

VISUAL DISCOVERY 2019

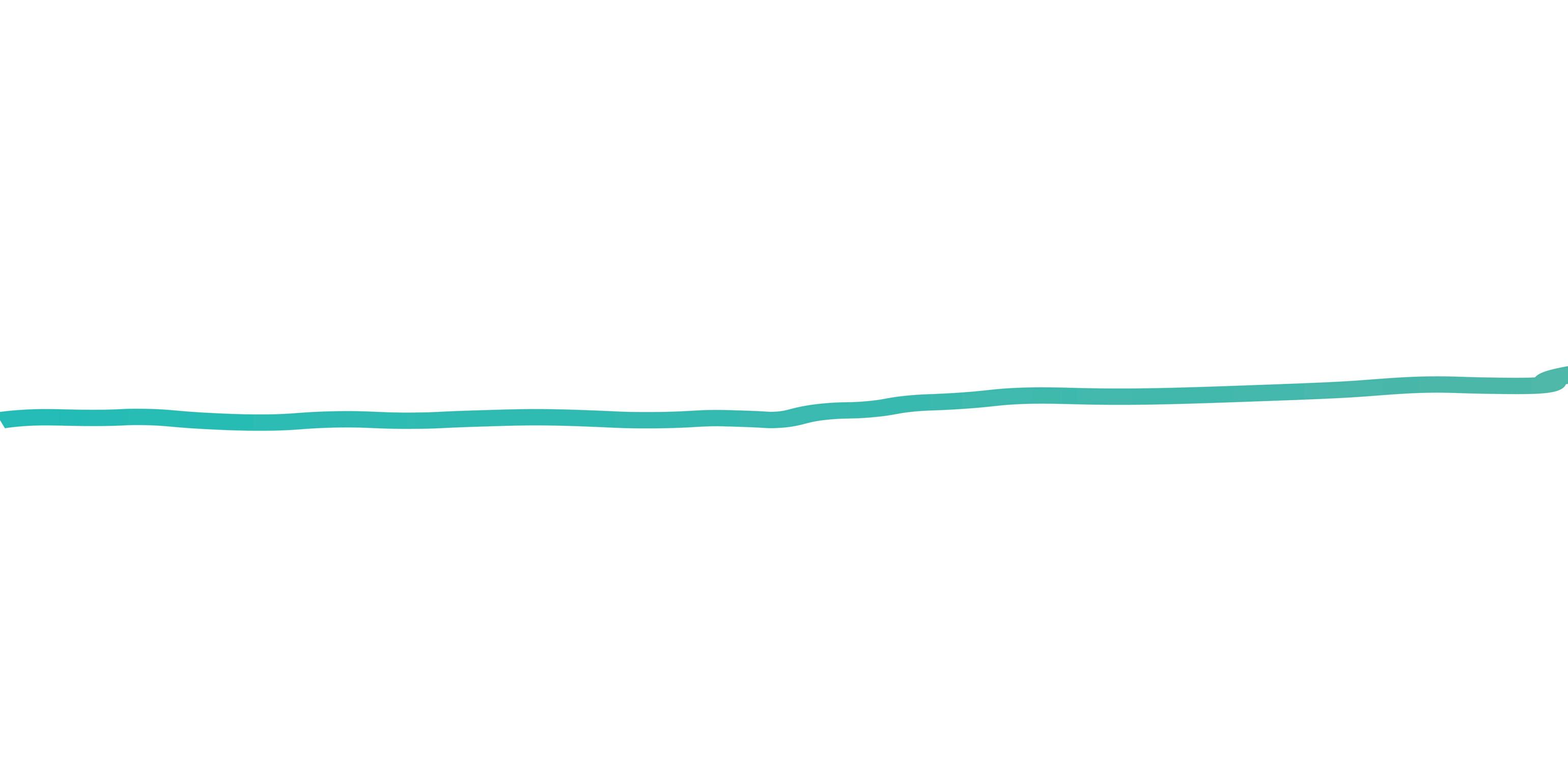
DON'T  
DRINK  
WHAT  
ORANGE  
CREEK  
WATER  
KIDS

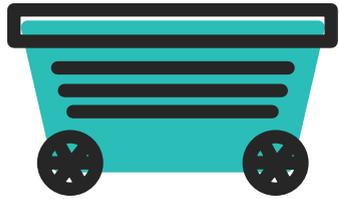
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MACEY ELDER  
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# Introduction

This book was made at the 2019 Visual Discovery Conference in Athens, Ohio. The focus was coal mining because of its affect on both the local enviornment and the local people. We hope that this book will help inform kids and adults alike. Enjoy the book!

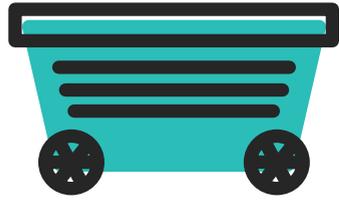




# Why Do People Mine?

Mining can extract different kinds of rock. In Ohio, most of these rocks are coal. That is a dark rock that gets your hands dirty. But it can also burn and power your stove, your lights and your heater.

Most of Ohio's mines produce coal for coal energy plants. Most of the energy is burned to generate some form of electricity.

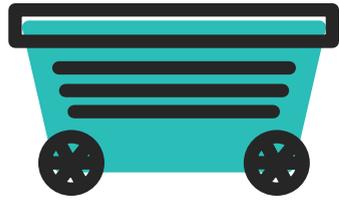


80 percent of the coal  
produced nationally  
is burned to generate  
electricity



## The Use of Coal

In the late 1800s, steam power was adapted to generate electricity. The first coal-fired electric-generating plant in the United States, the Thomas A. Edison Pearl Street Station in New York City, went on line in September 1883. The first coal-fired power plant in Ohio, the Tiffin (Seneca County) Edison Electrical Illuminating Plant, went on line in December 1883. Since the 1880s, the amount of coal consumed by power plants has increased such that currently 80 percent of the coal produced nationally is burned to generate electricity. The electric utility industry consumes 90 percent of the coal mined in Ohio.

