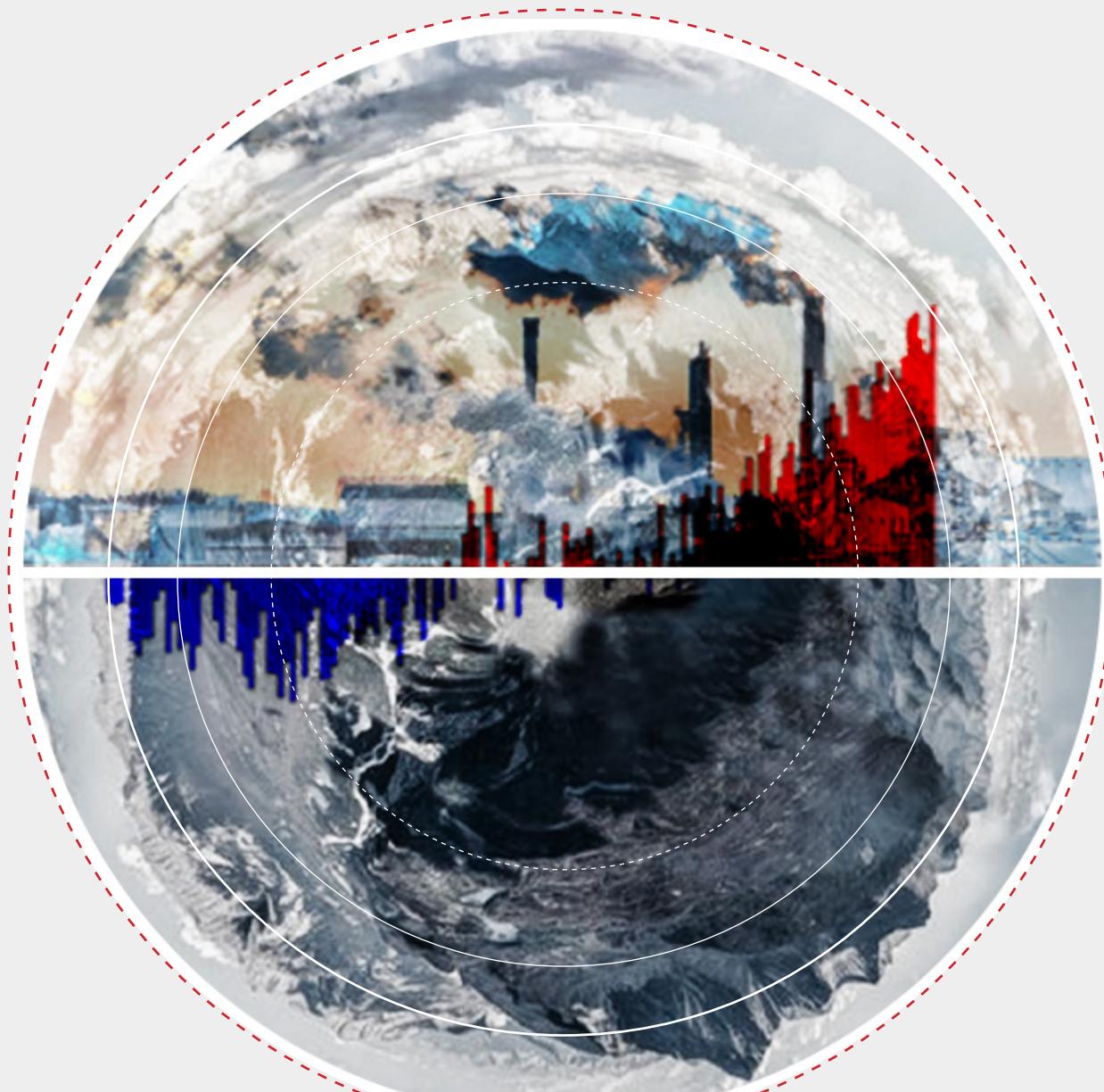
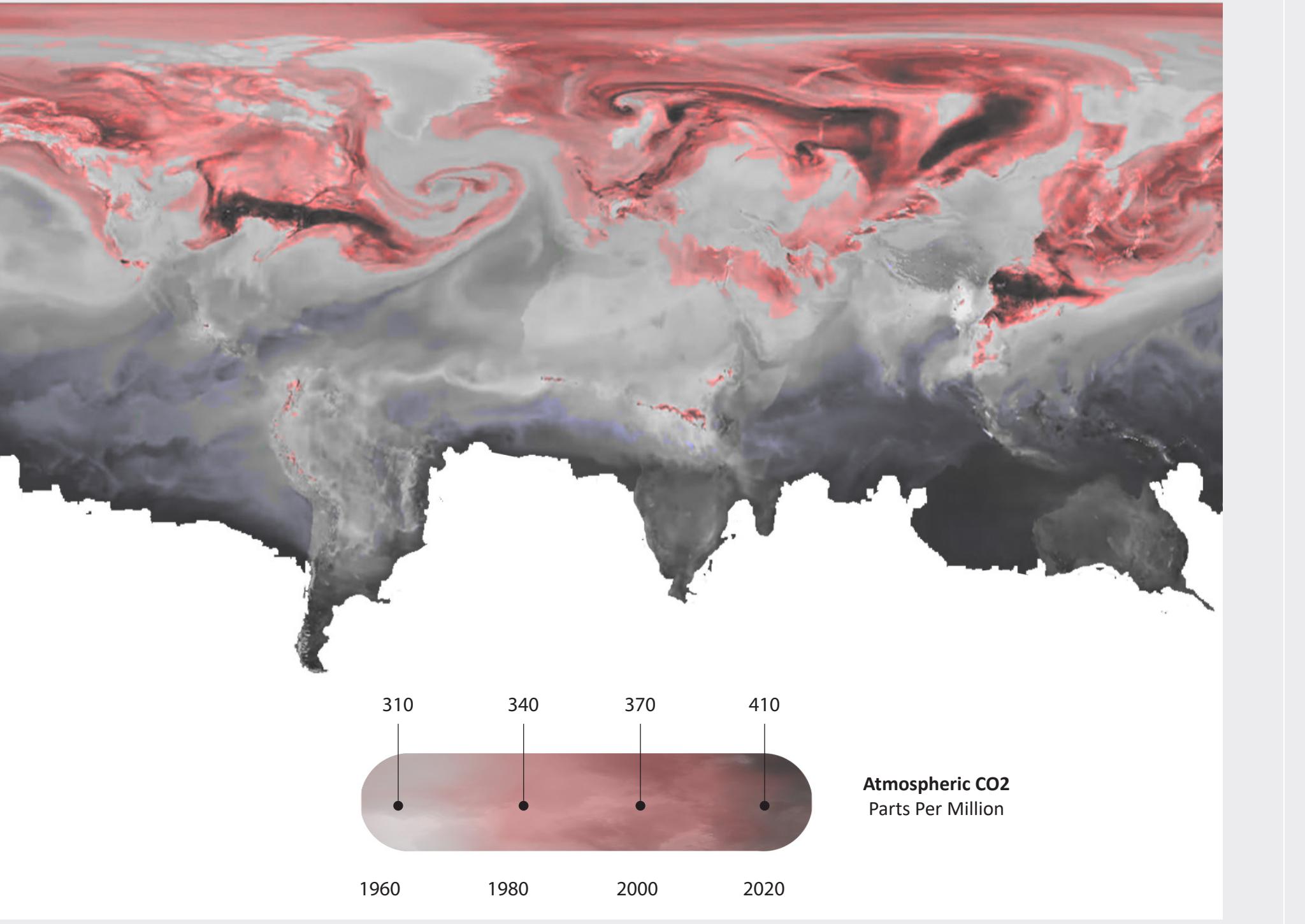


Carbon Dioxide Control

A
Step
to
break
our
addiction
to
Concrete

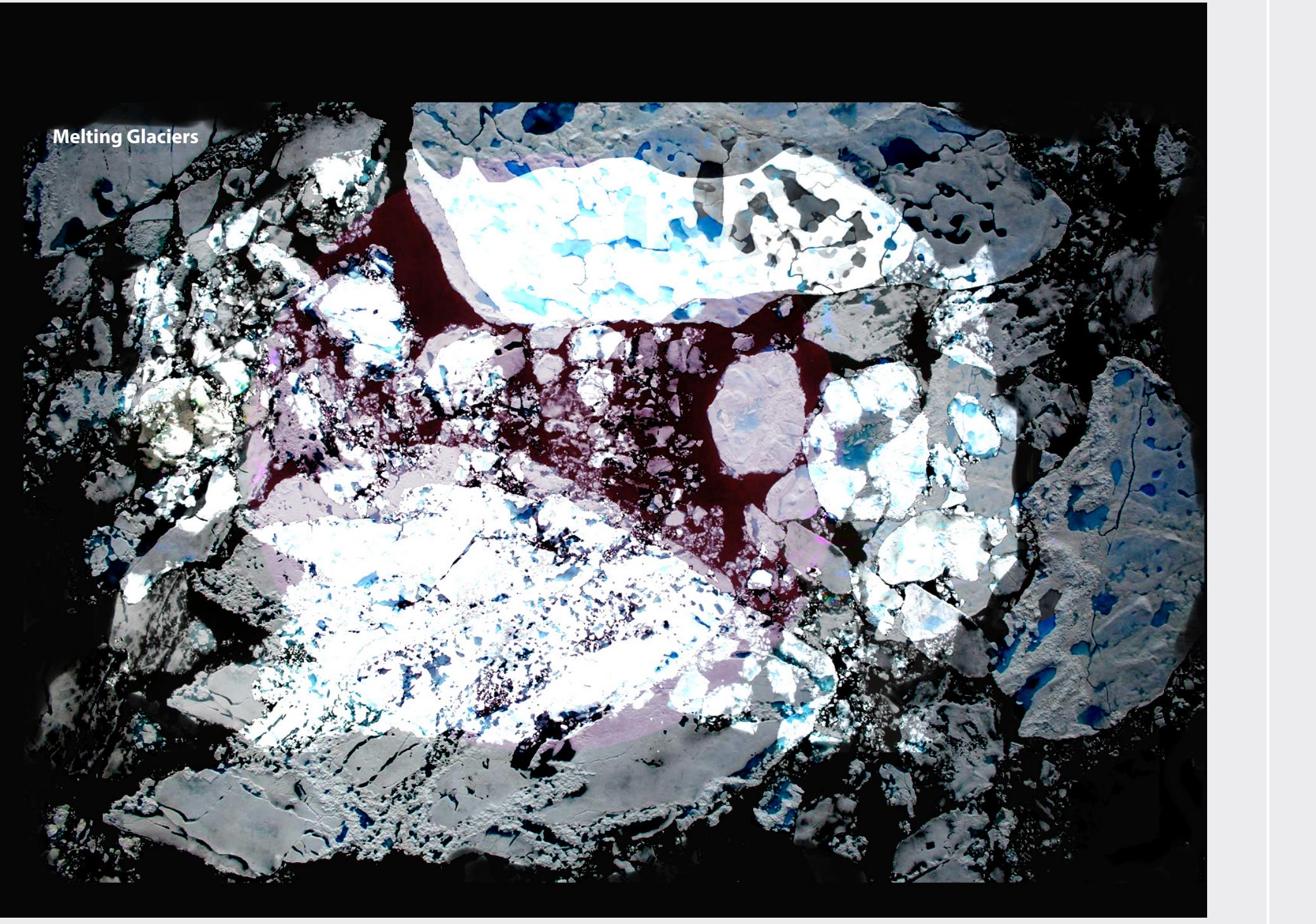




**Disasters Related
to climate change
by region in US**

The US will be expecting more disasters if CO2 emissions were not controlled. Some regions will face flooding, others wildfires, and some will witness earthquakes and land drought.

