

**Revealing Yellowstone's**

**Vital Signs Through**

**Machines**

# Controversy

For a long time now our relationship with Yellowstone has been driven by passion.



Wolves have a dark and complex history in this country, and the wolves of Yellowstone are the epitome of this struggle. We begun by hating wolves for killing our livestock; our most prized possession. This breed a deep seeded anti-wolf culture that still exists today.

In the middle of the 20th century when Manifest Destiny was in full swing the job of wolf killing was transferred to the government. The government took the job very seriously and made it into a science. All but a few packs were exterminated from the country. The country was free of wolves and livestock prospered.



Jesse Butterfield

As the world modernized so did the farming industry. More and more of our livestock were raised by industrial farming operations. This was an unforeseen blessing for wolves, as people moved further and further from there food sources they forgot why we hated wolves to begin with. When the prospect of wolf reintroduction was brought up a small minority of farmers spoke up against it but the majority of urban residents had no reason to oppose wolves in the national parks they enjoy.

***Most visitors don't know or appreciate the controversy, history, and impact that is integral to the mythology of wolves in Yellowstone. This is true for almost all resources in the park and this lack of understanding doesn't harbor empathy or stewardship.***

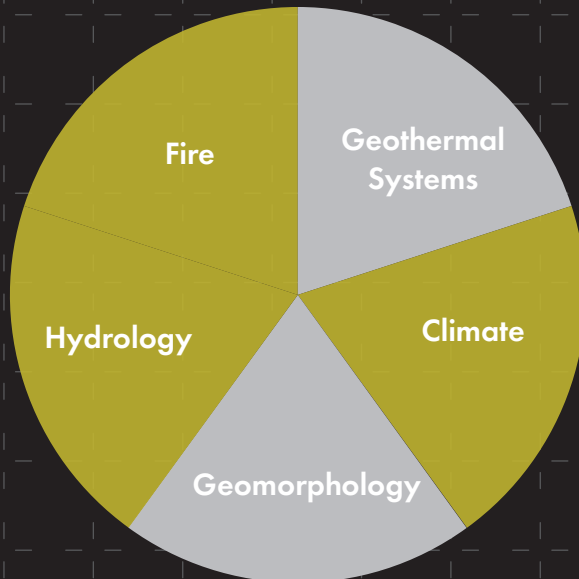


# Vital Signs

A Subset of physical, chemical, and biological elements and processes of the represent the overall health of the park.

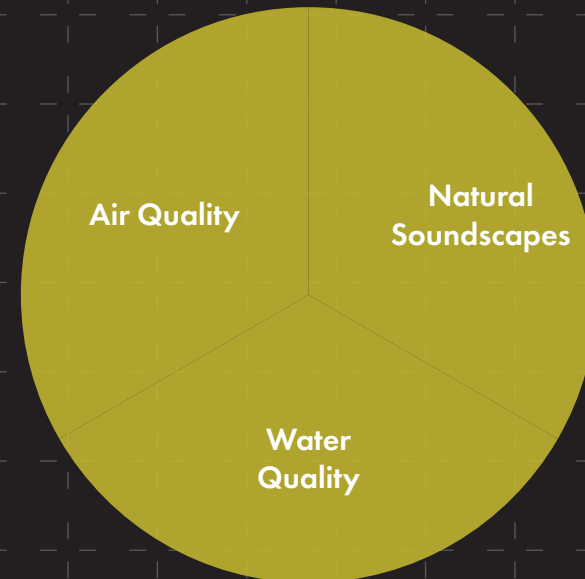
## Ecosystem Drivers

The major external driving forces that have large-scale influences on natural systems. Drivers can be either natural forces or anthropogenic influences.



## Environmental Quality

Parameters that are part of our environment and have a direct effect on humans and other organisms. The effect can be positive, neutral, or negative, depending on the state of the environmental quality parameter. In addition, environmental quality can be affected by human activities and natural influences that occur both inside and outside of the park.



