

A Memorandum of Symbiotic Relationships



Artist Statement

Carly Ryan is a Multidisciplinary Artist and Illustrator from Ecuador, South America. Currently residing in Portland, Oregon she is inspired by the flora and fauna that stems for her travels between South, Central and North America.

Creating informational narratives based from environmental conservation issues and events here locally + worldwide.

Her artwork focuses on the conservation of the flora and fauna, showing light to the importance of habitat + animal conservation as well as the effects of our current anthropogenic world and our personal relationships with our cohabiters. Her strong background and knowledge in science, her recent hobby of bird watching and general admiration for avian species has grown and intertwined into her art practice today.

Carly's art work has connotations of interconnectedness, human consumerism, activism, biodiversity, climate change, and habitat + species loss.



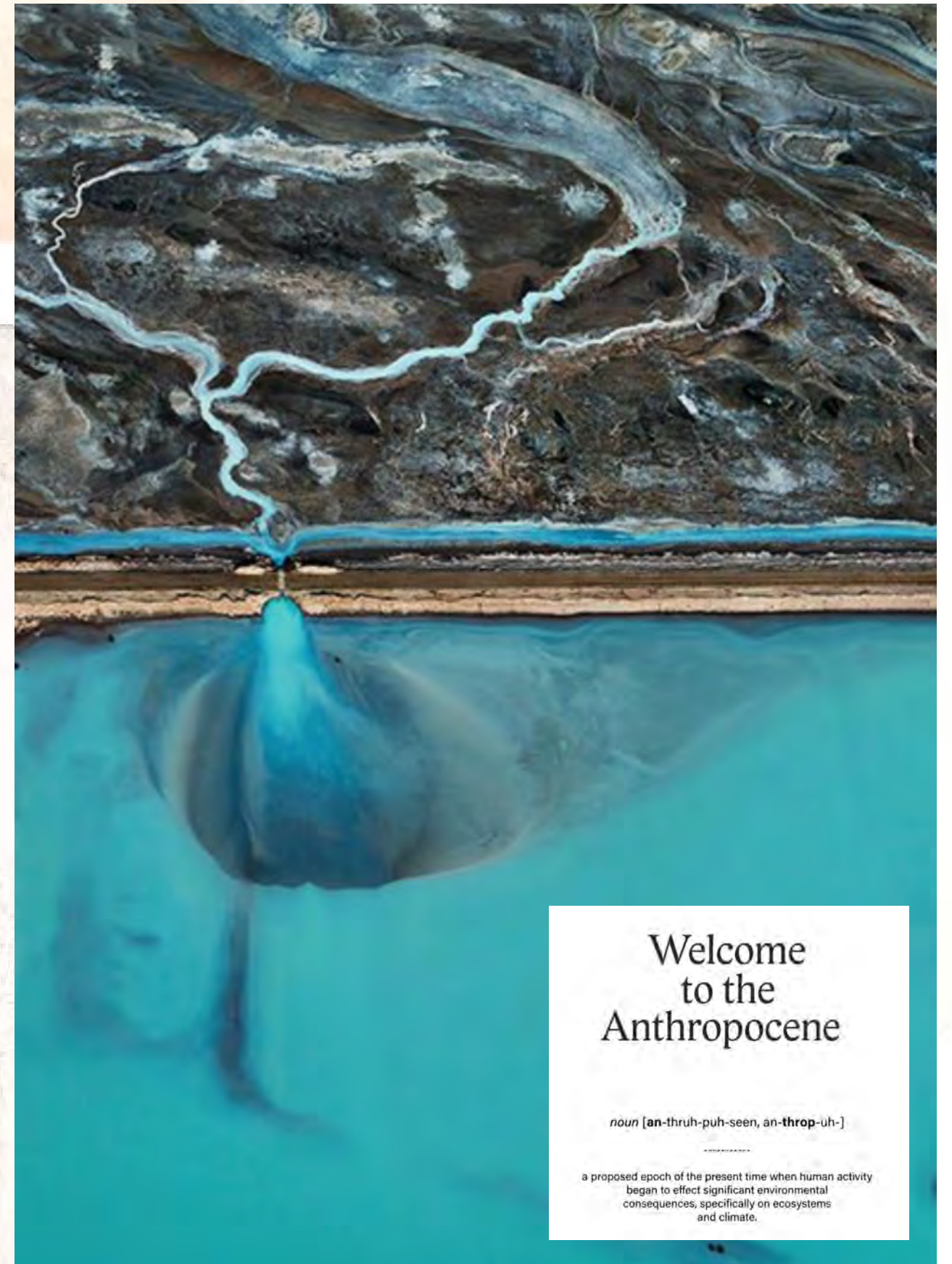
Thesis Proposal

As we enter Earth's most recent geological time period, the Anthropocene: an epoch where human activity has been at its most dominant influence on the environment and climate, we are witnessing the sixth mass extinction. This is an ongoing event in which species are being driven to the brink of extinction due to overwhelming human intervention and pollution. There's an overwhelming amount of global evidence that earth system processes are being altered by humans, directly and indirectly. This evidence can be found in atmospheric, geologic, hydrologic, and biospheric data.

I will focus my thesis project on opening awareness and empathy to the many species we are losing in our own backyards. By showing the symbiotic relationships between flora and fauna and sharing that through my artwork, I'm able to show the importance that is the systems that make up nature and the wildlife that inhabit it. My end goal is to demonstrate this by creating five different illustrations depicting the symbiotic relationships within these five different ecological collapsed areas; Ecuador, Honduras, Florida, Texas and Oregon.