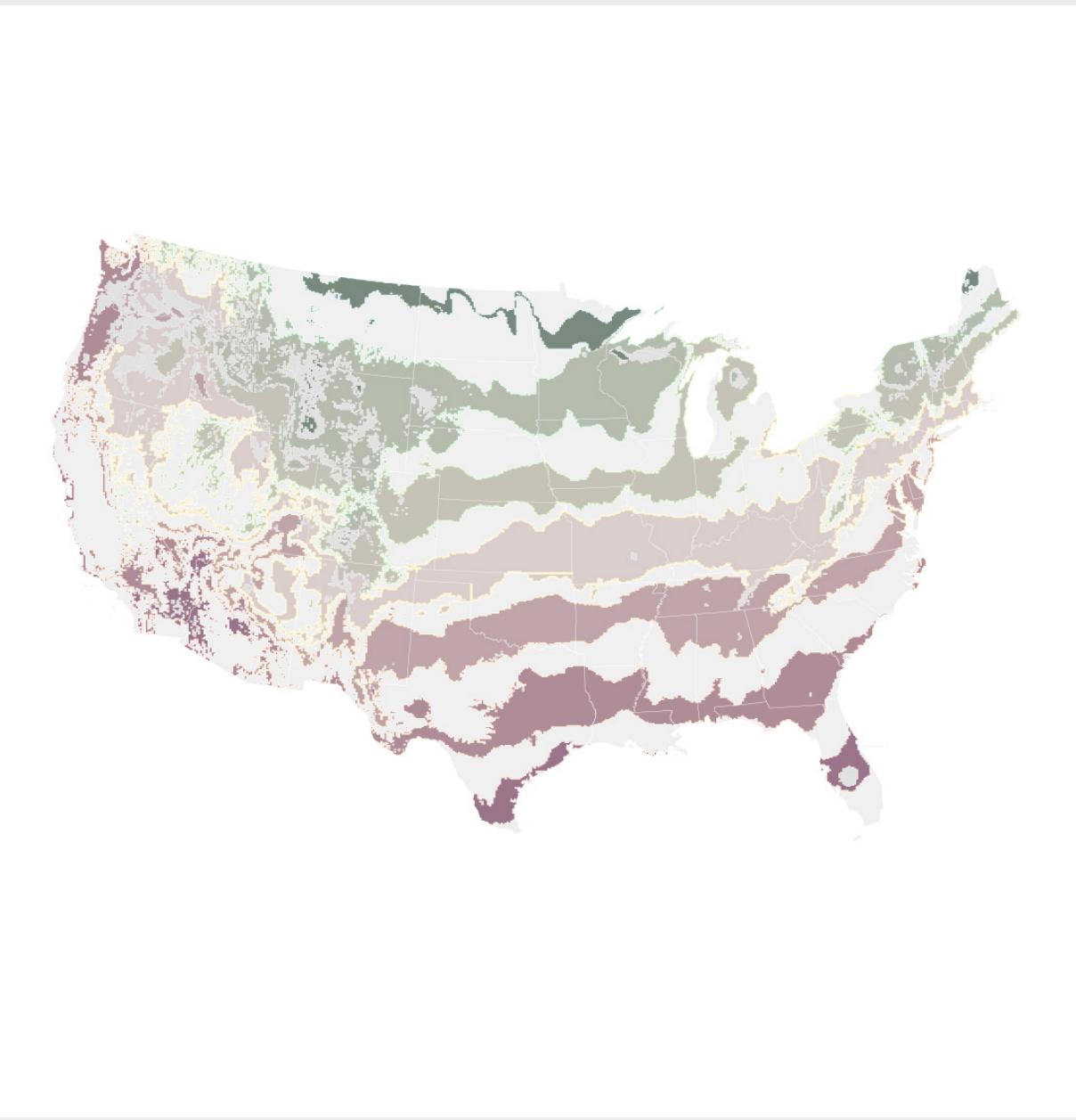




4

Climate Change altering Ecological Regions

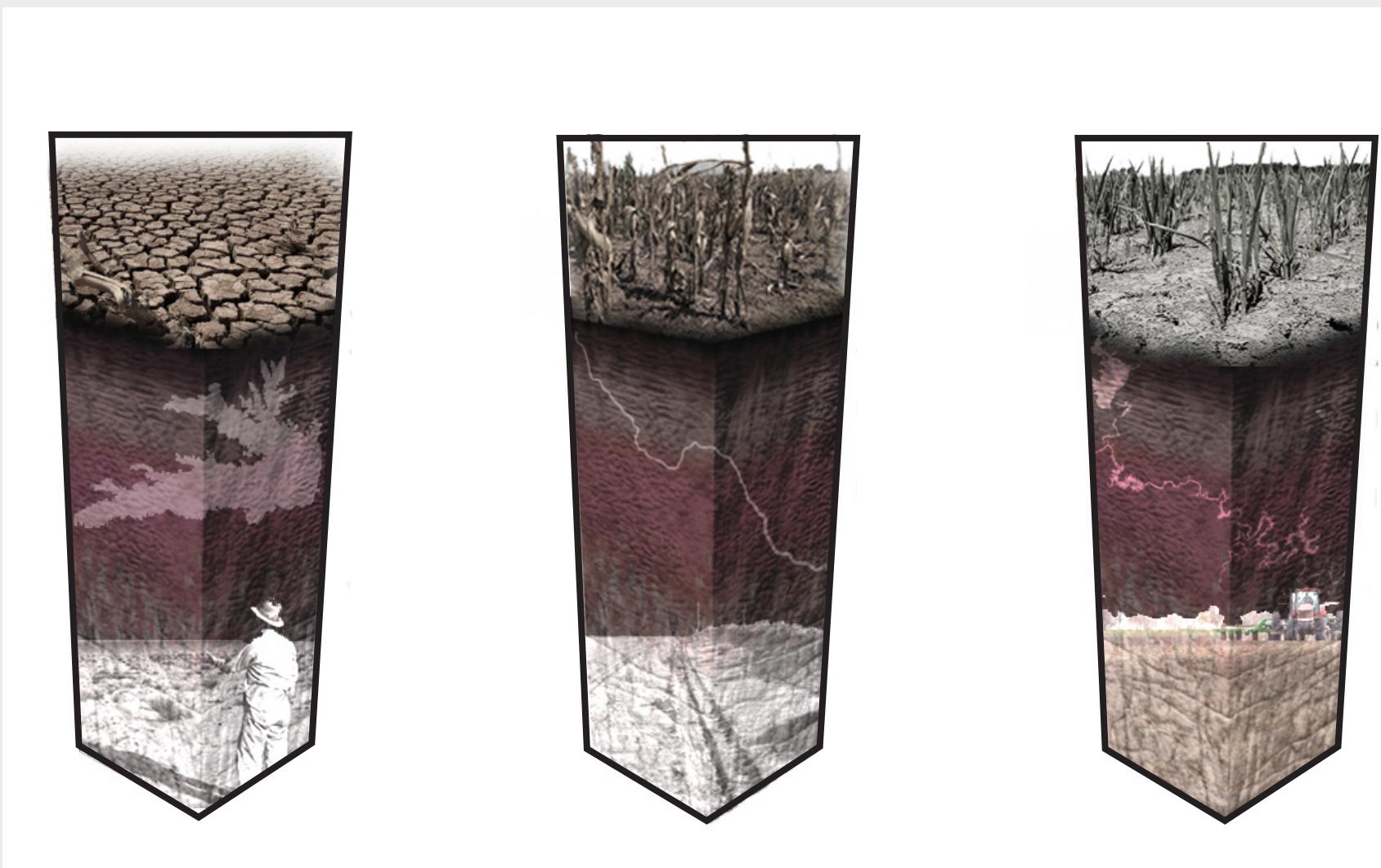
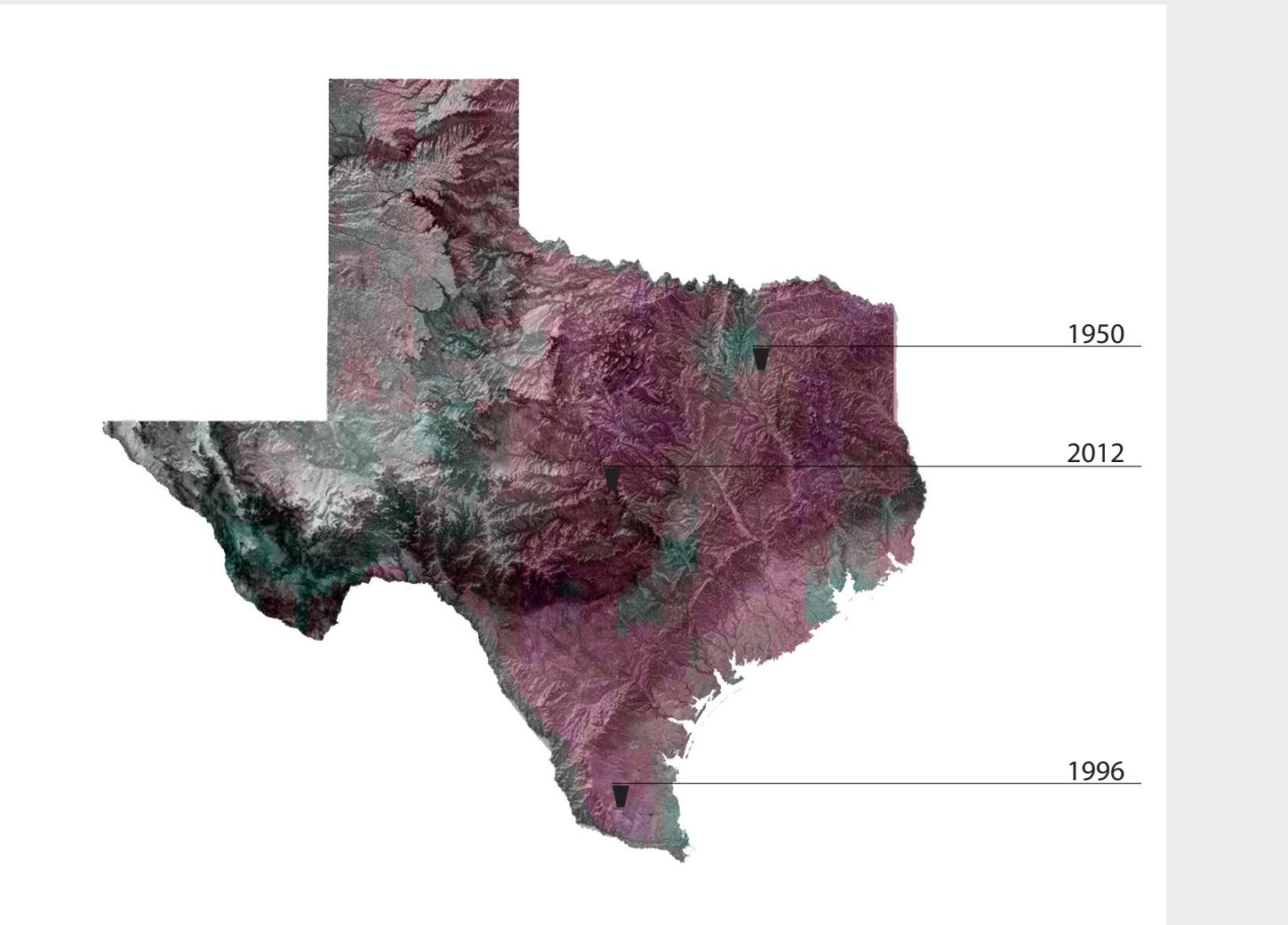
U.S. average temperature has increased by 1.3 F to 1.9 F since about 1970. Temperatures in the US are expected to continue to rise and regions are expected to change.



