natural ecosystems throughout the Arctic have been exploited by indigenous peoples in the Arctic for several thousand years. Wildlife has been the primary source of food, and has provided materials for clothing, shelter, fuel, tools, and other cultural items. Arctic-adapted cultures all show some similarity in their dependency on wildlife - both wild and semi-domesticated caribou/reindeer are used by inland peoples, while marine mammals support coastal peoples. Birds are also harvested annually for subsistence in most areas.

A ringed seal provides food, and skin for clothing.

Many wildlife species of the Arctic that are migratory, especially birds but also marine mammals and some caribou and wild reindeer herds, are dependent during part of their annual life cycles on ecosystems outside the Arctic. As a consequence, efforts to ensure the conservation and sustainable human harvests of migratory species require management and conservation efforts that extend beyond the Arctic.

Despite widespread temperature increases, natural ecosystems throughout most of the Arctic are still functionally intact –for now. However, energy and mineral extraction in the Arctic is becoming easier as temperatures rise and ice melts. Recent development of extraction projects tend to be large in scale, but still localized and widely scattered. Examples include the Prudhoe Bay oil field in Alaska, mines in the Taymir and Kola regions of Russia, and hydroelectric developments in northern Quebec. These have contributed to pollution of arctic waters, atmosphere and land. They have also resulted in local loss of wildlife through habitat destruction, and excessive hunting due to increased access by people from outside the Arctic.

As pressures from outside the Arctic for exploitation of its resources increase, protection is becoming increasingly recognized as essential. It also seems clear that responsibility for maintaining Arctic biodiversity must be supported through a sense of stewardship at both the local and global levels.

Conservation and management challenges

Harvest of wildlife through hunting and trapping is potentially the most manageable of the factors that influence conservation planning, at least at the local level. However, at a regional level, challenges multiply. Fortunately, indigenous peoples throughout much of the North are asserting their views and rights in wildlife management, in part through increased political autonomy over their homelands because of the settlement of land claims, or through involvement in cooperative management regimes. This is important because indigenous peoples have typically viewed their "ownership" of territory as continuous with that of other Arctic peoples and think of it as "property" held in common. This view comes into direct conflict with those of southern populations who have viewed the arctic resources as open to access and available for exploitation.

At the same time, as extraction industries expand in the Arctic, indigenous people, especially young people, are increasingly seeing opportunities for training, education and employment. Joshua Oliktoak spoke for many young people when he spoke up at a planning meeting held in the Canadian Northwest Territories town of Inuvik, "The training that usually comes to our communities is at the low end, so we end up with the low-end paying jobs. It would be nice if we could get some training where it's going to help us get work after the job is done [building future offshore gas drilling] within the region."

Indigenous people argue for integrated land, coastal and oceanic management plans.

This complex coupling between the local and the global demands collective action among a highly diverse set of stakeholders. Because of climate change, it also requires planning that assumes high ecological uncertainty about future conditions. An example of this type of ecological uncertainty can be seen in the range expansion of boreal trees and shrubs into the arctic tundra. It is important to remember that the decrease in biodiversity with increasing latitude that is a characteristic of arctic ecosystems is partly a consequence of the slow rate of dispersal of species into the Arctic following the last deglaciation. However, it is likely that climate change, projected to increase temperatures throughout much of the Arctic, and other forces, will accelerate the dispersal of plant and animal species into the Arctic.

If they change their distribution in response to a changing climate as is expected, critical wildlife habitats - for example, seabird nesting colony sites, reindeer/caribou calving grounds, waterfowl and shore-bird nesting areas, and marine mammal haul-out areas - will also change in their distribution on the landscape

over time. Consequently, anticipating the needs for new protected areas that will become important for conservation in the future will become an extremely difficult process.

Tell Me More

Hydroelectric development in Quebec takes hit with Plan Nord revision By Michael Harris, Feb 2012 Renewable Energy World online

MONTREAL, Quebec -- A measure being hailed as the "largest environmental conservation project on the planet" could close as much as 30 percent of Quebec's northern territory from hydroelectric development, sources report.

The proposal is part of a new set of guidelines for Quebec's "Plan Nord," unveiled by Quebec premier Jean Charest. Plan Nord, announced in May 2011, is a 25-year, US$80.5 billion plan that seeks to protect 50 percent of the province's northern wilderness territory. Originally, Plan Nord called for only 20 percent of the wilderness to be protected.

"We are proud of this heritage, and we want to make the Plan Nord a sustainable development and environmental protection benchmark worldwide," Charest said.

When first enacted, Plan Nord sought to increase Quebec's renewable energy output and also included measures for mining, forestry, tourism and wildlife development.

However, sources say pressure from various environmental protection groups and native Inuit tribes have led the government to scale back its aggressive energy development plan, which once included as much as 2,000 MW of hydroelectric power from about 50 potential sites.

http://www.renewableenergyworld.com/rea/news/article/2012/02/hydroelectric-development-in-quebec-takes-hit-with-plan-nord-revision

Check your thinking

What relevance do you think coupling has on your plan for conservation of your focal species?