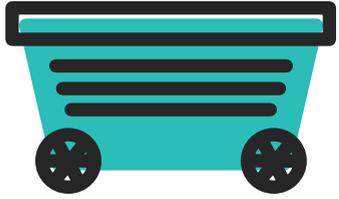


In the 1800s coal was recognised as an abundant, accessible and inexpensive fuel.

## Why Did Mining Become Popular?

With the mining of coal the people started to gather together and form towns. These towns were rich and wealthy and provided a lot of additional jobs and security.



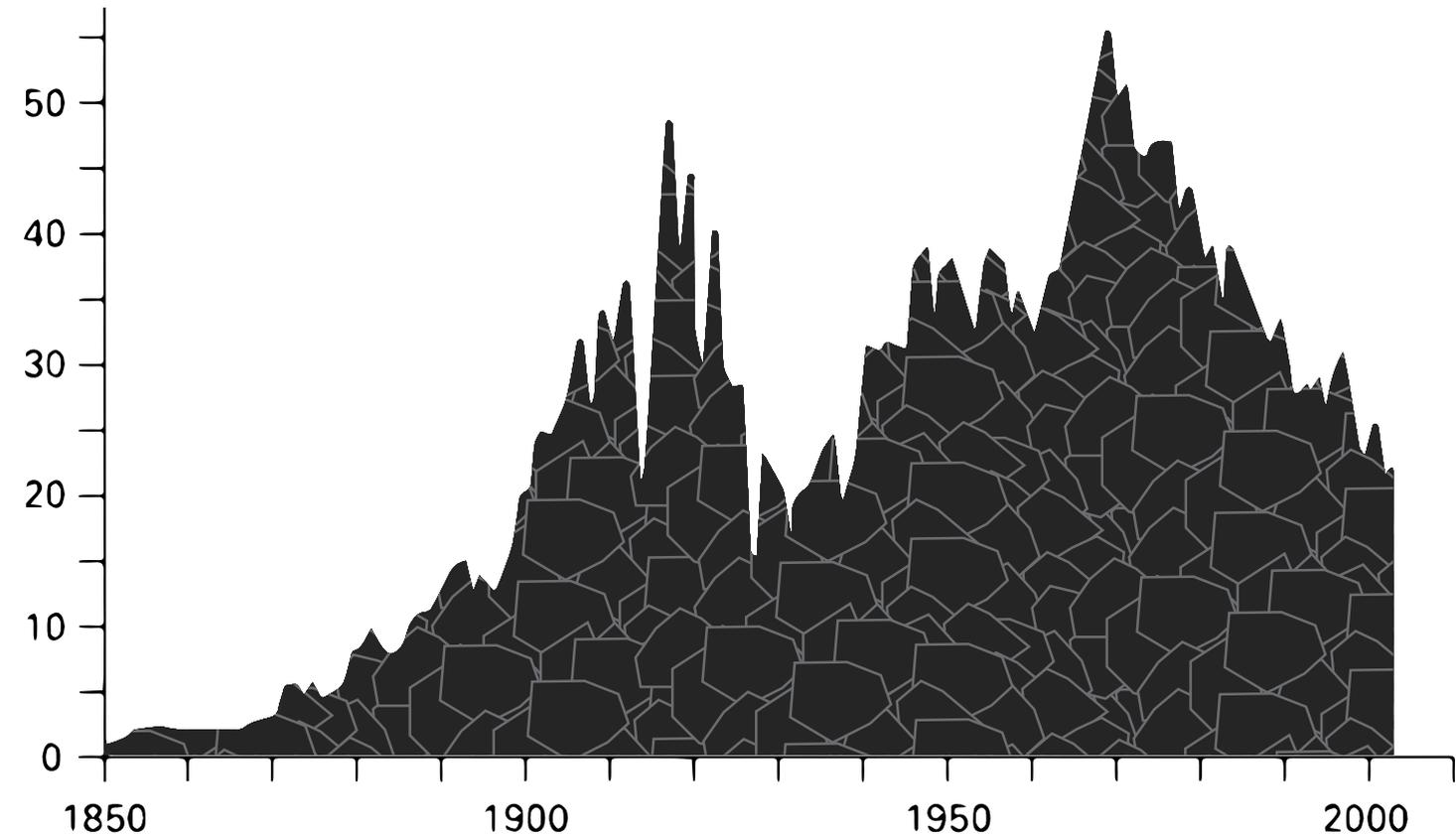


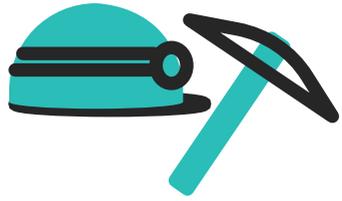
## Steampower and Coal

From Civil War times to the Great Depression of the 1930s, Ohio's coal production steadily and rapidly increased because of improved methods of transportation and mining. Between 1850 and 1880, Ohio's railroad system grew at a tremendous rate, facilitating the movement of coal to market as well as becoming a major consumer of coal for steam-generated locomotion. By the late 1800s, mechanized mining equipment had been successfully introduced into many of Ohio's underground coal mines.



## OHIO COAL PRODUCTION



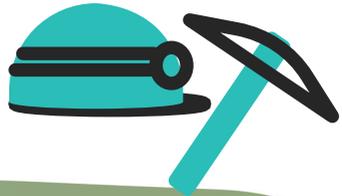


There were two basic methods for extracting coal. Deep mining and surface mining.

# How Mining Works

Mining is the extraction of rocks and minerals from the earth and mountains. To do that the miners need to dig deep into the earth and get the hidden treasures.



