

Read the following article carefully and **make notes in the margin** as you read. Your notes should include:

- Comments that show you **understand** the article (summary statement, main ideas, etc...)
- Questions that show what you are **wondering** about as you read
- Notes that differentiate between **fact and opinion**
- Other observations, comments, and thoughts

As you **read** also use your **Active Reading Marks** and write on the article to show your thoughts and feelings.

The Case for Invasive Species

By: Bill Chameides, Dean at Duke University School for the Environment

Notes on my thoughts, reactions, questions...

seems like unreliable source!

Why We Hate, Kill and (Try to) Eradicate Invasive Species

The avid antagonism aimed at invasive species is not without reason. Time and again we have seen a species from some distant shore sneak into our home ecosystems and bring about a serious ecological disruption. Consider just three of thousands of examples.

Kudzu, introduced from Japan in 1876, now buries landscapes beneath the weight of its vines.

Sea lampreys, native to the Atlantic Ocean, found their way into the Great Lakes and decimated that fishery.

WTM (100)

Cryphonectria parasitica, a devastating fungus commonly known as the chestnut blight and believed to have been introduced to the United States on fungus-bearing chestnut trees imported from Japan, all but wiped out the magnificent American chestnut tree in the 20th century, which in turn collapsed a number of moth species dependent on it.

Invasive species are also seen as an almost existential threat to biodiversity. Australia's national science agency, calls invasive species "one of the greatest threats to biodiversity, and to the ecological and economic well-being of society and the planet."

!/:
Yikes... Can they be stopped?

The University of Illinois reports that "introduced species are a greater threat to native biodiversity than pollution, harvest (agriculture, forestry, fisheries), and disease combined." Compared to other threats, invasive introduced species rank second only to habitat destruction, such as forest clearing. Finally, damage to the U.S. economy inflicted by introduced species is estimated at \$137 billion per year."

!!!
Holy cow! That's crazy! Now what!

If that isn't an indictment of invasive species, I can't imagine what would be. But are these statements accurate portrayals of the impact of invasive species? ←

Hmmm...? Huh?

Are Invasives All That Insidious?

While the accepted wisdom is that invasive species suppress biodiversity, the data supporting that argument is not all that strong. In fact, Jessica Gurevitch and Dianna Padilla of Stony Brook University argue that "the link between species invasions and the extinction of natives is widely accepted by scientists as well as conservationists, but available data supporting

Main Argument

invasion as a cause of extinctions are, in many cases, anecdotal, speculative and based upon limited observation."

In fact, there is a good deal of data that suggest something quite different.

* • An analysis of invasive species found that the effect on biodiversity depended upon the scale considered. At larger regional scales studies have concluded that "no native species have gone extinct from the introduction of plant competitors ... even in locations that are infamous for being devastated by species invasions, such as remote oceanic island." (They obviously did not consider humans in this analysis but more on that later.)



WUK?

• *Conservation* magazine, reports that "there is less than one extinction of a native species for every successful colonization of an alien species."

But, even one's bad... food chain?

* • A 2012 article in *Conservation Biology* states that "the effect of regional species introductions is generally an increase in diversity. Such an increase has occurred with plants, mammals, birds, fishes, and many other groups on both islands and continents worldwide."

Positive? who knew...

• Another article reports that "Britain, for instance, has gained 1,875 established non-native species without yet losing anything to the invaders."

* • Lastly, Padilla reports that of the 18,318 species listed by the International Union for Conservation of Nature as "extinct, endangered, or threatened globally," only 6 percent "list direct and indirect effects of all kinds from naturalized alien species as contributing to their decline." The greatest threat, by the way: loss of habitat caused by you know who. me? People

Is it just possible that invasive species have been given a bad rap? I think so...

What Is Invasive When Everything is Changing?

To me, the whole notion of invasive species gets kind of muddled when we recognize that we live in a warming world. Think about it: our notion of how species will survive with climate change is that they will be able to migrate to higher latitudes and altitudes. In fact in an article from 2011 in *Conservation Biology* "speculates that non-native species might contribute to achieving conservation goals in the future because they may be more likely than native species to persist and provide ecosystem services in areas where climate and land use are changing rapidly."

Sorry, earth.

Good point... and then aren't we partly to blame?

Interestingly, while conservationists plot campaigns to eradicate invasive species, they are at the same time working to create wildlife migration corridors to facilitate species movement in anticipation of further climate change. In other words to help species migrate to -- invade -- a new habitat. Do these species get a hostile reception as invasive once they arrive, or a warm welcome as climate-change survivors? I vote the latter - survivors.

Don't like lamprey? Carp, but deer are OK!

And that wouldn't be without precedent. After all, we've welcomed many a plant species for a very long time. Think apples and tomatoes for starters. (The vast majority of the fruits and veggies we eat are non-native.) And where would we be without the European honey bee?

Waa... never thought about that... So, maybe some are OK!

We Are All Invaders

The way I see it: much of the arc of life on planet Earth is the story of invasive species. There is a never-ending search for new habitats. And there is genetic mixing that results between two individuals (e.g., a native and invasive individual) to create new and unique genetic codes. I suspect that efforts to keep ecosystems genetically the same are ultimately doomed to failure. They may be a bad idea as well. We earthlings are blessed with a genetic diversity that is in many ways a product of species invasion. Why would we want to stop now?

kind of a cool thought...

Ultimately, invasives do not represent a zero sum game. And more conservation scientists are recognizing this. As our ability to hold on to pristine, functioning environments free of human influences dwindles, scientists on either side of the debate are looking at new ways to proceed.

And finally, when we talk about invasive species, let's be honest -- by far the most invasive, the most destructive species on the planet is *Homo sapiens*. Despite all our faults, I vote we leave *Homo sapiens* off the list for eradication. And if the worst of the worst is left off the list... then we leave less back off?

Decent arguments... how accurate is it though?

Source: Adapted from http://www.huffingtonpost.com/bill-chameides/the-case-for-invasive-species-b_4084391.html

1. Based on this article and what we have learned in class, provide a definition for **invasive species**.

A species of plant/animal that is not native to its current area, often has negative consequences and disrupts the ecosystem's food web.

2. According to our textbook and this article, why are invasive species a problem (hint: food web, food chain)?

See Above... but, they usually cause damage to the ecosystem by disrupting the food web!

3. Identify one invasive species mentioned in this article and explain its effect on its new environment.

Sea Lampreys → They are like a vampire fish - a parasite - they attach to native fish in the Great Lakes like trout and kill them. This really causes big problems for the food chain.

4. Provide three arguments from the article in favor of invasive species:

- Increase biodiversity
- Not damaging on large scales
- Rarely actually cause extinction

5. Do you support the author's thesis (main argument) that invasive species are not the threat that many claim them to be? Be sure to support your answer with at least three supporting details. Feel free to conduct your own research to help your answer.

The author makes some interesting claims that I was not aware of and hadn't really thought about. I have only heard about the negatives of invasive species. One point that he makes that I find interesting is that new species (invasive species) actually increase the biodiversity of an area, which I think is a good thing. Another strong argument he makes is that on a large scale, we haven't seen any plant extinctions. Lastly, there have been very few extinctions overall.

However, I still am unsure. I read in the news yesterday that some Asian Carp are now reproducing in the Great Lakes Watershed... Not cool! I know the Asian Carp are bad news and a big problem.

Ultimately, I am torn. Some invasive species are not a problem, whereas others are. It is important for us to carefully study invasive species and use our best judgment as to which should be allowed.

But, the most concerning thing to me is my impact on the world as an "invasive species"... hah... food for thought!