

IS THERE A SOLUTION TO CLIMATE CHANGE?

by

Margaret Claire White

April 2019

Director of Thesis: Matthew Egan

Major Department: School of Art and Design

This document supports my Master of Fine Arts thesis exhibition consisting of two digital prints, ten lithographs, vinyl text corresponding to each print and 5 stickers with listed references, in the SOAD gallery. The artwork is divided into two sections: mitigation and adaptation, and subsections detailing specific predicaments including ocean acidification, energy production, and thawing permafrost. Accompanying text explains the scientific and social relevance behind the imagery. In this way, the art acts as a framing device for the science and social issues of climate change. As I made the work for this exhibition, contemporary events included the 2018 mid-term elections and the International Panel on Climate Change released their report on the impacts of our rising global temperature. These are both relevant and pertinent to the thesis. While the media acknowledged the overwhelming alarm generated by the IPCC report, climate change was forgotten by the midterm campaigners in favor of policies on immigration and healthcare. Climate change is a pressing concern that will affect us for generations even if we solved it today. I believe it worth discussing, especially in the context of a university, but I hope this thesis will one day be irrelevant.

IS THERE A SOLUTION TO CLIMATE CHANGE?

A Thesis

Presented to the Faculty of the School of Art and Design

East Carolina University

In Partial Fulfillment of the Requirements for the Degree of

Master of Fine Arts

by

Margaret Claire White

April 2019

© Margaret Claire White, 2019

IS THERE A SOLUTION TO CLIMATE CHANGE?

by

Margaret Claire White

APPROVED BY:

DIRECTOR OF THESIS:

Matthew Egan, MFA

COMMITTEE MEMBER:

Linda Adele Goodine, MFA

COMMITTEE MEMBER:

Beth Blake, MFA

COMMITTEE MEMBER:

Heather Muise, MFA

COMMITTEE MEMBER:

Jacob Hochard, PhD

DIRECTOR OF THE
SCHOOL OF ART AND DESIGN:

Kate Bukoski, PhD

DEAN OF GRADUATE SCHOOL:

Paul J Gemperline, PhD

DEDICATION



Dedicated to Nestle C. Cat

ACKNOWLEDGEMENTS

Thank you to my friends Lauren Robillard, Vincent, Brett, Nikki, Pete, Lacey, Noelle, Andrew, Junghoon, Adam and Katya, my parents, Ronson, Joanne and Tim for showing with me, Kayla for giving me perspective, Robin for listening to my ramblings, Young for your support and sharing space with me, Gerald and Judd for helping me so much, Kai Rubens for sharing your work and inspiring me to think critically, Matt and Heather for putting up with me at my worst and pushing me to be my best, Jake for your knowledge and help, Adele for your friendship and mentoring, and Beth for your kindness, your guidance and making me laugh. I will miss ECU and all of you.

TABLE OF CONTENTS

LIST OF FIGURES vii

LIST OF PLATES viii

INTRODUCTION 1

POLITICAL CONTEXT SURROUNDING CLIMATE CHANGE 3

MITIGATION VS. ADAPTATION 8

BODY OF WORK 10

 SECTION 1 10

 SECTION 2 25

INFLUENCES 40

INSTALLATION 51

CONCLUSION 61

REFERENCES 62

BIBLIOGRAPHY 66

APPENDIX 73

LIST OF FIGURES

Figure 1: Robert Aerial, <i>The Real Terror</i> , 2015	6
Figure 2: Rob Rogers, <i>Untitled Cartoon</i> , 2016.....	6
Figure 3: <i>Sign from White River</i>	13
Figure 4: Colin Jost and Michael Che, <i>Saturday Night Live: Weekend Update</i> , 2018.....	41
Figure 5: Sue Coe, <i>The Reward for Just Following Orders</i> , 2018	42
Figure 6: Joel Pett, <i>Editorial Cartoon</i> , 2009.....	43
Figure 7: Joe Simon and Jack Kirby, <i>Captain America #1</i> , 1941	44
Figure 8: Chris Claremont, and Brent Anderson, <i>X-Men: God Loves, Man Kills</i> , 1982	46
Figure 9: 2 Hours a Week, <i>Action 240</i> , 2017.....	49
Figure 10: El Lissitsky, <i>Prouns</i> , 1923.....	54

LIST OF PLATES

Plate 1: <i>Installation Shot, 2019</i>	1
Plate 2: <i>Mitigations: Alternatives and Solutions, 2018</i>	10
Plate 3: <i>Fixing the Infrastructure, 2018</i>	12
Plate 4: <i>1,400 More Deaths from Coal a Year, 2018</i>	16
Plate 5: <i>Nuclear Energy and Natural Gas are not Clean Enough, 2018</i>	19
Plate 6: <i>Environmentalists Debate Biofuels, 2018</i>	22
Plate 7: <i>Adaptation: No Longer the Future, 2019</i>	25
Plate 8: <i>The Warming Arctic Releases More Methane, 2018</i>	27
Plate 9: <i>Rising Sea Levels Force Adaptation, 2018</i>	32
Plate 10: <i>Chicken Timeline, 2018</i>	35
Plate 11: <i>Mitigation: Alternative Solutions Table, 2018</i>	50
Plate 12: <i>Adaptation: No Longer the Future Table, 2019</i>	51
Plate 13: <i>Installation Shot, 2019</i>	53
Plate 14: <i>Installation Shot: Fixing the Infrastructure, 2019</i>	54
Plate 15: <i>Installation Shot, 2019</i>	56
Plate 16: <i>Installation Shot: The Warming Arctic Releases More Methane, 2019</i>	56
Plate 17: <i>Installation Shot, 2019</i>	5
Plate 18: <i>Changes in Fish Migration Due to Rising Temperatures, 2019</i>	68

INTRODUCTION

The climate change debate is multi-faceted, and discussion needs the representation of different sources and groups from post-millennials to the Silent Generation. The impetus for this thesis is to take an overwhelming topic, climate change, and display it in parts to present issues that appear separate as connected. Climate change is a global, social issue where failing to solve problems both at home and abroad negatively impacts humanity. A problem in North Carolina relates to problems in the arctic or in Bangladesh. The artwork aims to influence perceptions through showing climate change on the global scale and as singular problems. The thesis exhibition includes two large overall compositions are presented as tables. The dissection of the large images reveals specific issues as ten images on the wall above the tables. There are five images for each table. The accompanied supporting text in the installation provides a summary of articles, writings and source material used to derive the imagery.



Plate 1. Installation Shot. Margaret Claire White 2019

This Master of Fine Arts thesis exhibition and supporting document addresses two facets of climate change: mitigation and adaptation. Subsections detail specific predicaments, like farming, energy, thawing permafrost, etc. The text explains the idea behind the artwork and allows the imagery to make symbolic and emotional connections the facts alone cannot. In this way, the art acts as a framing device for the science and social issues. Each work includes vinyl text explaining the issues featured in the images allows for a more direct communication with viewers and repeating certain motifs, such as smoke, factories, people, and crops, connecting pieces and making the work visually unified. The thesis title "*Is there a solution to climate change?*" ponders many sources of the issues as included in the exhibition along with images visualizing issues we should be examining

POLITICAL CONTEXT SURROUNDING CLIMATE CHANGE

The environmental conservation debate is contentious. There has been a long history of disagreement regarding environmental policies. Global warming, however, started as a non-partisan issue. In 1970, Gaylord Nelson and Pete McCloskey, a Democrat and a Republican respectively, worked with Denis Hayes to create Earth Day. In 1988, George H. W. Bush, the Republican candidate for president and Michael Dukakis, the Democratic candidate, each addressed climate change as a threat. The debate grew and festered to the charged discussion we have today as business regulation hampered the discussion. It transformed from a mutual effort to save the environment to a vitriolic argument. Democrats fought for more accountability of large corporations, such as the oil company Exxon and Republicans rallied around businesses and defending the market. The divide was most apparent in 2009 when hackers broke into the email server at the University of East Anglia, in Norwich, England and released the private emails of climate scientists to discredit them. The hacking occurred in conjunction with the 2009 United Nations Climate Change Conference in Copenhagen and exposed the ever-growing divide between the political right and left. A Pew Research Center survey in October 2018, around the midterm elections found Democrats rated climate change as a serious concern, but Republicans did not. Statistically, Democrats were 61% more likely to be concerned with facing climate change.¹

¹ Pew Research Center. Little Partisan Agreement on the Pressing Problems Facing U.S. Pew Research Center. October 15, 2018. http://www.people-press.org/2018/10/15/little-partisan-agreement-on-the-pressing-problems-facing-the-u-s/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top Accessed March 20, 2019

Climate change should be considered the United States' biggest problem from a global and domestic standpoint. The transformation of the planet is inevitable and occurring.² Our current president, Donald Trump, doubts the veracity of climate change, as expressed by his rhetoric during the campaign and while in office. President Trump frequently posts tweets doubting the legitimacy of climate change and has called it a hoax developed by the Chinese government.³ From his statement on the Paris Climate Accord, an agreement between nations to mitigate climate change by cutting down on carbon emissions and researching renewable energies:

At what point does America get demeaned? At what point do they start laughing at us as a country? We want fair treatment for its citizens, and we want fair treatment for our taxpayers. We don't want other leaders and other countries laughing at us anymore. And they won't be. They won't be. I was elected to represent the citizens of Pittsburgh, not Paris. (President Trump June 2017)⁴

Millennials have a vested interest in combating climate change. Nearly a third of millennials consider climate change as a factor against having children, including Representative Alexandria Ocasio-Cortez.⁵ Ocasio-Cortez' opinion sparked outrage in some, but according to

² Ball, Jeffrey. With Climate Change No Longer in the Future, Adaptation Speeds Up. New York Times. September 21, 2018. <https://www.nytimes.com/2018/09/21/climate/climate-change-adaptation.html> Accessed October 20, 2019.

³ Trump, Donald. President Trump @POTUS. Twitter. <https://twitter.com/potus?lang=en> Accessed March 19, 2019.

⁴ Clark, Pilita and Leatherby, Lauren. Trump transcript on Paris climate deal exit-annotated. Financial Times. June 1, 2017. <https://ig.ft.com/trump-paris-agreement-speech-annotator/> Accessed March 19, 2019.

⁵ Relman, Eliza and Walt, Hickey. More than a third of millennials share Alexandria's Ocasio-Cortez' about having kids while the threat of climate change looms. Business Insider. March 5, 2019.

<https://www.businessinsider.in/more-than-a-third-of-millennials-share-alexandria-ocasio-cortezs-worry-about-having-kids-while-the-threat-of-climate-change-looms/articleshow/68262786.cms> Accessed March 10, 2019. Accessed March 8, 2019.

the New York Times' poll young adults are having less children, and 33% said it was due to climate change concerns.⁶ Climate change will affect all of us for the rest of our lives, but it becomes a serious concern for millennials as we are the last generation who can make a difference. The International Panel on Climate Change reported we need to reduce emissions by 2040 or the damage to the planet, and our way of life, will be irreversible.⁷ More frustrating, most of the Democrats and Republicans running the 2018 midterm elections left climate change out of their ad campaigns and according to the New York Times, Democrats ranked health care as their most pressing concern, with only 7% of party members believing climate change to be the larger problem.⁸ Another Pew Research study showed that younger Republicans are less likely to approve of expanding the use of fossil fuels.⁹ The younger generations, post-millennials and millennials are more likely to link human action with climate change.¹⁰ Climate change becomes less of a partisan issue as we move forward.

Unfortunately, President Trump, and many who share his opinions in his administration, view climate change through self-interests and a sense of nationalism. Climate change is a global issue as concerns that appear specific to certain communities at first, carry lasting repercussions

⁶ Miller, Claire Cain. Americans Are Having Fewer Babies. They Told Us Why. The New York Times. July 5, 2018. <https://www.nytimes.com/2018/07/05/upshot/americans-are-having-fewer-babies-they-told-us-why.html> Accessed March 20, 2019.

⁷ The Intergovernmental Panel on Climate Change. IPCC. <https://www.ipcc.ch/> Accessed March 20, 2019.

⁸ Gabriel, Trip. Floods. Wildfires. Yet Few Candidates Are Running on Climate Change. The New York Times. October 2, 2019. <https://www.nytimes.com/2018/10/02/us/politics/environment-climate-elections.html> Accessed March 20, 2019.

⁹ Funk, Cary and Hefferon, Meg. Many Republican Millennials differ with older party members on climate change and energy issues. Pew Research Center. May 14, 2018. <https://www.pewresearch.org/fact-tank/2018/05/14/many-republican-millennials-differ-with-older-party-members-on-climate-change-and-energy-issues/> Accessed March 29, 2019.