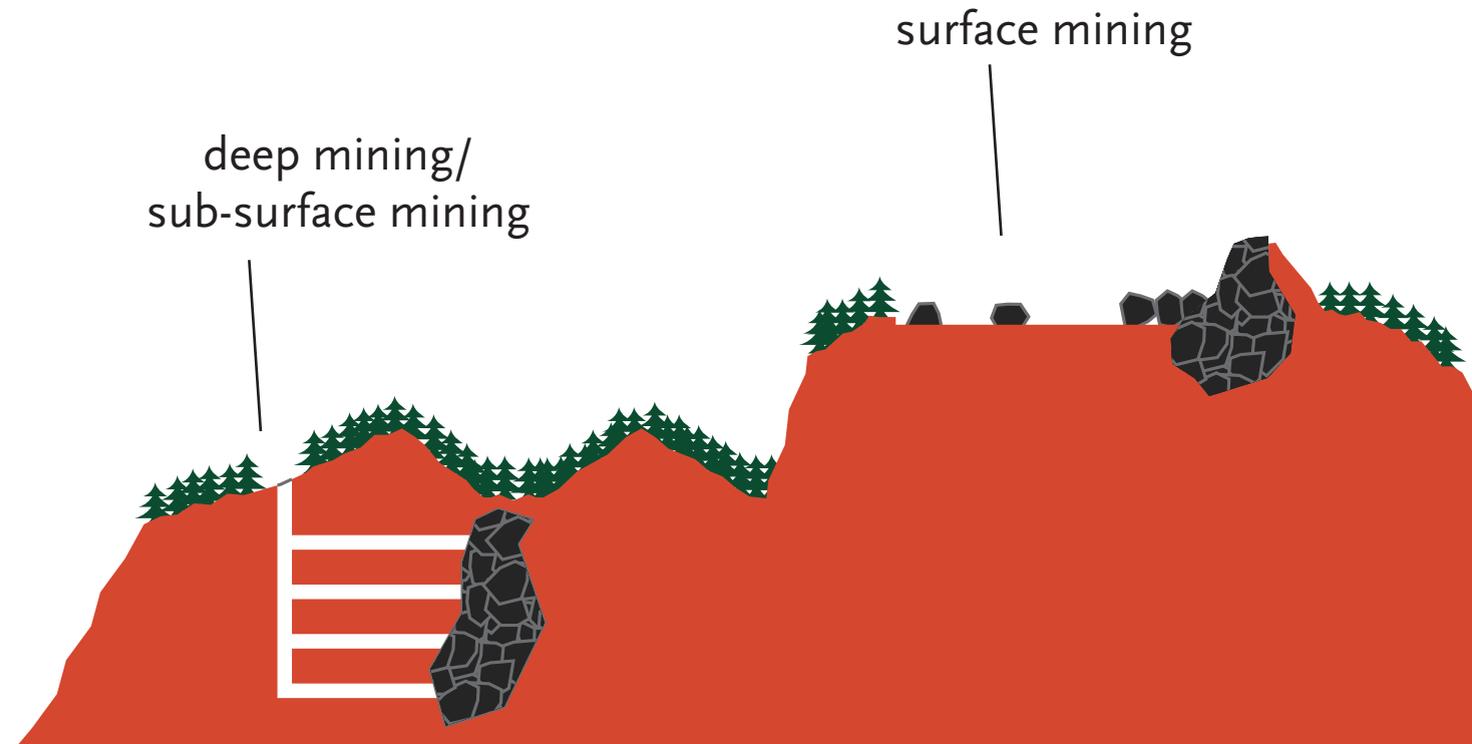


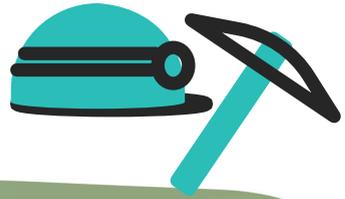
## Deep Mining

Vertical shafts are made that reach into the earth's surface. Rocks and minerals are mined underground by miners. Minerals and rocks are carried up in lifts.

## Surface Mining

Top soil and vegetation is removed. Explosives are used to break the rocks and loosen it up. The rocks are carried by trucks to their destinations.



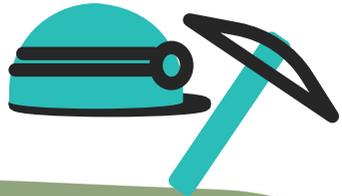


Since 1970, Ohio's annual coal production has declined nearly 59 percent to its present (2003) level of 22.3 million tons.