Declining



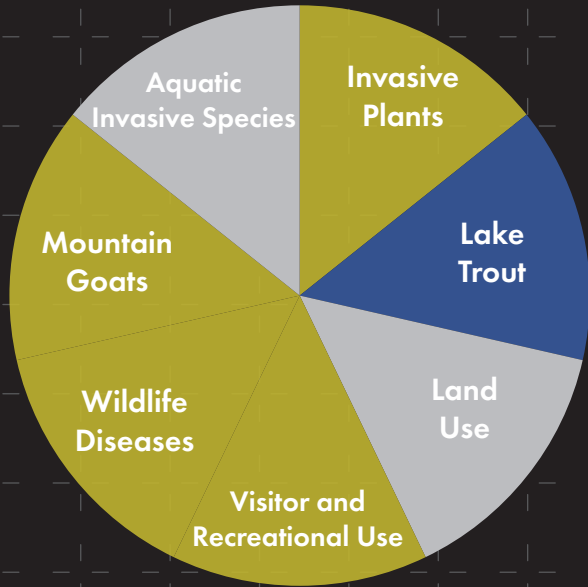
Stable



Improving

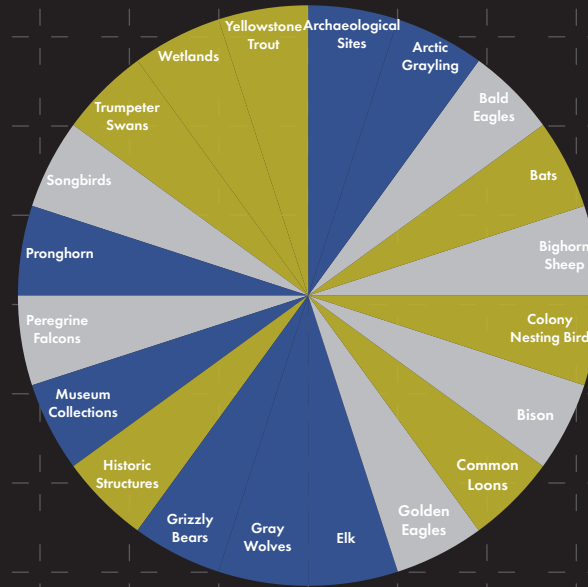
# Ecosystem Stressors

Agents that cause significant changes in the ecological components, patterns, and relationships in natural systems or cultural resources. The effects of stressors on park resources can be positive or negative. In this report, most of the stressors are having negative effects on other resources.



# Resources

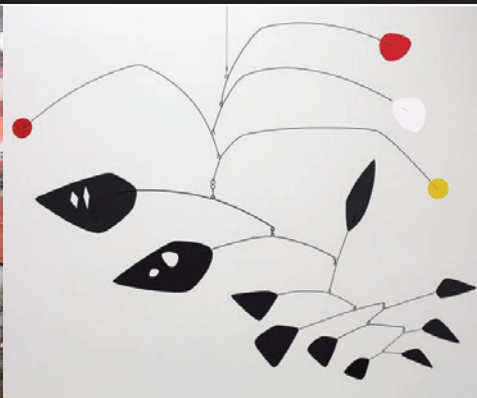
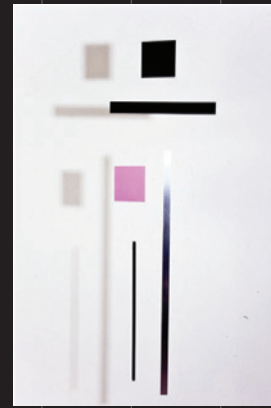
Both man-made and natural resources that the park has identified as important to the culture or ecosystem. Can range from animals to plants and includes Historic Structures and Museum Collections.



***Many aspects of the Greater Yellowstone Ecosystem are in poor health and are getting worse. Yellowstone National Park doesn't easily impart this knowledge onto visitors. Unless you read their Vital Sign Report people drive through the park believing it is frozen in pristine condition.***