5

Texas

Climate change causing land drought in Texas areas.



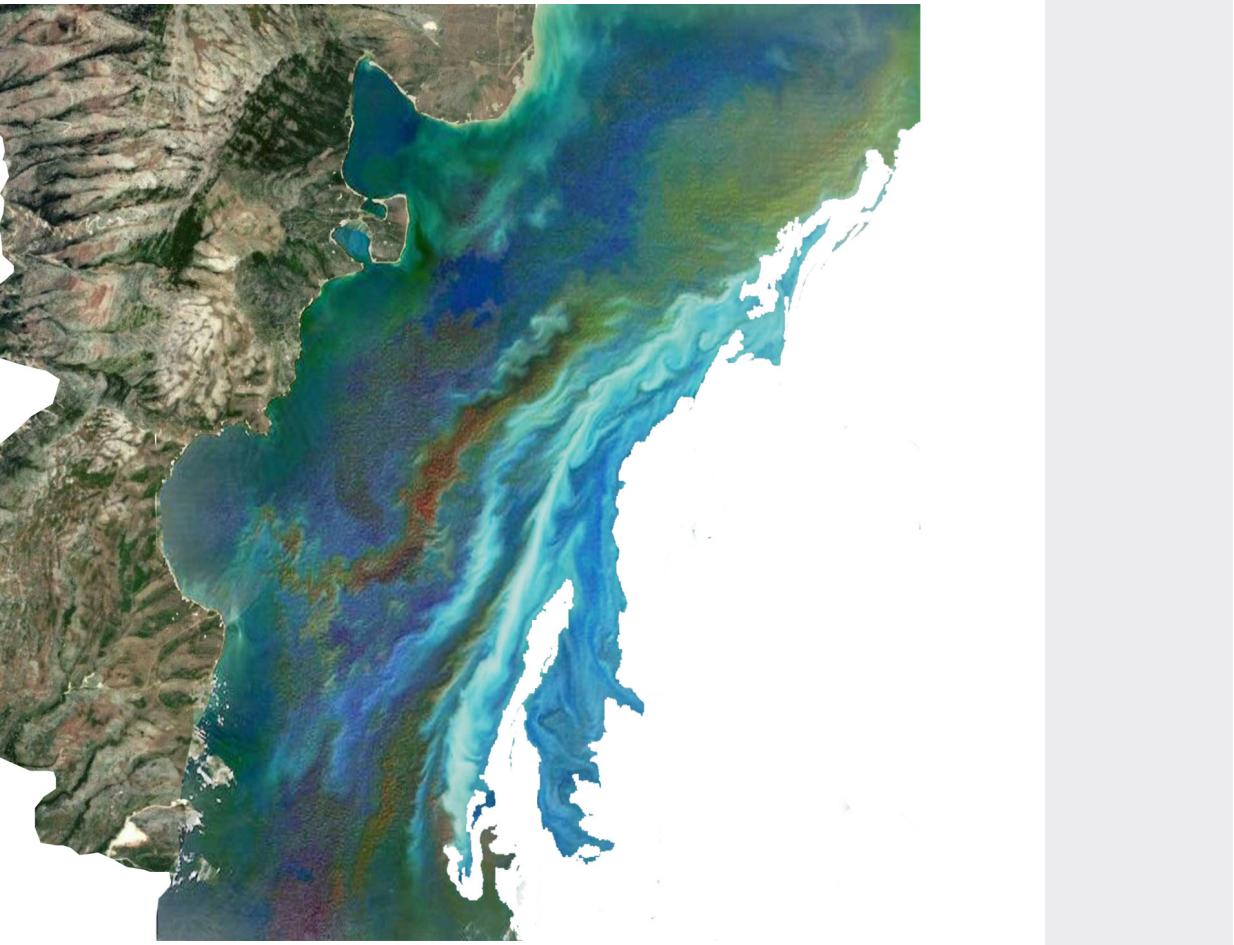
1950
Towns suffered from the drought. Dallas reservoir ran so low water had to be pumped from Red River.

1996
Some regions along the Rio Grande River had experienced lower than-expected rainfall, which increased the severity of the drought.

2012
Wells in the town of Spice-wood Beach ran out of water. Water level of the Highland lakes on the Colorado River were extremely low.

Flooding in the U S caused by Climate Change

As the country has heated up an average of 1.8 degrees Fahrenheit since 1901, it has also become about 4 percent wetter. Sea level rise and extreme weather will bring flooding to a number of regions in US.