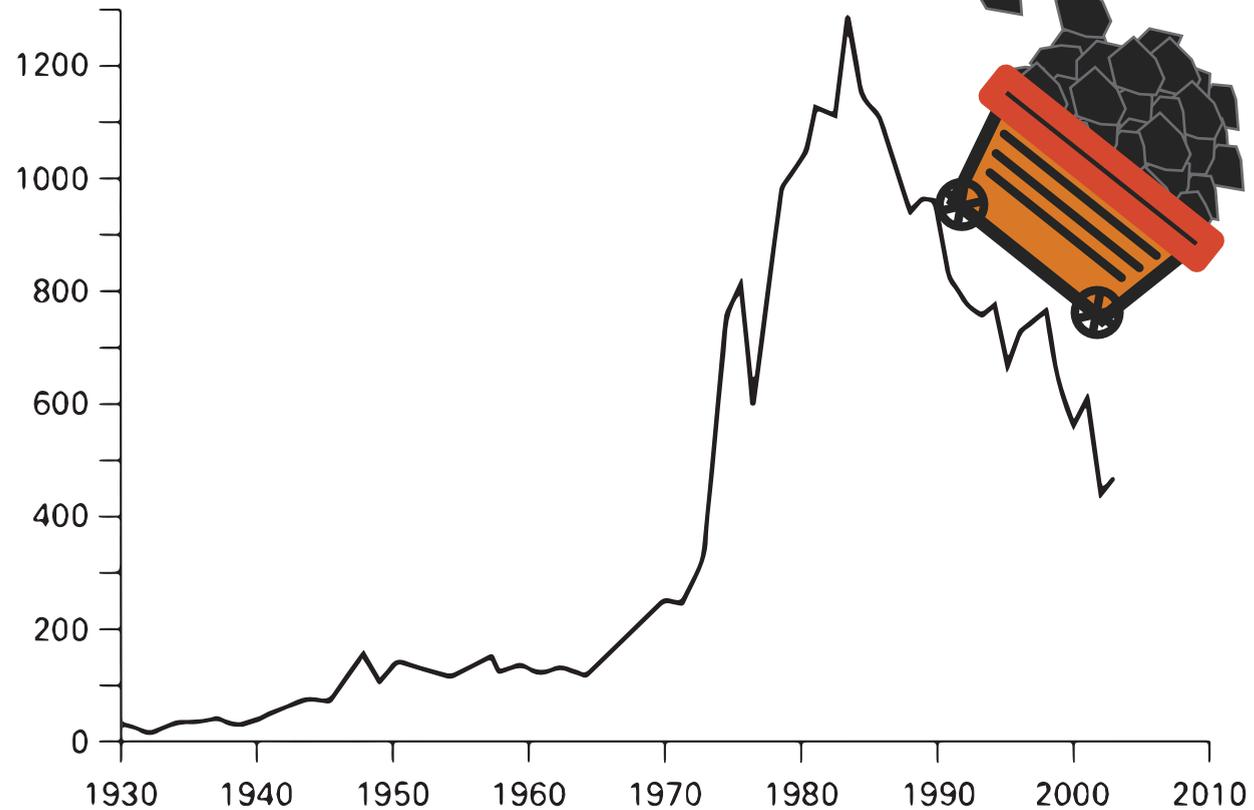
## Mining Started to Decline

There is less mining now than there use to be. There are many different reasons for that. The main reasons for this were regulations from the goverment to make sure air, land and people are better protected since mining does put the people and environment at risk.





Value of Ohio Coal

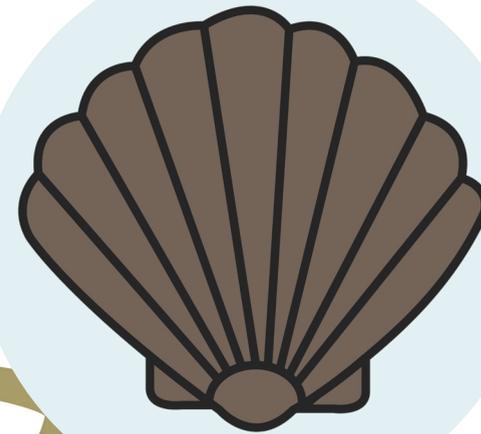


## Bye-bye Mining

This drop in production is, to a lesser extent, due to the increasing regulation of surface-mine activity, reclamation, and health and safety issues, but is primarily the result of the Federal Clean Air Act of 1970 and its amendments in 1977 (CAAA77) and in 1990 (CAAA90), which placed stringent controls on the sulfur dioxide emissions from burned coal.



# Protecting our Wildlife



Hi! I'm a **Fanshell**.

I'm endangered, which means there are less of me and my friends. You can find my home in the rivers and streams.

My friends and I like to bury ourselves deep in the sand and rocks, so we need clean water.

When our rivers are dirty and the forest are gone, many animals lose their homes. Some of these animals are endangered or almost extinct. This means that there aren't many of them left. We can protect the homes of these animals by learning about them and what they need.



Hi! I'm an **American Black Bear**.

I mostly live in large woods. Most people don't know this, but I prefer broccoli more than burgers. If you see these tracks stay away because I may be cute but I can be dangerous.





# Wayne National Forest Information

The Wayne National Forest was established in 1992. Since then they have taken strides to reverse the effects of mining and deforestation on the area. About 8,100 people learned about conservation education through various outreach programs offered by the Wayne National Forest.

The forest is split into 3 parts totaling 244,265 acres. There is over 450 miles of trail. Some of which is available to hikers and horseback riders, and more of it is available for ATV and mountain bikers.



# How You Can Support Wayne National Forest

Below are the various services offered by Wayne National Forest. Participating can support this valuable local resource. Icons and more information can be found on: <https://www.fs.usda.gov>



## Camping

Campground Camping, Dispersed Camping, Group Camping, and RV Camping are all offered to potential campers.



## Day Hikes

Over 450 miles of trails to choose from in the Wayne National Forest.



## Horseback Riding

You must bring your own horse to the trails, but there are many trails to choose from if you can.



## Fishing

There are about 130 ponds and lakes you can fish from as well as the 3 largest lakes in the forest. Just make sure to have a license!



## OHV Riding

There are 145 miles of trails provided for OHV riders to enjoy the forest.



Hi! I'm a **Northern Long-eared Bat.**

Like the Fanshell, I'm endangered. You may recognize me by my long ears. I like to live in caves and mines



Hi! I'm a **Hellbender salamander.**

I'm almost extinct which means that I'm one of the last of my friends. The rivers and forest are my home, but it's been dangerous for me to live there recently. Crayfish are my favorite food.



Hi! I'm a **White-tailed Deer.**

I got my name because of my white tail that fluffs up as I run. I live in lots of different places, but my friends and I like to live in the woods. Look for my tracks to see if my family has been to visit your family.



Hi! I'm a **River Otter.**

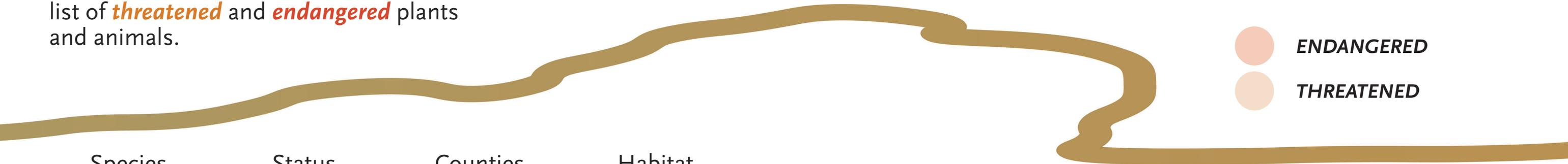
My friends and I live in rivers and lakes. Do you see my special tail? It helps me be an amazing swimmer. My tracks can lead you to a great swimming hole, but be careful because the rivers can be dangerous if your not as great of a swimmer as me.





# Threatened and Endangered List

The U.S. Fish & Wildlife Service keeps a running list of *threatened* and *endangered* plants and animals.