¹⁰ Parker, Kim, Graf, Nikki, and Igielnik, Ruth. Generation Z Looks a lot Like Millennials on Key Social and Political Issues. Pew Research Center. January 17, 2019. <https://www.pewsocialtrends.org/2019/01/17/generation-z-looks-a-lot-like-millennials-on-key-social-and-political-issues/> Accessed March 29, 2019.

on the global scale. In 2018, Trump pulled the United States out of the Paris Climate Accord, though just two years ago, in March 2016, President Obama named climate change the number one threat to security, over ISIS- a jihadist militant group prominent in Iraq and Syria. “ISIS is not an existential threat to the United States,” Obama told the *Atlantic*, in 2016. “Climate change is a potential existential threat to the entire world if we don’t do something about it.”¹¹ His



Figure 1. Robert Ariail “The Real Terror” 2015

statement received mixed reactions. These opposing views were depicted in political cartoons at the time. Figure 1, “The Real Terror” by Robert Ariail, an editorial cartoonist for The

State newspaper, refers to ISIS as a greater threat than climate change. Factory smoke forms into an

ISIS soldier mocking the threat of carbon emissions and global warming. Figure 2, Rob

Rogers’ cartoon for the Pittsburgh Gazette, depicts a conservative protester more concerned with bashing Obama and ISIS than the

floodwaters surrounding him. Both cartoons reference Obama’s statement on ISIS and climate

change. They allow us to see the emotions behind the argument. ISIS is a tangible enemy for the

United States; climate change feels more abstract but is extremely harmful in the here and now. Editorial cartoons are a good measure of the political climate in the past and present. Cartoons

State

newspaper, refers to ISIS as a greater threat than climate change. Factory smoke forms into an ISIS soldier mocking the threat of carbon emissions and global warming. Figure 2, Rob Rogers’ cartoon for the Pittsburgh Gazette,

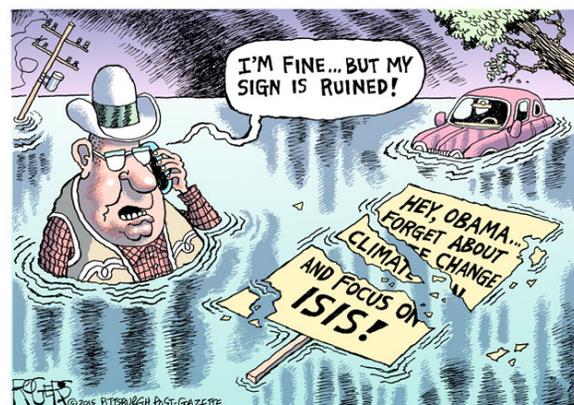


Figure 2. Rob Rogers’ Untitled Cartoon 2016

¹¹ Johnson, Keith. *Obama Says Climate Change is a Security Risk. Why Are Republicans Laughing?* Foreign Policy. March 21, 2016. <https://foreignpolicy.com/2016/03/21/obama-says-climate-change-is-a-security-risk-why-are-republicans-laughing/> Accessed March 19, 2019.

provide political discourse and play a role in the freedom of the press. Without the ability to criticize, the press loses its legitimacy. The same holds true for fine art. All art is tied to the culture of its day and political cartoons act as links to the past; they provide examples of the thoughts and motives responsive to an era.

MITIGATION VS. ADAPTATION

Scientists debate mitigation and adaptation as the most appropriate response to climate change. Mitigation reduces climate change by lowering greenhouse gases, like water vapor, methane, and carbon dioxide emissions by relying increasingly on renewable energies such as solar and wind. Adaptation handles the problem as it currently exists. Proponents of mitigation seek to reduce anthropogenic impacts on the Earth's climate in the hope to prevent climate-related damages from occurring. Adaptation, rather, attempts to respond to climate-related damages that do occur. For example, a hotter climate gives a longer growing season for some locations, but too much heat renders some crops ungrowable. Adaptation would account for this impairment of crops by switching to a heat-resistant crop while mitigation would attempt to prevent changing climate patterns from occurring.

Central to the debate is the fear that adaptation allows for continued, potentially unmitigated pollution. Adapting to a situation deals with future concerns as they arise but does not fix the root of it. However, mitigation approaches must make earlier investments that are subject to more uncertainty over future climate damages. Attitudes shifted toward adaptation-oriented solutions in recent years. Former vice-president and environmental activist Al Gore, a critic of adapting to climate change in 1992, called it necessary in 2008. Previously, Vice President Gore called adaptation a "kind of laziness, an arrogant faith in our ability to react in time to save our skins."¹² The greenhouse gases causing global warming and climate change

¹² Gore, Albert. "Earth in the balance-ecology and the human spirit." (1992).

remain in the atmosphere long after they were emitted and continue to warm the earth and alter global climate trends.¹³

The body of work presented within this document and exhibition explores the tensions inherent to the mitigation and adaptation debate. One half of the work focuses on technological innovations, renewable resources and potential solutions. The other half highlights problems we face today and how we are adapting to thawing permafrost, rising sea levels, and challenges to livestock. These problems stem from altered climatic trends. Mitigation acts as a partial solution to prevent a continued disruption in these climate trends while adaptation attempts to address damages as they arise.

¹³ The National Aeronautics and Space Administration uses its Eyes of the Earth monitoring system to study Earth's climate. It is an expert on climate science.

BODY OF WORK

SECTION 1



Plate 2. Claire White *"Mitigation: Alternatives and Solutions"* Digital Print 3x4 feet 2018

Plate 2. *"Mitigation: Alternatives and Solutions"* represents potential problems and solutions available now and in coming decades. This print explores mitigation – tactics to reduce pollution, such as switching from coal to nuclear and renewable energies. The imagery shows drought, extreme temperatures, crop and power shortages, nutrient collapse, over population, and health impairments brought on by climate change. Most importantly, there is a focus on the following possible solutions: cultured meat, desalination, repairing infrastructure and shifting the power grid.

The image depicts nutrient collapse. The ever-increasing amount of CO₂ in the atmosphere causes crops to grow faster, but with less nutrients.¹⁴ The plants lose their protein, which negatively impacts the population. The people are outlines and in poor health who lack substance because they are nutrient deficient. One has collapsed and died.

Cultured meat could be a solution for nutrient collapse. Cultured meat is an environmentally-friendly way to produce meat and protein. Raising cows for meat is harmful to the environment because cows produce large amounts of methane, which is a greenhouse gas. The feed for cows uses water and land, and fertilizer and pesticides get into the water around the farms. The flipping burger depicted is cultured meat, which is meat grown in a lab. The price of these burgers initially cost \$325,000 in the United States in 2013 and dropped to 11\$ today. By 2025, lab grown burgers are projected to be as affordable as fast food burgers.¹⁵¹⁶ Projections show that in 2050 meat consumption will rise by 70%.¹⁷ Like many Americans, I also eat meat. The hand in the image is mine representing my struggle with consuming these products that harm the environment and contributing to the problem.

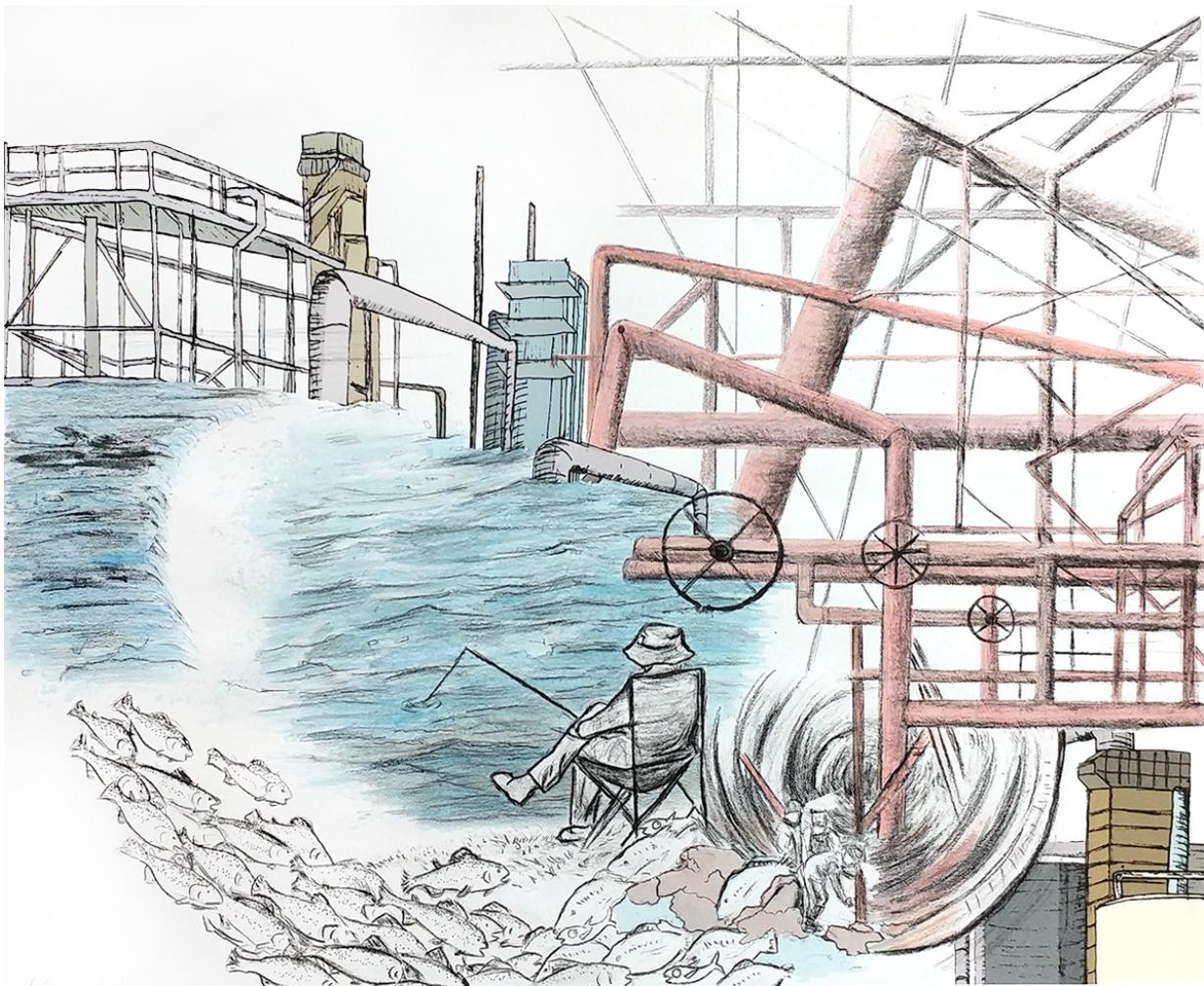
“Mitigation: Alternatives and Solutions” also depicts water scarcity and desalination. Desalination is a common practice in the Middle East, and the United States has plants in California, North Carolina’s Outer Banks and Florida. Desalination takes the salt water from the ocean and removes the salt through boiling or using a membrane filter. The water is then distributed as drinking water. The United States gets most of its water from ground sources like rivers and lakes, but water scarcity issues make desalination an interesting adaptive solution.

¹⁴ Loladze, Irakli. “Hidden shift of the ionome of plants exposed to elevated CO₂ depletes minerals at the base of human nutrition.” The Catholic University of Daegu, Republic of Korea. May 7, 2014. <https://elifesciences.org/articles/02245> Accessed March 20, 2019.

¹⁵ Peters, Adele. Lab-Grown Meat Is Getting Cheap Enough For Anyone To Buy. Fast Company. May 2, 2018.

¹⁶ Ronson, Jacqueline. “The Cost of Lab-Grown Burger Has Dropped Dramatically.” Inverse. January 16, 2017.

¹⁷ Buzzfeed. “Would You Eat Lab Grown Meat?”



In 2008, Channel 13 News reported that Indianapolis annually dumped 6 to 7 billion gallons of raw sewage into the White River. Poor infrastructure threatens drinking water across the country. Indiana is developing a new sewage system to be completed in 2025.

Plate 3. Claire White "Fixing the Infrastructure" Mixed media and vinyl text 16x20 2018

The sewer opening into the water, in “*Fixing the Infrastructure,*” (Plate 3) and the piping around it represent pollution and infrastructure. The pink coloring applied to the pipes visualizes rusting and outdated piping. The pink mixes with the blue of the water to show contamination leading to unsafe drinking water and killing fish. The fish depicted, rainbow trout and small mouthed bass, are species common to North Carolina and Indiana - the two places I have lived the longest. Among the fish is interspersed the logo for the “NOT ALL FISH ARE SAFE TO EAT” sign used in Indianapolis.

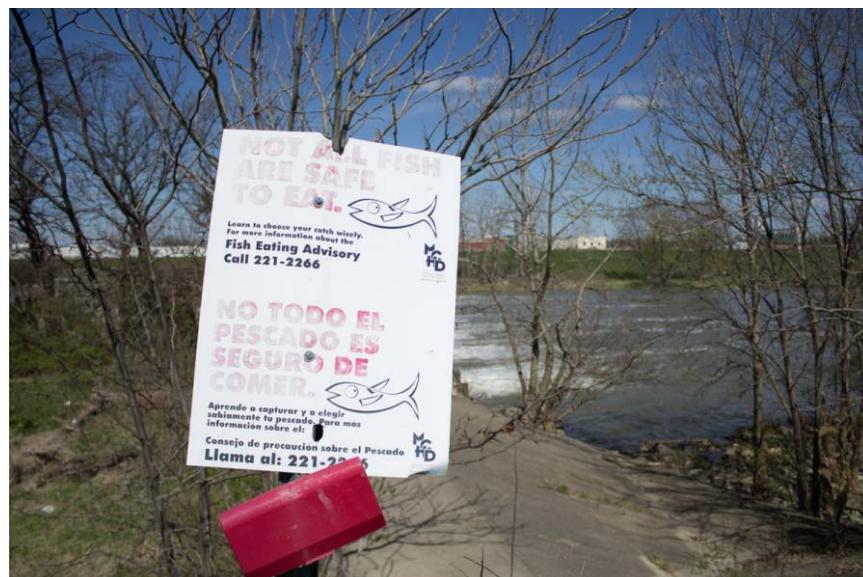


Figure 3. Sign from White River

In 2008, Channel 13 news in Indianapolis reported that the city annually dumped 6 to 7 billion gallons of raw untreated sewage into the White River.¹⁸ People have fished in the White River and known about the pollution longer than I lived in Indianapolis. Citizens use the river for sport and food, and the White River provides tap water for Indianapolis; making this is an issue of environmental justice. Poor infrastructure threatens drinking water across the country, as seen in the recent (2012-2018) crisis in Flint, Michigan.