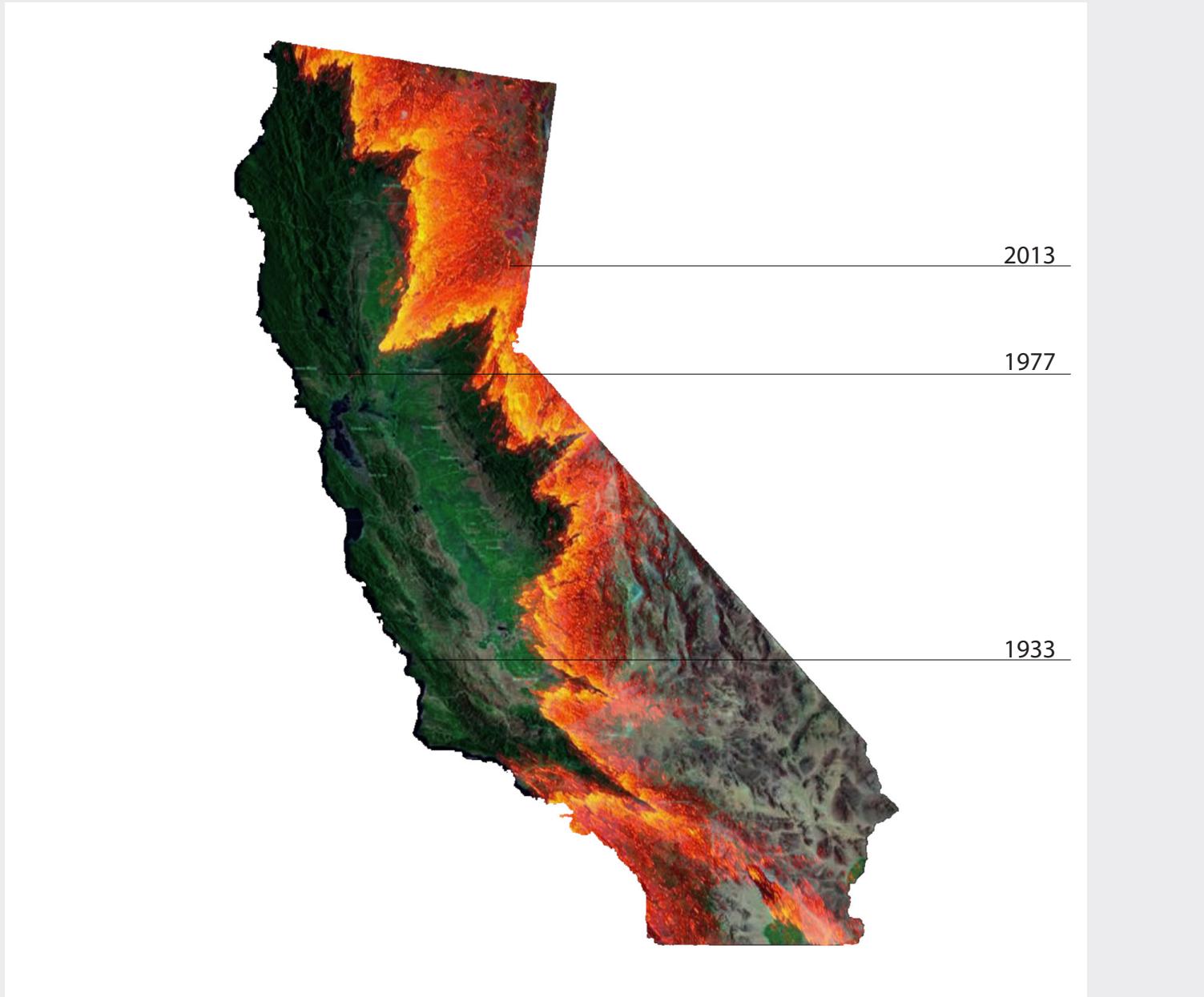
New York City

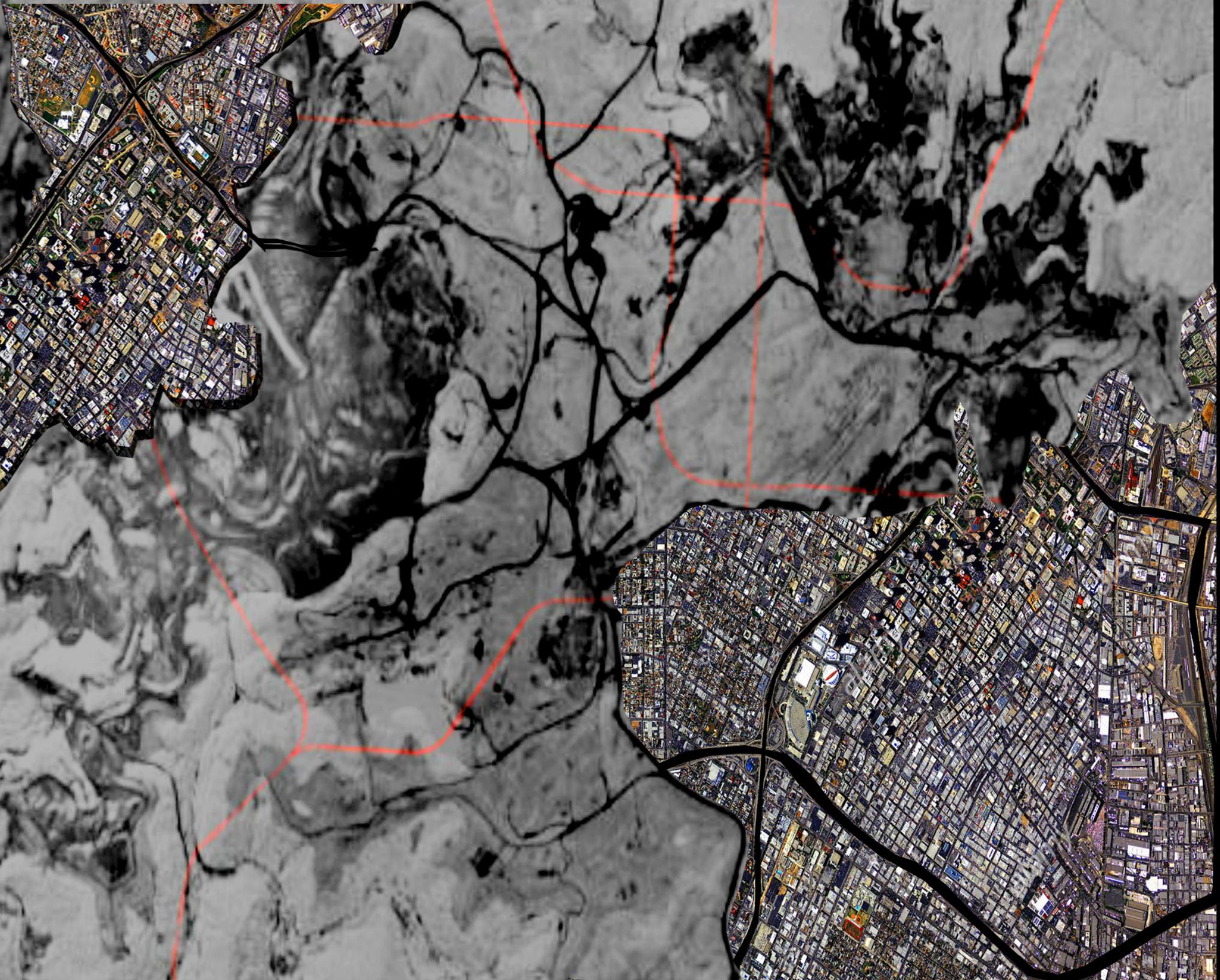
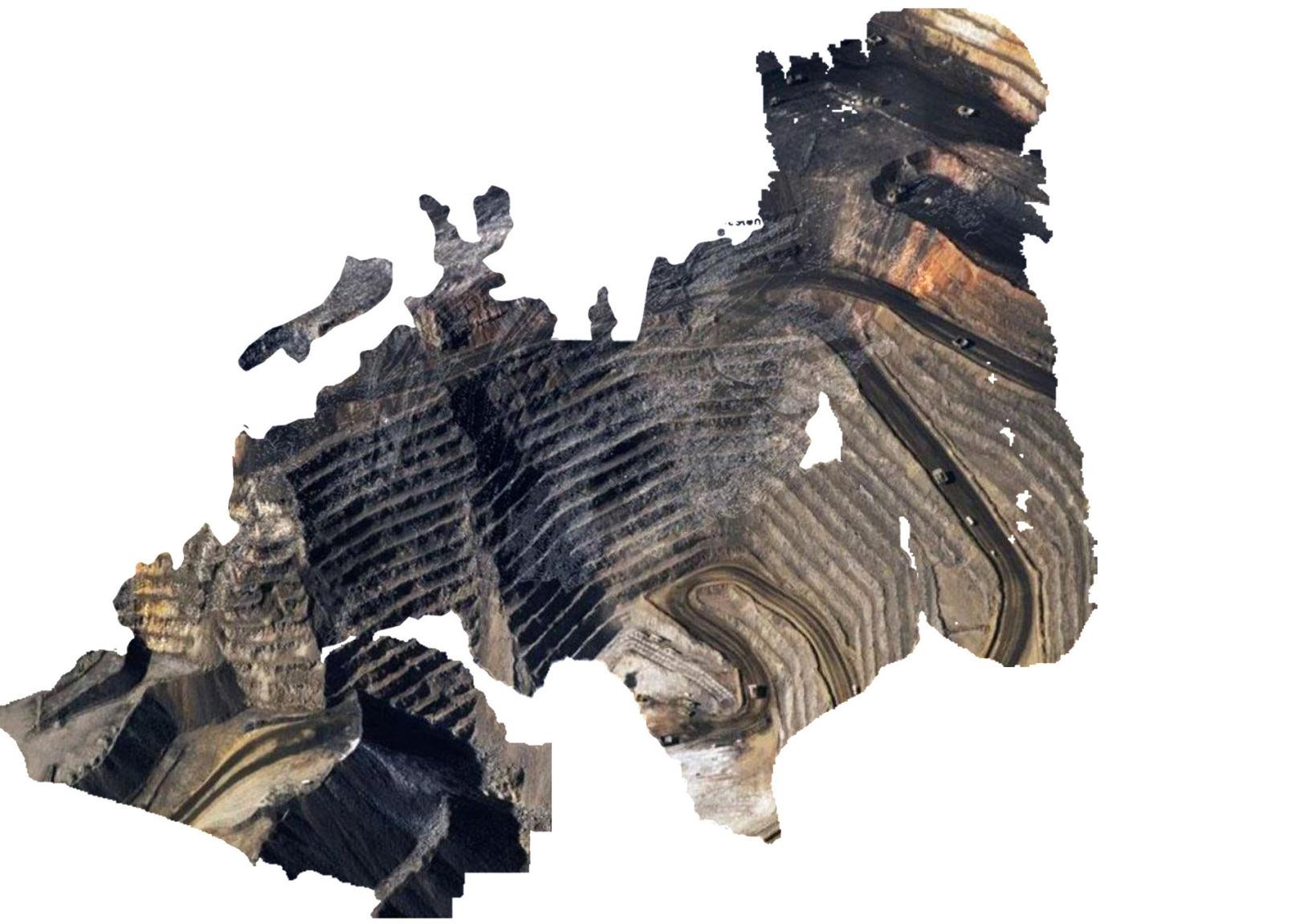
Flooding in NY after
100 years



Wildfires in California

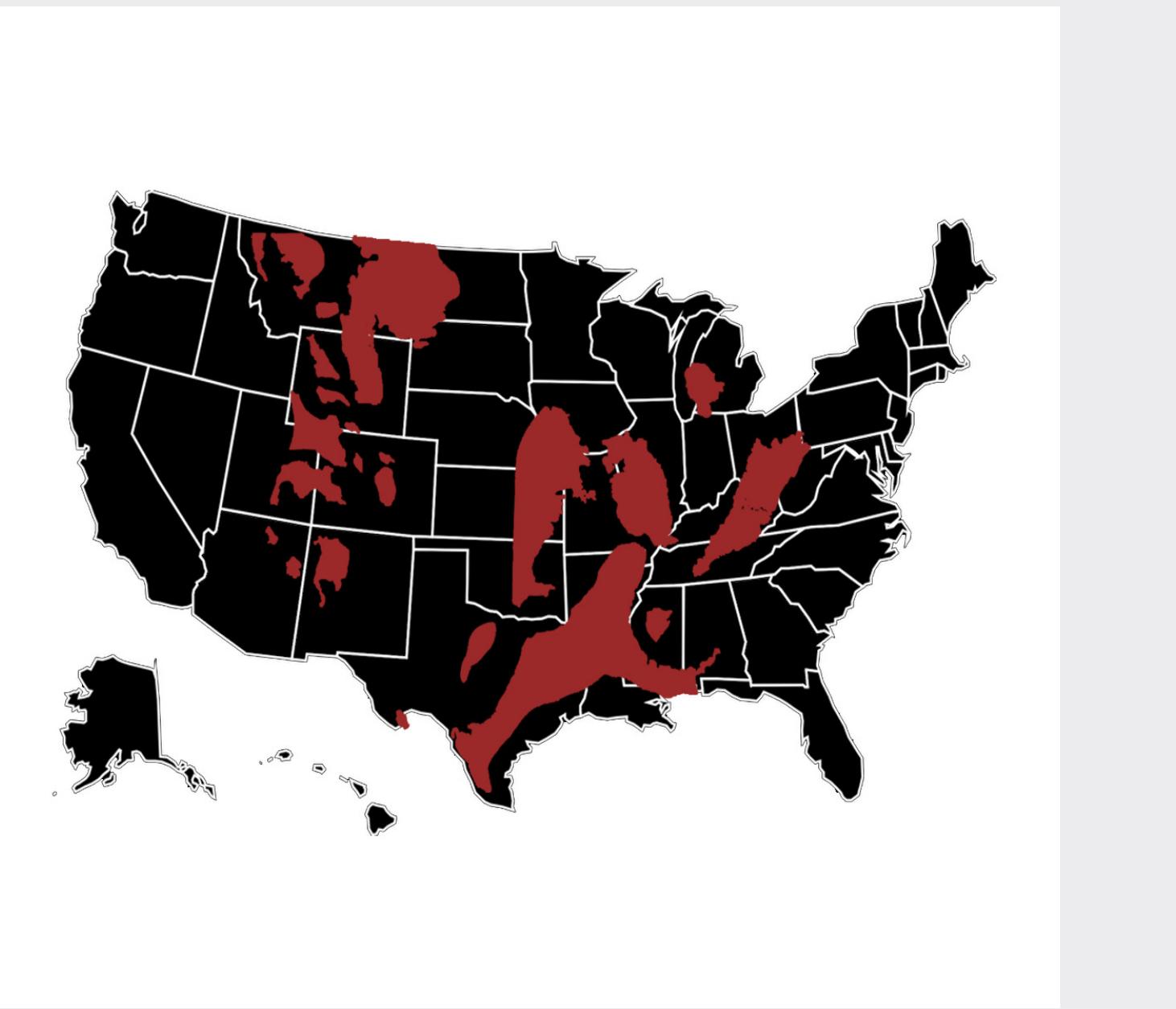
Increasing heat, changing rain and snow patterns, shifts in plant communities, and other climate-related changes have vastly increased the likelihood that fires will start more often and burn more intensely and widely than they have in the past.