I have always loved being surrounded by nature and what it has to offer. As a young girl growing up between third world countries and the United States in the early 90's, where cable television and dial-up internet was a new thing, fun and other interests were found elsewhere. For me, I found fun outsider to the in nature. Attending a bilingual school in Honduras, which had about an acre and a half of open but fenced-in forest land, my classmates and I used to play hide-and-seek and tag. In the forest, we threw pine cones at each other and we explored by turning each stone and climbing fallen trees during recess time.

While visiting my mother's family in the largest port city in Ecuador, near this region is where I experienced true jungle, a small but mighty piece of the Amazon. The vastness of it all left me amazed but mainly impressed. Being submerged in an ever-green tropical landscape, where I was surrounded by the echoing sounds of the jungle, I felt as small as ant.



Welcome
to the
Anthropocene

noun [an-thruh-puh-seen, an-throp-uh-]

a proposed epoch of the present time when human activity began to effect significant environmental consequences, specifically on ecosystems and climate.

My summers were spent in central Texas were involuntary but also refreshing. When my parents were sick of us, my sister and I were shipped to New Braunfels, Texas where we spent our time with our grandparents. Summer passes to Schlitterbahn waterpark, outdoor trips, tubing in the rivers, and road trips to neighboring states helped me grow an appreciation for this region of the states. Making the final move out of Latin America to Central Florida should have been easy but I found myself exploring the marshlands and lowlands, enhancing my love to nature. Living in Oregon for the past five years, has exposed me to the very unique ecological habitat that the Pacific Northwest very much flaunts. It has a wet and moderate climate which has led to the growth of extensive forests featuring some of the largest trees in the world.

In addition, growing up with a marine biologist, as a father, further expanded my appreciation for nature. His background helped increased my knowledge and empathy for nature. I recall standing on fresh shrimp as an infant, packing and shipping live shrimp, and cultivating and feeding fish. With him, I also gathered water and soil samples, participated in bird counting, bird watching, pulling invasive plants and climbing in and out of giant salt water aquariums in museums as an adult. Accompanying him on many of his work trips gave me a closer relationship with my father but also an intimate knowledge of nature through science.

I am lucky enough to have experienced different regions within the Americas and I have come to have an appreciation for all nature and its different environments. It brings me joy knowing that plants and animals are in their normal healthy habitat, interconnected as they're intended to be. Though I'm aware that not many share my experience of traveling between north, central and south America, I understand that many people share an appreciation for nature itself. Whether that appreciation is big or small, it can be met with the knowledge that almost all living organisms have an expiration date, but due to human activity and its repercussions today, some of these living organisms are expiring at an abnormal rate.

Talking about ecological collapse through my artwork, I hope to evoke pressure and motivate people into action. I also hope to increase empathy with

mother natures artwork locally, nationwide or worldwide. I'd like to shed light on the importance of what these species mean and highlight their role within the natural world. For example, in my birth country of Ecuador, mining has become a geological and ecological problem. Mining companies in the past five years have opened up legally protected areas for the mining of copper and other minerals. The process of deforestation and mining is destroying Ecuador's landscape and has displaced several species within the world's richest rainforest. The threat is felt by the white-bellied spider monkey, the giant otter, sloths and jaguars. Indigenous tribes, who depend on the rainforest's abundance, are also in danger of losing their ancestral homes, food and medicine. How I plan to showcase Ecuador's displaced species is by paying homage to them through a portrait like collage.

I believe this topic could be of interest and appeal to anyone who cares about the well-being and preservation of mother nature, like Greta Thunberg and the thousands of young adults actively participating in the climate strike protests, due to the effects of deforestation and fossil fuel emissions. This work may also interest those who actively participate and volunteer in their local organizations or institutions to maintain and improve city parks and national parks; anyone who is a camper, a gardener, a swimmer, or traveler. Finally, anyone who appreciates nature's role in our lives; anyone who is starting to exercise their green thumb; and anyone who drinks water.

In terms of professional interest for this type of work it could fall under the editorial umbrella, could be of interest to a book or website publisher such as Vox, Colossal, HypeBeast and among others.

My process will rely on research, saving reading material, photos for references, and making sure information is updated and accurate. After gathering as much information regarding each of the five locations and their threats for potential ecological collapse, I will select between five to eight species from each region and find their symbiotic relationship with one another. Then, I will begin ideation process for composition, color and value. I will start ideating rough sketches using the photos I've saved as reference and also use the gathered information to create and to keep an accurate and realistic approach to the drawings

themselves. I'd like to portray as much as natural foliage and realistic life-like creatures that inhabit these certain ecological collapsed areas and those that hold a symbiotic relationship with one another.

By merging plants and animals, the tone of these illustrations will be somewhat vibrant as I will use all full colors to capture both the very realistic threat at hand and beautiful aspects of each species. Each illustration will act as an homage to these species who are ecologically threatened. I am envisioning this project to be presented on a gallery wall on campus for my oral defense. There will be a set of five large illustrations displayed on the wall at 121.92 cm by 91.44 cm (48in x 36in). I would like these illustrations to be this specific size because my work is mostly representational of life, focusing on detail. I would like for people to pause and visualize not only the problem at hand but the beautiful creatures mother nature created. I would like to provide these illustrations a positive, memorial space in which they can be appreciated.

