



Pine
Rockland
Zine

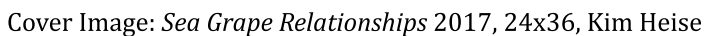
Climate Change

Edition
2019

How climate change effects South Florida
and ways to take action.

Kim Heise

Edition
2019



KIM HEISE
Florida Sea Grape Relationships, 2017
Watercolor on paper 20x30"

ART FOR THE EARTH

ARTISTS ON CLIMATE CHANGE

A Multidisciplinary Arts Event

Part of an international series called Climate Change Theatre Action in which over 140 collaborators in 23 countries host events to reach an audience of more than 12,000 people.

Performance by Kellianne Jordan
Artwork by Kim Heise & Lucinda Linderman
Poetry readings by Clayre Benzadón,
Christell Roach & Caitlin Andrews

More info: Broward.org/Climate



SPECIAL GUEST PERFORMANCE BY **KELLIANNE JORDAN**

OCTOBER 17, 2019, 6-8 PM

THE FRANK

601 City Center Way Pembroke Pines, FL 33025 | Free and open to the public



About

Pine Rockland Zine: Climate Change Edition 2019 is a collaboration with Taryn Nicoll and The Frank Gallery for 'Art For The Earth: Artists on Climate Change', a multi-disciplinary art show held on October 17, 2019.

This event is part of an international series called *Climate Change Theatre Action* in which over 140 collaborators in 23 countries host events to reach an audience of more than 12,000 people. With the support of Broward County Cultural Division, Broward County's Environmental Planning and Community Resilience Division, Pembroke Pines is one of the 60 cities across the United States participating in the series. Presenting a selection of artworks that deal with climate change and environmental conservation, this event featured a play, a pop-up exhibition by visual artists Kim Heise and Lucinda Linderman and readings by poets from University of Miami's Sinking City literary magazine, Clayre Benzaón, Christell Roach and Caitlin Andrews.

Acknowledgements

The zine was made possible by the Frank Gallery, Broward County Cultural Division and Broward County's Environmental Planning and Community Resilience Division, who collectively provided the resources and guidance to get this started.

The Ways To Take Action section was made with the help of the Frank Gallery staff, who wrote the descriptions for several action items. Activists on the Artists For Climate Action Facebook page contributed resources to this section as well.

Learn more

For copies or a digital version to share, visit KimHeise.com/zine
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Pineland Croton Relationships 2018, 13x25", Kim Heise
(Florida Leafwing and Bartram's Scrub Hairstreak Butterflies)

Introduction

According to The Union of Concerned Scientists, 40% of the most at-risk coastal land in the U.S. is in Florida. Sea level rise stresses our canal and water drainage systems, causes natural habitats to transition into saltwater marsh, saltwater intrusion threatens our drinking water, while hurricanes damage some areas beyond repair. Many South Florida communities grapple with where the effects of climate change can be mitigated and how. For some communities that means investing millions in infrastructure. For others it means buying back affected land to return to nature. The answers are numerous and nuanced.

Municipalities aren't the only places where these questions are being asked. Wildlife managers in South Florida are currently formulating a plan of action for the future of endangered species in the path of rising seas. For instance, some species most immediately at-risk in the Keys might start getting moved to the mainland.