# Opportunity

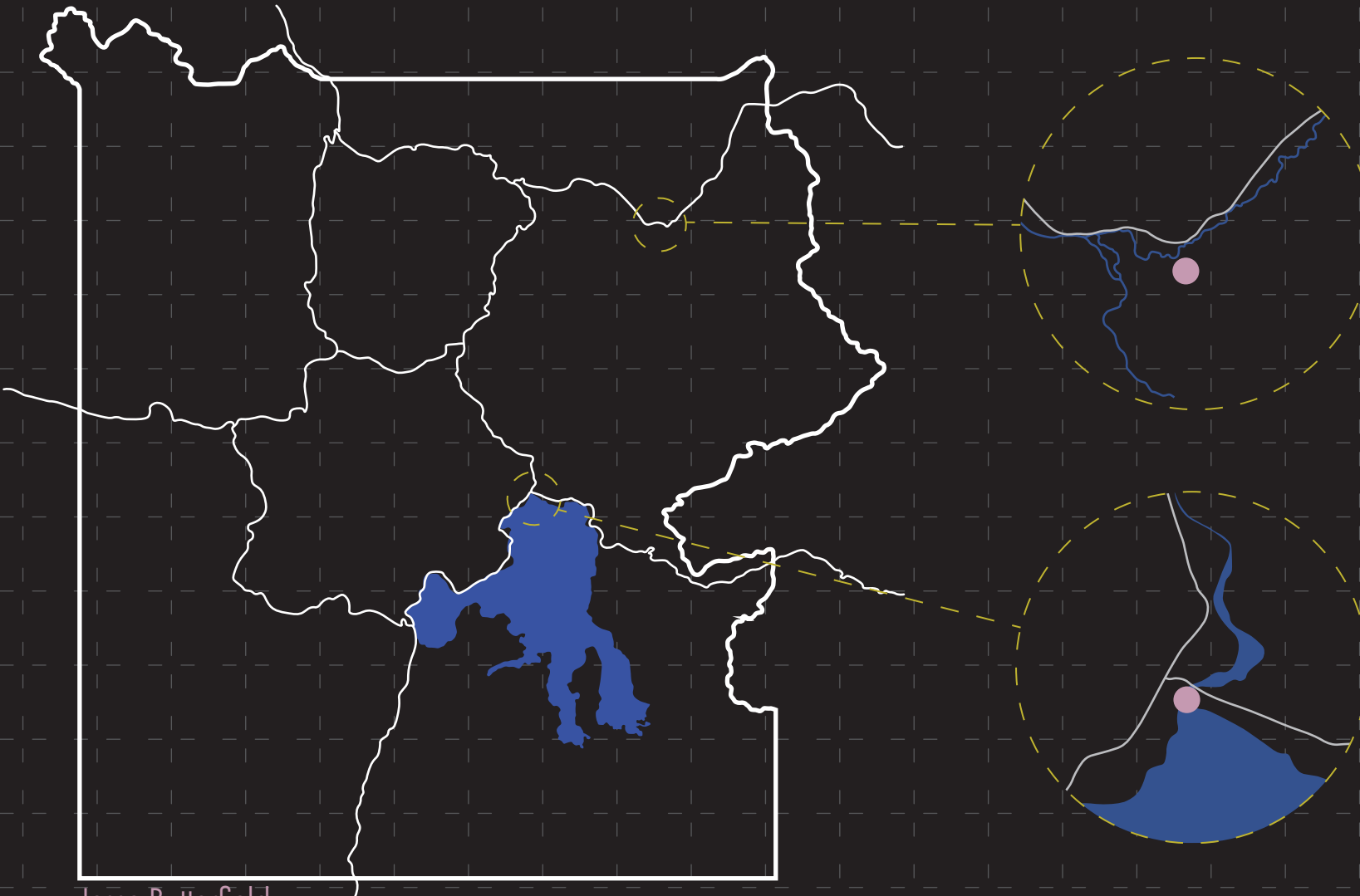
*Create three-dimensional representations of current vital sign data and incorporate them into the park to give visitors a glimpse into the health of the park and connect visitor actions to consequences.*





# Machine Locations

The machines will live through out the park in spaces relating to the vital signs they represent.



# Air & Water Quality

Direct link to visitation that shows how local consumption alters and harms the environment. These two vital signs are closely connected through water cycle.

