

Investigation 1.C: Ecology of an Endangered Prairie Ecosystem Answer Key

Answers to Analysis Questions

1. Factors threatening the existence of the prairie ecosystem may include use of land for agriculture or urban development, pollution, and atmospheric changes and climate change. Factors threatening the existence of your endangered species may include the above, as well as habitat fragmentation, loss of breeding grounds, hunting/predation, disease, and lack of food. Other answers may also be acceptable.
2. The loss of a species will have repercussions throughout the food web. Such extinction would likely increase the population of species in the trophic level below, as the extinct species would no longer be feeding upon these species. This effect will be greater if the extinct species in the higher trophic level had consumed the species at the lower trophic level as its main food source. Similarly, such extinction would likely decrease the population of species in the above trophic level since the species in this trophic level would have less to consume. This effect will be greater if the extinct species was the primary food source of the species at the higher trophic level. A wider menu selection means that consumers are less likely to be affected by a decrease in one of their food sources. As a further result of such extinction, the species at the higher trophic level may in turn change their diet to consume other species, altering the food web further. As a result of these changes, energy transfer would follow a different path through the food web.
3. In general, the more diverse the pathways of energy transfer, the greater the stability of an ecosystem. This is the case because, when organisms have more diverse feeding habits, a population change or extinction of one species is less likely to lead to population change or extinction of other species that depend on it as their primary source of food. Similarly, a population change or extinction of one species is less likely to lead to a population boom in its major prey species if other species are also consuming that species as prey. Changes to the food web you hypothesized in Procedure step 2 may affect the endangered prairie ecosystem by decreasing the stability of the ecosystem as indicated above. You should give specific examples where possible.
4. Make specific references to your research findings and provide a well-reasoned explanation.

Answer to Extension Question

5. Answers should include the pros and cons (benefits and costs), feasibility of the action plan, and how it would be carried out.