



Figure 1. An Image of Beltzville Lake. Built by the US Army Corps of Engineers as a means of Flood Control for the Lehigh Valley.

Can stocking Fingerlings better balance the food web in an anthropogenically established lake?

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Background

- As an anthropogenically established lake, (Kristensen et al., 2020) Beltzville (figure 1) has minimal nursery and spawning habitats (Dietz 2006). At the bottom there is Big Creek Valley Village (times news) but as the lake is 949 acres (DCNR) it would be insufficient for all of its aquatic inhabitants.
- There is marked instability in Beltzville Lake food web, as marked by the fluctuations of the predator fish populations (Esox genus). (Pennsylvania Fish and Boat Commission)

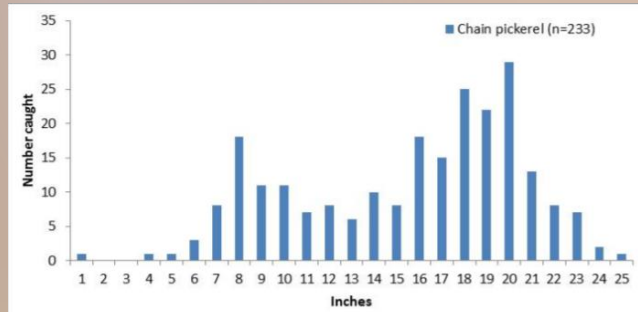


Figure 2. Frequency graph of Esox Americanus sizes. Despite the long length of these fish, they are incredibly thin, with their sparse shoreside habitats being to blame.



Figure 3. A Photo of Area Fisheries manager Dave Arnold with a 42in Esox Masquinogy, a rarity in the lake

Motivation

- To supplement the limited spawning of a variety of fish species, the lake stocks fingerlings. However transplanted fish not only need more space, but have higher mortality rates, indicating poor adjustment (Monk et al. 2020). Survival of stocked fingerling Esox Masquinogy to legal harvest size is extremely low in this lake (figure 3); The bone-thin appearance, despite the high frequency of lengthy Esox Americanus (figure 2) may be attributed to sparse shore habitats with even sparser forage organisms to feed on (Pennsylvania Fish and Boat Commission)
- we propose monitoring the lifespan of the fingerlings to see if they live long enough to mature and balance the fluctuating food web at the lake.**

Intended Analysis

- Given that our response variable (fingerling mortality) is continuous, and our independent variable (habitat or no-habitat) is categorical with 2 groups, we will analyze the data collected using a T-Test.
- The output from the T-Test will help us identify whether there is a habitat related difference or is there a difference in lack of habitat. As we are limited in selecting sites that already have established habitats (or lack thereof) in the lake, our inferences will be limited to our study area.

Hypothesis

- We Hypothesize that there is a connection between stocking fingerlings and the presence of whether or not there is a habitat.

Predictions

- We predict that fingerling mortality, as measured by the number of fingerlings that do not manage to reach adulthood, would be highest in areas with little to no habitation, and would be lowest in areas with greater habitation.
- We predict that if more fingerlings are capable of reaching adulthood, then they will be better able to balance the food web problem in the lake.

Study Design

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Expected Benefits

- Freshwater ecosystems are already fragile in part because of their sensitivity to environmental change. Since many public lands, like that of Beltzville Lake, are managed for wildlife and recreational reasons, it is critical to better understanding the underlying problem of food web instability in the lake and what practices can influence this food web.