¹⁸ Segall, Bob. [What's Floating in the River?](#) WTHR. News 13.

Low funding caused the dangerous drinking water situation in Flint, Michigan. The city lost money when General Motors downsized in the 1980s and eventually the state took control of Flint's finances. The city chose to switch away from Detroit's water system to a new pipeline bringing water from Lake Huron to Flint in 2012. The new pipeline would save money, but until it was built the city switched to the Flint River as its source of drinking water. Citizens found bacteria, lead, and a buildup of chlorine, which had been used to kill the previously discovered bacteria in their water. The City Council of Flint voted to reconnect with Detroit's water in 2015, but Jeremy Ambrose, the state emergency manager, overruled the vote, again, due to cost. The people of Flint lived with undrinkable water for years, but at last, in 2017, the Environmental Protection Agency awarded 100 million dollars to improve Flint's infrastructure and the state of Michigan granted 97 million dollars to replace the lead and galvanized steel water lines in the city. The state will replace pipes for over 18,000 homes leading to the main pipe underneath the city. The disaster eroded any trust between government and citizen and culminated in several lawsuits, including charges of manslaughter for an outbreak of Legionnaires disease which killed 12 people.¹⁹²⁰ People suffer and die when the government values savings over its populace.

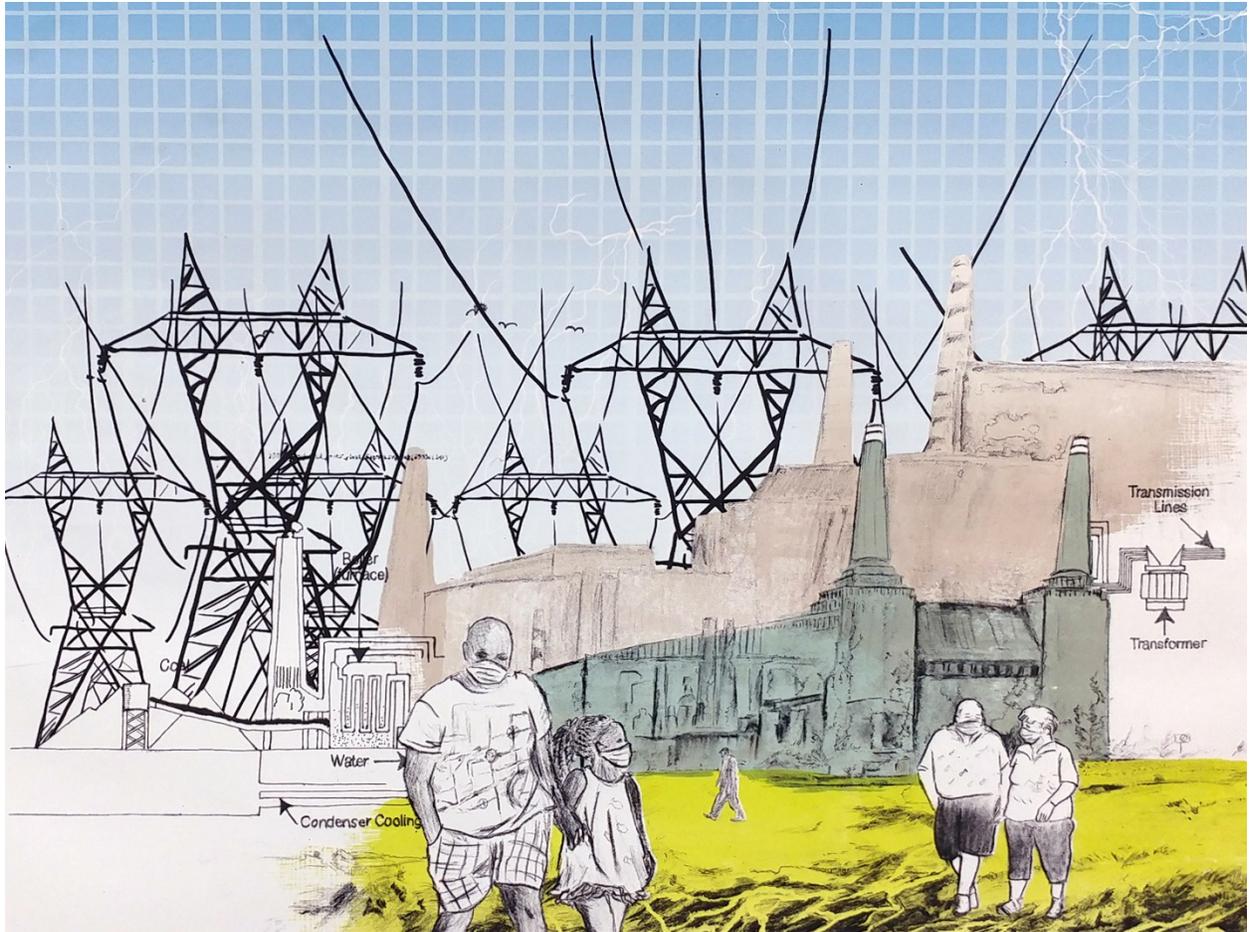
Indiana made moves to improve its own water conditions by constructing tunnels to prevent run-off and sewage contamination. Heavy rain backs up waste and floods it untreated into river systems; the new tunnel system, to be completed in 2025, prevents this by storing and conveying the water to treatment facilities. The tunnels help bring Indianapolis into compliance with federal standards. 105 sewage systems in Indiana need improvements to meet these

¹⁹ Legionnaires disease is spread by bacteria living in contaminated water

²⁰ CNN Library. [Flint Water Crisis Fast Facts](#). December 6, 2018.

standards. Here, the role of government was to protect Hoosiers from unclean water.

Governments can solve these controversies through proper funding and dedication.



The Affordable Clean Energy Act lets states regulate carbon emissions giving a break to coal plants, which are more expensive than renewables. Increased coal particulates in the air will cause 1,400 premature deaths by 2030 as reported by the New York Times.

Plate 4. Claire White "1,400 More Deaths from Coal a Year" Mixed Media 16x20 2018

The title, “*1,400 More Deaths from Coal a Year,*” is a direct reference to a New York Times article, “Cost of New E.P.A. Coal Rules: Up to 1,400 More Deaths a Year.” In August 2018, the Trump administration rolled back on Obama-era pollution and coal restrictions. The Trump administration’s Affordable Clean Energy rule allows states to regulate their own carbon emissions, giving a financial break to coal plants; the former regulations would have cost millions. As they are competing with renewables and natural gas, both less expensive, coal plants need these breaks to stay open longer. This would also increase air pollution as burning coal creates floating particulates, which get into and damage lungs. The Environmental Protection Agency reported the change would cause 1,400 premature deaths a year by 2030. A solar grid dominates the background of the piece as a solution ignored by a complacent populace. The people adapted to living with air polluted by coal particulates by using particle masks when venturing outside.

One megawatt-hour of electricity of solar energy costs \$50.²¹ Coal costs twice as much, but solar only accounts for 2% of energy in the United States. The coal industry is falling behind renewable energy sources and natural gas as both options are less expensive. Solar energy continues to decrease in price, leading to energy domination in the future, but in the United States, President Trump’s tariffs on solar panel imports have changed the solar industry and currently much of the fabrication for solar panels is done overseas. Large solar companies, like SunPower, the number one producer of solar panels in the United States, responded by moving more manufacturing to the United States, but the tariffs challenge the growth of the solar industry. Though meant to protect the United States’ solar sector, the tariffs increase costs for consumers, prolonging our reliance on coal.

²¹ Jeremy Berke. “One simple chart shows why an energy revolution is coming-and who is likely to come out on top.” Business Insider. May 8, 2018.

The shutdown coal plant in *“1,400 More Deaths from Coal a Year,”* with vines growing on it and cracking walls, is based loosely on American Electric Power’s (AEP) plant in Glen Lyn, Virginia. The plant closed May 31, 2015 under the U.S. Environmental Protection Agency’s Mercury and Air Toxics Standards law, established in 2011, which seeks to lower mercury emissions from power plants.²² It is more worth our time to invest in solar energy; solar costs much less than coal and produces no emissions, but these coal plants are important fixtures in their communities and to eliminate them without considering replacement jobs is unethical and irresponsible.

Though AEP rarely used Glen Lyn, a ninety-six-year-old plant, the closure left a \$440,000 hole in Giles County’s budget. The plant employed 31 people, twenty-six percent of Glen Lyn’s population of 115. Glen Lyn’s plant would likely have closed due to age within the decade. In April 2016, several “Classic Seven” powerplants closed across the Midwest, also due to mercury emissions.²³ These were public utility company Consumers Energy’s oldest plants. The closures left an energy dip, though natural gas replaced the plant in Jackson, Michigan. These closures become more common as the Environmental Protection Agencies standards raise and new technology is available. The energy field needs a replacement, but the United States currently looks toward natural gas fracking, an ultimately unsuitable choice.

The lightning and power lines in *“1,400 More Deaths from Coal a Year”* creates a menacing backdrop behind the failed power plant and suffering population. They loom ominously in the background reminding the viewer our energy sources are a problem to confront, though we rarely consider how our electricity is generated. The solar panel grid is colored

²² National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units

²³ Tracy Samilton. ““Classic Seven” power plants to shut down April 15.” Michigan Radio. April 3, 2016.

brightly to balance this negativity. Solar energy is a potential solution and a commitment away from coal can prevent the predicted 1,400 deaths a year.



Natural gas emits less carbon than coal giving it a reputation as green, but it releases more pollutants than nuclear energy and renewables. Nuclear energy has its own problems. The United States federal government has no permanent storage for waste.

Plate 5. Claire White "Nuclear Energy and Natural Gas are not Clean Enough" Lithograph with screen printing and vinyl text 15x20 2018

Plate 5. *“Nuclear Energy and Natural Gas are not Clean Enough,”* examines the steps away from coal to renewable energy sources. Nuclear power and natural gas sit visually in between coal and wind energy. Above them, lightning represents electricity and power. Proponents of natural gas and nuclear power often use pro-environment language to secure funding and subsidies for their products. Nuclear energy does not emit carbon; making it less harmful than fossil fuels. Natural gas is less harmful than coal and less expensive than nuclear energy, but still produces greenhouse gases.

Positioned to the right of the nuclear silos, the fracking station symbolizes natural gas, which is cheaper than nuclear energy and currently replacing it as an energy source. 31.7 percent of U.S. electricity came from natural gas in 2017. Natural gas produces water vapor and carbon dioxide and consists mostly of methane. Largely used for heating and cooking, but also used for fuel, natural gas emits less carbon than coal when burned for electricity. It has a reputation as a cleaner source of fuel, but of course, it produces more greenhouse emissions than carbon-free nuclear energy and renewable energies like wind and solar and it faces obstacles such as leaking methane. In 2014 the Environmental Defense Fund, a non-profit organization lead by scientists and economists, found leaks release enough methane to power 10 million homes for one year. Their estimates were higher than that of the Environmental Protection Agency and were disputed by the Western Energy Alliance, an oil and gas company in Colorado. The emissions have a higher toll on the environment than a ‘clean’ energy should.²⁴

Nuclear energy has its own downsides, for example, this image directly references Three Mile Island, a nuclear power plant in Pennsylvania and the site of the United States’ worst nuclear disaster. The silos in the print are also colored the same tan as in Plate 2, “Mitigation:

²⁴ Leigh Paterson “Large Methane Leakers Threaten Perception of ‘Clean’ Natural Gas.” National Public Radio. Danielle Fisher “Are there CO2 emissions from natural gas?” How Stuff Works.

Alternatives and Solutions,” relating this image to the larger piece on the table, while still conforming to Three Mile Island’s actual design. The incident, in 1979, reported no detectable health consequences, but is significant as the reactor responsible for the accident remains inactive on the island. There are two silos producing power and two resting as in the print. The plant is now owned by Exelon and is scheduled to shut down in 2019.

David Fein, of Exelon, fought for money to support Three Mile Island using a climate change platform when it became clear the plant needed monetary support. Nuclear energy produces no greenhouse gasses, but it has other, significant, environmental costs. The United States federal government does not have permanent storage for nuclear waste and mining the uranium for the plant itself has an impact. Public subsidies could be used instead for renewable resources. Funding these plants keeps us in the status quo, when we need to build a new energy economy for the pressing future, but their closing is detrimental to their communities. There is not an easy balance for an environmental agenda. In the long term, allocating funding to creating jobs in more sustainable fields, like renewable energies, rather than perpetuating failing and harmful institutions benefits more people. In the short term, closing plants eliminates the livelihood of their workers which is an important issue we face when pushing for renewable resources. Energy security is paramount with climate change rapidly occurring. The renewable energies (wind and solar) depicted in *“Nuclear Energy and Natural Gas are not Clean Enough”* are brightly colored green and blue to reflect healthy nature and demonstrate their sustainability.



Biofuels made from algae, switchgrass, or waste are more sustainable than fuels using soybeans or corn. The United States mandates oil refineries blend biofuels into gas. Most is corn based ethanol, which uses too many fossil fuels to be a renewable energy.

