

Expansion of Species

Natural environmental changes such as droughts can lead to the expansion of a species' range. For example, a long-lasting drought can change an ecosystem to make it more suitable for plants adapted to dry conditions. These plants could expand into the ecosystem and outcompete plants that are less well-adapted to the dry conditions. Humans can also cause environmental changes that lead to the expansion of species.

Increasing Populations

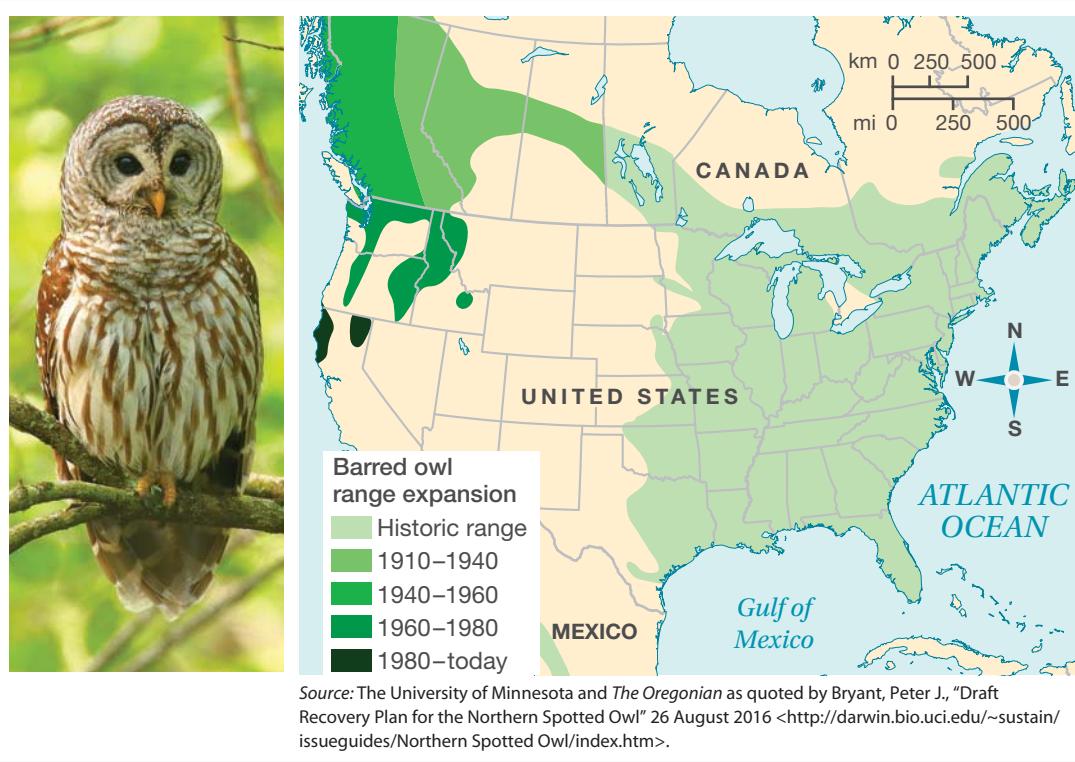
Historically, the barred owl lived in the eastern United States. The Great Plains served as a barrier to the westward expansion of many species that lived in forests, including the barred owl. The Great Plains were maintained in part due to regular burning by Native Americans and the disturbance caused by massive herds of buffalo. Much has changed in these ecosystems over the past 100 years. The plains are no longer burned, herds of buffalo no longer shape the landscape, wildfires are put out, and the climate has warmed. These environmental changes are potential causes for the barred owl range expansion across British Columbia in Canada into Washington, Oregon, and northern California in the Pacific Northwest region of the United States. The warming climate could have made Canada's northern boreal forests more suitable for the barred owl. The owls may have used this habitat as a bridge to reach the Pacific Northwest. Another possibility is that the barred owl worked its way across the plains as settlers planted trees and encouraged tree growth along streams. The owls could have used these intermediate habitats to journey from eastern forests to western forests.



Gather Evidence

Why might it be easier for plants than animals to expand their ranges?

FIGURE 8: Barred owls benefited from environmental changes that increased suitable habitat.



Climate Change and Species Expansion

Climate change is affecting different areas in different ways, from rising sea levels to an increase in average global temperature. As areas warm, they may become more suitable for organisms that were previously kept out due to uninviting habitat conditions. For example, polar bear habitat in northern Canada was once too cold and inaccessible for grizzly bears. As this area warms, it becomes more suitable habitat for grizzly bears. Because of these environmental changes, grizzlies have expanded their range into polar bear habitat. This movement could lead to a wider expansion of grizzly bear populations in the long term.



Language Arts Connection

Using library and Internet resources, research the potential long-term effects of grizzly bears moving into polar bear habitat. Is this a problem? Write a short magazine-style article detailing your findings and position. Use images, graphs, and data to support your claims.

FIGURE 9: Grizzly bears have expanded their range into polar bear habitat.



Analyze

How can climate change lead to the expansion of a species?

The expansion of species into new territories can also lead to hybridization. Hybridization occurs when two distinct, but closely related, species are able to successfully mate together. Sometimes, the features shown by the hybridized species fall within the range of characteristics shown by one or both of the original populations. Over time, as the two species continue to interact with one another, they may become a single species.

In the case of grizzly bears, as climate change lets them expand their territories northward, they are interacting more and more with polar bears. Because both bear species are closely related, they are able to successfully mate and produce viable offspring. Some scientists worry that this inbreeding may result in the disappearance of the polar bear as a separate species, particularly as it is already being threatened by habitat loss due to climate change.



Explain How would population expansion most likely occur in the silversword alliance, assuming these plants underwent adaptive radiation?