● **ENDANGERED**  
● **THREATENED**

	Species	Status	Counties	Habitat
Mammal	Indiana Bat	Endangered	All of Ohio	Hibernacula: Mines and Caves Foraging habitat: small stream corridors; upland forests
Mammal	Northern Long-eared Bat	Threatened	All of Ohio	Winter: Hibernates in caves and mines Summer: Forages in the upland forest
Mussels	Fanshell	Endangered	Southwest Ohio	Found in areas with good current, packed sand and gravel

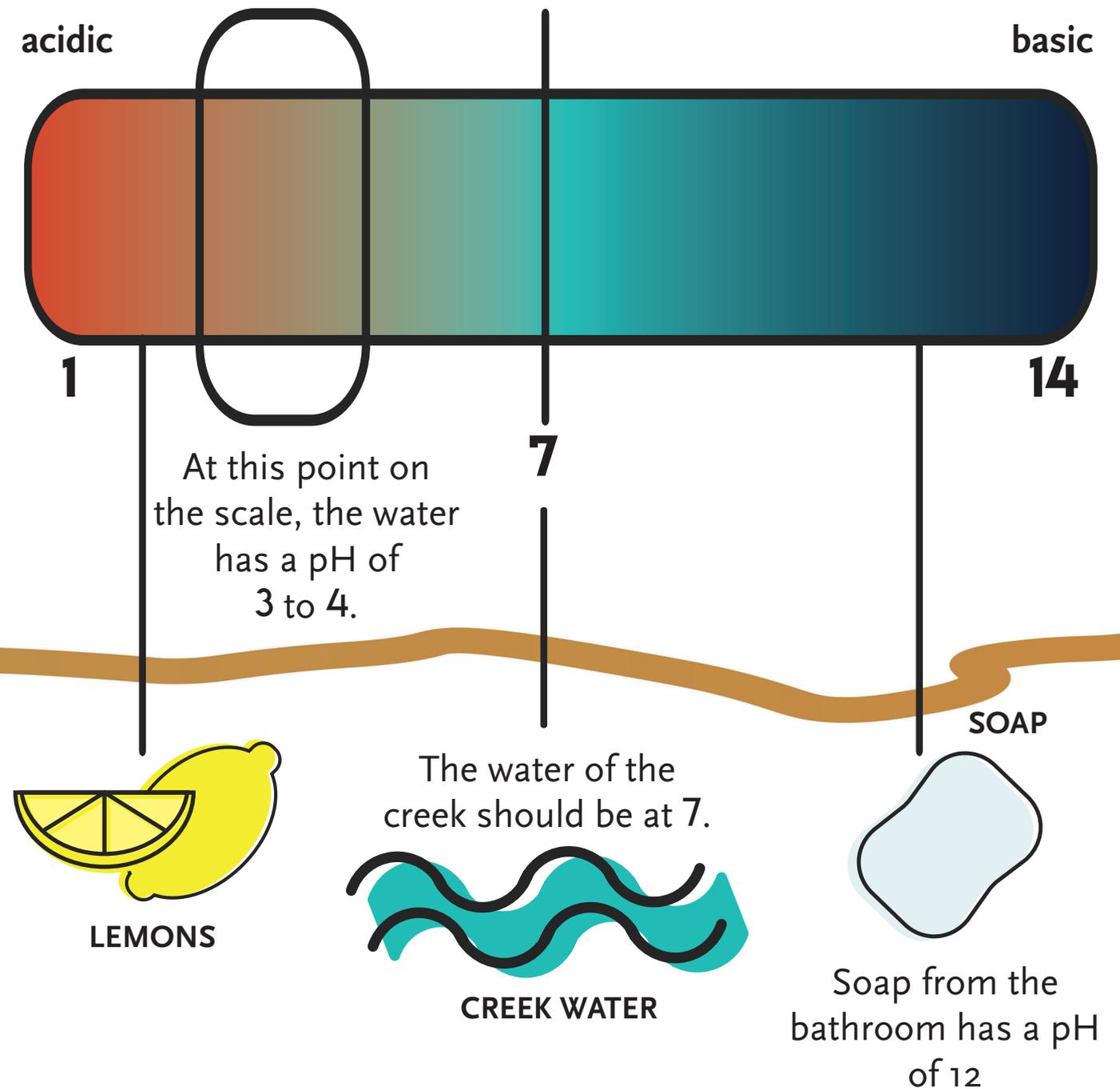
	Species	Status	Counties	Habitat
Insect	American Burying Beetle	Endangered	Southwest Ohio	Habitat is unknown as of November 2019

Mussels	Sheepnose	Endangered	Southwest Ohio	Shallow parts of larger rivers and streams
Plant	Northern Monkshood	Threatened	Hocking, Portage, Summit	Cliff faces or talus slopes in wooded ravines, near water seeps with cool, moist shade
Plant	Small Whorled Pogonia	Threatened	Hocking, Scioto	Upland sites of dry woodland in mixed forests.



# Water Pollution

When mines are made, they can make the river and creek water dirty making it change color from blue to orange or red which can hurt the fish who live in the rivers and the animals and plants that drink the water.



