



HISTORY OF BALD EAGLES AND DDT

Prepared by James River Association

Today, when you spend time along the James River, you are likely to see a few bald eagles soaring above the water. Tragically, 50 years ago, that wasn't the case. In the 1970s, the bald eagle had all but disappeared from Virginia. The culprit was DDT - a widely used pesticide that, when ingested, prevented the eagles from reproducing successfully by weakening their offsprings' eggshells. The bald eagle population declined and became critically endangered. At their lowest point, there were zero nesting pairs of bald eagles left along the James River. Several interventions from humans -- such as banning DDT and protecting habitat -- helped restore the bald eagle population to a stable and healthy size. The story of the bald eagles is one of our greatest success stories. When you see bald eagles flying by the river, you are seeing the proof that humans can repair damage to the environment if they take strong enough action.

Bald eagles (*Haliaeetus leucocephalus*) are native to North America, including Virginia. They can live to be 20-30 years old, and their wingspan can reach up to 8 feet long. Their preferred habitat is forested regions alongside bodies of water. Most of their diet is fish, but bald eagles will also hunt small mammals, other birds, reptiles, and they will also sometimes scavenge. They are also the national symbol of the United States.

Read the following website article and answer the questions below.

<https://abcbirds.org/bald-eagle-the-ultimate-endangered-species-act-success-story/>

1. What is DDT?
DDT is a pesticide / insecticide
2. How, specifically, did DDT harm bald eagle populations?
DDT weakened the shells of bald eagle eggs, which made them less likely to survive.
3. At their lowest point in 1963, how many bald eagle nests were left in the lower 48 states?
417
4. What is the Endangered Species Act (ESA)? When was it made into law?
The Endangered Species Act is a law that protects species at risk for extinction. It became law in 1973.
5. Name three protections the ESA gave bald eagles:
 - It **banned DDT**.
 - It protected their **nests** from human disturbance.
 - It protected their **habitats** from destruction.
6. When were bald eagle populations recovered enough to be delisted from the ESA?
2007
7. What are 2 threats bald eagles still face today?
Ex: poisoning from lead ammunition, SGARs (rodent-killers), habitat loss

Every two years, the James River Association (JRA) publishes a comprehensive assessment of the health of the James River. Access the most recent version here, and use it to answer the following questions: <https://thejamesriver.org/stateofthejames/>

8. What number of breeding pairs is the JRA benchmark for a healthy breeding population?
120 breeding pairs.
9. What was the first year the James River eagle population passed that benchmark?
2006
10. Pick one other metric on the interactive State of the James Report. What is the JRA benchmark for a healthy value, and what was its actual value for 2019? Was it healthy?
Ex: The healthy benchmark for American Shad is a catch value index of 35, and in 2019 its catch value index was 1. That is not healthy.

In the article, Hesiman defines the “take” of a protected species is defined as “killing, capturing, or otherwise harming” them. She also poses a question: “how much take is too much?”

What do you think? How much should we limit human behavior in order to protect an endangered species? What is the right thing to do ethically? Environmentally? Legally? Why? What counterargument might someone with an opposing viewpoint make, and how would you attempt to persuade them?

Write a 6-10 sentence response that 1) makes an argument, 2) acknowledges an opposing viewpoint, and 3) uses at least 3 facts from the article to support your argument.

Strong answers have:

- A clear THESIS (argument) (bolded pink)
- A clear COUNTERARGUMENT (blue)
- Strong ANALYSIS
 - Include 3 FACTS from the article (purple), & use the facts to support their claim.
- Clear communication (minimal spelling and grammar errors).

Ethically and ecologically, we are dependent upon a healthy environment. **Therefore, when human activity endangers a species, we owe it to them to limit human activity and repair their population.** While some people might argue that restrictions on hunting, agriculture, and industry are too limiting on human freedom, the alternative is the loss of important animal species like the bald eagle. At their lowest point, there were only 417 bald eagle nests in the lower 48 states; after banning DDT and listing bald eagles as endangered species for about 25 years, that number increased to 5,000. The Endangered Species Act is effective. For example, 41 other American bird populations have improved thanks to ESA restrictions. Lastly, the chemicals that biomagnify and harm high-level consumers like bald eagles have a high potential to harm humans, too. The most responsible thing to do when a wild species is endangered is to limit human activity -- to protect not just them, but also ourselves.