Each illustration will be depict regions where symbiotic relationships are at stake and suffering from ecological collapse. Each of these five illustrations will be based on the regions I grew up in, have visited numerous times and became very familiar with, through time and people. They will contain cluster of local flora and fauna native to each region, species in which have an interconnection with each other and the environment in which they inhabit.

These illustrations will be executed by marrying traditional mediums such as ink and watercolors as well as digital mediums. I'd like the final work to be presented as 'open to the public' not just for the time I'll be talking during my defense, I'd also like for these to exist for the entire duration of focus week inside the school building, so it can be viewed by whomever, whenever. This way people can get a closer look and appreciate those creatures and their role in nature.

Science has been a strong influence in my life and in my work as of late, especially through minoring in Art + Ecology. Artists such as Zoe Keller, Tegan White, Lisa Erickson, Erica Williams, Katrina Haffner, and Halsey Swain inform my thesis project and overall creative vision. Their artwork is solely based on nature's strength and its fragility that it creates for itself. They all show their own personal perspectives regarding nature through their work and capture the



likeness of each creature and the essence that is life within their artwork. Their work also plays between hyperrealistic drawings and imagination, it touches subject of death, the mystical and the unknown and acknowledges the symbiotic relationships within mother nature. They are also all local women artists here in the Pacific Northwest. My work in the past few semesters has been centered-around and prioritizes the idea of awareness, endangered species and conservation. Entering the Art + Eco minor has also influenced me to do more work around these subjects. Learning about various artists such as Zaria Foreman, who cross the line between activism and art, has also been an inspiration.

Knowing that consumerism is the main driving factor for ecological collapse today, how is my voice as an artist able to communicate with society, show empathy and a general understanding and a sense of awareness of ecological collapse? Creating artwork that can spark a conversation on these topics is what I'd like to accomplish through my artwork.

The Anthropocene is happening right in front of our eyes. We are losing species at such an alarming rate that most newborns now won't be able to witness an elephant, a lion, or a macaw bird in person. Only memories stored in photos and videos will be all that's left behind to satisfy human curiosity. And as we're settling into the Anthropocene and the endless cycle of human intervention continues, How is my voice as an artist able to communicate with today's society? Show empathy, a general understanding and a sense of awareness to ecological collapse at a time when we so desperately need to find action in order to save nature for our future generations? Actions start locally and I hope to inspire and nurture relationships with nature among the people. I hope for people to take action and to donate to organizations doing amazing work in order to conserve and preserve our natural world. We can diminish the depletion of natural resources through education and awareness. Only through this way, are we able to salvage ecological collapse areas and the symbiotic relationships found within.

Abstract



A Memorandum of Symbiotic Relationships

is a series of five illustrations based on ecological collapsed areas found within the Americas. The series simply portrays endangered species and their symbiotic partners in their local, natural environment. Each illustration depicts five different regions where symbiotic relationships are at stake and are currently suffering from habitat loss.

The project's purpose very much focuses on empathy and awareness of the symbiotic relationships found between endangered species in geographical locations which are dear to me. And lastly, my thesis has connotations of activism, human consumerism, interconnectedness, biodiversity, climate change, and habitat + species loss.



Oral Presentation

Hello all,

My name is Carly Ryan and I'd like to start by thanking you all for attending my thesis defense presentation today titled "*A Memorandum of Symbiotic Relationships*" I would also like to give a big thanks to Ardis, for all the wonderful conversations held over the past few months, for your mentorship, of course through this very important project.

A Memorandum of Symbiotic Relationships is a series of five illustrations based on ecological collapse areas found within the Americas.

The series portrays endangered species and their symbiotic partners in their local, natural environment. Each illustration depicts five different regions where symbiotic relationships are at stake and are currently suffering from habitat loss.

My thesis purpose very much focuses on empathy and awareness of the symbiotic relationships found between endangered species in geographical locations which are dear to me.

And lastly, my thesis has connotations of activism, human consumerism, interconnectedness, biodiversity, climate change, and habitat + species loss.

In addition, the five illustrations carry the Cerulean Warbler bird species as a symbol of self. This symbol is an important key-element to the illustration series for two main reasons;

- the cerulean warbler's migratory path is the same as mine, the artist.
- the species' migratory path is being disrupted due to habitat loss.

During migration, the cerulean warbler uses the coastal woodlots and forests along the Gulf Coast of North and Central America. Those wooded areas are currently being cleared as coastal development expands.

For this project, it is important, for me, to deliver awareness to the geogra-

phical locations in which species have suffered and continue to suffer due to the ongoing phenomenon that is habitat loss. It is also important to acknowledge the symbiotic relationships second-handedly affected by this phenomenon and for these species not to be taken for granted either.

Before I dive into the thesis itself,

I'd like to briefly give you all a little background on myself to better understand how I come up with this project and as to why it's important to me and hopefully understand why it should resonate with you. To start, I was born in the largest port city in Ecuador, Guayaquil. Not only did I experienced city life here, but I also experienced a small but mighty portion of the Amazon Rainforest. Despite Ecuador being my home country, I was raised in Honduras. This is where I experienced temperate coniferous forests for the first time. I also experienced other types of tropical landscapes, and the northern coast of Honduras was my introduction to the Caribbean Sea. Texas is where my grandparents on my father's side lived at the time. Here, in this region and surrounding areas, was my first time experiencing what seemed landscapes full of nothingness; the Grand Canyon, Death Valley, the Great Sand Dunes, and Mesa Verde, were locations like I've never experienced before; where the color green wasn't the dominant one.