Measures: Jesse Butterfield

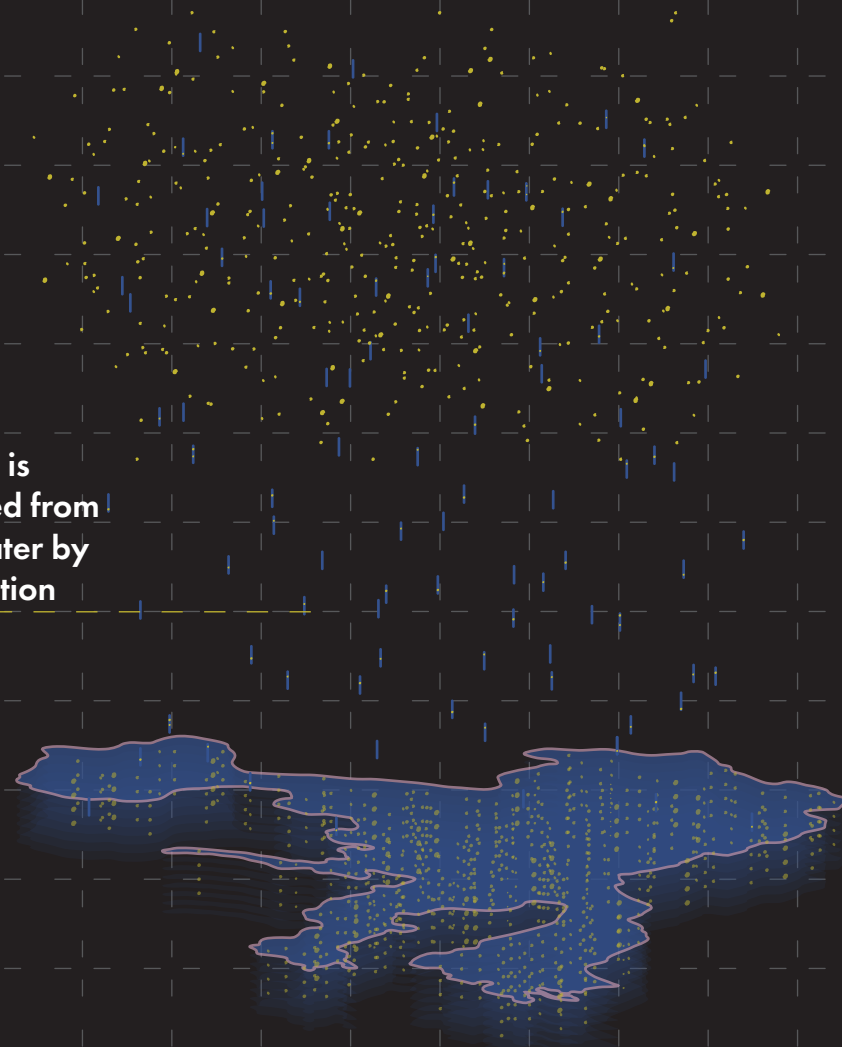
Nitrogen

Carbon Dioxide



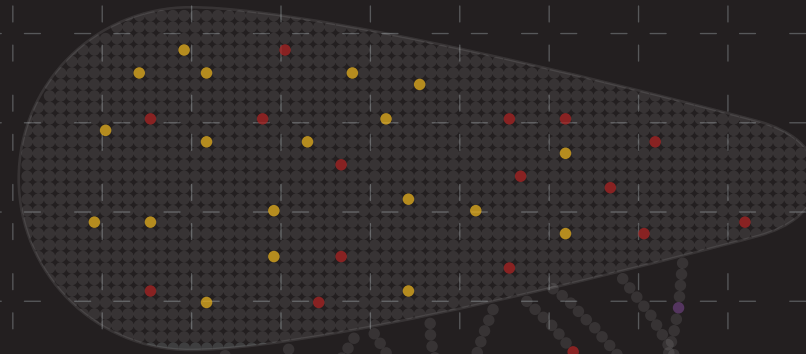
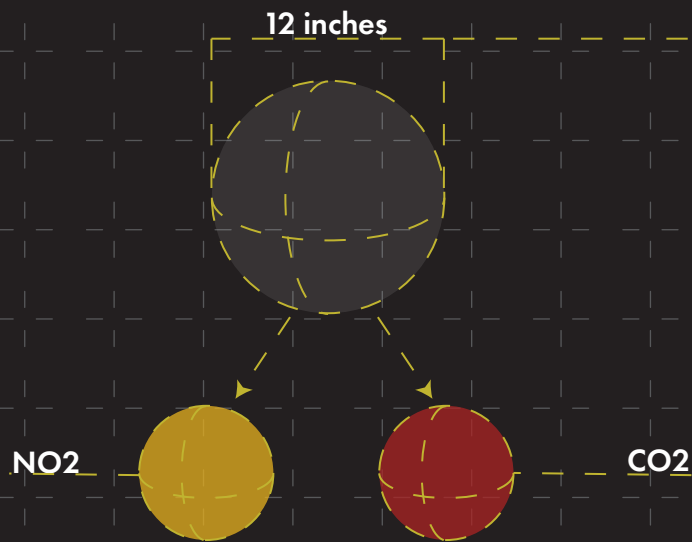
Jesse Butterfield