When a species like the bald eagle is in danger, some limitations are effective at protecting the species, but too many restrictions will unduly infringe upon human freedoms. On the one hand, banning DDT was an important step, and it helped the bald eagle population recover and become de-listed in 2007. That said, a pesticide by definition exists to poison pests, and these agricultural poisons are necessary to protect crops. It would be unethical to ban *all* pesticides and permit people to starve. The ESA also prohibited human disturbance of bald eagle habitats, which limits human recreational activities. Although bald eagles are largely recovered, the article lists lead ammunition as one of the most serious modern threats to bald eagles. Banning lead would require people who want to hunt to purchase non-lead bullets, which can be more expensive and unfair to low-income Americans. Rather than banning lead ammunition, perhaps the government could use a financial incentive to make non-lead alternatives more affordable. In short, restrictions are important, but should not come at the cost of human health and equity.

RUBRIC

Thesis statement (0-3 points)

- 0 = There is no argument.
- 1 = There is an argument, but it is unsupported or unclear.
- 2 = There is a somewhat strong argument with ok support, clarity, and/or nuance.
- 3 = There is a strong argument with excellent support, clarity, and nuance.

Counterargument (0-3 points)

- 0 = There is no counterargument.
- 1 = There is a counterargument, but it is flimsy/unevidenced/unreasonable.
- 2 = The counterargument is moderately strong and rational.
- 3 = The counterargument is strong, rational, and supported by facts.

Evidence: 3 facts from the article (0-3 points)

- 0 = no facts from the article included
- 1 = 1 fact from the article included
- 2 = 2 facts from the article included
- 3 = 3 facts from the article included

Analysis: clear connection from evidence to claim (0-3 points)

- 0 = there are no facts.
- 1 = the facts do not support the claim
- 2 = writer attempts to support the claim, but with limited clarity or nuance
- 3 = the facts support the claim, and the argument has clarity and nuance

Spelling and grammar (0-3 points)

- 0 = unable to understand
- 1 = difficult to understand
- 2 = there are some errors, but the reader can still understand
- 3 = no spelling or grammar errors.

Thesis statement: ___/3

Counterargument: ___/3

Evidence: ___/3

Analysis: ___/3

Spelling and grammar: ___/3

TOTAL: ___/15

Biomagnification

Watch these short YouTube videos:

<https://www.youtube.com/watch?v=85I7oPWUuak>

<https://www.youtube.com/watch?v=fcVRK6ALXMo>

In your own words, define biomagnification:

Biomagnification is when toxins accumulate at higher trophic levels.

Create your own food pyramid with the organisms from your local habitat.

Tertiary consumer

Bald eagle

Secondary consumer

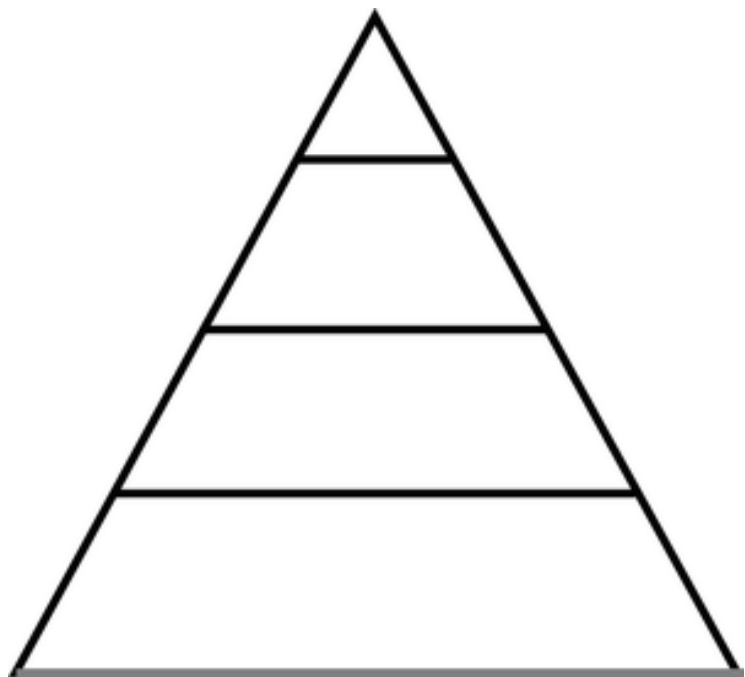
Blue catfish

Primary consumer

Menhaden

Producer

Phytoplankton



Now, imagine a toxin has been released into your food pyramid's environment. Assuming the concentration inside your producers is 1 unit per organism, and each organism eats 10 of the lower level's organisms per day, what will the concentration be at each trophic level?

Producer = 1 unit per organism

Primary consumer = **10 units per organism**

Secondary consumer = **100 units per organism**

Tertiary consumer = **1,000 units per organism**