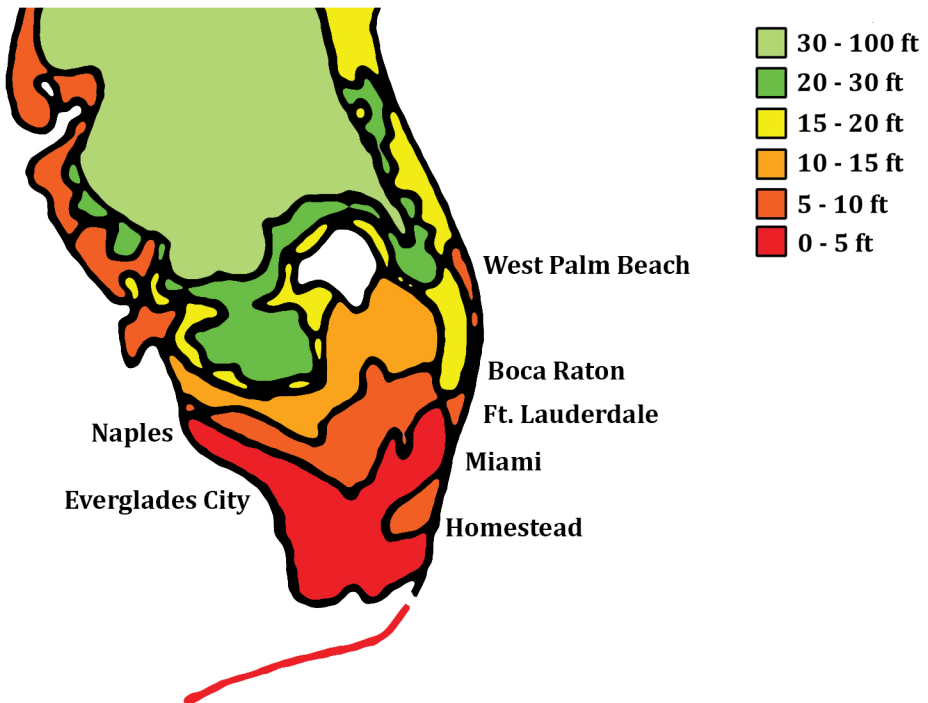
For 2 years I've been illustrating the endangered animals and plants of the Pine Rocklands through watercolor and creating zines about their struggles for survival to draw attention to conservation needs. Less than 2% currently remains outside of Everglades National Park and much of that land is still not protected. It's home to the rare and iconic Miami Tiger Beetle, two dwindling species of butterfly and the most endangered mammal in North America, the Florida Bonneted Bat. Wholesale destruction and clearing of these lands for commercial real estate is the most immediate concern, but climate change poses major threats in the long term.

This zine addresses some climate change concerns as they relate to Pine Rocklands and to the people of South Florida and provides resources for how to get involved!

Sea Level Rise: Above Ground

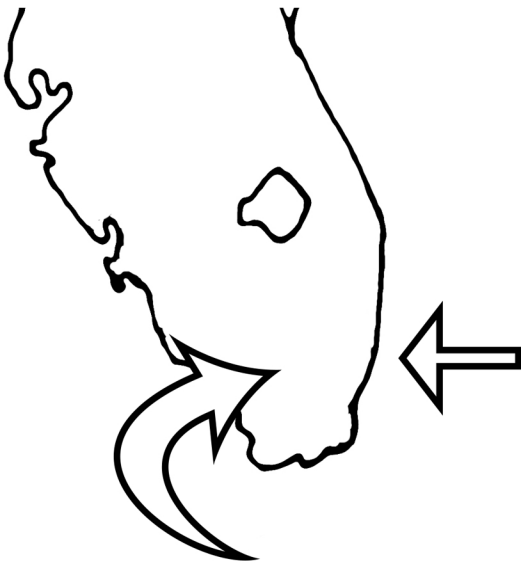
This topographical map illustrates South Florida elevation in feet (1), and is a good way to visualize which parts of Florida will be most affected by sea level rise. For instance, a rise of 5 feet would put the red area underwater.

South Florida Elevation in Feet



(1) Where and when seas will rise is hard to pin, since water does not distribute evenly around the globe and ice melts in a somewhat unpredictable manner. Scientists CAN say with a high level of certainty that global temperature increases are causing arctic ice to melt, and that sea rise is very much guaranteed;(3) seas have already risen by eight inches between 1993 and 2017 (4)!

For South Florida, this means that Everglades National Park and Miami will feel the most immediate effects, with seas rising in 2050 up to 1.5 feet give or take (2), and could potentially see levels 2-5 feet by 2100, or be even higher if it accelerates (3). Areas of Miami are already suffering from high-tide flooding.



The East coast's relatively high and dry land, upon which the metropolitan area from Jupiter to Miami was built, stands to loose ground from both it's sea-facing and Everglades facing sides.