Officially, my family and I made the move to the states in the early 2000s; to Florida specifically. Known for its relaxed lifestyle, warm climate, and number-one rated sunny beaches in the nation, Florida contains a tropical beauty of her own. And finally, the move to the thirty third state was made in 2015. Oregon is known for its luscious-green mountains, rainy weather topped with world-famous old-growth forests on one side of the state and sparsely inhabited on the other.

In addition to experiencing these locations, my father further expanded my appreciation for nature through a mixture of daughter-father outings as well as work outings. His work experience as a Peace Corps. member and his profession as a Marine Biologist helped increase my personal knowledge and empathy for the natural world.

Through these various types of geographical locations, I have experienced various types of forests, waters, general landscapes; some wild and untamed, some luscious yet well-manicured. Through all my personal experiences within these regions, I have come to have a greater appreciation for all nature and its different environments. As well as for its inhabitants.

These regions are not only important to me because they hold personal memories and experiences throughout the past years but these regions are most important to the many local species which depend on the land and the land depends on its species for its survival and flourishing.

In my proposal last semester, I spoke a little bit about living in our current Anthropocene epoch; the rapid increase in the human population, the effects of consumerism among the depletion of natural resources, and its negative toll on the natural world. The negative toll is, of course, being the extinction of ecosystems and its species. Habitat loss today is the leading cause of biodiversity loss worldwide.

It is the leading cause of extinction among species and ecosystems throughout all seven continents. Habitat loss is not only a problem for the flora and fauna species but it's also a problem for the future of the human race.

Unfortunately, as a part of a capitalist society, we, the human race, are a geographical force within the alteration of the natural world. While we may

recycle and do our part to improve our comfortable consumerist lifestyle, but the negative effects are unfortunately greater than the positive efforts made today, especially when the time's ticking.

Keeping in mind what consumerism means worldwide, and the effects of those numbers are and the political play behind certain geographical locations which are currently being affected the most.

This is the main driver as to why I'm interested in pursuing empathy and awareness as a form within my artwork. It is my goal to bring awareness through my work to the environmental problems created by consumerism, over-development, and the destruction of habitat.

The evolution transition of my project was smooth sailing; it was broken down into four stages; research + reference collection, composition play + rough sketches, final drawing + color, and, finally, presentation.

As for the transformational aspect of the project, the only difference was the change of delivery, the presented platform, and the change in size dimensions of the final illustrations. I had initially planned to have the final five illustrations presented on campus, the illustrations would have been at 121.92 cm by 91.44 cm (48in x 36in) (4ft x 3ft) Today the five illustrations are at 15 in by 20 in.

This project's focus was not only on awareness and the well-being of the natural world but it also serves as a platform from which to educate myself and my potential viewers. It is an ongoing educational process.

This intersection of personal education through informal study and my art practice, it allows me to keep growing as an artist and it also allows me to create science-based narratives in which I can later incorporate into my work.

Last semester during my proposal, I had stated that this sort of topic could be of interest and appeal to anyone who's interested in the well-being and preservation of nature anywhere. Among those are citizens who are gardeners, critical thinkers, activists, journalists, educators, promoters, and influencers. I also mentioned about the many organizations and institutions who already put in the time and efforts towards stewardship work and improvements to our cities, states, and national parks.

Through the time frame of my thesis process, I became aware that this topic not only extends to those who are interested or those who have been affected by, but also those who are currently studying and educating themselves about climate change, biodiversity, interconnectedness, and habitat + species loss.

As I mentioned before, doing the research and reference collection was the first stage of the project. I started with basic research; searching for endangered species from each regional location and making a list of my own for each location. Then I carefully narrowed down my list of endangered species to four to five species for each region to incorporate into the illustrations which is what you see in this slide.

Once I had my selection made for each region and its species, I had to do further research to find the endangered species symbiotic partners.

This second part of the research was a little bit less loose, in terms of selecting either of the five main symbiotic relationships; mutualism, commensalism, predation, parasitism, and competition.

Some of the decisions made as to why I picked the species that I did were for various reasons; simply because I have personally seen one or met one, or because I felt intrigued by them, sometimes they're influenced by my growing personal hobby of birding, or simply for their size, and for their role within their ecological habitat.

For example, in this slide (22), I'm showing you my final illustration for Honduras, and a close-up photo of one of the species selected for this piece, the Giant AntEater. I selected this species because I actually met one, back when I was around six years old. His name was Celoso, which means jealous in Spanish.

Did you know anteaters have no teeth? But are also able to eat soft fruits such as bananas and papaya. I remember, Celoso understood his name and came over when he was called. He liked to nap on the living room sofa and if I remember correctly, I believe Celoso lived up to be sixteen years old. He belonged to one of my dad's friends who lived out of town on the mountain side in Central Honduras

Another example is the Gray Wolf and its vital role. Perhaps one of the most compelling stories in American wildlife, a species whose proven itself a keystone species for the revitalizing and restorations of ecosystems. They improve the surrounding habitat and increase populations of countless species just by their presence. Their presence influences the population and behavior of their prey and in the long term the ecosystem flourishes. Once I had finished with the research stage,

I continued onto the second stage of the project process. After I had gathered all the photos to be used as reference, I used my iPad to quickly draw the rough sketches of the species. I drew each species on a separate layer on the Procreate app which allowed me to play with composition quickly, and effectively change the size of the species within the composition accordingly which is what you see here.

With that said, I'd like to note that in no way I'm giving a hierarchical position or meaning to species based on placement within the drawing.