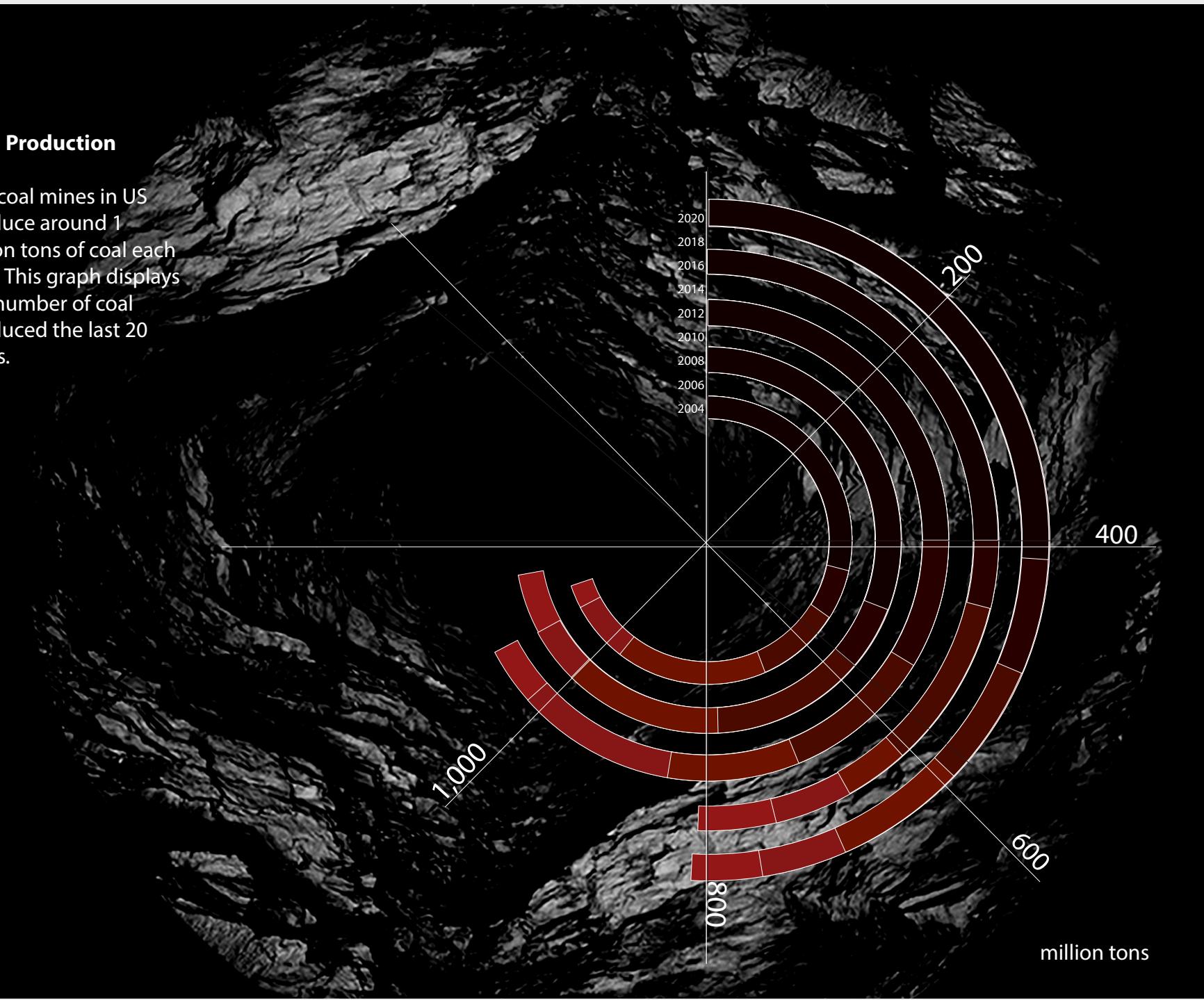
Map of major coal U.S. coal basins.

Coal Regions in US are distributed across the US map. They are in the Appalachian coal region, Interior coal region, and Western coal region.



Coal Production

853 coal mines in US produce around 1 billion tons of coal each year. This graph displays the number of coal produced the last 20 years.



Appalachian Coal Region

The Appalachian coal region includes Alabama, Eastern Kentucky, Maryland, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. About 27% of the coal produced in the United States came from the Appalachian coal region.



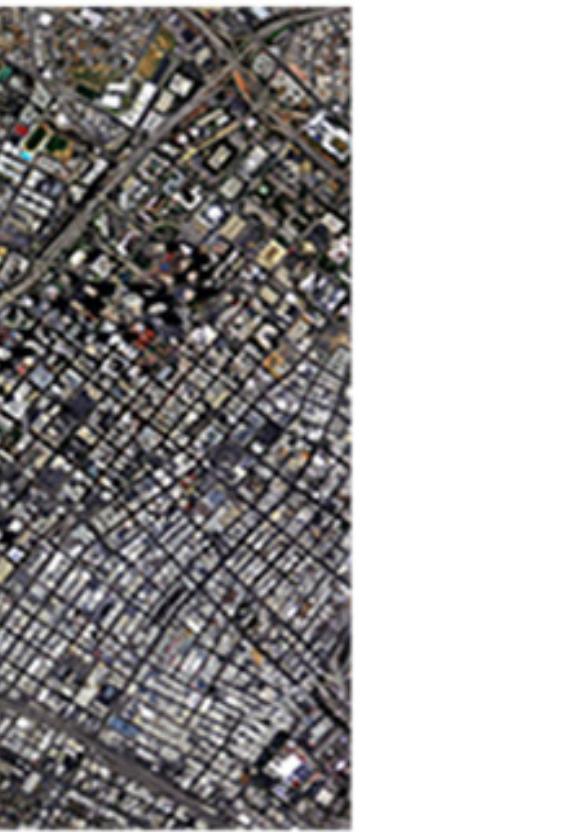
Michigan Coal Region

160 coal mines once were active in Michigan. Although coal is found throughout the central part of the Michigan Basin, mining has mostly been concentrated in the southern and eastern sections of this area, because here the coal seams are close to the surface. Most of the mining activity was concentrated in Bay, Saginaw, Tuscola and Genesee Counties



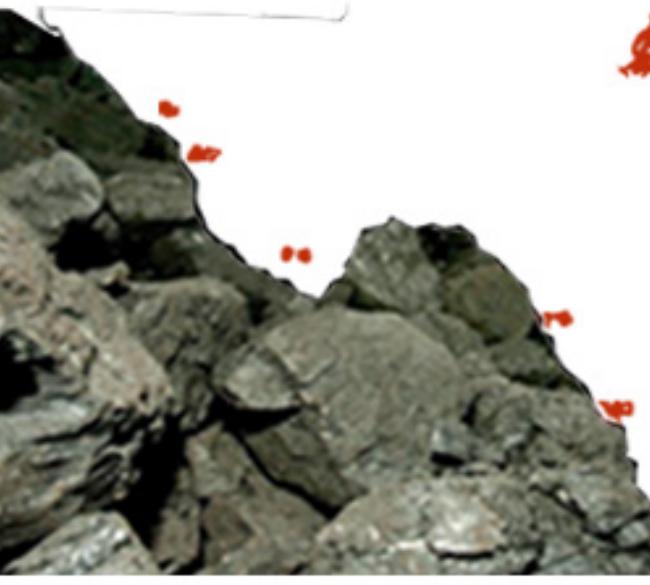
Wyoming Coal Region

Sixteen coal mines are in operation in Wyoming, located in three counties: Campbell, Lincoln, and Sweet water. The majority of the coal, however, is produced from the 11 mines in Campbell County. Fifteen of the mines extract coal through surface mining techniques, and