Plate 6. Claire White "Environmentalists Debate Biofuels" Lithograph with screen printing and vinyl text 15x20 2018

Renewable fuels are energies made from more sustainable resources than fossil fuels. This includes biofuels, like ethanol, popularly made from corn, soybean oil, and switchgrass. The assertion about biofuels is the growth of the plants will offset the carbon produced by burning the fuels. On paper it is a sound theory, but some scientists study and debate its accuracy. Plate 6. *“Environmentalists Debate Biofuels”* depicts the positives and negatives of biofuels; they are a double-edged sword. When we use crops for fuels rather than food, the food must be replaced. The people in *“Environmentalists Debate Biofuels,”* also seen in *“Mitigations: Alternatives and Solutions,”* are people with nothing to eat. Biofuels take up not only land for crops, but also endanger grasslands and forests and making room for biofuel crops releases more CO₂ into the atmosphere. The source materials for biofuels also have an adverse effect on the environment due to land use and the fossil fuels necessary for some crops, like corn. Fuels made from algae, switchgrass, or even waste are more sustainable than fuels made using soybean or corn crops, but soy and corn are currently more popular as they are easier and less expensive to grow. The United States mandates oil refineries blend biofuels into their gas and most of this biofuel is corn based ethanol, though the production of corn uses too many fossil fuels to be an effective source. This mandate, The Renewable Fuel Standard, created in 2005, benefits the corn farmers more than the environment because 40% of domestic corn is for biofuels and up to 10% of US gasoline is made with biofuels.²⁵

“Environmentalists Debate Biofuels” shows the struggle between finding solutions and compounding mistakes. I made this image thinking biofuels fixed the energy crisis, and the more I read about biofuels, the more I was disappointed, but still hopeful. Not every solution is a complete answer. Biofuels made a smaller step forward than hoped but searching for alternatives

²⁵ National Public Radio: Talk of the Nation. February 8, 2008

is worthwhile. The image shows people caught between two losing systems: coal and biofuels. The soybeans dominate the piece, echoing "*Mitigation: Alternatives and Solutions*," and in turn, are overshadowed by corn and later switchgrass. Soybeans and corn are often grown together, and soybeans are used as a rotation crop to keep the soil healthy from over production. Corn remains the giant among crops in the United States, but alternatives like switchgrass and other cellulosic biofuels show innovation and a stronger potential future beyond harmful energies.

SECTION 2

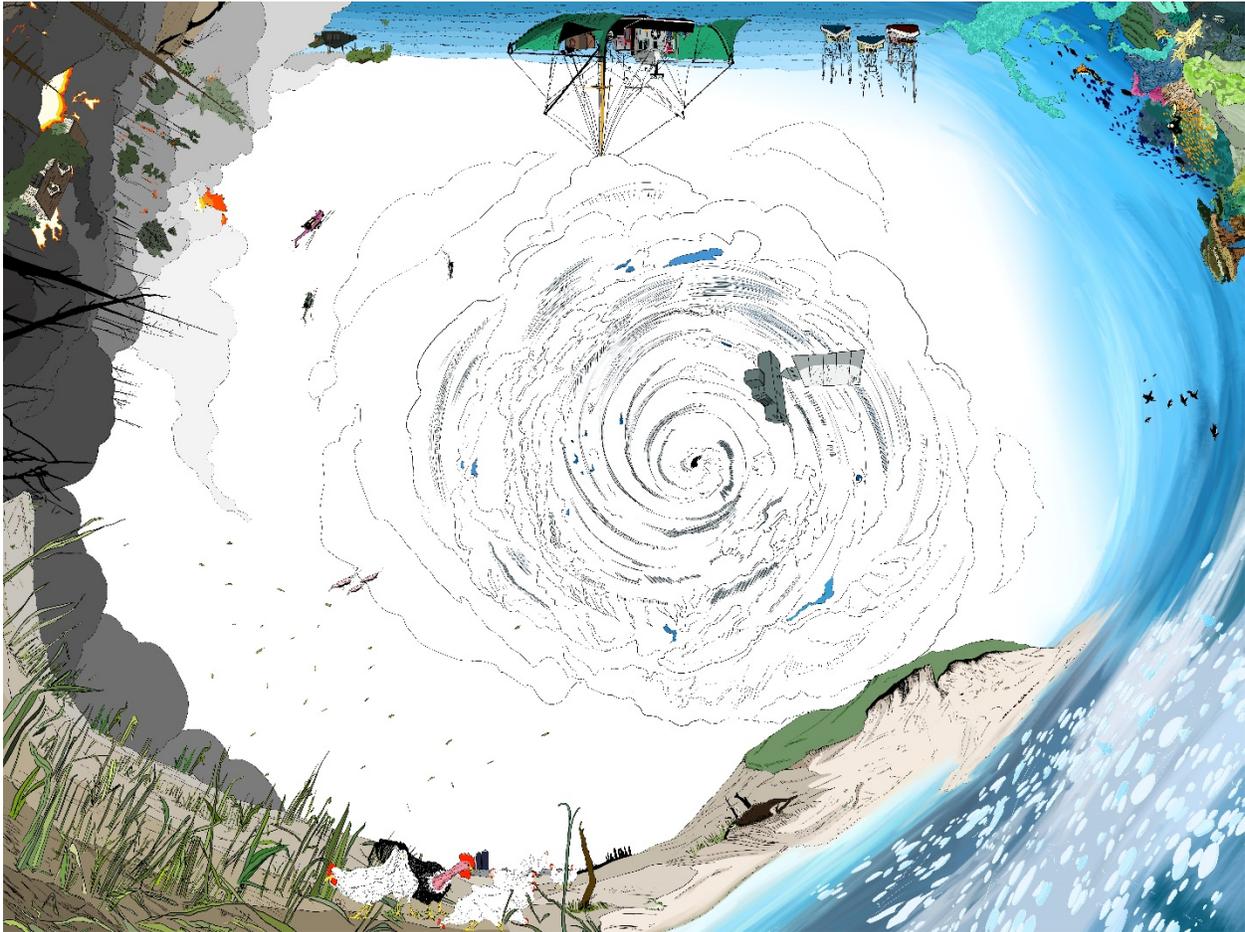


Plate 7. Claire White *“Adaptation: No Longer the Future”* Digital Print 3x4 feet 2019

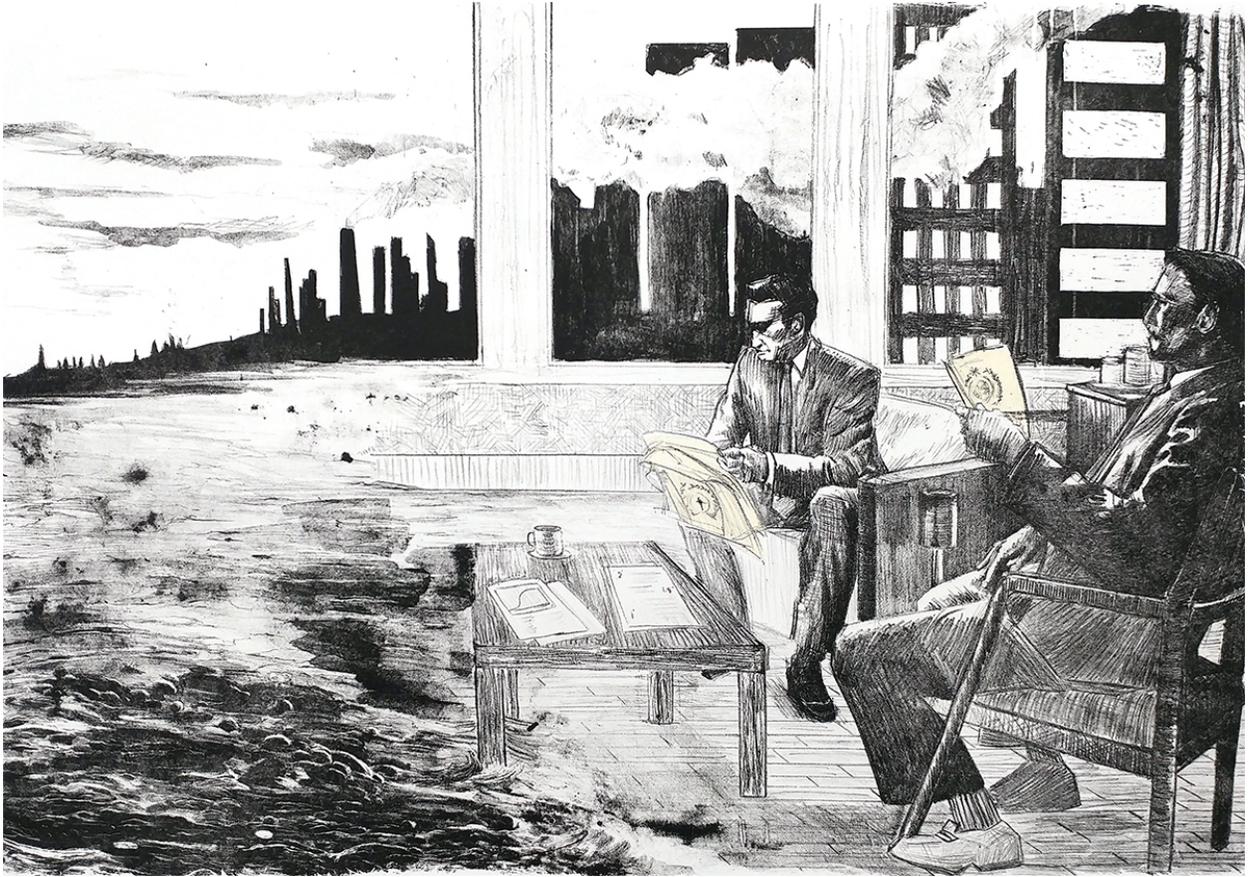
There is no single solution to climate change. Individually, biofuels or solar powered plants or wind energy will not solve the problem. Just as the problem can be divided into parts, the solution needs to consist of many plans. There is not a simple solution; biofuels take away land, but as a country, we need to direct spending toward all new sources of energy and away from fossil fuels. Climate catastrophe is currently a crisis that also stretches beyond mitigation. This is the focus of Plate 7. *“Adaptation: No Longer the Future.”* The image specifically touches on rising temperatures affecting crops and animals, forest fires, dying coral, thawing permafrost, and stronger storms caused by climate change. Specifically, *“Adaptation: No Longer the*

Future” depicts Hurricane Florence, which ravaged the North Carolina coast in the fall of 2018. The rainfall from Hurricane Florence was 50% stronger than past hurricanes due to warmer surface temperatures created by climate change.²⁶

Much of the inspiration for this “*Adaptation: No Longer the Future*,” was found in the Intergovernmental Panel on Climate Change’s report released in 2018. The IPCC is the United Nation’s group for assessing climate change and the science behind it. The IPCC was created by the United Nations and the World Meteorological Organization and makes objective reports for policy makers describing where the scientific community agrees on aspects of climate change, where there is more information needed and options for dealing with the results. It relies on scientists for research as it is not a researching body. The IPCC makes assessments and special reports, and in 2018 the IPCC released a special report on the impacts of global warming of 1.5 degrees °C above pre-industrial levels. The “Special Report on Global Warming of 1.5°C” was released and discussed at a panel in Incheon, South Korea October 1-5, 2018. The report found global warming is already occurring. With mitigation, levels will increase by 0.5 °C over the next two to three decades and without mitigation tactics will increase by 4°C or 7.2°F.²⁷ An increase in temperature causes sea levels to rise, drought, increased potency for storms, thawing permafrost and ocean acidification killing coral. Solving these problems requires adaptations such as protecting coral reefs by using seagrass to absorb some of the CO₂ in the water, breeding plants and animals to survive in challenging conditions and cutting back on emissions.

²⁶ Reed, Kevin A. et al. The human influence of Hurricane Florence. Stony Brook University. September 11, 2018.

²⁷ The Intergovernmental Panel on Climate Change. IPCC.



Thawing permafrost releases carbon which can become carbon dioxide and methane and disrupts the landscape creating thermokarst lakes and changing roads. The melting permafrost releases more methane, increasing the heath and causing more melting.

Plate 8. Collaborative Print: Claire White and Brett Bischler "The Warming Arctic Releases More Methane" Lithograph with screen printing and vinyl text 13x19 2018

Reports like the IPCC and organizations and agreements like the Paris Accord inspire and alarm citizens, but industries have little motivation to change unless there is the incentive of profit. Change comes from government intervention. Changing the law changes attitudes and the atmosphere. Plate 8. “*The Warming Arctic Releases More Methane*” depicts business executives and bubbling methane released from an arctic lake side by side. The executives are reading the IPCC report and pollution is visible outside their window, but they sit nonchalantly in an office. The color, used only on the document, shows them reading but failing to act.

The release of methane from the frozen arctic lakes and the related thawing permafrost promises an even greater increase in temperature.²⁸ The released carbon can become carbon dioxide and methane, which is 30 times more powerful at heat-trapping than carbon dioxide. This sometimes leads to the formation of thermokarst lakes. A thermokarst lake is formed by thawing permafrost. Water fills in the depression, creating an uneven surface and a lake. Thawing permafrost disrupts the landscape itself by forming these lakes and changing the shape of paths and roads. The permafrost underneath the lakes thaws quickly compared to other areas and releases more methane into the air, increasing heat and spurring more melting. Together, this is referred to as abrupt thawing. The lakes continuously release carbon when formed and alarmingly, the Arctic may hold more carbon than anywhere else on Earth.²⁹ NASA’s Arctic-Boreal Vulnerability Experiment (ABOVE) predicts the release of methane will continue and rise over the next few decades, increasing the abrupt thawing process.³⁰

The greenhouse gases released in this fashion are not factored in many reports on climate change prediction. Methane accounts for only 20% of thaw feedback which is the heat from the

²⁸ Behold, Another Signal of the Coming Climate Apocalypse That Will Go Ignored by Half Our Political System

²⁹ Gray, Ellen. Unexpected boost of future methane possible from Arctic permafrost. NASA. NASA’s Earth Science News Team. August 20, 2018.