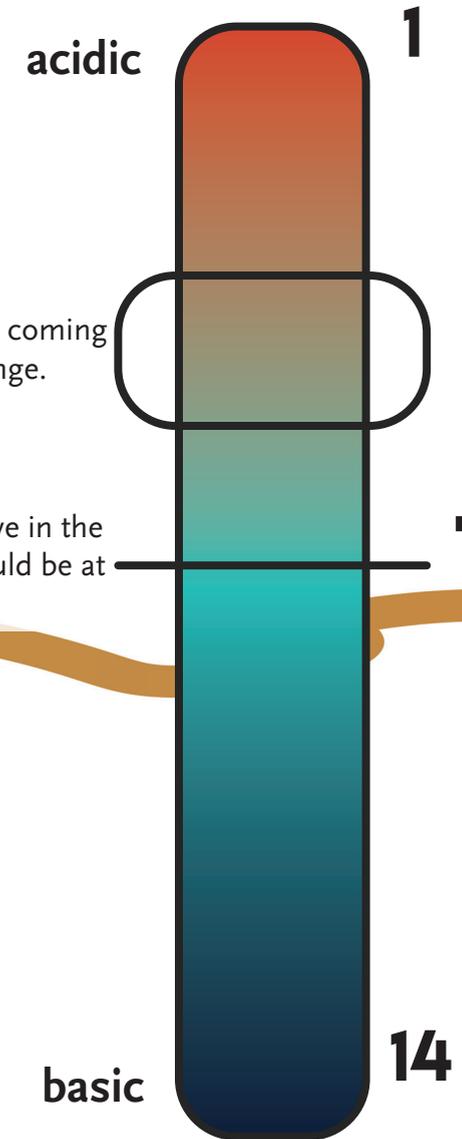


# Water Pollution

Water pollution in the area is caused by acid mine drainage, metal contamination, and increased sediment levels in the water. The acidity of the water destroys living organisms and the surrounding environment. Throughout Ohio, 4,400 abandoned mines pollute at least 1,300 miles of once freshwater. Acid mine drainage is one of the main causes that turn the streams orange and change the water quality. This is caused by a chemical reaction that occurs when iron pyrite, an unstable mineral, is exposed to water and oxygen. This reaction lowers the natural pH of the stream/water which hinders the ability of many organisms to live in the streams and rivers they live in.



“yellow boy” is iron and aluminum compounds that stain the stream beds and turn it orange.



The current water pH is coming out in the 3 to 4 range.

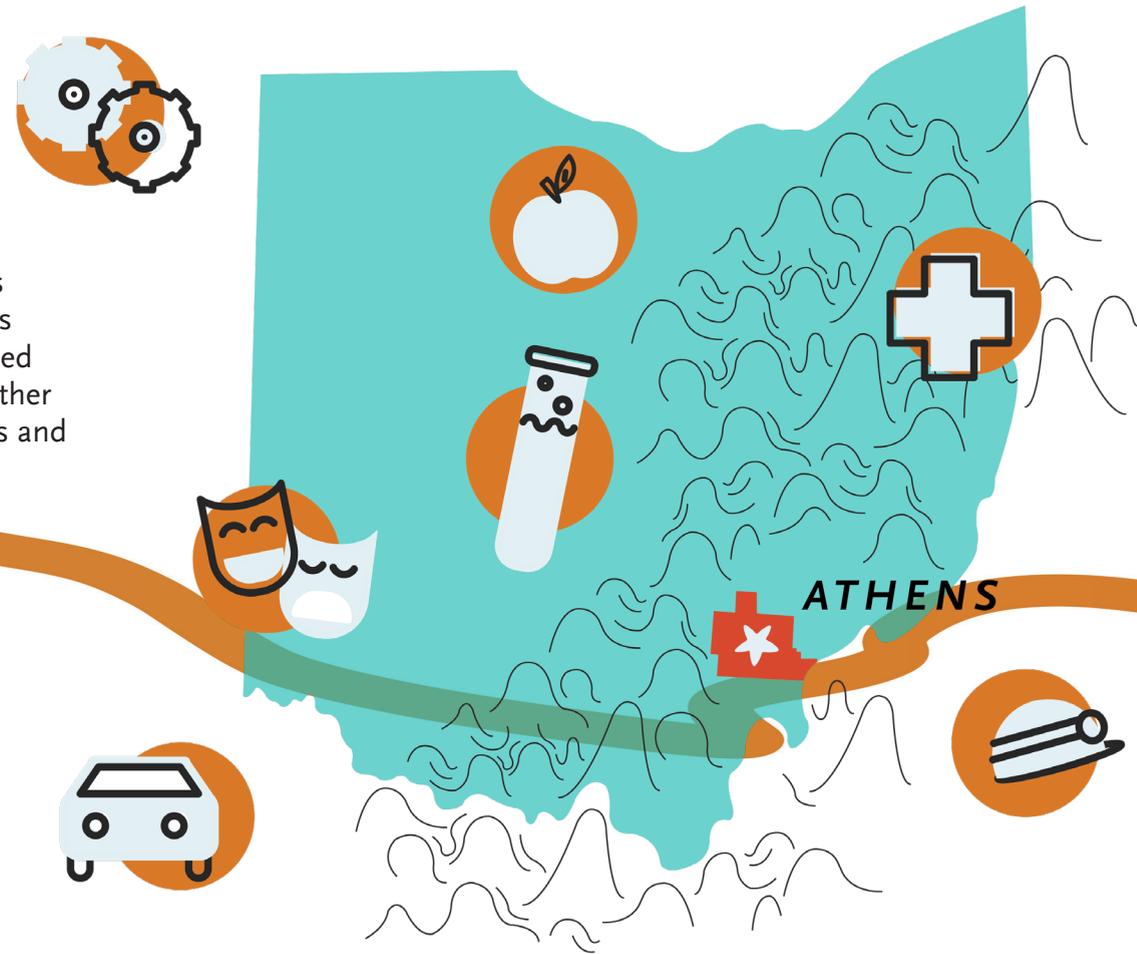
For organisms to survive in the water, the pH level should be at a 6.5 or above.

The general readings of the pH levels for the water of the affected streams are an acidic 3 to 4, similar to that of citrus fruit and vinegar whereas, the normal pH of drinking water is 7.

# When There is Less Mining

There is an entire world of possibilities for jobs and careers all over the United States and Ohio including scientists, builders, inventors, or teaching.

