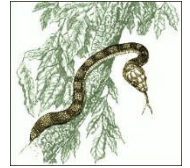


Blizzard Bag Lesson #2: Impact of Invasive Species

(Biology – Grade 10)

Objective: Explain the impact of invasive species on an ecosystem

Overview: Species that are not normally found in an ecosystem can cause major disruption to the balance of an ecosystem. Called invasive or non-native species, these organisms are often introduced by human activities. In our nearby Great Lakes, the zebra mussel is one such organism that has resulted in a decades long struggle to restore the ecosystem to its natural state. Other species, such as the brown tree snake on the island of Guam, has resulted in the same impact for this ecosystem.



Directions

- 1.) **Read** the included article and **answer the critical thinking** questions at the end.
- 2.) Visit **either or all** of the following and **write a paragraph summarizing** what you feel are the best methods of to address issues of invasive species.

Explore this Website: <http://www.epa.gov/greatlakes/invasive/>

Explore this Website (includes video) : <http://www.npr.org/blogs/thetwo-way/2013/12/03/248386912/dead-mice-update-tiny-assassins-dropped-on-guam-again>

Explore this Website: (includes video): <http://www.jsonline.com/news/wisconsin/formidable-invasive-species-wont-be-easy-to-keep-out-of-great-lakes-b99297517z1-267014431.html>

How to turn in this assignment:

- 1.) Turn in the answers to the required questions, either typed or neatly written, to your teacher by the due date.
- 2.) If you do not have the ability to print your document from home, you may do so when you return to school and/or you may email the assignment to your teacher.

No Internet Alternative:

If you do not have Internet access at home, see your teacher to arrange a time during your study hall or before or after school to access the materials and complete your response.

Populations and How They Grow

Enrich

Skill: Drawing conclusions

Uninvited Guests

Each of Earth's environments has evolved to accommodate the populations of many different species. Every population in an environment plays a role in regulating the growth of other populations. The result is a delicate balance of numerous individual populations. These populations may periodically experience booms and busts, but their overall size remains fairly constant over long periods of time.

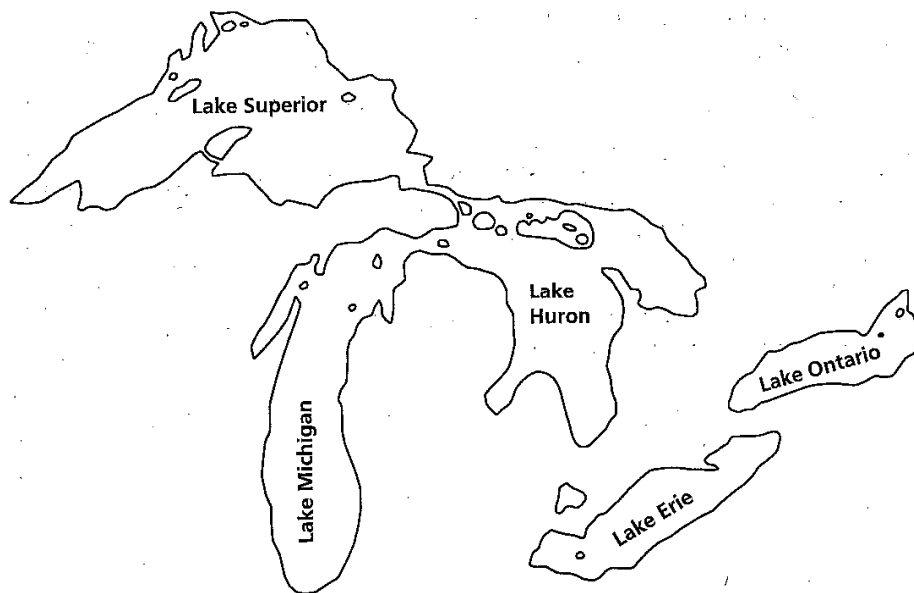
The balance of populations can be upset with the introduction of a new species. If conditions are right, the introduced species may undergo a rapid and sustained population explosion. This growth occurs at the expense of native species and can have far-reaching ecological and economic effects.

One species that was introduced into an environment and has had major effects on the adopted environment is the zebra mussel. The zebra mussel is a freshwater mollusk about the size of a fingernail. Scientists believe the zebra mussel hitched a ride to North America from its native waters in Russia on a ship in 1985 or 1986. The

zebra mussel quickly became established in all of the Great Lakes and in eight river systems, including the Mississippi.

In their native environment, zebra mussel populations are kept in check by predators and competing mussel species. However, the zebra mussel has no major predators or competitors in North America, and its populations have grown at a tremendous rate. The reproductive potential of this mollusk is staggering—a single female zebra mussel may release over five million eggs per year!

Zebra mussels are filter feeders, which means that they get their food by straining tiny plants and animals out of the water. There are now so many zebra mussels in Lake Erie that they can filter the entire lake in ten days. The mussels are so effective at filtering the water that very little food is left for native species. As a result, both native mussel and fish populations have declined sharply. Virtually all native organisms, from primary producers (tiny aquatic plants) to carnivores (large fish) have been adversely affected by the zebra mussel. This ecological



Populations and How They Grow **Uninvited Guests** (continued)

upheaval is taking a huge economic toll. The United States Fish and Wildlife Service has estimated that the zebra mussel could cost the Great Lakes region \$5 billion by the year 2000.

Another example of an uninvited guest is the brown tree snake on the island of Guam. The first few snakes arrived on the island as stowaways on planes and ships. Since their arrival, the population of the brown tree snake has undergone an explosion. Scientists estimate that Guam now has 10,000 to 30,000 brown tree snakes per square kilometer. The tremendous success of these snakes has come at the expense of the birds of Guam. Since the arrival of the brown tree snake, nine of Guam's eleven native forest bird species, some found nowhere else on Earth, have become extinct. Other bird populations have experienced dramatic decreases in size.

How could the brown tree snake multiply so quickly? The explanation is simple. In their native habitats of Australia and Papua New Guinea, brown tree snake populations are limited by the availability of birds, their preferred prey. The birds in Australia and Papua New Guinea have evolved ways to defend themselves from the snakes. However, the birds in Guam had not evolved these defenses because, before the recent invasion, there were no snakes on the island that preyed on birds. When brown tree snakes arrived in Guam, they found a plentiful food supply and no competitors.

The damage caused by the brown tree snake is not limited to the disappearance of native bird

species. The climbing snakes also damage power lines, costing Guam millions of dollars per year.

In addition, the bite of a brown tree snake can be poisonous to small children.

When a species establishes a permanent population in a new environment, populations of native species are reduced or eliminated. In this way, balance is restored to the environment. The zebra mussel and the brown tree snake are just two of many examples of species that were introduced into new environments and have caused extensive damage as a result. Although introducing a species to an environment does not always have negative results, such as in the cases of wheat, soybeans, and cattle, ecologists are discovering that the unintentional introduction of nonnative species can cause widespread and unpredictable ecological change.

CRITICAL THINKING

1. Do you think that importing other Russian species to compete with the zebra mussel would be a good way to control the mussel's growth in North America? Explain your answer. (*Making judgments*)
2. The population of brown tree snakes on Guam cannot grow forever. Eventually, the population will be limited. What do you think will ultimately limit the size of the population? (*Making predictions*)