³⁰ NASA’s study of climate change results on the Arctic.

gases creating more thawing, with carbon dioxide representing the other 80%, but according to the lead author NASA's ABoVE, Katey Walter Anthony, adding in thermokarst lakes increases methane's amount to 70% to 80% of thawing. The emissions from this are irreversible. The image entitled "*The Warming Arctic Produces More Methane*" shows the dangers of complacency and a need for an environmentally focused government.

If the United States lacks a strong enough government and the will to mitigate or adapt to these disasters, its own people suffer. The government exists to represent and protect the interests of its citizens. Environmental concerns are also social concerns and require government intervention. Gina McCarthy, former head of the Environmental Protection Agency, explains its role:

The idea is that EPA acts as a referee to see how we protect individuals from pollution that would otherwise harm us. Why do we regulate; is because the market has failed to account for the full harm that is happening in that marketplace and individuals, especially those most vulnerable to pollution can't stand up for themselves and make a change. That's why you have government. (Gina McCarthy, "Environmental Policy and the Assault on Science")³¹

Without a government to stand up to businesses, there will be no change. Businesses are created to generate profit and cannot be expected to self-regulate. Environmental crises affect health and harm poor people the most. The Fourth National Climate Assessment, a study

³¹ McCarthy, Gina. "Environmental Policy and the Assault on Science." University of Gothenburg, Sweden. June 25th, 2018. https://www.youtube.com/watch?time_continue=492&v=-dO2yn1Qfx0&app=desktop

conducted by government officials to map the effects of climate change in the United States, found climate change compounds existing difficulties. President Trump rejected the findings, stating he did not believe the report. This is a failure of government to intercede on the populace's behalf.



Some rice farmers in Bangladesh switched to salt-tolerant rice crops or shrimp due to rising seawater brought on by climate change. Our climate has already altered enough that we need to change practices to survive.

Plate 9. Claire White "Rising Sea Levels Force Adaptation" Mixed Media and vinyl text 15x20 2018

Plate 9. *“Rising Sea Levels Force Adaptation”* illustrates adaptation using farming in Bangladesh. This drawing addresses human adaptation. The dilemma at hand is that our climate has already been altered enough that we need to change practices to survive.

“Rising Sea Levels Force Adaptation” depicts rising seawater and increased salt levels in Bangladesh and the subsequent change in farming practices. Farmers switched to crops more suited to salty waters, but eventually, even those engineered rice crops will not be able to stand up to the increased salt levels. Some farmers have moved away entirely from rice toward shrimp, but shrimp are expensive and less marketable than rice. River deltas, like the Bengal Delta in Bangladesh, are “sentinels of climate change;” they provide an early warning for future complications.³² The IPCC report estimated a rise of half a meter in the ocean by 2100. Rising sea levels impact deltas earlier than other areas, as seen now by the change in farming practices. Coastal flooding is happening in many deltas, including the Ganges, Mississippi, Mekong, etc. Deltas house seven percent of the world population, but the adaptation ability in these areas is lowered by economic ability and stacked hazard risks. Lowered crop production influences the country’s gross domestic output and challenges quality of life and the global economy. Saleemul Huq, director of Bangladesh’s International Center for Climate Change and Development said, “You guys are not ready for it yet. But you’re going to have to learn from us how to deal with it. Because we are learning.”³³

In Plate 9, the shrimp floating above the rice crops show shrimp taking over for rice, but floating away from the ground, shrimp lacks the substance of rice. Shrimp are not as commercially successful or useful for farming as rice crops. The shrimp are bright pink to catch

³² Dr. Kimberly Rogers. “Dynamics of Coupled Natural-Human (and Technical) Systems in the Bengal Delta Bangladesh.” Lecture. East Carolina University.

³³ Ball, Jeffrey. With Climate Change No Longer in the Future, Adaptation Speeds Up. New York Times. September 21, 2018.

the eye and the ground from which the rice grows is murky and hazy, depicting the salty water that prevents crops from healthy growth. Shrimp farming is an attempt to adapt to the negative results of climate change, but this solution is neither sustainable nor ideal.



Scientists are researching breeding chickens that can survive hotter temperatures to adapt to climate change. The world will be dealing with a larger population the same time increased heat will hamper crop growth creating food shortages.

Plate 10. Claire White "Chicken Timeline" Lithograph with screen printing with vinyl text 15x20 2018

Chickens have changed quite a bit over the past 60 years. Broiler chickens, those bred for consumption, are much larger than chickens of the 1950s. The central chicken in this “*Chicken Timeline*” represents the 1950s broiler chicken. The chicken on the left is today’s boiler chicken and the chicken on the right is a naked neck African chicken. They are standing on a bed of peas, a legume commonly used to replace chicken in vegetarian diets and a potential substitute should climate change affect the survival of animals like chickens.

Scientists are researching breeding chickens that can withstand hotter temperatures to adapt to the changing climate. The world will be dealing with a larger population the same time as increased warming will hamper crop growth causing food shortages. The African naked-neck chicken can withstand hotter temperatures than the American broiler chicken. Through selective breeding, the slim 1950s chicken in the center of the drawing disappeared, replaced by a large breasted beast as chicken consumption rose. Chickens are cheap and effective to breed, making them the most popular meat in the United States. There is little doubt they can be bred to resist global warming. Chicken embryos in the middle ground supersede the background, which is a general chicken slaughterhouse scene, resting behind the three main chickens. The embryos represent the life cycle of the chicken, sped up through human engineering and the potential for further change. Uncolored, they blend into the foreground figures, but pop from the pale-yellow background.

Knowledge, science and expert breeding went into the chicken, giving us the perfect, cheap food, but we are ignoring the alternative just under their talons. According to Forbes, 70% of the world population is reducing its meat consumption and demand for plant-based alternatives is on the rise.³⁴ Millennials consider themselves greener than previous generations

³⁴ Rowland, Michael Pellman. [Millennials Are Driving The Worldwide Shift Away From Meat.](#) Forbes. March 23, 2018.

and make purchasing decisions based on animal welfare and environmental impact.³⁵ Our generation is already making a positive impression on food production and can move that energy into policies supporting pro-environmental values: animal welfare and decreasing pollution.

<https://www.forbes.com/sites/michaelpellmanrowland/2018/03/23/millennials-move-away-from-meat/#4971eff0a4a4>. Accessed March 3, 2019.

³⁵ Fiona Dyer, Consumer Analyst at GlobalDate. Forbes.com

INFLUENCES

Presentation of facts and framing an argument influences perception, especially in a tense discussion like environmental research. President Obama approached climate change as a global threat. President Trump discusses his politics using “America first,” to entice his supporters. “A frame is a way of looking at the world that is value laden, and like a metaphor it conjures up all kinds of thoughts and emotions.” (Hoggan, 221) Frames can be more powerful than hard facts. Alexander Severson and Eric Coleman from Florida State University conducted a study on the effects of multiple presentation hooks on climate change on a study group. They presented information to the group using moral or religious values, scientific values, and positive or negative values. Their results:

...religious moral frames and economic efficiency frames are ineffective, whereas scientific frames, secular moral frames, and economic equity frames are effective at increasing overall policy support. Additionally, the positive science frame and economic equity frame reduce the ideological divide in climate policy support. (Coleman and Severson, *Social Science Quarterly*)³⁶

Moral or emotional narratives are more accessible and positive phrasing more uplifting. Framing the science hopefully through art and solutions creates a positive impact.

Climate change is overwhelming. When the International Panel on Climate Change put out their latest report, the news media introduced it with article titles like, “We have 12 years to limit climate change catastrophe, warns UN,” from the Guardian, “UN Says Climate Genocide is

³⁶ Coleman, Eric and Severson, Alexander. Moral Frames and Climate Change Policy Attitudes. *Social Science Quarterly*. 2015. Florida State University.

Coming. It's Actually Worse Than That," from New York Magazine, and "The world has just over a decade to climate change under control, U.N. scientists say," from the Washington Post. People across the country took the report seriously but found it too staggering to act. On the September 29th edition of Weekend Update, Saturday Night Live comedians Michael Che and Colin Hanks showed the IPCC and discussed how stressed out but unwilling to act they were.



Figure 4. VIDEO CLICK TO PLAY: Colin Hanks and Michael Che "Saturday Night Live, Weekend Update" September 29th, 2018

SNL reached an audience of over 11 million in 2017 and in 2018, 20.5% of viewers were 18-29, giving them a strong millennial fan base.³⁷ Hanks and Che's words resonated with their audience. The report was too much stress and too far reaching for them to feel like they have a chance to change anything. Breaking down the situation, by focusing on one thing at a time,

³⁷ Semeraro, Eleanor. [Here's Who's Watching 'Saturday Night Live' -and Where They're Watching It](#). Broadcasting Cable. May 4, 2018.

makes it easier to take in everything. We can view climate change as tasks to solve rather than statistics to fear.



Figure 5. Sue Coe "The Reward for Just Following Orders" Linocut 2018

It seems apparent that an emotional connection, rather than statistics, builds a stronger case when trying to convince someone. This can be developed through imagery, for example showing the audience the results of animal cruelty to give an emotional resonance to the argument, or depicting the Gina Haspel, the new head of the CIA as supporting torture to show torture as unacceptable no matter the perpetrator. Artist Sue Coe does just that, using a negative moral frame to sway her audience. She talks about horrible things, like torture and animal abuse, with a shocking bluntness and dramatic flair. Coe's work covers a range of current events,

including animal rights, and The Troubles in Northern Ireland, and President Donald Trump and his Administration. Her prints, laid out in chronological order on her website, act as a timeline for environmental and political events in the United States. She has a direct and honest approach with her work. She makes work about events as they happen, and she often uses the title in the print. Sue Coe is very clear with her message and speaks directly to her audience, sometimes implicating them as well. After seeing her work, I set out to make my art as clear and straightforward as possible.

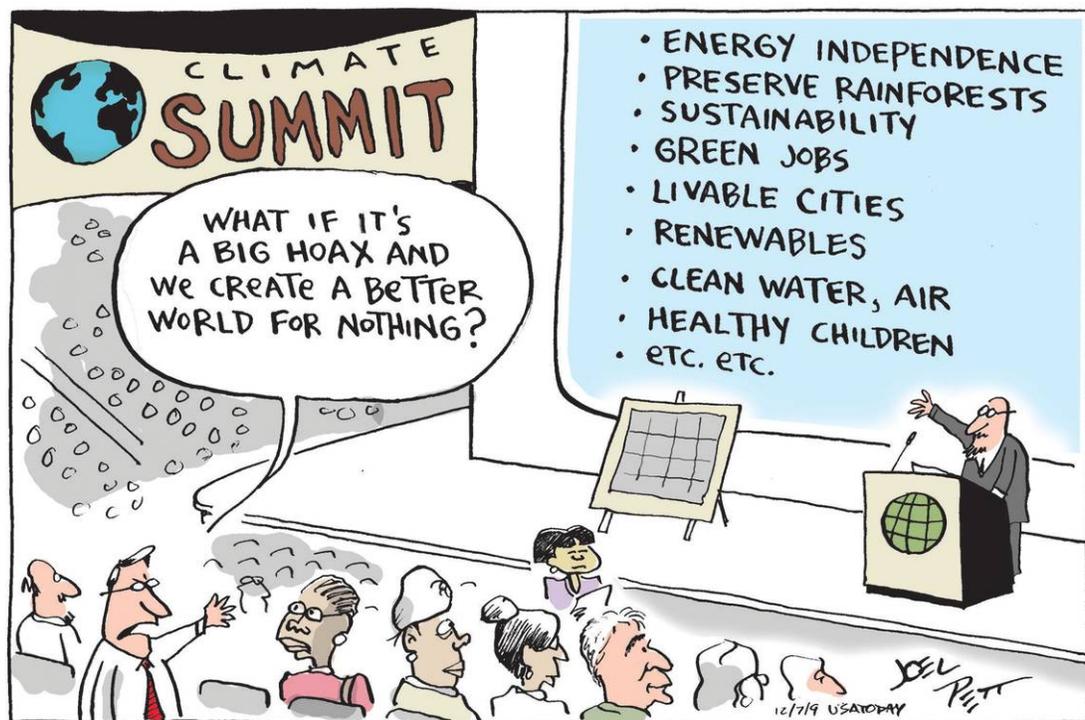


Figure 6. Joel Pett. Editorial Cartoon. USA Today 2009

I also take a lot of inspiration from political cartoons. Editorial cartoons are a good measure of the political climate in the past and present. Pictures sway people to the illustrator's way of thinking; political cartoons rely on humor and opinion to make their case. Cartoonists use symbolism, exaggeration, satire, and metaphors to make their case. The drawings use humor to influence their audience. Finding a new way to present the idea can swing audience member to

their side when words and facts alone failed. Editorial cartoons change minds because they made the reader laugh and are tied to the politics of the day. Despite my best efforts, I somehow lack a sense of humor when making. I see my work like political cartoons, but without the punchlines.