This particular stage of the process was the less stressful one. Using the Procreate app allowed me to work quickly and efficiently. Mistakes can be made with no problem and knowing that these were just rough sketches no worry was in mind at this point of the process. Though, deciding on the composition layout for each illustration was more time consuming, rather than stressful or frustrating, just because of my own personal decision-making habits. Moving on to the third stage, (final drawing + color) After deciding on all five composition layouts, my next step was to print all of the rough sketches on 11 x 17 tabloid paper. From then on, I traced the rough sketches using a portable light-tracing tablet onto cold-press watercolor paper here in my home studio.

Once I drew the main species from each location, I started to draw in between the negative spaces to create a similar natural environment in which they would naturally be found. These negative spaces mainly include drawings of foliage; grass blades, tree leaves, as well as rocks and pebbles. In this slide, you can see close up photos of those negative spaces and can also see the detail within the illustrations. After I had completed drawing all five drawings, I scanned the final drawings before proceeding with the coloring part of the stage.

After I had completed all five drawings, I scanned the final drawings before proceeding with the coloring part of the stage. I mainly worked in layers, but I started with a quick wash through all five illustrations. So starting with a wash layer helped me establish color onto the paper quickly. The fluidity of the wash process allowed me to knock out all five illustrations in one sitting. I believe this particular stage of the process helped me keep coherency within all five drawings.

The next few slides are photos of the process making of the color stage. They show the progression of the watercolor layers behind each illustration. As you can see, here's a few photos of the process making for Florida's illustrations. And here's the finished illustration for Florida.

After the quick wash layers I started to add a few more mid-tone wash layers. This particular part of the process was a bit more mind constraint; keeping in mind the natural sun-light within these environments, the shadowing, layout of foreground vs background as well as the natural camouflage between land and animal. In the final layers of watercolor, I added heavier, drier watercolor ink on the brush to the areas where it was needed, almost treating the watercolor as paint to achieve the finer details. This can be seen in areas such as the tree trunks and branches, the grass blades, ferns and the fur on most of the mammal species throughout all five drawings. As I colored, I used reference photos in order to achieve an accurate interpretation of each species. Each illustration took about seventeen hours to color from start to finish.

As part of the thesis progress, the cerulean warbler, as I mentioned before, is a symbol which represents myself. The small wood-warbler's migratory path is similar to mine, though in reverse. Migrating from the north east side of the states, Michigan, Ohio, Tennessee through north florida, the Texas coast down the central american countries into the north coast of the south american continent slightly dipping and narrowing their path in Ecuador. The warblers were just spot illustrations, they were the first drawings that I completed. Same process was done to create the warblers, however, their time length for completion was very much shorter and less stressful. For those that know me know how much I enjoy drawing birds.

The final and fourth stage (presentation), was the one aspect of the project that has changed the most in terms of dimensions and presentation. This was mainly due to the Covid-19 pandemic outbreak.

As I mentioned before, I had planned to have my images to sit at 121.92 cm by 91.44 cm (48in x 36in) (4ft x 3ft) and be displayed at campus during the entirety of Focus Week, but as you can see I have created a small gallery-like space here in my home studio to display and share my artwork with you today.

Nature very much influences me as a person and as an artist. Nature's visual beauty awakens all senses, it energizes the body and soul and I try to carry that through my artwork by portraying its bright natural colors.

As our current political and environmental problems catch up to us, I'm influenced and motivated by the turmoil caused here at home and elsewhere. Keeping up, or stumbling upon news, articles or documentaries, spark emotion within me and within that emotion I find the reason to create art. Current events are just enough to spark creativity and find the willingness within to voice for others through my artwork.

Current artists such as Lisa Erickson, Zoe Keller, Erica Williams, Kratina Haffner, very much influence the artist in me.

Their artwork is solely based on nature and its fragility that it creates for itself. Each artist, they all show their own personal perspectives regarding nature and capture the likeness of each creature and the essence that is life within their artwork. Their work also plays between hyperrealistic drawings and the imagination, it touches subjects of life and death, the mystical and the unknown.

My next steps for this project would be to scan them at their original size now with the cerulean warbler included, then to digitally clean them up. I'd like to create a second set of the same illustrations but with a clean black background, I plan on doing this digitally.

Once I do this, I plan on creating prints, postcards and other goods out of these images and share the proceedings with organizations supporting the wellbeing of species within the five focused regions. Also, I'd like to share them on my website and social media platforms, since I haven't had the chance to promote myself yet.

Because I had originally envisioned this project being presented in a gallery at the 511 building and because I still envision it being presented in a gallery setting today. I plan to contact local galleries such as Talon Gallery and Antler Gallery which are both local galleries in Portland. If this opportunity presents itself, I would like to create pamphlets about the work itself to go alongside the exhibition. The pamphlet would contain local and national organisations to which the audience could not only educate themselves but also support and possibly donate to.

My thesis' message is to give awareness of endangered species. I believe A Memorandum of Symbiotic Relationships holds a sense of importance and urgency in our current and critical political and environmental world and for this, my thesis project holds its place in the contemporary art scene and culture today. For this very same reason, I would like to submit the series to lifestyle and editorial magazines such as National Wildlife, Pacific Northwest Magazine, Vox, Colossal, HypeBeast, and among others. I also believe it would be beneficial for me as an artist, to have these five illustrations licensed.