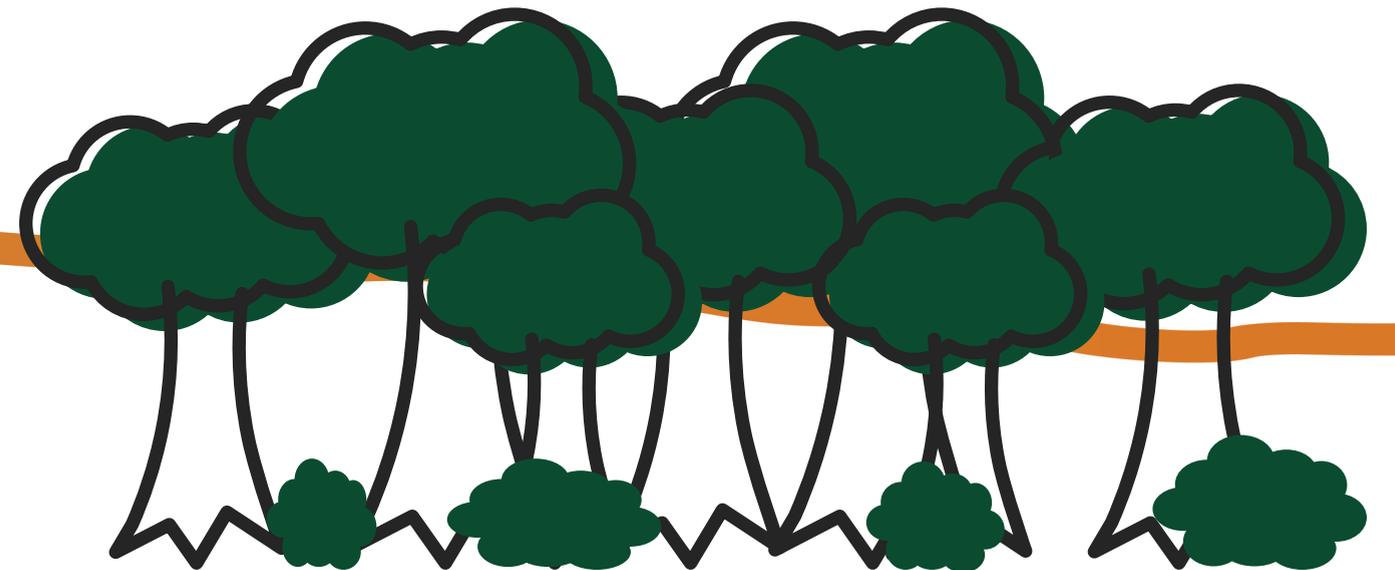
When there is less mining many parts of Ohio have started looking towards other growing industries and occupations



# Reforestation

Reforestation is planting trees in an area that has lost its trees. There are 5 steps to reforestation.

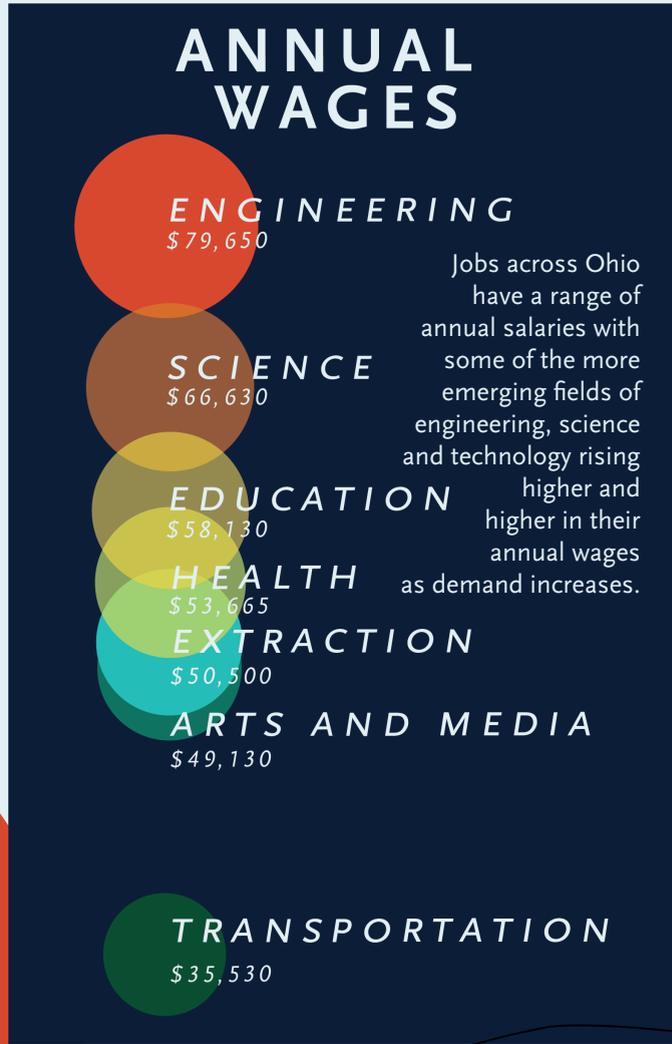
1. Understand the soil near your home
2. Create a hole big enough to plant your tree in
3. Make sure to plant different types of trees
4. Plant the tree and press the dirt down
5. Plant grass and bushes around it to help protect your tree



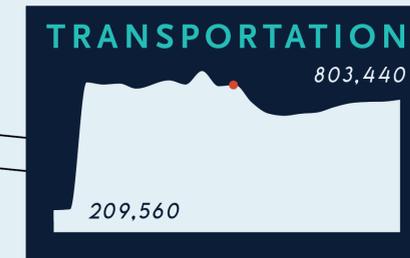
# A SHIFTING OHIO JOB MARKET

Ohio is home to over 11 million people who occupy over 700 different jobs in various fields all over the state. In recent years, as mining has become less and less popular there is a need to shift not only towards other forms of energy but also a need for a wider, more diverse job market. There are several fields that have continually increased over the past two decades including the transportation, health, education, engineering, science, and arts occupations