Figure 7. Joe Simon and Jack Kirby "Captain America #1" 1941

Comic superheroes are influential in my work. These narratives often combine art and politics in a way that engage viewers with a serious issue. Comic books have long referenced the geo-political landscape, but often fail to gain traction as they are considered entertainment. Marvel Comics and Detective Comics (DC) both used the Nazi Reich as an enemy when they were establishing themselves in 1940s. Wonder Woman's first archnemesis, Baroness Paula von Gunther was a Nazi spy, and Captain America punched Hitler on his debut cover in 1941, a time when the United States preferred isolationism and had yet to enter World War II. In 1941,

Captain America fighting Nazis created controversy; in 2018 it is a given that Captain America fights Nazis. Marvel and DC tied their comics to the culture of their audience. Comics, and all forms of culture, including and especially art, reflect the time of their creation. Ignoring the culture and political movements of the time creates empty work:

Sure, it's possible to exclude politics from comic books, but not from art. Comics produced through avoidance of the real world are hardly satisfactory on any meaningful artistic level. Reading them might fill 15 to 30 minutes of time as a momentary distraction, but without at least a bit of sociopolitical inference, you might as well buy a superhero pinup book to flip through. (Brent Anderson)³⁸

Brent Anderson said this in an interview about *X-Men: God Loves, Man Kills*, one of the seminal *X-Men* stories and Marvel's second standalone graphic novel.³⁹ Written in 1982 by Chris Claremont and penciled by Anderson, *God Loves...* is a politically charged storyline in a superhero comic. The graphic novel format gave Anderson and Claremont room to explore a difficult theme in a compact story outside the monthly issues. The liberalism of the 1960s and 1970s faced backlash, evident in the rise of Christian evangelicals and in the election of President Ronald Regan.⁴⁰ To Claremont and Anderson, the 1980s moved backward on religious freedom and discrimination. Claremont wrote *God Loves...* in response to the TV evangelicals, like Billy Graham, Oral Roberts, Pat Robertson, and Jim and Tammy Faye Baker. He felt they

³⁸Abad-Santos, Alex. [God Loves, Man Kills: the creators of the legendary X-Men story reflect on its 35-year legacy.](https://www.vox.com/culture/2017/5/3/15341432/god-loves-man-kills-claremont-anderson-interview) Vox. 2017

<https://www.vox.com/culture/2017/5/3/15341432/god-loves-man-kills-claremont-anderson-interview>

³⁹ A graphic novel is a contained story meant to be published as one book, as opposed to the single-issue format of most comic books. Often, graphic novels are set outside the larger canon.

⁴⁰ *God Love, Man Kills* Preface



Figure 8. Chris Claremont and Brent Anderson "God Loves, Man Kills" Marvel 1982

excluded other ways of thinking and these televangelists, with their personal interpretations of the Bible led to the rise of fundamentalism. Themes of discrimination and religious fundamentalism resonate today, with President Trump's travel ban on several Muslim majority countries, his call for the exclusion of transgender soldiers in the United States military, and the rise of religious extremism in our politics. William Stryker, the main villain, even bears a bizarre resemblance to Vice President Mike Pence, though he was based visually off Alexander Haig, Secretary of State to President Ronald Regan.

The story remains highly influential among X-Men fans because we are still dealing with issues of discrimination and religious freedom:

The irony of *God Loves*, is that it was very much of its time and place, and yet, almost twenty years later the sentiments-and the inspirations that brought it into being-retain their relevance. People are still judged more by the color of their skin, and the nation of their origin, and the faith they espouse, than their character.

And I still find myself dreaming of a time when all of that is behind us and saying, why not? (Chris Claremont)⁴¹

God Loves, Man Kills used a story to confront a growing ideology and the discriminatory politics of the 1980s. Anderson and Claremont put their position into perspective via narrative. Referencing only data leaves the audience with nothing to grab and consider. The most inspirational part of the Claremont and Anderson's X-Men is their desire to right a wrong they saw in the world, whether they succeeded or not. They had a platform and they used it, though many consider comics juvenile entertainment, they used their reach to impact Marvel's audience in a way that still resonates with fans. More impressive, they used comic books, a medium more about fighting and adventure, to tell a story about peace and addressing conflicts that can't be solved with violence, but with words.

Topical political art matters, even though it references specific moments in time these situations reoccur. We will never be without these struggles. That is why we need laws and continued representation of all peoples. There is a long history of political activism in art and it is a tradition continued today. Hans Haacke invited his audience into the art and into the political sphere. By involving the audience, he created a social experience. He brought politics to the gallery in 1969 with his polling project *Gallery-Goers' Birthplace and Residence Profile*. He used his polls to figure out the demographic of gallery goers. The art critiqued the institution of the gallery by determining who benefits from exhibitions and was his first work that directly spoke to his viewers. Previously, he had made work that physically reacted to his audience by changing with temperature, or reflections, but here he made a request of them and they

⁴¹ *God Love, Man Kills* Preface

responded. The poll asked gallery goers to indicate their home address on a map of New York with push pins. In later exhibitions, he asked questions using multiple choice polls with ballots, punch cards and questionnaires mimicking the Democratic process. These interactions with viewers put the audience and the art in the same world. As active participants, they are no longer separated by the institution, the gallery, and the work acknowledged its context within society. The polls placed the viewer in that moment, dispensing with the transcendental and universal properties often applied to art. Giving the viewer agency in the art, mirrors the power of the people in the social world. In pursuing this thesis, I hope to reach and acknowledge the audience like Haacke and so, used vinyl text to explain my imagery.

2 Hours a Week is an organization that connects online with their viewers and sprung out of the unsatisfying results of the 2016 United States Presidential election. The New York based group offers avenues for civic engagement online by offering tips or “actions.” They include explanations of events, like the incoming tax bill, and how to prevent what they see as negatives. Their suggestions include getting certain politicians elected, signing up for healthcare, and, very often, calling representatives. The “actions” provide information for who to call and what to say and why the action is useful.

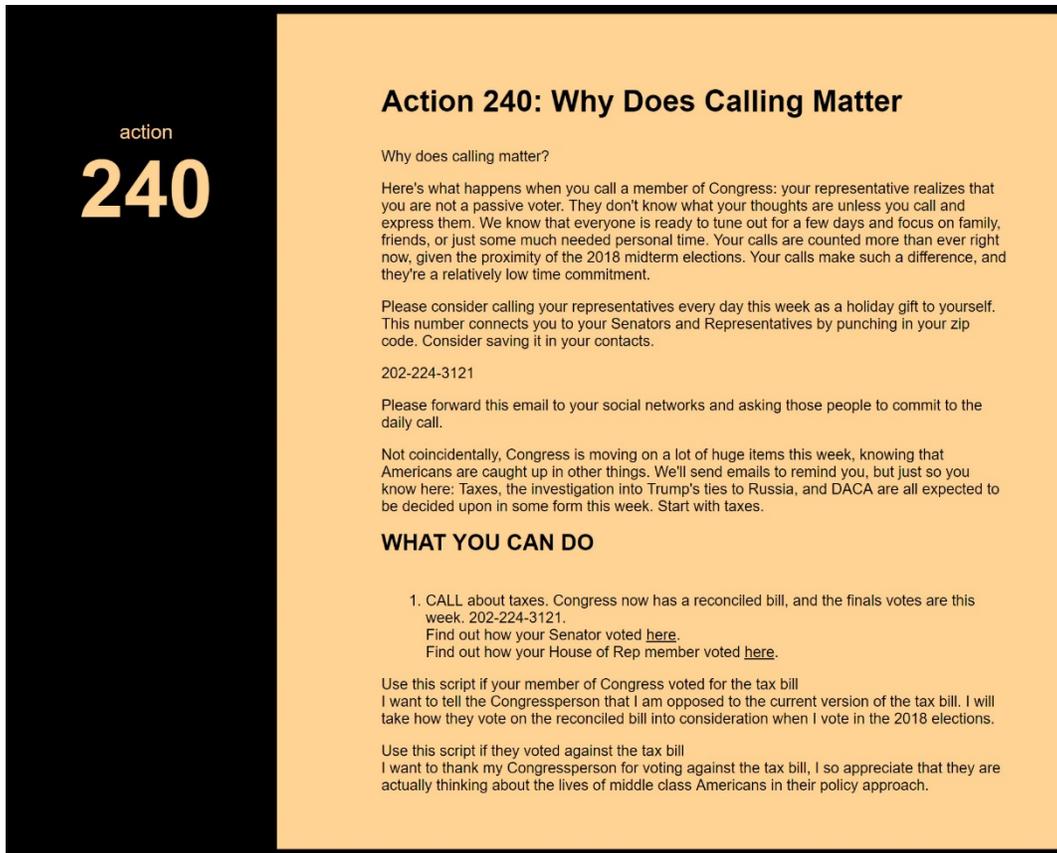


Figure 9. Two Hours a Week "Action 240" 2017

2 Hours a Week provides concrete actions people can take to participate in government. *2 Hours a Week* are not the solution themselves but give the tools for making changes. This model relies on audience participation and they take suggestions for upcoming actions. By limiting the activities to two hours a week, they simplify political activism, which often seems like an overwhelming task, especially in a busy work week. It does not have to be difficult to be involved in our country. *2 Hours a Week* speaks about the issues in a positive way that gave me hope when reading their suggestions. It is so important to talk about social issues not as natural facets of life but as real problems we can make a difference toward resolving.

2 Hours a Week, Hans Haacke, and Sue Coe address the viewers directly in their work; *2 Hours a Week* and Hans Haacke practice active participation and Sue Coe speaks to people by

uniting text and image. This approach to the viewer influenced the conceptualization and exhibition of the thesis and the display of the work. I was inspired to communicate my goals by sharing the context that generated my imagery and defining the signs and symbols in the work. The intent is to involve viewers in the discussion of societal issues through representational imagery. Climate change is a social issue. Addressing the political climate with the scientific debate and the impact on people brings the work into a tangible and specific existence in the Gray Gallery within the School of Art and Design at ECU. The larger problems created by climate change cause smaller issues. They must all be contemplated as separate but interconnected issues to resolve the problem.

INSTALLATION

All my influences so far use text as part of their work. Editorial cartoons are illustrations generally accompanied by text, comic books are text based as well as illustrated narratives, Sue Coe often incorporates her titles into her prints, Hans Haacke's poll displayed the gallery goer demographics and *2 Hours a Week* is entirely text based. These sources had a large impact on the installation of this thesis. The combination of image and text offers a powerful way to communicate ideas with the image backing up the text and the text defining the image.

When I am making, my goal is to share ideas and concerns. I cannot solve problems, especially ones so large as climate change, as an individual without input from peers. Using the university as a platform for this installation, the intent is to communicate with students, and others, focusing on millennials and post-millennials. Millennials, those born from 1981-1996, and post-millennials, those born from 1997-the present⁴² are an overlapping generation currently enrolled in the university. They are the target audience because they are currently seeking education coupled with the fact that climate-based problems emerging and being realized today will last for the rest of their lives and subsequent generations on Earth. Effectively communicating with this segment of the population matters because millennials make up the second largest voting block and are increasingly involved in politics.⁴³ Change happens through persuasion and law; movements need passion and regulation, discussion and cooperation to generate momentum. Millennials are concerned with climate change and it significantly impacts how we see ourselves in the world and envision our future.

⁴² Serafino, Jay. New Guidelines Redefine Birth Years for Millennials, Gen-X, and 'Post-Millennials.' Mentalfloss. March 1, 2018.

⁴³ Coltrain, Nicholas. Here's where fed up Millennials are thinking about putting their votes. USA Today. Oct. 11, 2016.



Plate 11. Claire White "Mitigation: Alternative Solutions" Table 4x3 feet 2019 Digital print

The work included in this thesis installation consists of ten framed prints with accompanying vinyl text, 5 on the east and west walls of the gallery, with the title and references on the north wall surrounding two 3x4 feet tables in the middle of the space. The two big picture images sit in functional tables, rather than on the wall. By not including chairs, viewers are able to walk around the tables and view each aspect of the piece. As climate change affects everyone, we will need many new points of view. The piece is intended to be experienced by multiple viewers simultaneously. The images were drawn from all angles and should be seen from multiple perspectives. This references the multitude of dilemmas and the variety of people climate change affects. The tables also represent a beginning as work often starts at a table or desk and these tables give gallery goers a chance to converge and discuss climate change.



Plate 12. Claire White "Adaptation: No Longer the Future" 4x3 ft Table 2019



Figure 10. El Lissitzky "Prouns" 1923

The installation of the work is relative to the experience of the viewer. Considering installations and viewer interaction, Lissitzky's "Prouns" inspired the table format and open spacing for displaying "Mitigation: Alternative Solutions" and "Adaptation: No Longer the Future." Lissitzky displayed his "Prouns" in corners and he used multiple perspectives in the shapes to expand from the single viewer. He broke with traditional perspective in a way that invited multiple viewings. I emulated his perspective visually in the tables by altering the perspective in the drawings. In "Mitigation: Alternative Solutions," the perspective continually shifts throughout the piece from one-point to two-point, to bird's eye view; this is most evident with the figures. In the second table, "Adaptation: No Longer the Future," the viewpoint on the

edges is in one-point perspective and the center is bird's eye view. His "*Prouns*" allowed multiple viewers to see the work from multiple perspectives. In my thesis exhibition, I positioned the tables in the center of my installation for the audience to walk around them and see the image from each side in a group.