Besides awareness, my thesis work and message has connotations of activism in spreading awareness to these vulnerable species. As a bilingual artist who continues to read about habitat loss, and as a dual-nationality citizen, who witnesses the continual difference in landscape everytime I travel back home or to any of these locations, my experiences and my emotions are very much a part of my work.

To conclude,

A Memorandum of Symbiotic Relationships is a series of five illustrations based on ecologically collapsed areas found within the Americas. The series portrays endangered species and their symbiotic partners in their local, natural environment. Each illustration depicts five different regions where symbiotic relationships are at stake and are currently suffering from habitat loss.

The five locations selected for the series are areas that are familiar and dear to me. It is important to me as a dual citizen and as an artist to tell my viewers about the continuous troubles mother earth faces through my ongoing educational art practice

Thank you all, again, for attending my thesis presentation.
I will now invite the panel for questions.



Creative Brief

Objective/Project Vision:

My objective is to bring conscious awareness to the symbiotic relationships within our natural world.

This projects' purpose and vision is to showcase the vulnerability of relationships within species in its specific geographical location when its symbiotic partner is threatened by human activity. To understand and acknowledge the importance of their survival when all species are thriving in their natural environment.

Audience:

I'm targeting the nature + science lovers. Nature and science activists, educators, mentors, promoters, influencers. Institutions, organizations and nonprofits who focus on the stewardship and wellbeing of the natural world. Those who are affected by or are studying climate change, biodiversity, interconnectedness, and habitat + species loss.

Method & Materials:

- Collect research information regarding endangered species
- Collect photos for reference
- Research and working with traditional mediums- Watercolors
- Scan/edit on Photoshop

Comparative Media:

Artists with similar work:

Lisa Erickson, Katrina Haffner, Zoe Keller
Tegan White, and Jessica Roux
Print, Books, Editorial.

Marketplace Application:

Educational/ Call to action

Stationeries/ Prints/Books/ Merchandise

Editorial; Print/Web: Magazines such as the Nature Conservancy Magazine, Smithsonian and Sierra Magazine, etc.

Bibliography

Brenner, Laurie. *What is a Symbiotic Relationship?* Sciencing.com. 09 August 2009. <https://sciencing.com/symbiotic-relationship-8794702.html>.

Nature is full of symbiotic relationships, such as the honey bee and flower, the clownfish and anemone, and your gut and the prokaryotic intestinal bacteria living inside it. Symbiosis defines three basic relationship types (with multiple subgroups) occurring between living entities: mutualism, where both species benefit; commensalism, where one organism benefits and the other experiences no harm; and parasitism, in which one entity benefits, sometimes at the cost of the other. The word symbiosis comes from the Greek sym and bios, which translated means together and life, or life working together. To understand how these relationships evolved, researchers developed a system to classify all life based on the distinct characteristics of individual organisms.

First-Arai, Leanna. *Petroleum is at the Heart of Ecuador's Anti-Austerity protests*. Thruthout. 06 November 2019. <https://truthout.org/articles/petroleum-is-at-the-heart-of-ecuadors-anti-austerity-protests/>.

Protests in Ecuador — along with those in Chile, Colombia and elsewhere — reveal the deeply unequal aftermath of some of Latin America's "Pink Tide" governments: a wave of progressive leadership, often expressly "anti-neoliberal," that built popularity by investing in social programs but that were often funded by extractive industries. In Ecuador, protesters' frustration over the surge in gas prices triggered the strike, but the grievances Indigenous groups have brought to the negotiation table center around the country's inequitable and unsustainable economic model. That model is increasingly based on mining and oil extraction, and at odds with Ecuador's 2008 constitution, which prioritizes ecosystem integrity and Indigenous rights. "Our territory, where we have been living for hundreds of years, is being exploited, concessioned to new oil companies," said Mirian Cisneros, president of the Kichwa community of Sarayaku.

Gray, Richard. *Sixth Mass Extinction could destroy life as we know it -biodiversity expert*. Horizon. Horizon- The EU Research & Innovation Magazine. 04 March 2019. <https://horizon-magazine.eu/article/sixth-mass-extinction-could-destroy-life-we-know-it-biodiversity-expert.html>.

Environmental Interview between Professor Georgina Mace, head of the Centre for Biodiversity and Environmental Research and Horizon Magazine.

Alarming declines in the number of insects, vertebrates and plant species around the world have raised fears that we are in the midst of a sixth major extinction that could cause a collapse of the natural ecosystems we rely upon to survive.

Grossman, Teo. *Artist Lisa Erickson on Surrealism and Nature*. Bioneers.org. Unknown Publish Date. <https://bioneers.org/artist-lisa-ericson-on-surrealism-and-nature-zmbz1808/>

Painter Lisa Ericson has been described as "a multi-hyphenate, utilizing her visual talents as an artist, illustrator, and designer to craft meaningful images." Based in Portland, OR, Ericson's enthralling artwork manages to be simultaneously hyper-realistic and wildly imaginative. In many ways, this perspective exemplifies precisely what is needed to surmount many of the most pressing issues facing us today: a combination of pragmatism and creativity. Her clear love and admiration for nature's intricate genius is immediately apparent when faced with her work.

Bioneers has annually chosen an artist and piece of artwork to provide the look, feel and visual inspiration for our annual conference. We were overjoyed when Lisa was willing to donate an image of her painting, Terrarium II, to Bioneers as the featured image for the 2018 annual Bioneers Conference. Terrarium II is part of a series of paintings displaying different species of turtles carrying collections of ecosystems on their backs. The images evoke beauty, bounty and fragility and one can't help but recall creation stories of many Native American tribes that refer to our collective home as Turtle Island.