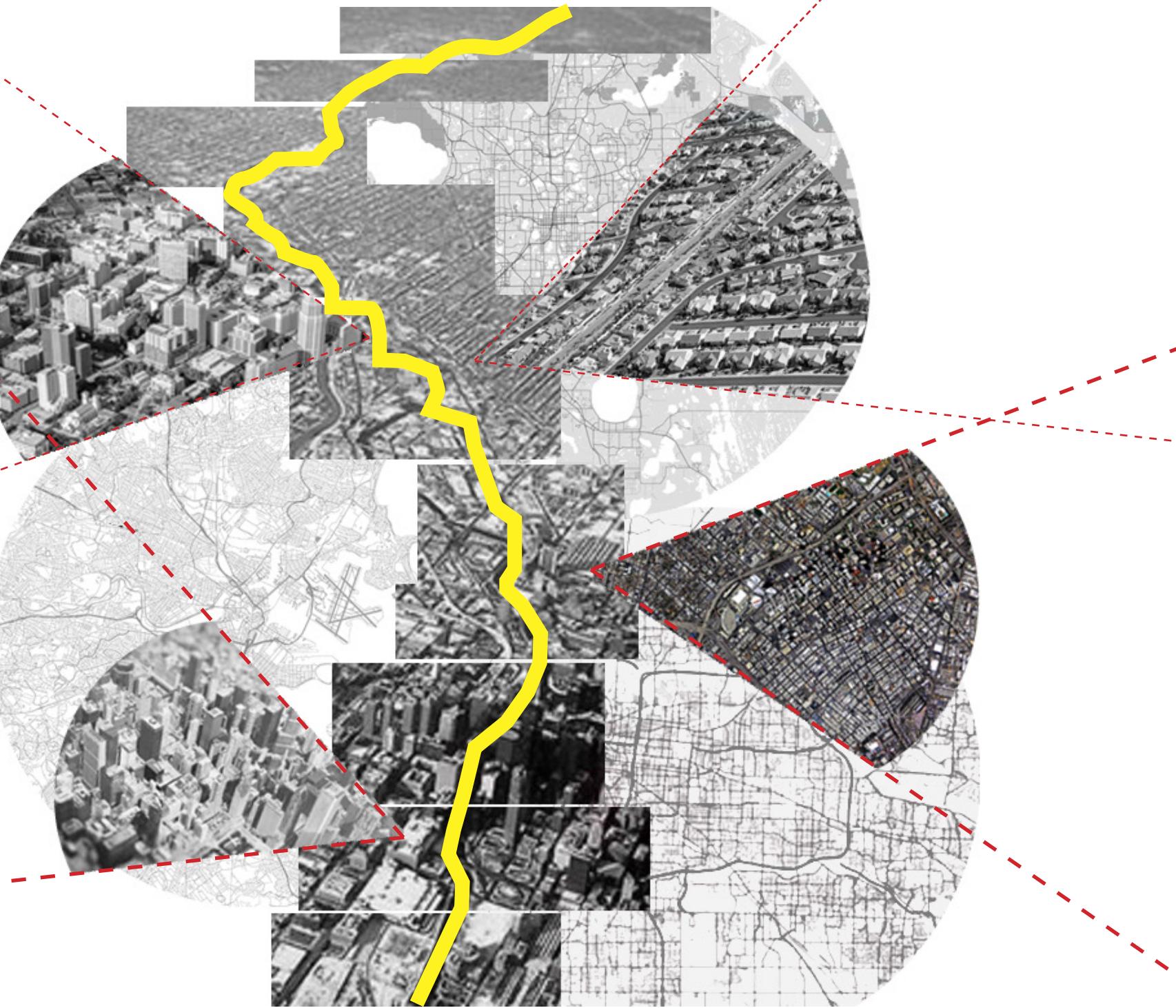


Texas Coal Region

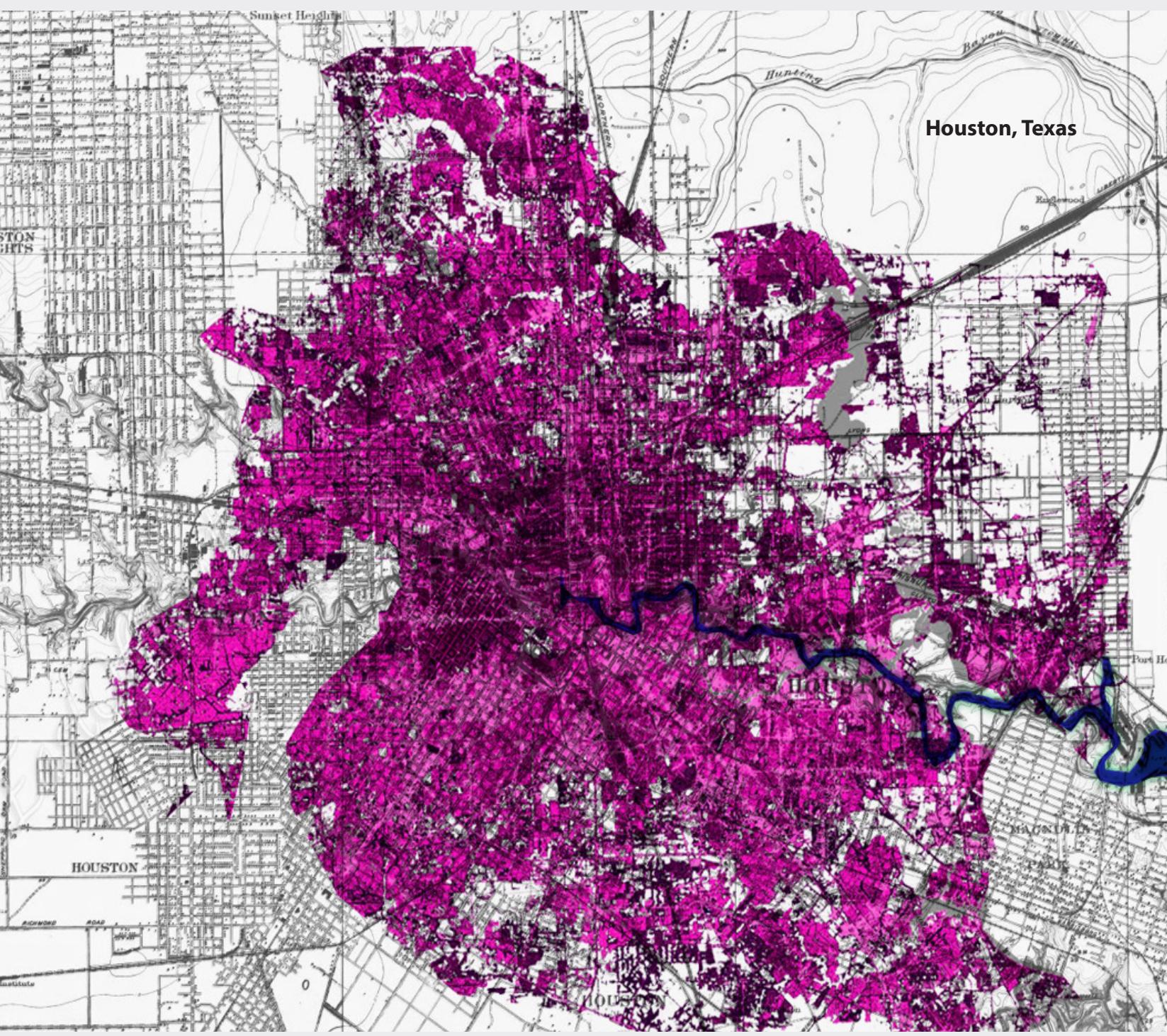
Texas has more than 9 billion tons of estimated recoverable coal reserves, almost 4% of the nation's total.⁸⁹ The state is the largest lignite producer in the nation and is among the top 10 coal producers overall.