Plate 13. Installation Shot. Margaret Claire White 2019



In 2008, Channel 13 News reported that Indianapolis annually dumped 6 to 7 billion gallons of raw sewage into the White River. Poor infrastructure threatens drinking water across the country. Indiana is developing a new sewage system to be completed in 2025.

56.11.12.38.39

Plate 14. Installation shot Margaret Claire White "Fixing the Infrastructure" Mixed media and vinyl

By including text with image and academic, scientific, and journalistic references as part of the exhibition, I wanted to demonstrate and clarify how we are impacting our environment through climate change and visualize the effects. I posted information with the images to address the viewer in a way the art by itself cannot. Using written information with imagery combined the ideas of fine art and poster. Both avenues are necessary for this body of work: the fine art prints displayed the initial concerns and the posted text complimented the visualization with a literal description of the image. The text summarizes a specific concern and the image visualizes and suggests the concern within context. The images and text are individual issues and pieces, but composed together in the exhibition, the text and image, express a figurative and literal connection to global and social concerns.

One side of the gallery focuses on mitigation and the opposite side has adaptation. The work is read from left to right. It begins with mitigation, as we did, and moves into adaptation as it is becoming more accepted in the scientific community. The sides are opposing, representing the debate, but connected by the title wall and the references. They are two parts of the same problem and two valid solutions.



Plate 15. Installation Shot. Margaret Claire White 2019

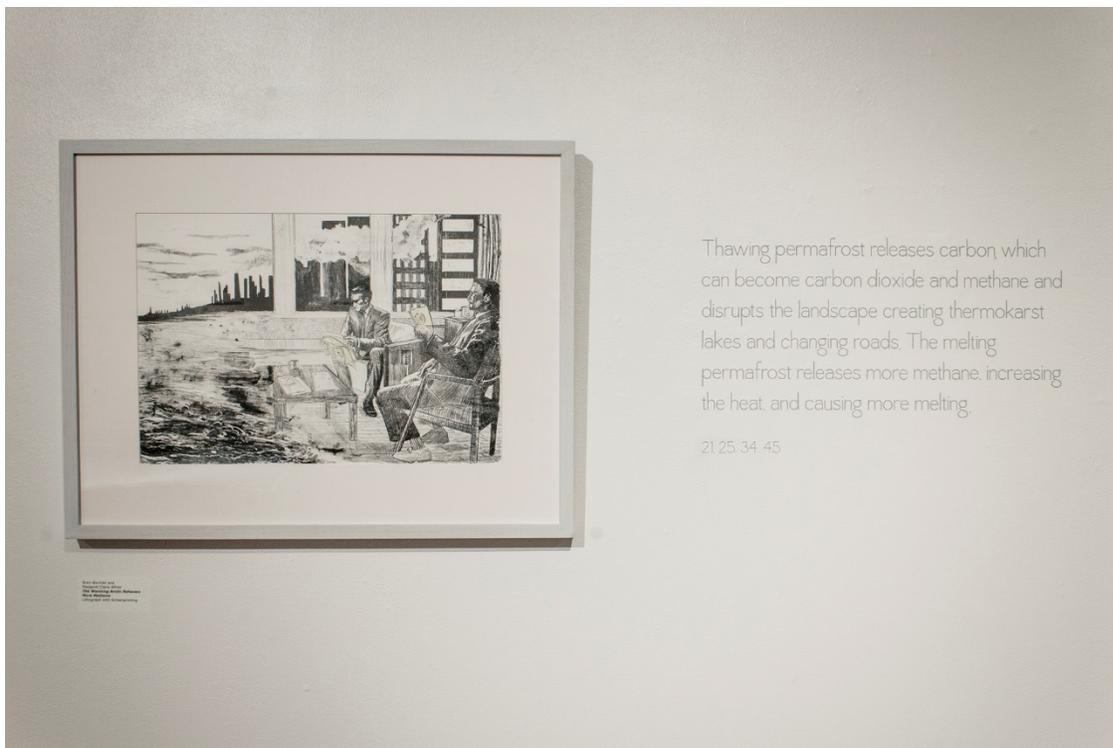


Plate 16. Installation Shot. "The Warming Arctic Releases More Methane" Collaboration between Brett Bischler and Margaret Claire White 2019

The references posted support the text and image. They are also an invitation to further research and were vital in creating the work. A great deal of my studio process for this body of work involved reading and learning about different aspects of climate change. Without these sources, I would not have understood the gravity of the situation we face nor would I have been able to make relevant work. These references support the visualization of these issues.

Margaret Claire White

Is there a solution to climate change?



Plate 17. Installation Shot. Margaret Claire White 2019

When looking for a way to combine research and image, including text with image was the most direct and logical solution. If the image fails to convey a specific meaning, the supporting text can fill in the gaps, and the text itself uses the imagery to illustrate the facts and draw in viewers. The imagery supports the research as much as the research inspired the images.

CONCLUSION

The question, “Is there a solution to climate change?” opens the exhibition and asks the audience to reflect on climate change. There is not a single solution but there are many actions we can make as a society to fix the earth if we are willing. We can better regulate energy consumption and production, and secure food sources for the future. Tackling climate change is a reality that needs diverse groups and strategies concerned with both mitigation tactics and adaptation.

Separating the thesis into two bodies of work, “*Adaptation: No Longer the Future,*” and “*Mitigation: Alternatives and Solutions,*” I wanted to show the tension between the two sides of the debate and how both strategies can benefit us in preventing climate related crises. Though I was able to single out issues, climate change is not a topic that can be simplified. It is a serious social, economic, political, and scientific emergency and should be on the forefront of our minds and our elections. The single-issue images and the larger prints on the table as displayed together show we need to address this problem on large and small scales and though climate change is overwhelming, we can overcome problems if we treat them as connected instead of isolated incidents.

REFERENCES

1. Pew Research Center. Little Partisan Agreement on the Pressing Problems Facing U.S. Pew Research Center. October 15, 2018. http://www.people-press.org/2018/10/15/little-partisan-agreement-on-the-pressing-problems-facing-the-u-s/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top Accessed March 20, 2019
2. Ball, Jeffrey. With Climate Change No Longer in the Future, Adaptation Speeds Up. New York Times. September 21, 2018. <https://www.nytimes.com/2018/09/21/climate/climate-change-adaptation.html> Accessed October 20, 2019.
3. Trump, Donald. President Trump @POTUS. Twitter. <https://twitter.com/potus?lang=en> Accessed March 19, 2019.
4. Clark, Pilita and Leatherby, Lauren. Trump transcript on Paris climate deal exit-annotated. Financial Times. June 1, 2017. <https://ig.ft.com/trump-paris-agreement-speech-annotator/> Accessed March 19, 2019.
5. Relman, Eliza and Walt, Hickey. More than a third of millennials share Alexandria's Ocasio-Cortez' about having kids while the threat of climate change looms. Business Insider. March 5, 2019. <https://www.businessinsider.in/more-than-a-third-of-millennials-share-alexandria-ocasio-cortezs-worry-about-having-kids-while-the-threat-of-climate-change-looms/articleshow/68262786.cms> Accessed March 10, 2019. Accessed March 8, 2019.
6. Miller, Claire Cain. Americans Are Having Fewer Babies. They Told Us Why. The New York Times. July 5, 2018. <https://www.nytimes.com/2018/07/05/upshot/americans-are-having-fewer-babies-they-told-us-why.html> Accessed March 20, 2019.
7. The Intergovernmental Panel on Climate Change. IPCC. <https://www.ipcc.ch/> Accessed March 20, 2019.
8. Gabriel, Trip. Floods. Wildfires. Yet Few Candidates Are Running on Climate Change. The New York Times. October 2, 2019. <https://www.nytimes.com/2018/10/02/us/politics/environment-climate-elections.html> Accessed March 20, 2019.
9. Funk, Cary and Hefferon, Meg. Many Republican Millennials differ with older party members on climate change and energy issues. Pew Research Center. May 14, 2018. <https://www.pewresearch.org/fact-tank/2018/05/14/many-republican-millennials-differ-with-older-party-members-on-climate-change-and-energy-issues/> Accessed March 29, 2019.
10. Parker, Kim, Graf, Nikki, and Igielnik, Ruth. Generation Z Looks a lot Like Millennials on Key Social and Political Issues. Pew Research Center. January 17, 2019. <https://www.pewsocialtrends.org/2019/01/17/generation-z-looks-a-lot-like-millennials-on-key-social-and-political-issues/> Accessed March 29, 2019.
11. Johnson, Keith. Obama Says Climate Change is a Security Risk. Why Are Republicans Laughing? Foreign Policy. March 21, 2016. <https://foreignpolicy.com/2016/03/21/obama-says-climate-change-is-a-security-risk-why-are-republicans-laughing/> Accessed March 19, 2019.
12. Gore, Albert. "Earth in the balance-ecology and the human spirit." (1992).
13. The National Aeronautics and Space Administration uses its Eyes of the Earth monitoring system to study Earth's climate. It is an expert on climate science.
14. Loladze, Irakli. "Hidden shift of the ionome of plants exposed to elevated CO2 depletes minerals at the base of human nutrition." The Catholic University of Daegu, Republic of Korea. May 7, 2014. <https://elifesciences.org/articles/02245> Accessed March 20, 2019.

15. Peters, Adele. Lab-Grown Meat Is Getting Cheap Enough For Anyone To Buy. Fast Company. May 2, 2018.
16. Ronson, Jacqueline. "The Cost of Lab-Grown Burger Has Dropped Dramatically." Inverse. January 16, 2017.
17. BuzzFeed. "Would You Eat Lab Grown Meat?"
18. Segall, Bob. What's Floating in the River? WTHR. News 13.
19. Legionaries disease is spread by bacteria living in contaminated water
20. CNN Library. Flint Water Crisis Fast Facts. December 6, 2018.
21. Jeremy Berke. "One simple chart shows why an energy revolution is coming-and who is likely to come out on top." Business Insider. May 8, 2018.
22. National Emission Standards for Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units
23. Tracy Samilton. "Classic Seven" power plants to shut down April 15." Michigan Radio. April 3, 2016.
24. Leigh Paterson "Large Methane Leakers Threaten Perception of 'Clean' Natural Gas." National Public Radio.
25. National Public Radio: Talk of the Nation. February 8, 2008
26. Reed, Kevin A. et al. The human influence of Hurricane Florence. Stony Brook University. September 11, 2018.
27. The Intergovernmental Panel on Climate Change. IPCC.
28. Behold, Another Signal of the Coming Climate Apocalypse That Will Go Ignored by Half Our Political System
29. Gray, Ellen. Unexpected boost of future methane possible from Arctic permafrost. NASA. NASA's Earth Science News Team. August 20, 2018.
30. NASA's study of climate change results on the Arctic.
31. McCarthy, Gina. "Environmental Policy and the Assault on Science." University of Gothenburg, Sweden. June 25th, 2018.
https://www.youtube.com/watch?time_continue=492&v=dO2yn1Qfx0&app=desktop
32. Dr. Kimberly Rogers. "Dynamics of Coupled Natural-Human (and Technical) Systems in the Bengal Delta Bangladesh." Lecture. East Carolina University.
33. Ball, Jeffrey. With Climate Change No Longer in the Future, Adaptation Speeds Up. New York Times. September 21, 2018.
34. Rowland, Michael Pellman. Millennials Are Driving The Worldwide Shift Away From Meat. Forbes. March 23, 2018.
<https://www.forbes.com/sites/michaelpellmanrowland/2018/03/23/millennials-move-away-from-meat/#4971eff0a4a4>. Accessed March 3, 2019.
35. Fiona Dyer, Consumer Analyst at GlobalDate. Forbes.com
36. Coleman, Eric and Severson, Alexander. Moral Frames and Climate Change Policy Attitudes. Social Science Quarterly. 2015. Florida State University.
37. Semeraro, Eleanor. Here's Who's Watching 'Saturday Night Live' -and Where They're Watching It. Broadcasting Cable. May 4, 2018.
38. Abad-Santos, Alex. God Loves, Man Kills: the creators of the legendary X-Men story reflect on its 35-year legacy. Vox. 2017
39. A graphic novel is a contained story meant to be published as one book, as opposed to the single-issue format of most comic books. Often, graphic novels are set outside the larger canon,
40. *God Love, Man Kills* Preface
41. *God Love, Man Kills* Preface

42. Serafino, Jay. New Guidelines Redefine Birth Years for Millennials, Gen-X, and 'Post-Millennials.'” Mentalfloss. March 1, 2018.
43. Coltrain, Nicholas. Here's where fed up Millennials are thinking about putting their votes. USA Today. Oct. 11, 2016.