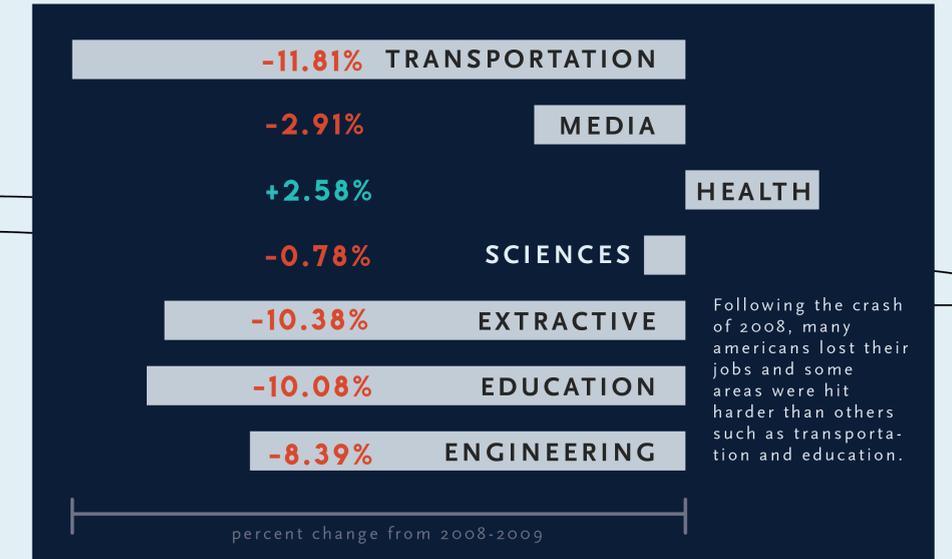
**791**  
DIFFERENT JOBS  
IN OHIO



## THE SHIFTS IN DIFFERENT OCCUPATIONS OVER THE PAST 20 YEARS



## EMPLOYMENT PERCENT CHANGES THE YEAR AFTER 2008



Of the hundreds of jobs that can be found within Ohio, many of them have continued to increase in numbers since 1997 despite some declines following the stock market crash of 2008.



## How Doser Work

A doser is a large tank people put near the rivers and creeks to help clean the dirty mine water to make the bad orange water blue so the fish can swim in it again.

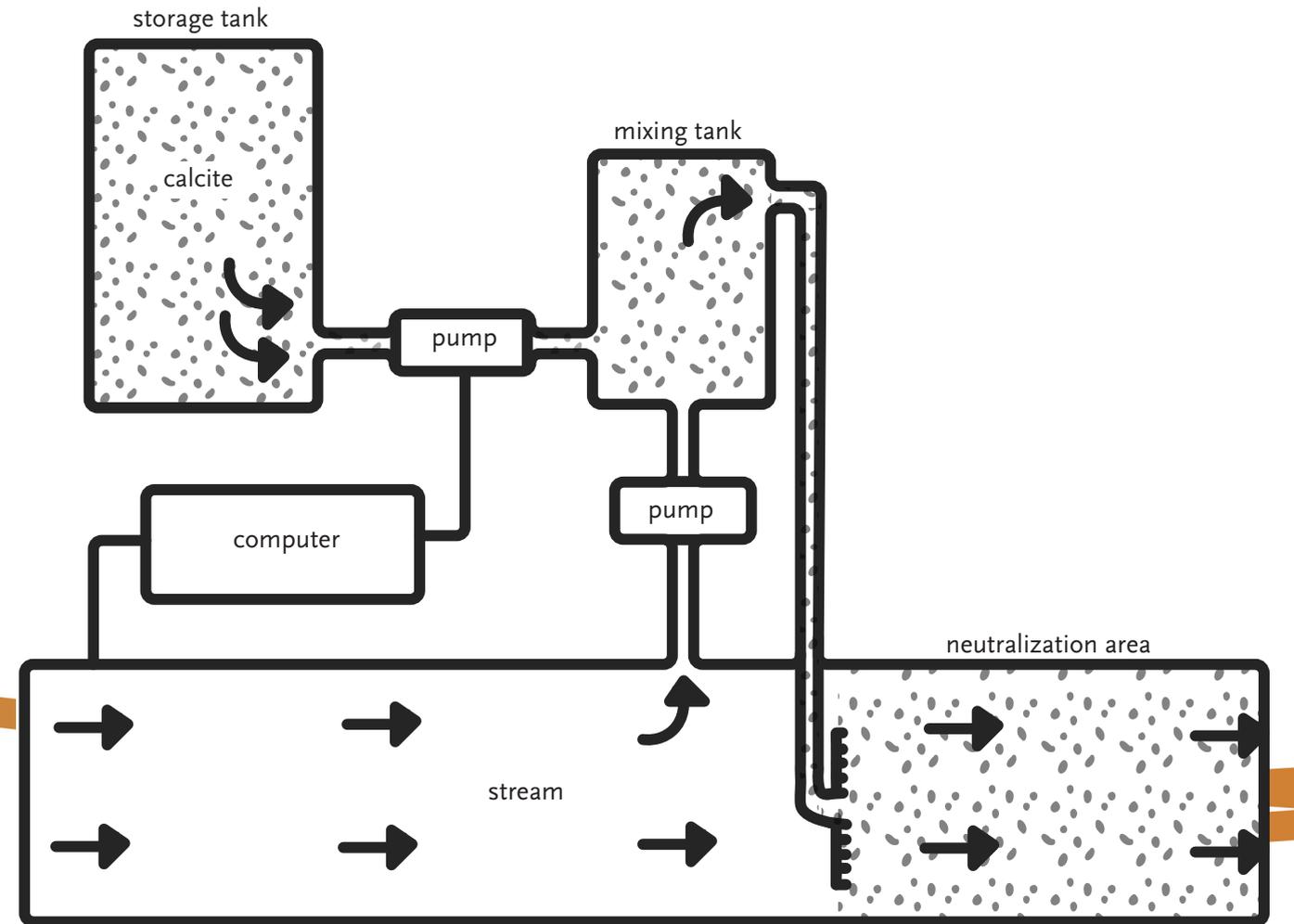


The dirty water goes in, and then the clean water comes out.



# How Doser Work

Dosers introduce alkaline materials (limestone calcite) into the stream to balance the pH levels of the water of streams near areas that have been both deep and surface mined. The target pH level is greater than 6.5 to return the pH of the water to its normal safe drinking levels. Dosers run calcite, a basic compound, through a system of pumps and tanks to incorporate it into the stream water to neutralize it.





This book is dedicated to the people who helped put together the 2019 Visual Discovery Confernece, we thank them for all of their hard work and dedication. Thank you for providing a space for us to come together and create this book.