Sutter D. John. *Sixth Mass Extinction: The Era of Biological Annihilation*. CNN. CNN Health. 11 July 2017. <https://www.cnn.com/2017/07/11/world/sutter-mass-extinction-ceballos-study/index.html>.

Many scientists say it's abundantly clear that Earth is entering its sixth mass-extinction event, meaning three-quarters of all species could disappear in the coming centuries. Nearly one-third of the 27,600 land-based mammal, bird, amphibian and reptile species studied are shrinking in terms of their numbers and territorial range. The researchers called that an "extremely high degree of population decay." The scientists also looked at a well-studied group of 177 mammal species and found that all of them had lost at least 30% of their territory between 1900 and 2015; more than 40% of those species "experienced severe population declines," meaning they lost at least 80% of their geographic range during that time.

Strickland, Jonathan. *Are we Entering the Sixth Mass Extinction on Earth?* Science; How stuff works. 06 May 2019. <https://science.howstuffworks.com/life/evolution/sixth-major-extinction.htm>.

Today, Earth could be facing its next mass extinction. A global report issued by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and released on May 6, 2019, found that some 1 million species are at risk of extinction – the greatest number in human history.

Tollefson, Jeff. *Humans are Driving One Million species to extinction*. Nature. 06 May 2019. <https://www.nature.com/articles/d41586-019-01448-4>.

Landmark United Nations-backed report finds that agriculture is one of the biggest threats to Earth's ecosystems.

Up to one million plant and animal species face extinction, many within decades, because of human activities, says the most comprehensive report yet on the state of global ecosystems.

Without drastic action to conserve habitats, the rate of species extinction – already tens to hundreds of times higher than the average across the past ten million years – will only increase, says the analysis. The findings come from a United Nations-backed panel called the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).

According to the report, agricultural activities have had the largest impact on ecosystems that people depend on for food, clean water and a stable climate. The loss of species and habitats poses as much a danger to life on Earth as climate change does, says a summary of the work, released on 6 May.

Unknow Author. *The Earth's sixth mass extinction?* Understanding Evolution. Understanding Evolution; your one-stop source for information on evolution. Unknown Published Date. https://evolution.berkeley.edu/evolibrary/article/0_0_0/massextinct_10.

Module chart of rates of bird extinctions has increased over time due to human impacts and shows that if extinctions continue at high rates, we will officially cause a mass extinction.

Unknown Author. *What is Symbiosis?* Ocean Explorer. NOAA, Unknown Publish Date.
<https://www.ecologicalcitizen.net/article.php?t=ecuador-endangered-call-to-action>

Symbiotic relationships are an important component of life in the ocean. In such relationships, plants or animals of different species may be dependent on one another for survival. They may share habitats or lifestyles or interact in a specific way to benefit from the presence of another organism.

Unknown Author. *Halting the Extinctions Crisis*. Center for Biological Diversity. Unknown Published Date.
https://www.biologicaldiversity.org/programs/biodiversity/elements_of_biodiversity/extinction_crisis/.

Donation site with informational news. The website asks for your participation in their “Saving Life on Earth” campaign where you can build a coast-to-coast network to ensure the United States is a leader in saving the world’s biodiversity.

“You can also read our plan to confront this emergency. It’s full of bold, life-changing initiatives including a call for a \$100-billion investment in endangered species and the creation of 500 new national parks, wildlife refuges and marine sanctuaries.”

Unknown Author. *Species of Concern*. U.S Fish & Wildlife Service. December 2006.
<https://www.fws.gov/midwest/es/soc/birds/cerw/cerw-fctsheets.html>.

Fact sheet about the Cerulean Warbler. It includes topics of habitat, range, feeding habits, appearance and as well as concerns regarding the species such as population decline and habitat loss.

Unknown Author. *Living Planet Index*. Living Planet Index.org. Unknown Publish Date.
<https://livingplanetindex.org/home/index>.

The 2020 Living Planet Report is based on the trends of thousands of population time series collected from monitoring sites around the world. This online portal allows you to search for and contribute to data.

Wake, David B. and Vredenburg, Vance T. *Are we in the midst of the sixth mass extinction? A view from the world of amphibians*. Proc Natl. Academy of Science. 12 August 2008. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2556420/>

Many scientists argue that we are either entering or in the midst of the sixth great mass extinction. Intense human pressure, both direct and indirect, is having profound effects on natural environments. The amphibians—frogs, salamanders, and caecilians—may be the only major group currently at risk globally. A detailed worldwide assessment and subsequent updates show that one-third or more of the 6,300 species are threatened with extinction. This trend is likely to accelerate because most amphibians occur in the tropics and have small geographic ranges that make them susceptible to extinction. The increasing pressure from habitat destruction and climate change is likely to have major impacts on narrowly adapted and distributed species. We show that salamanders on tropical mountains are particularly at risk. A new and significant threat to amphibians is a virulent, emerging infectious disease, chytridiomycosis, which appears to be globally distributed, and its effects may be exacerbated by global warming. This disease, which is caused by a fungal pathogen and implicated in serious declines and extinctions of >200 species of amphibians, poses the greatest threat to biodiversity of any known disease. Our data for frogs in the Sierra Nevada of California show that the fungus is having a devastating impact on native species, already weakened by the effects of pollution and introduced predators. A general message from amphibians is that we may have little time to stave off a potential mass extinction.