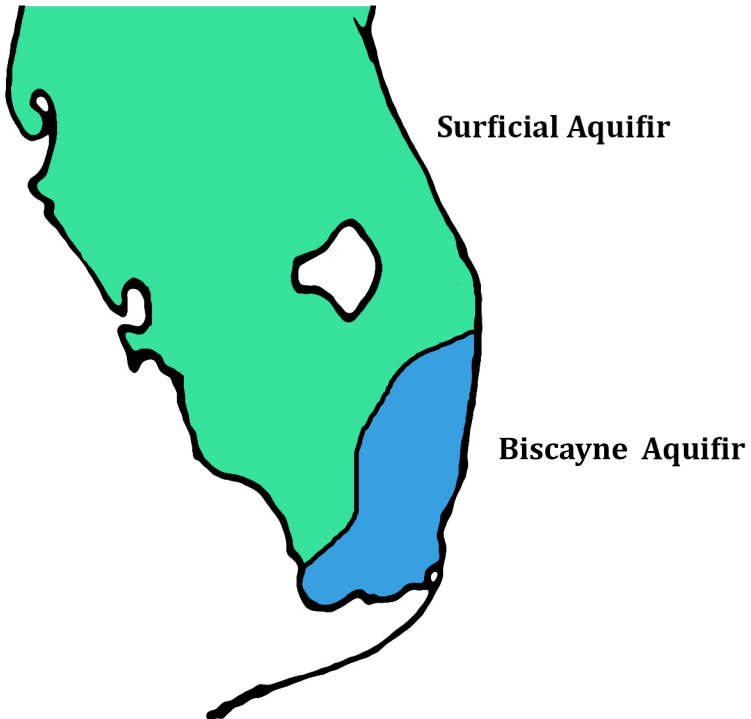
Low lying areas in East and West Miami-Dade and Broward counties are the most innediately at risk, as storm drains begin to fail and can no longer carry excess water from land into the sea via. gravity.