BIBLIOGRAPHY

- Abed-Santos, Alex. God Loves, Man Kills: the creators of the legendary X-Men story reflect on its 35-year legacy. May 3rd, 2017. <https://www.vox.com/culture/2017/5/3/15341432/god-loves-man-kills-claremont-anderson-interview>. Accessed September 30, 2018.
- Adalian, Josef. Why Saturday Night Live's Ratings This Season Are Unprecedented. Vulture. NY Mag. May 29, 2017. <https://www.vulture.com/2017/05/saturday-night-live-ratings-this-season-are-unprecedented.html>. Accessed December 12, 2018.
- Ball, Jeffrey. With Climate Change No Longer in the Future, Adaptation Speeds Up. New York Times. September 21, 2018. <https://www.nytimes.com/2018/09/21/climate/climate-change-adaptation.html> Accessed October 20, 2018.
- Berke, Jeremy. One simple chart shows why an energy revolution is coming-and who is likely to come out on top. Business Insider. May 8, 2018.
- Boyette, Charles. Michigan and Flint agree to replace 18,000 home water lines by 2020. CNN. March 27, 2017. <https://www.cnn.com/2016/03/04/us/flint-water-crisis-fast-facts/index.html>. Accessed November 24, 2018.
- Bowman, Sarah. More than 55 million gallons of sewage kept out of White River by DigIndy tunnel. Indy Star. USA Today. <https://www.indystar.com/story/news/2018/02/27/more-than-55-million-gallons-sewage-kept-out-white-river-digindy-tunnel/377673002/>. Accessed November 24, 2018.
- Buzzfeed. "Would You Eat Lab Grown Meat?" Youtube.com. June 2, 2017. https://www.youtube.com/watch?v=vgX9GTie0_0 Accessed March 20, 2018.
- Brady, Jeff. "More than Half of the Nation's Nuclear Power Plants are at Risk of Closing." National Public Radio. Morning Edition. June 12, 2018. <https://www.npr.org/2018/06/12/618812542/more-than-half-of-the-nation-s-nuclear-power-plants-are-at-risk-of-closing>. Accessed December 21, 2018.
- Can seagrass help fight ocean acidification? Carnegie Institute for Science. July 31, 2018. <https://phys.org/news/2018-07-seagrass-ocean-acidification.html> Accessed December 27, 2018.
- Chappell, Carmin. Climate change in the US will hurt poor people the most, according to a bombshell federal report. CNBC. November 26, 2018. <https://www.cnbc.com/2018/11/26/climate-change-will-hurt-poor-people-the-most-federal-report.html> Accessed February 13 2019.
- Clark, Pilita and Leatherby, Lauren. Trump transcript on Paris climate deal exit-annotated. Financial Times. June 1, 2017. <https://ig.ft.com/trump-paris-agreement-speech-annotator/> Accessed March 19, 2019.
- Climate Change and the Poor: Adapt or Die. The Economist. Sep 11th, 2008. Accessed October 27th, 2018. <https://www.economist.com/international/2008/09/11/adapt-or-die> Accessed January 4, 2019.
- CNN Library. Flint Water Crisis Fast Facts. December 6, 2018. <https://www.cnn.com/2016/03/04/us/flint-water-crisis-fast-facts/index.html> Accessed January 7, 2019.
- Coltrain, Nicholas. Here's where fed up Millennials are thinking about putting their votes. USA Today. Oct. 11, 2016.

- <https://www.usatoday.com/story/news/politics/elections/2016/10/11/millennials-vote-november-hillary-clinton-donald-trump-fort-collins-colorado/91590254/> Accessed February 4, 2019.
- Douclevff, Michaelleen. Killing Reindeer to Stop Anthrax Could Snuff Out a Nomadic Culture. National Public Radio. October 12, 2016. <https://www.npr.org/sections/goatsandsoda/2016/10/12/496568291/killing-reindeer-to-stop-anthrax-could-snuff-out-a-nomadic-culture> Accessed January 4, 2019.
- “Environmentalists Debate the Promise of Biofuels.” National Public Radio. Talk of the Nation. February 8, 2008. <https://www.npr.org/templates/story/story.php?storyId=18800996> Accessed November 4, 2018.
- Fisher, Danielle. Are There CO2 Emissions from Natural Gas? HowStuffWorks. <https://science.howstuffworks.com/environmental/energy/emissions-natural-gas.htm>. Accessed October 25, 2019.
- Friedman, Lisa. Cost of New E.P.A. Coal Rules: Up to 1,400 More Deaths a Year. The New York Times. New York. Aug. 21, 2018. <https://www.nytimes.com/2018/08/21/climate/epa-coal-pollution-deaths.html>. Accessed October 12, 2018.
- Funk, Cary and Hefferon, Meg. Many Republican Millennials differ with older party members on climate change and energy issues. Pew Research Center. May 14, 2018. <https://www.pewresearch.org/fact-tank/2018/05/14/many-republican-millennials-differ-with-older-party-members-on-climate-change-and-energy-issues/> Accessed March 29, 2019.
- Gabriel, Trip. Floods. Wildfires. Yet Few Candidates Are Running on Climate Change. The New York Times. October 2, 2019. <https://www.nytimes.com/2018/10/02/us/politics/environment-climate-elections.html> Accessed March 20, 2019.
- Goldfarb, Ben. Feeling the Heat: How Fish Are Migrating from Warmer Waters. Yale Environment 360. Yale School of Forestry and Environmental Studies. June 15, 2017. <https://e360.yale.edu/features/feeling-the-heat-warming-oceans-drive-fish-into-cooler-waters>. Accessed November 27, 2018.
- Gore, Al. Earth in the Balance: Ecology and the Human Spirit. Houghton Mifflin. Boston, MA. 1992.
- Gray, Ellen. Unexpected boost of future methane possible from Arctic permafrost. NASA. NASA’s Earth Science News Team. August 20, 2018. <https://climate.nasa.gov/news/2785/unexpected-future-boost-of-methane-possible-from-arctic-permafrost/>. December 12, 2019.
- The History of Earth Day. Earth Day Network. 2018. Washington, D.C. <https://www.earthday.org/about/the-history-of-earth-day/> Accessed October 12, 2018.
- Hoggan, James. Litwin, Grania. I'm Right and You're an Idiot: The Toxic State of Public Discourse and How to Clean it Up. New Society Publishers. British Columbia, Canada. 2016.
- The Intergovernmental Panel on Climate Change. IPCC. <https://www.ipcc.ch/> Accessed March 20, 2019.
- Janzen, Nick. Tunnels Expected to Solver Sewage Overflow Problem in Indianapolis, Fort Wayne. Wfyi. News. Public Affairs. April 4, 2016. <https://www.wfyi.org/news/articles/tunnels->

[expected-to-solve-sewage-overflow-problem-in-indianapolis-fort-wayne](#). Accessed December 12, 2019.

Johnson, Keith. Obama Says Climate Change is a Security Risk. Why Are Republicans Laughing? Foreign Policy. March 21, 2016. <https://foreignpolicy.com/2016/03/21/obama-says-climate-change-is-a-security-risk-why-are-republicans-laughing/> Accessed March 19, 2019.

Léger, Marc James. Culture and Contestation in the New Century. Intellect, The University of Chicago Press. Chicago Illinois. 2011.

Locke, Susannah. Chickens have gotten ridiculously large since the 1950s. Vox. October 2, 2014. <https://www.vox.com/xpress/2014/10/2/6875031/chickens-breeding-farming-boilers-giant>. Accessed December 14, 2019.

Loladze, Irakli. “Hidden shift of the ionome of plants exposed to elevated CO2 depletes minerals at the base of human nutrition.” The Catholic University of Daegu, Republic of Korea. May 7, 2014. <https://elifesciences.org/articles/02245>. Accessed March 20, 2019.

Manning, Jennifer E. Membership of the 114th Congress: A Profile. Dec. 5, 2016. <https://fas.org/sgp/crs/misc/R43869.pdf> Accessed November 4, 2018.

McCarthy, Gina. “Environmental Policy and the Assault on Science.” University of Gothenburg, Sweden. June 25th, 2018. https://www.youtube.com/watch?time_continue=492&v=-dO2yn1Qfx0&app=desktop. Accessed October 4, 2018.

McKim, Cooper. “Coal Country: EPA Plan Is Short Term Boost, No Solution for Industry Decline.” National Public Radio. Morning Edition. August 27, 2018. <https://www.npr.org/2018/08/27/641837554/coal-country-epa-plan-is-short-term-boost-no-solution-for-industry-decline> Accessed October 7, 2018.

Miller, Claire Cain. Americans Are Having Fewer Babies. They Told Us Why. The New York Times. July 5, 2018. <https://www.nytimes.com/2018/07/05/upshot/americans-are-having-fewer-babies-they-told-us-why.html>. Accessed March 20, 2019.

Palinky, Malin. “Life in a giant water bath: consequences for ecological dynamics in the ocean.” Going Coastal Seminar Series. East Carolina University. November 11, 2018. Lecture.

Paterson, Leigh. “Large Methane Leaks Threaten Perception of ‘Clean’ Natural Gas.” June 23, 2018. Weekend Edition Saturday. National Public Radio. <https://www.npr.org/2018/06/23/622727843/large-methane-leaks-threaten-perception-of-clean-natural-gas>. Accessed December 16, 2018.

Penn, Ivan. Trump’s Solar Tariffs Cause a Scramble in the Industry. The New York Times. May 3, 2018. <https://www.nytimes.com/2018/05/03/business/energy-environment/solar-industry-tariffs.html>. Accessed December 16, 2018.

Peters, Adele. Lab-Grown Meat Is Getting Cheap Enough For Anyone To Buy. Fast Company. May 2, 2018. <https://www.fastcompany.com/40565582/lab-grown-meat-is-getting-cheap-enough-for-anyone-to-buy> Accessed March 19, 2019.

Pett, Joel. Joel Pett: The cartoon seen ‘round the world. Lexington Herald Reader. March 18, 2012. <https://www.kentucky.com/opinion/op-ed/article44162106.html> Accessed January 26, 2019

- Pew Research Center. Little Partisan Agreement on the Pressing Problems Facing U.S. Pew Research Center. October 15, 2018. http://www.people-press.org/2018/10/15/little-partisan-agreement-on-the-pressing-problems-facing-the-u-s/?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=top. Accessed March 20, 2019
- Pierce, Charles. Behold, Another Signal of the Coming Climate Apocalypse That Will Go Ignored by Half Our Political System. Esquire. September 25, 2018. <https://www.esquire.com/news-politics/politics/a23454924/methane-lakes-arctic-republicans-climate-change/> Accessed October 20, 2018.
- Reed, Kevin A. et al. The human influence of Hurricane Florence. Stony Brook University. September 11, 2018.
- Relman, Eliza and Walt, Hickey. More than a third of millennials share Alexandria's Ocasio-Cortez' about having kids while the threat of climate change looms. Business Insider. March 5, 2019. <https://www.businessinsider.in/more-than-a-third-of-millennials-share-alexandria-ocasio-cortezs-worry-about-having-kids-while-the-threat-of-climate-change-looms/articleshow/68262786.cms> Accessed March 10, 2019. Accessed March 8, 2019.
- Rogers, Kimberly, Phd. "Dynamics of Coupled Natural-Human (and Technical) Systems in the Bengal Delta Bangladesh." Going Coastal Seminar Series. East Carolina University. Lecture.
- Ronson, Jacqueline. The Cost of Lab-Grown Burger Has Dropped Dramatically. Inverse. January 16, 2017. <https://www.inverse.com/article/26464-cultured-meat-burger-price>. Accessed March 8, 2019.
- Rowland, Michael Pellman. Millennials Are Driving The Worldwide Shift Away From Meat. Forbes. March 23, 2018. <https://www.forbes.com/sites/michaelpellmanrowland/2018/03/23/millennials-move-away-from-meat/#4971eff0a4a4>. Accessed March 3, 2019.
- Ryan, Jordan B. White River Pollution. Discover Indiana. <https://indyhist.iupui.edu/items/show/19>. Accessed December 20, 2018.
- Segall, Bob. What's Floating in the River? WTHR. News 13. <https://www.wthr.com/article/whats-floating-in-the-river> Accessed December 20, 2018.
- Semeraro, Eleanor. Here's Who's Watching 'Saturday Night Live' -and Where They're Watching It. Broadcasting Cable. May 4, 2018. <https://www.broadcastingcable.com/news/heres-whos-watching-saturday-night-live-where-theyre-watching-it> Accessed December 28, 2018.
- Serafino, Jay. New Guidelines Redefine Birth Years for Millennials, Gen-X, and 'Post-Millennials.' Mentalfloss. March 1, 2018. <http://mentalfloss.com/article/533632/new-guidelines-redefine-birth-years-millennials-gen-x-and-post-millennials> Accessed December 19, 2018.
- Smoot, Michael. A Democratic Art. East Caroline University. Greenville, North Carolina. May 2013. http://thescholarship.ecu.edu/bitstream/handle/10342/4232/Smoot_ecu_0600M_10964.pdf?sequence=1&isAllowed=y Accessed August 29, 2018.
- Tabuchi, Hiroko. Score One for Corn: In Battle Over Biofuel, a Rare Setback for Big Oil. The New York Times. November 30, 2017. <https://www.nytimes.com/2017/11/30/climate/trump-ethanol-biofuel.html> Accessed September 2, 2018.

Tarbox, Wilson. An Art School Started by Marc Chagall that Became a Modernist Wasteland. Hyperallergic. July 11, 2018. <https://hyperallergic.com/451015/an-art-school-started-by-marc-chagall-that-became-a-modernist-wasteland/>. Accessed March 10, 2019.

Trump, Donald. President Trump @POTUS. Twitter. <https://twitter.com/potus?lang=en> Accessed March 19, 2019.

Two Hours a Week. Two Hours a Week. <http://2hoursaweek.org/> Accessed January 19, 2019.

Westcott, Todd. Methane from Thermokarst Lakes Absent in Current Climate Change Models. Water Canada. August 20, 2018. <https://www.watercanada.net/methane-from-thermokarst-lakes-absent-in-current-climate-change-models/> Accessed December 22, 2019.

APPENDIX



Plate 18. Changes in Fish Migration due to Rising Temperatures Lithograph with Screenprinting 15x20 2019.