Pollution is transferred from air to water by precipitation

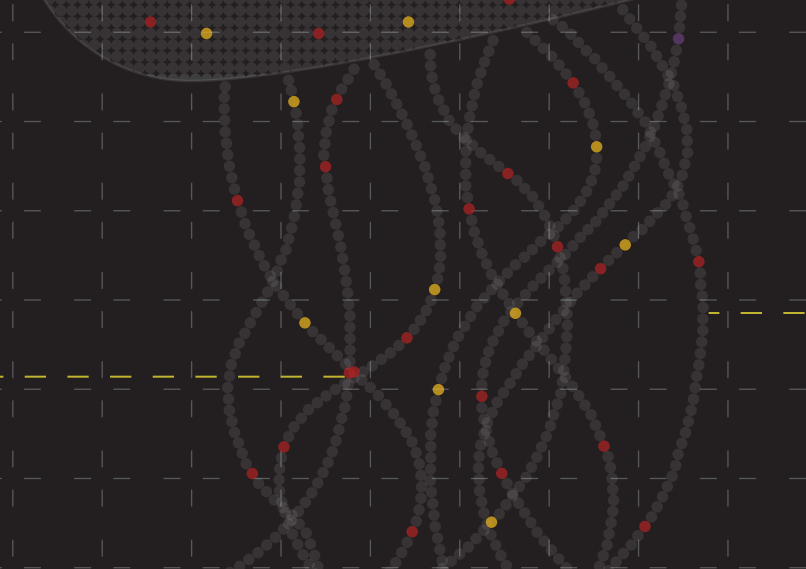


# Machine No.1

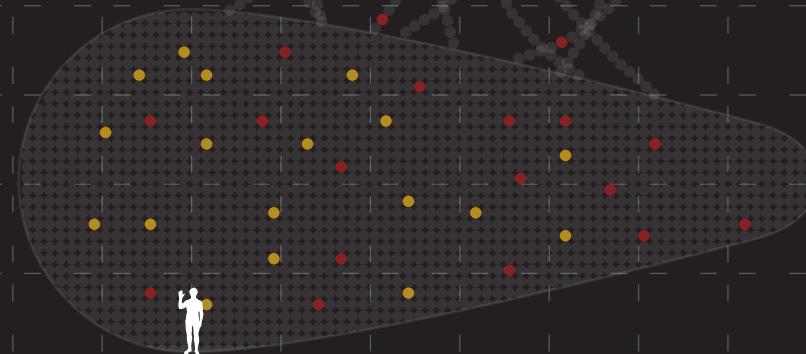
This machine is a three dimensional representation of how Yellowstone National Park's air and water quality is at any given time. Air and water quality are two measures that are directly tied to visitation that shows how local consumption alters and harms the environment. Currently both air and water quality is degrading mostly because of high amounts of vehicles in the park. As a federally designated Class I area, YNP is required to protect air quality and resources that may be affected by air pollution. Although the park is in compliance with the national regulatory standards for air pollutants, pollutant levels measured in YNP are impacting park resources. Many of YNP ecosystems have a very high sensitivity to nutrient-enrichment effects. Nitrogen deposition may disrupt soil nutrient cycling, affecting biodiversity of some plant communities, especially in alpine areas.



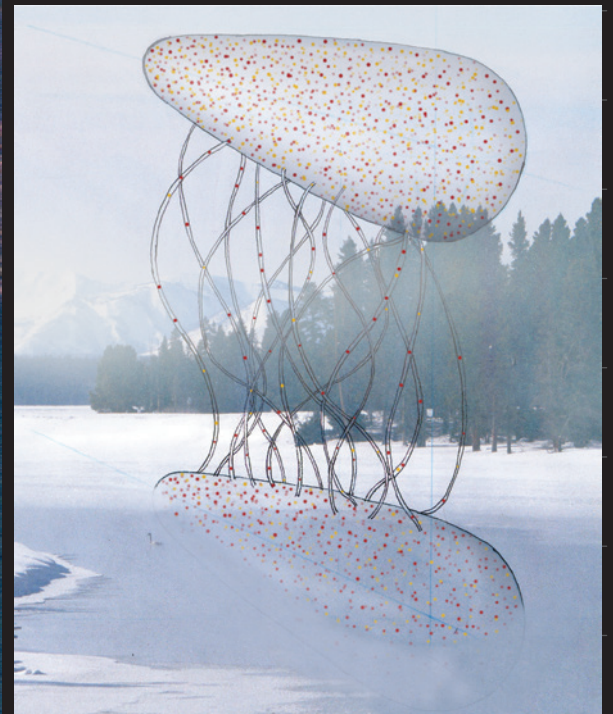
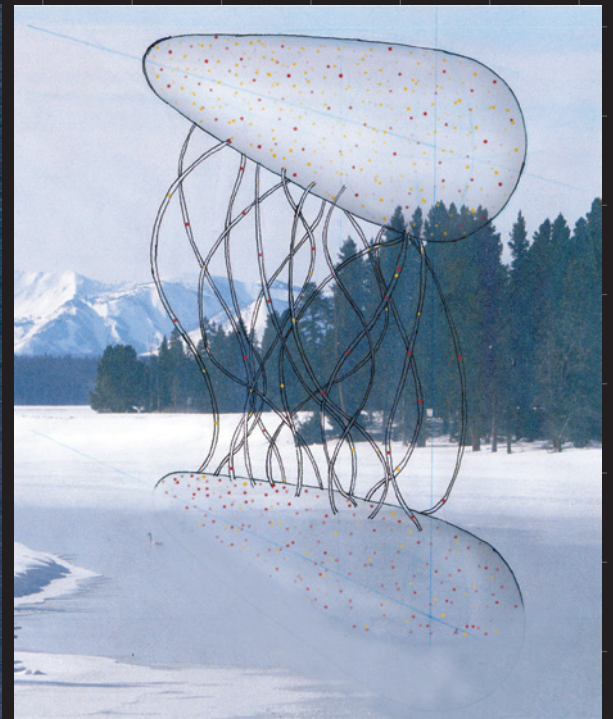
Air Quality