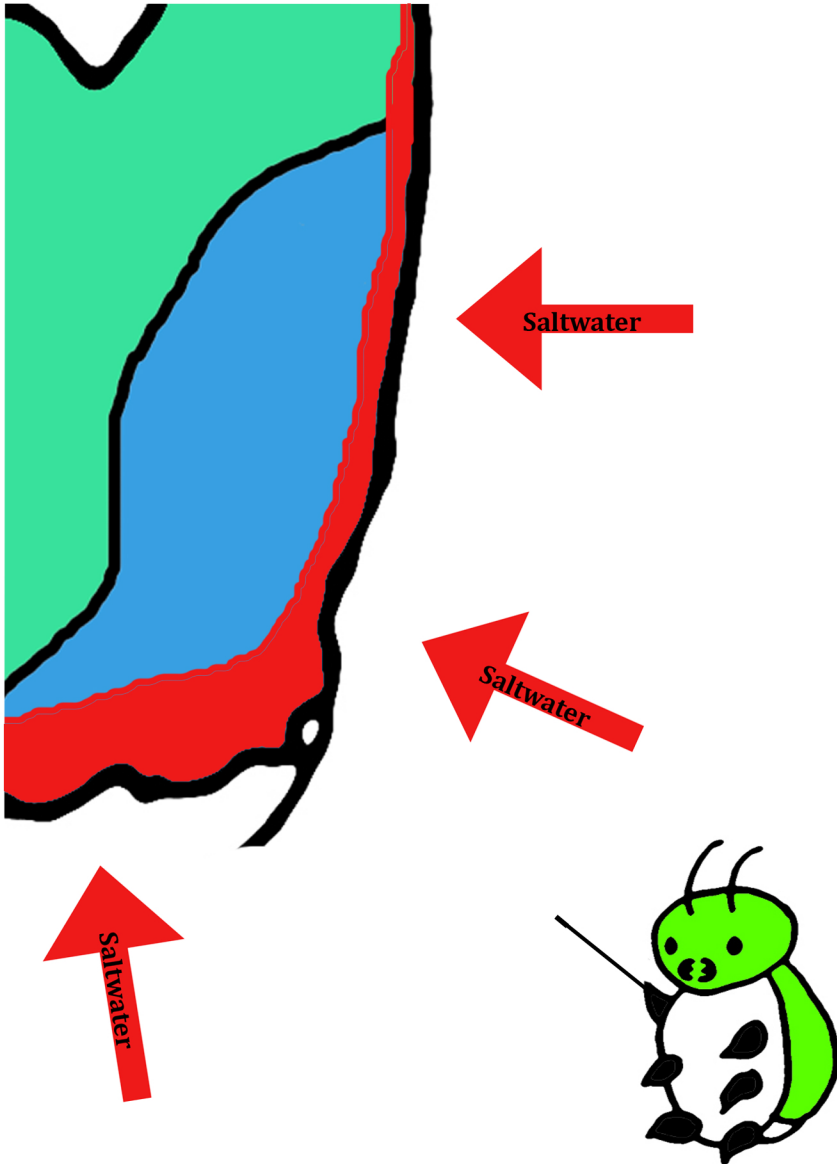
Sea Level Rise: Below Ground

The water supply for Miami-Dade and Broward County is the Biscayne Aquifer. It's an already threatened resource exacerbated by rising seas. The underground waters are fed by the Everglades and rainfall, with water seeping through porous limestone bedrock to underground reservoirs. Canals built in the 1950's drained large parts of the Everglades and the communities that followed paved over large swaths of land. This reduced the surface area and meant less water was seeping into the ground to replenish what was being lost due to the high water demands. As the aquifer shrank, saltwater from the Atlantic seeped in to take its place. This process, called Saltwater Intrusion, continues to this day and is exacerbated by climate change.

Map of South Florida Aquifers



Saltwater Intrusion in Biscayne Aquifer



Hurricanes

By 2100, hurricanes are expected to become slower, more likely to become a Category 4 or 5, and increase the amount of rainfall they drop by 20% (5), but not necessarily increase in number (6). It's not unusual for Florida to see one or even two hurricanes a year, or go for long stretches of time without one, like the 10-year lull between the hyperactive year 2005 (Wilma, Katrina and Rita) and Matthew of 2016 (9). Climate change likely won't increase the rate of hurricanes, just make them stronger - up to 300% stronger by 2100 (10). The trend is already noticeable.

This year saw one of the strongest and slowest hurricanes ever. Dorian caused massive destruction in the Bahamas, its wind blowing away homes and rain flooding others. Its effects have yet to be measured on the island's Pine Rocklands (called Pine Yards there), although pine tree damage is expected to be extensive.

2017 was a notable year for hurricanes as well. Irma hit the Caribbean, including Puerto Rico and the Keys, causing massive destruction. Later that same year Harvey hit Louisiana and Texas dropping a huge amount of rain over an already prone-to-flood region.

Areas impacted by these very strong storms have huge costs for people. They cause billions of dollars' worth of damage, some of which is never repaired. For instance, the damage from Irma in the Keys is causing some residents to settle for taxpayer buyouts of their homes for a fraction of what they once cost. (11)



Wildlife, on the other hand, seem to fare a lot better. When hurricane Irma struck the Keys in September of 2017 there was concern that endangered Key Deer species would suffer. Already only numbering 600-800 animals, they live exclusively in the Florida Keys and had evolved their small stature (average of 32 inches at the shoulder) to match their tiny island home (7).

After the storm, wildlife managers reported that they fared better than expected, with 21 dying of storm-related injuries (8).

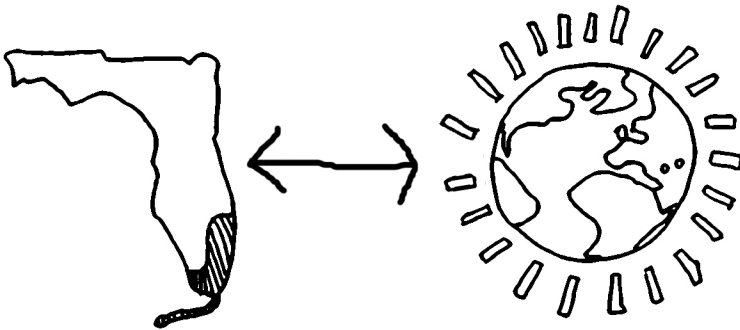


Biologists also reported that endangered Miami Blue Butterfly populations fared extremely well in the aftermath of Irma, even though the storm made a direct hit on one of their tiny islands (12). Tall trees fare less well, even the famous hurricane-tempered Dade County Pine. Hurricane Andrew in 2004 and Wilma in 2005 knocked down large swaths of the tree canopy in South Florida and many areas have yet to recover. (13)

Image: *Key Deer*, 46x46" 2019 Kim Heise

Policies for People and Planet

To mitigate and adapt to these changes, communities need comprehensive policies and the will to carry them out.