22

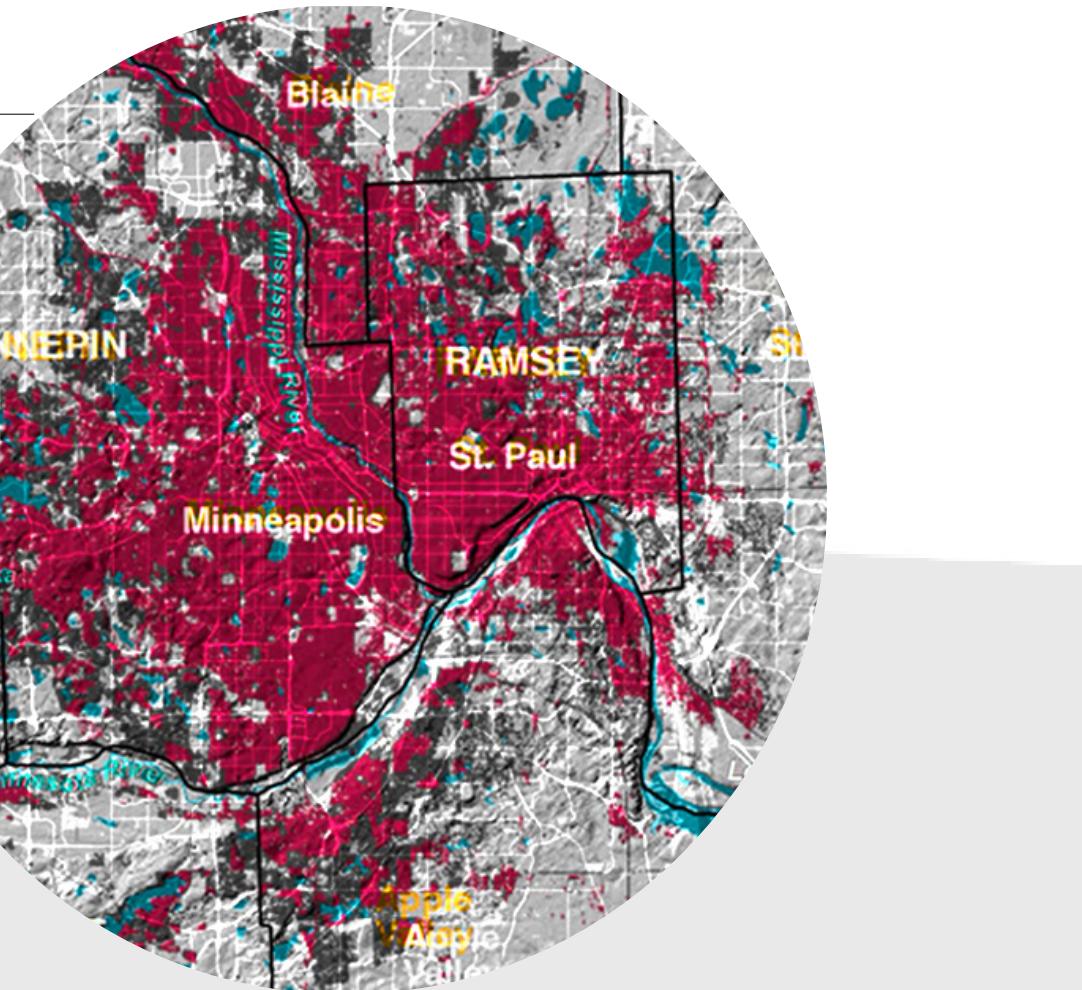


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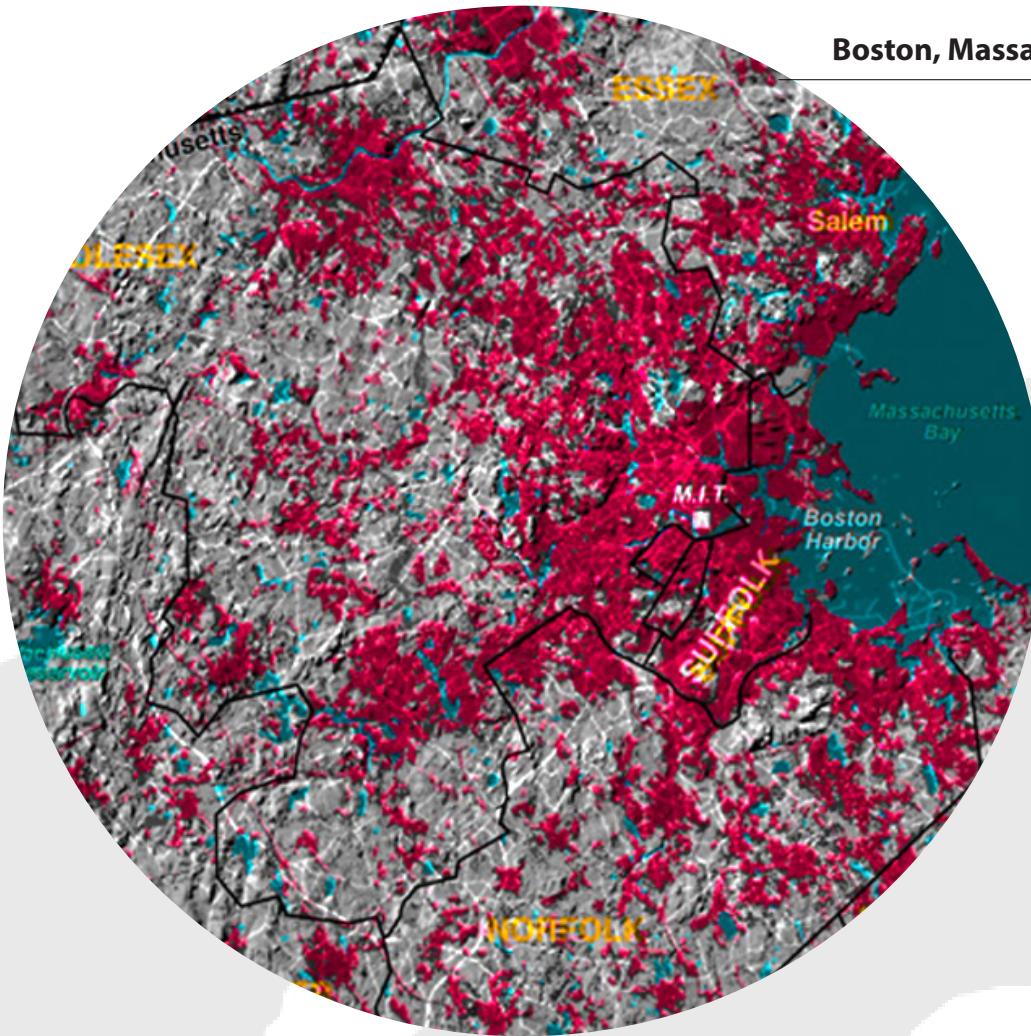
**Urban Growth
means more
Concrete Use**

A selection of 4 regions that witnessed growth in urban land area. Each region selected contains the adjoining cities and suburbs that make up a surrounding metropolitan region.