Pollution



Water Quality



# Elk and Wolves

Elk having the greatest impact on the ecosystem and in turn the wolves have the greatest impact on the elk. These two species give great insights into the health the GYE.

Measures:

Population of Elk

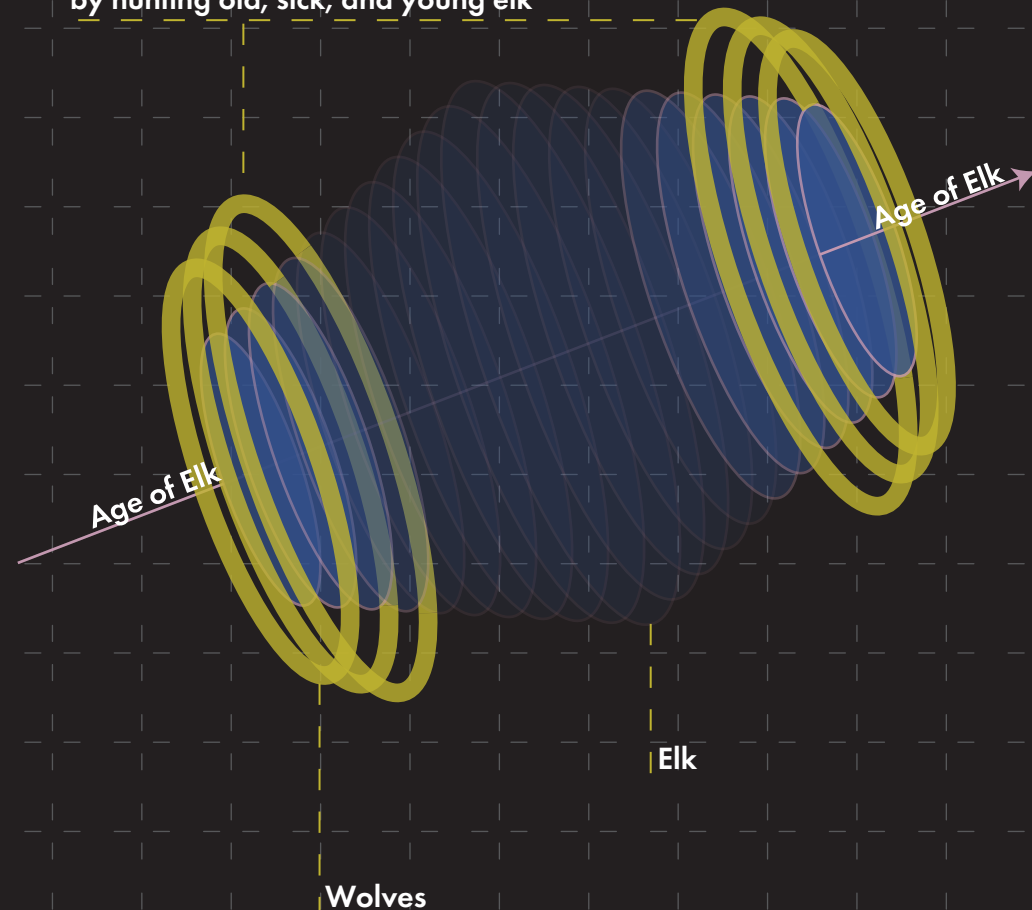
Population of Wolves

Number of Packs



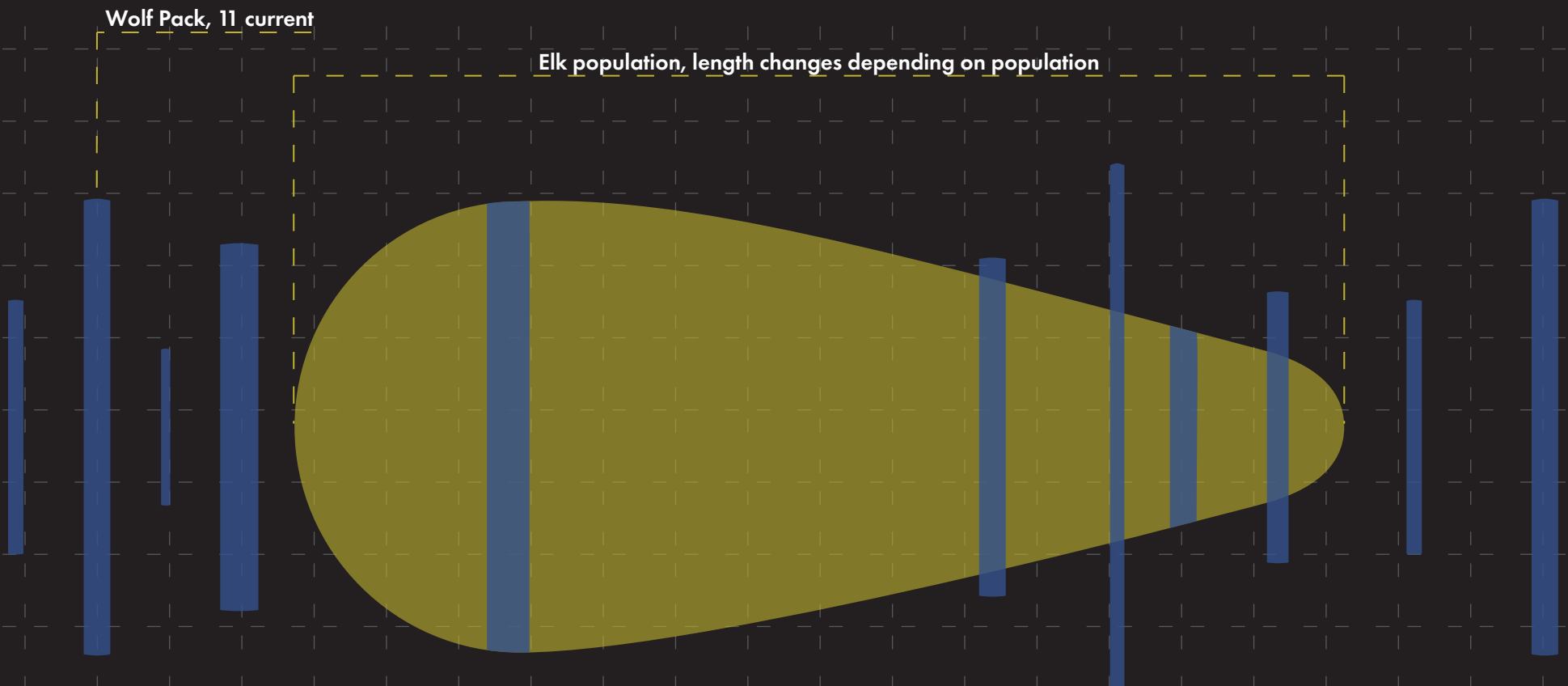
Jesse Butterfield

Wolves control elk populations primarily by hunting old, sick, and young elk



# Machine No.2

Elk have the largest impact on the ecosystem and in turn the wolves have the largest impact on the elk. These two species give great insights into the health of the GYE. There were 108 wolves in 11 packs in YNP during 2016, including 7 breeding pairs. This is the largest protected assemblage of wolves in the northern Rocky Mountains. Numbers in the park have been relatively stable; there were between 95 and 110 wolves in 7–10 packs since 2009. The population has high levels of genetic variation and low levels of inbreeding, with gene flow to other areas in the Rocky Mountains. Winter counts of northern Yellowstone elk ranged between 4,844 and 5,349 during 2015 to 2017. These counts were within or above objectives developed by Montana Fish, Wildlife & Parks for the winter range north of the park, with 4,776 elk observed in Hunting District 313. This machine seeks to visualize these population counts and the two species interaction.





# Interaction

The Machines themselves are visually impactful but how do visitors in the park understand what they are and why they are here?