One of the most impressive climate plans to come out of South Florida is the Southeast Florida Climate Compact and its Regional Climate Action Plan (RCAP). It's a coalition of Palm Beach, Broward, Monroe and Miami-Dade counties. Its policies are suggestions that can be adopted by communities when appropriate. Topics range from infrastructure, greenhouse gas reduction, public health and environmental protection. Its recommendations can be implemented not only by the county, but by cities and towns in affected areas, and are a good reference point for other communities in the U.S., coastal or otherwise.

Many RCAP policies have been integrated into county plans, and some are already at work. For instance, Miami's Office of Resiliency (14) lists climate projects in the works or currently underway, like raising roads and installing pumps (15). Broward has a climate change action plan for use by its cities, towns and citizens.

Ways To Take Action

Want to do something about Climate Change in South Florida? There are many organizations and actions to choose from. On the following pages is a non-exhaustive list of resources compiled by this zine's contributors.

But no matter where you live, here are two things you can do:

- Register to vote and hold elected officials accountable in elections. This ensures that municipalities, states or federal government are taking action on climate change.

- Follow regional, national or international climate change organizations. Whether it's through emails or a social media page. They can alert you to news or actions to take, such as communicating with your government representatives or attending events.

Some regional resources and information:

South East Florida Regional Climate Compact

<https://southeastfloridaclimatecompact.org/>
Comprehensive policies made by 4 counties.

Broward Climate, Energy and Sustainability Program

<https://www.broward.org/Climate>
Broward's climate policies and programs.

Miami Office of Resiliency

<https://www8.miamidade.gov/global/economy/resilience/home.page>
Miami's climate policies and programs.

Broward County Resources

Join the Sustainability Stewards of Broward Network

For more news & events, email resilience@broward.org

King Tides Initiative (Citizen Science)

Yearly peak high tides are expected to increase in depth and frequency due to the effects of sea-level rise and climate change. By collecting necessary data, our communities are able to more effectively plan how to counteract these effects. To learn more, visit: www.broward.org/waterresources/Pages/KingTides.aspx

Globe at Night Light Pollution Program (Citizen Science)

This program is an international campaign to raise public awareness of the impact of light pollution on energy consumption, wildlife and health. Citizen-scientists are invited to measure and report their night sky brightness.

Learn more at: www.globeatnight.org/

Become a Climate Ambassador

To access science-based training to support your conversations and advocacy, email resilience@broward.org

Go Solar

Going solar can not only cut your electricity bill, but can save the planet too! By going solar, you can reduce your family or business's carbon footprint. To learn more, visit www.broward.org/Climate/Pages/GoSolar.aspx

Plant it Green: Create "Carbon Neutral" Events

Florida is full of fun events, but that fun can come at a cost. You can offset the carbon footprint of your events by planting trees with local planting projects. Learn more at: www.broward.org/Climate/EnergyAndSustainabilityProgram/Pages/Plan-It-Green.aspx

Conserve Water

Reduce your property's water consumption, lower your water bill and potentially increase the value of your home. Reduce run-off of pollutants and keep canals and water bodies clean in our urban areas by retrofitting your home and having the NIS examine your property to improve your irrigation efficiency.

www.broward.org/waterresources/Pages/Indoor-Water-Conservation.aspx

www.broward.org/waterresources/Pages/Outdoor-Water-Conservation.aspx

Create a Wildlife Friendly Habitat

We share our communities with local wildlife, and one of the easiest ways to have a lasting impact is to turn your yard into a wildlife friendly space. This can be done through planting a variety of non-invasive native plants, responsibly using and disposing of fertilizers and pesticides, and practicing responsible water usage. To learn how your yard can become a certified wildlife habitat, visit

www.broward.org/NatureScape/Pages/HowToGetCertified.aspx

Resources for Protecting Habitat

South Florida Wildlands Association

Threats to the greater Everglades and wildlife corridors are abundant. Join SFWA on Facebook or subscribe to their newsletter to get the latest news and calls for action to protect our green resources in South Florida.