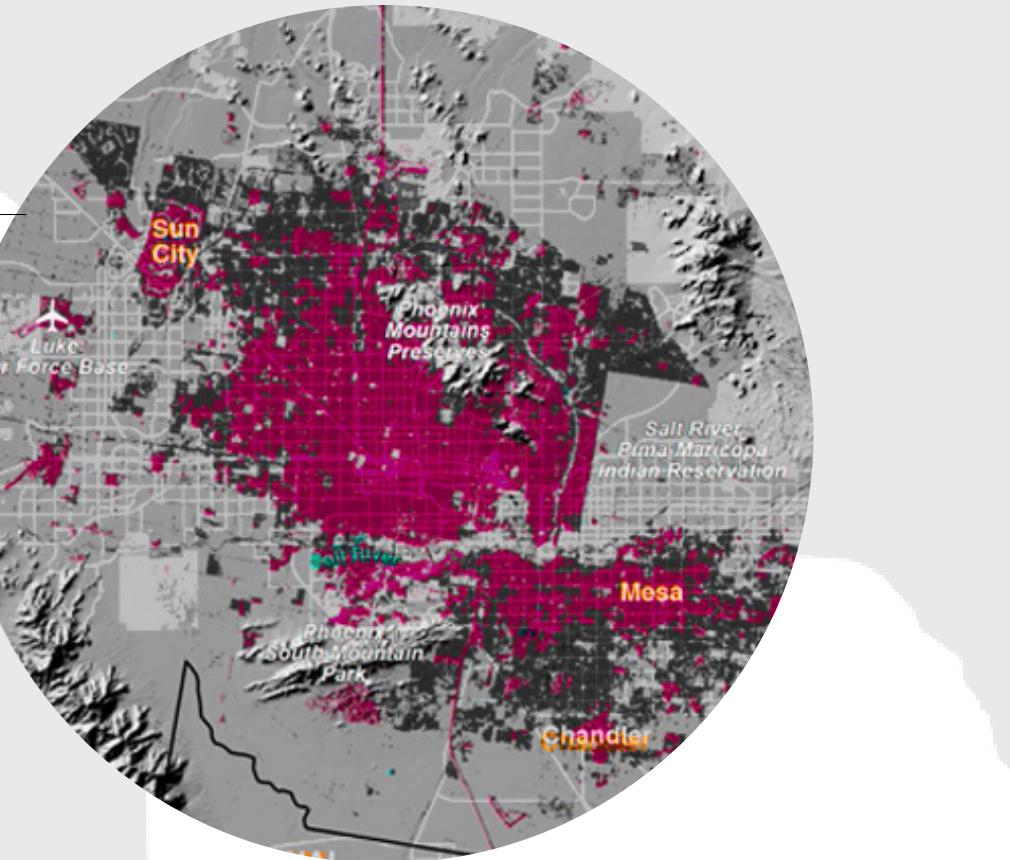
Minneapolis, Minnesota



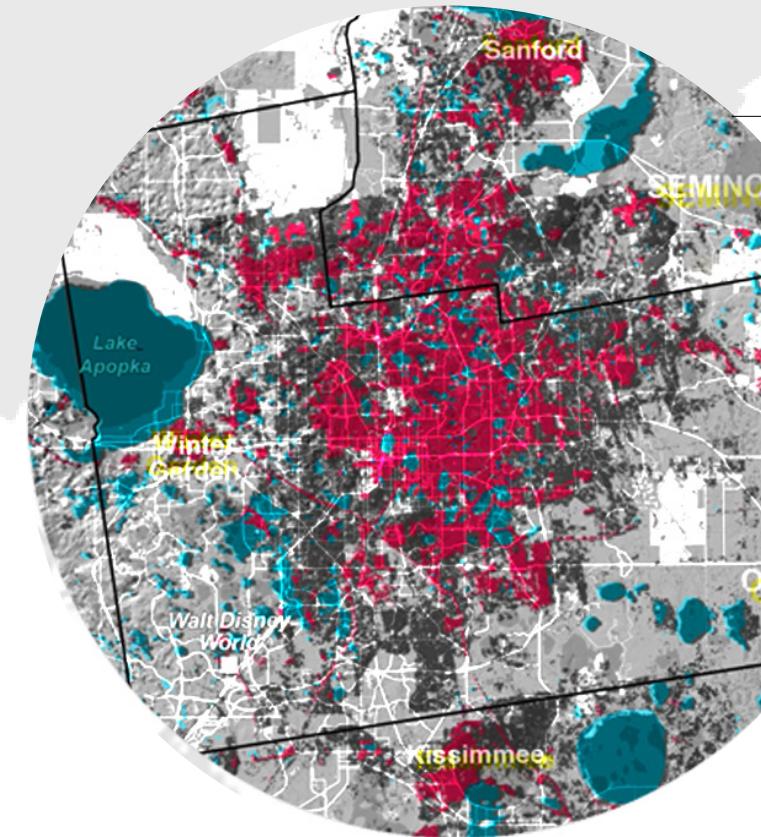
Boston, Massachusetts



Phoenix, Arizona

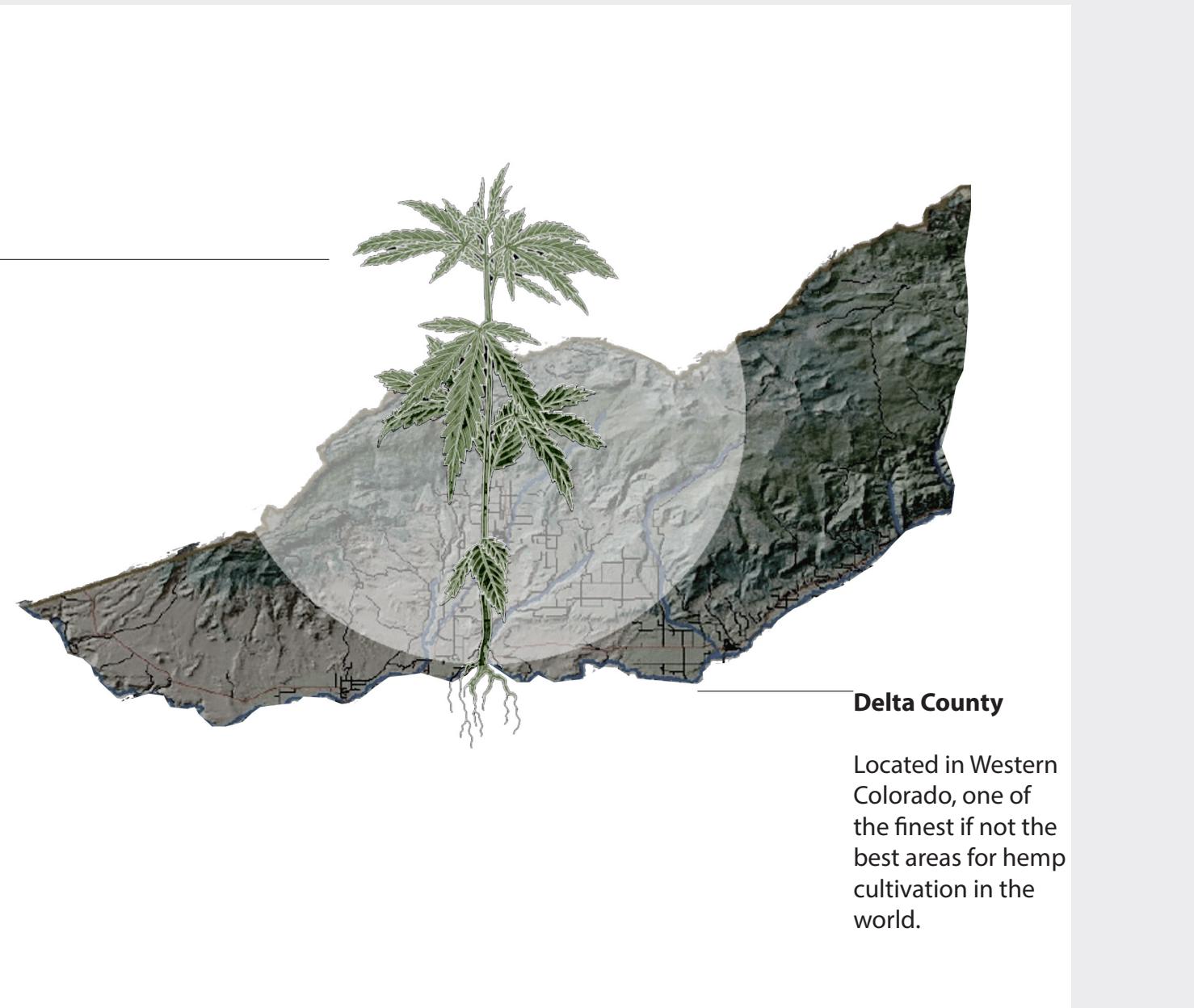


Orlando, Florida



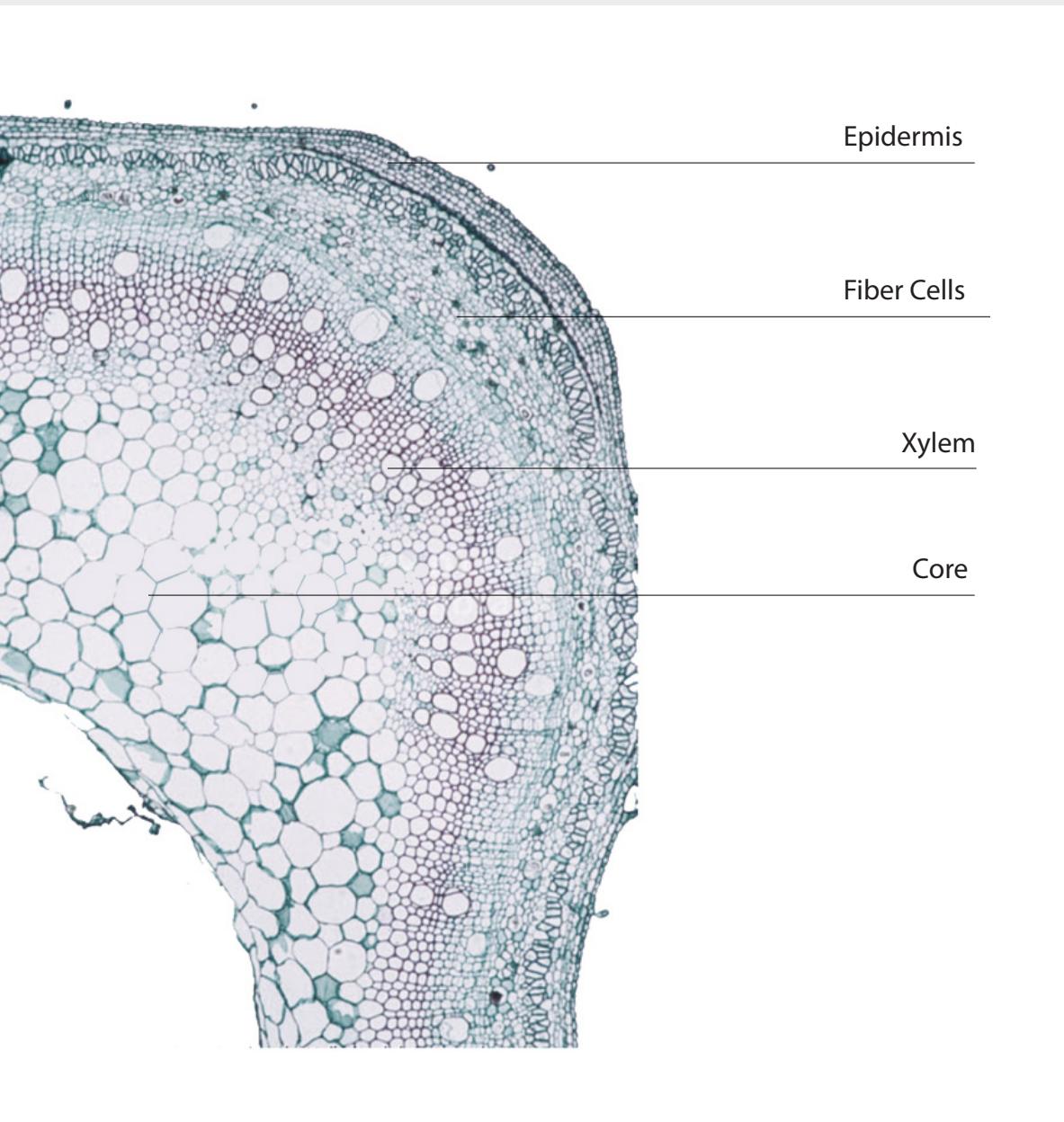
Hemp Tree

Hemp is a plant from a strain of the *Cannabis sativa* plant species. It is used to make a building material called hempcrete. To make hempcrete, the wooden core of the plant (called the shiv) is mixed with a lime binder and water.



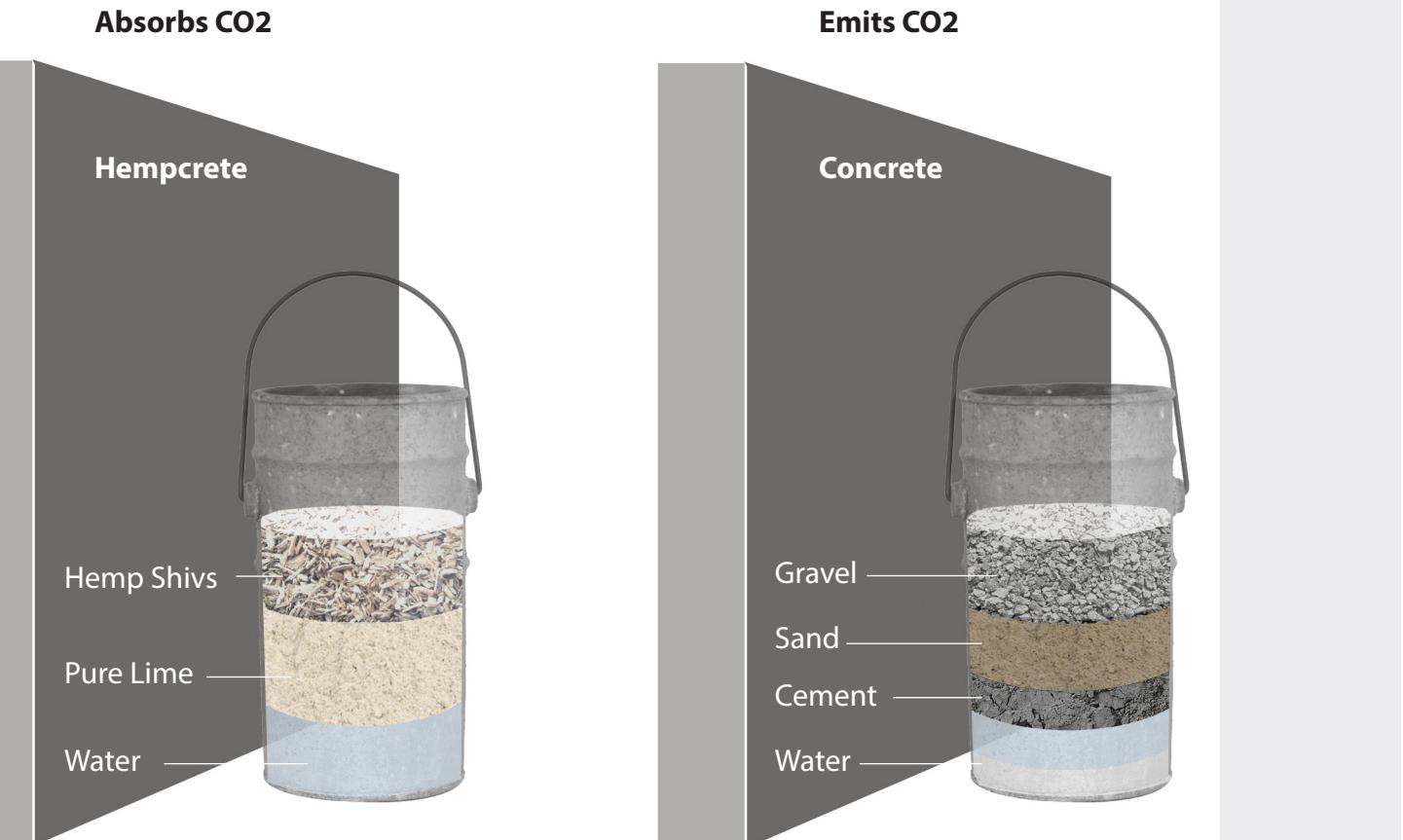
Hemp Stem Cross Section

Hemp stem has a heterogeneous cell wall. It can be used to make stronger and lighter building material that is environmentally friendly.



Hempcrete Vs Concrete

In ordinary concrete, cement is mixed with aggregate and water, in hempcrete, hemp shivs is replaced by the cement.



325 kilograms of CO₂ are stored in one tonne of dried hemp, and hempcrete absorbs CO₂ not only when it is being grown, but after it has been made into building materials as well.

The manufacture of one tonne of cement causes about 0.87 tonnes of carbon dioxide emissions by fossil fuel combustion.



<https://nationalhempassociation.org/some-interesting-faces-about-hempcrete-as-a-building-material>
<https://www.nytimes.com/interactive/2019/05/23/climate/plant-hardiness-zones-shifting>
<https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-tx.pdf>