Live feed webcam

Measures

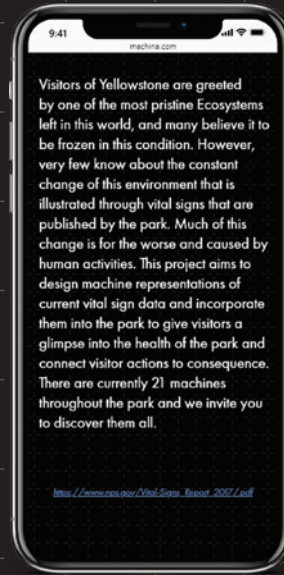


Machine Number

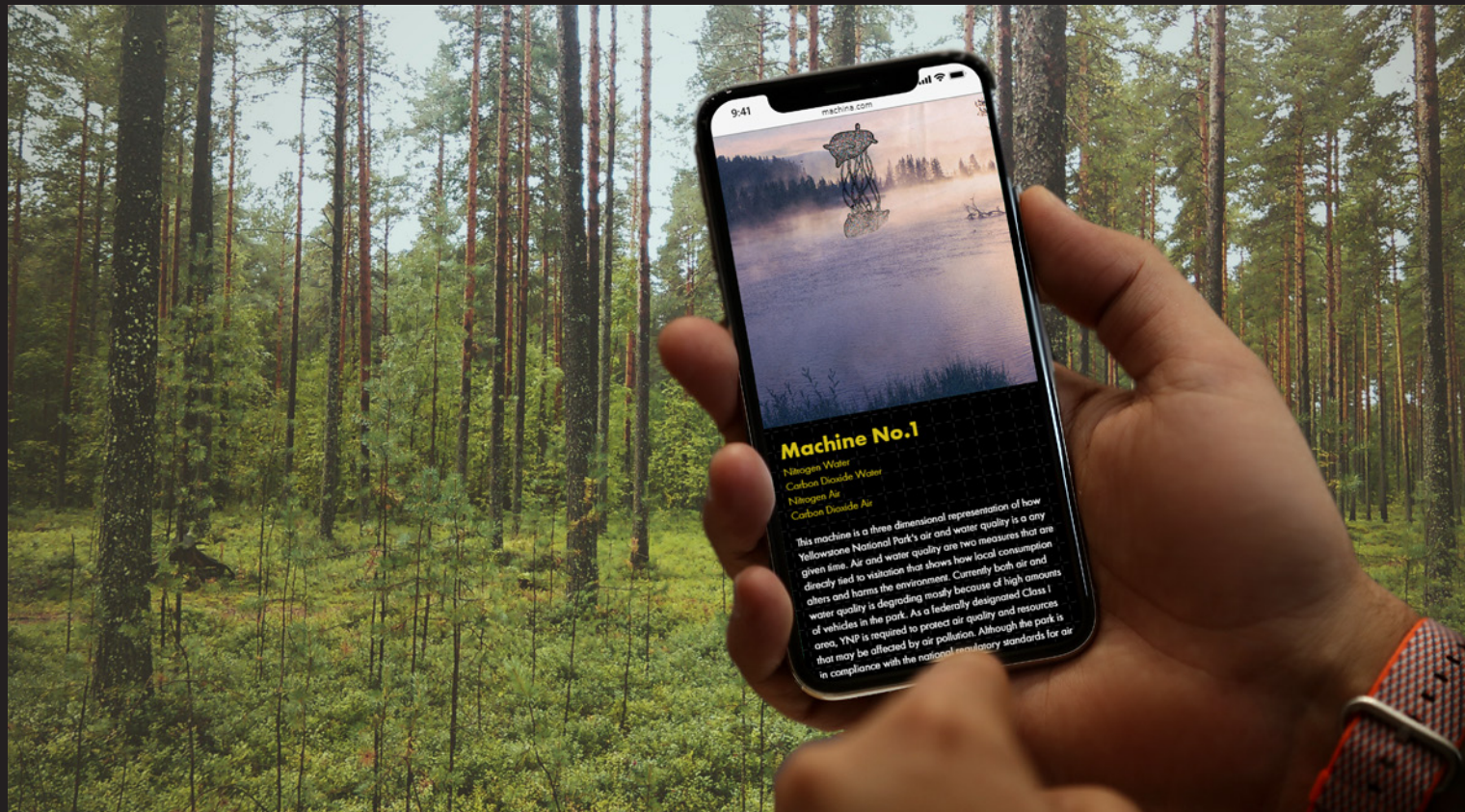
Description of Machine



## List of current Machines



## Description of project and why the Machines are in the park



# Place

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*These machines will become part of the ecosystem they represent. They should move, interact and be apart of the place that is Yellowstone National Park. The hope is these machines go on to live rich, meaningful lives within the Yellowstone Ecosystem.*

<https://vimeo.com/306699428>