<https://southfloridawild.org>

<https://www.facebook.com/southfloridawild/>

Urban Paradise Guild

A Miami-based group dedicated to community greening and preservation. Join them for tree and habitat plantings.

<http://urbanparadiseguild.org/>

Miami Pine Rocklands Coalition

Join monthly meetings and the Facebook page to be a part of a Miami-based grass-roots community dedicated to protecting Pine Rocklands.

<https://www.miamipinerocklandscoalition.org/>

<https://www.facebook.com/groups/MiamiRPC/>

Florida Native Plant Society

Still can't get enough plants? Join chapters in each county to access botany field trips and educational events.

<https://fnps.org/>

IRC: Natives For Your Neighborhood

An online resource to find out which native plants belong in your area.

<https://regionalconservation.org/beta/nfyn/default.asp>

Cleanups

Surfrider Foundation

A national organization with local chapters and campaigns dedicated to protecting oceans and beaches.

<https://florida.surfrider.org/>

Volunteer Cleanup

An online tool to find cleanup activities by city zipcode, organize a cleanup, or access educational resources about marine debris.

<https://www.volunteercleanup.org/>

Debris Free Oceans

A Miami-based organization engaged in education, cleanups, events, consulting, policy and research.

<https://debrisfreeoceans.org/>

Arts-based Resources

Climate Change Theatre Action

Brings resources and expertise to local communities around the world to address climate change through the arts. (the Art For The Earth: Artists On Climate Change show, where this zine comes from, is a collaboration between this organization, The Frank Gallery and Broward County!)

<http://www.climatechangetheatreaction.com/>

Artists For Climate Action

A Facebook page community moderated by local Palm Beach County climate activist and art historian Mary Jo Aagerstoun. It's a place for discussion, and sharing of news and resources. Several resources in this section were contributed by its members.

<https://www.facebook.com/groups/751890081595539>

United Climate Artists

A new working group born from the Climate Reality Project. Contact them to get involved in their mission of education and artist networking.

<https://unitedclimateartists.org/>

Other Resources

Rethink Energy Florida

A state-wide organization dedicated to energy independence, with education outreach an intern program and grass-roots advocacy.

<https://www.rethinkenergyflorida.org/>

Climate Reality

A national group led by Al Gore and Ken Berlin, offering trainings, a sharable climate science fact sheet, and a mailing list to get updates on the latest climate policy and ways to help.

<https://www.climaterealityproject.org/>

Sunrise Movement

groups across the country (called “hubs”) host climate strikes and events intended to demand climate action from lawmakers. They offer trainings and a mailing list and have news and resources on their webpage.

<https://www.sunrisemovement.org/>

NAACP Environmental and Climate Justice Committee

Find out how environmental issues and climate change relate to justice for all Americans by visiting their webpage and reading about their achievements starting in 2009.

<https://www.naACP.org/issues/environmental-justice/>

Citations and Further Reading

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- (13) Malernee, Jamie. *Crisis in the Canopy*, Nov 6 2005, South Florida Sun Sentinel. <https://www.sun-sentinel.com/news/fl-xpm-2005-11-16-0511150754-story.html>
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- (15) Milman, Oliver. Eskenazi, Joe. Luscombe, Richard. Dart, Tom. *The fight against climate change: four cities leading the way in the Trump era* June 17 2017, The Guardian. <https://www.theguardian.com/cities/2017/jun/12/climate-change-trump-new-york-city-san-francisco-houston-miami>

Climate change effects people and animals alike. This zine provides an illustrated overview of some of the challenges we face in South Florida, like sea level rise, saltwater intrusion, shifting habitats and hurricanes. Find out what communities here are doing about it and how you can help!