Welch, Bryan. *Humans to Blame for the Sixth Mass Species Extinction*. Mother Earth. April/May 2015. https://www.motherearthnews.com/nature-and-environment/wildlife/sixth-extinction-zmgz15amzsto?gclid=CjwKCAiA-vLyBRBWEiwAzOkGVIpPwrDX078TZwu-9K7LuJi1aO5hewQelwMer1IJmN047-tBVCa2-BoCNFUQAvD_BwE

Kolbert establishes the facts of her case at the outset: We are losing species at a rate thousands of times greater than at any previous point in human history. Those species are dying off for a variety of reasons, but nearly all the causes — spreading diseases, shifting ocean chemistry, habitat destruction — stem from human expansion and our rapid industrialization of the planet throughout the past 300 years. The deaths are accelerating, along with humanity's impact on habitats worldwide. So, we have a crime. We know the perpetrator. But we don't yet have a confession. Kolbert traces a thread of stubborn human denial. In the 18th century, most people couldn't fathom that any creature that had once lived on Earth could have conclusively disappeared. Extinction was a difficult concept to grasp, partly because the idea implied that God's creation may not have been as perfect as humans had originally believed. Worse yet, some species seemed to have been annihilated because of human hunting, meaning human beings may have permanently altered God's creation. As researchers unearthed fossils and other evidence of long-extinct species, however, public opinion gradually came to accept the idea that species don't necessarily last forever, and that humans can play a major role in their extinction.

Documentation

Rough sketches.



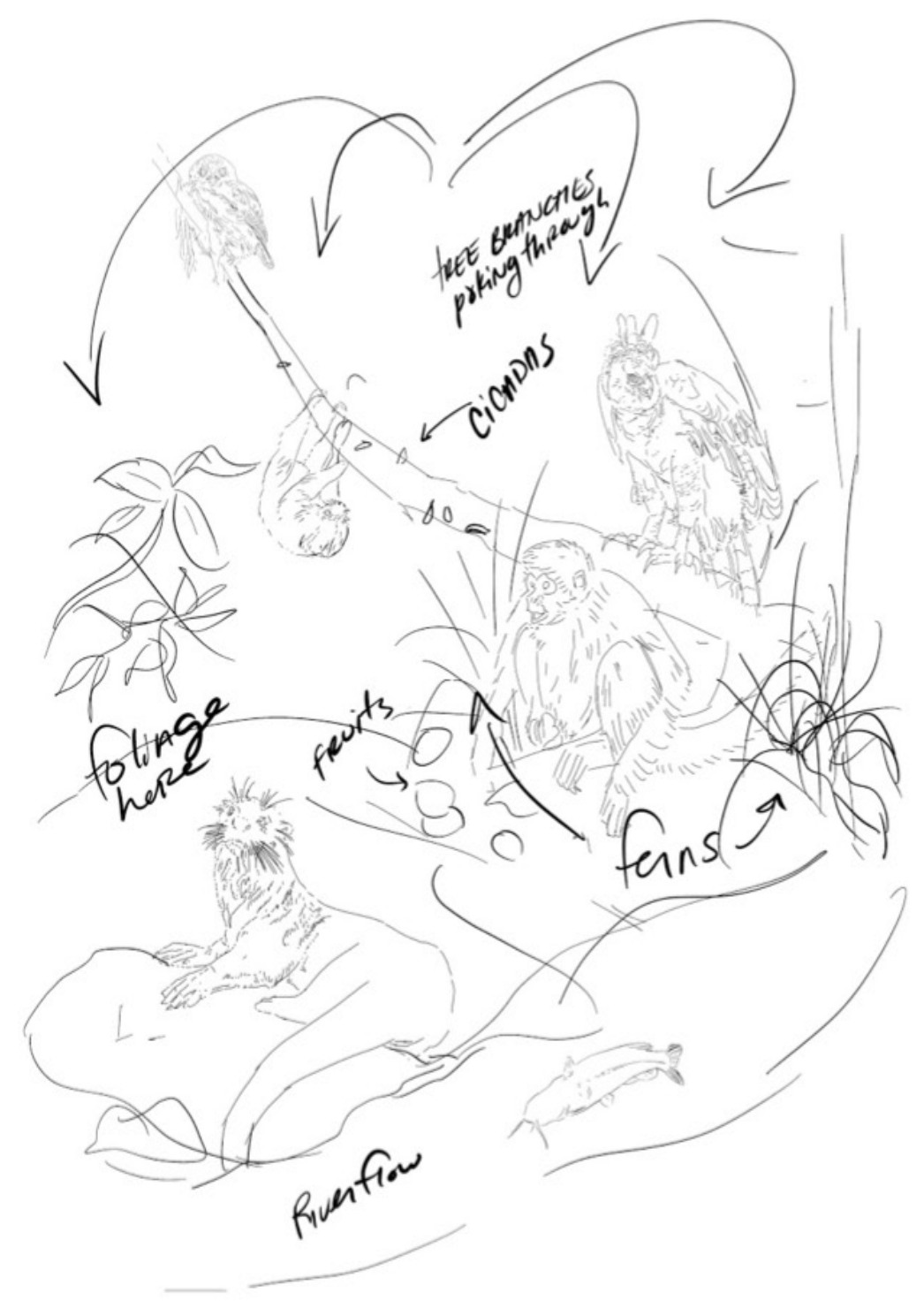
Oregon



Florida



Texas



Ecuador



Honduras

Final Sketches



Left to right:

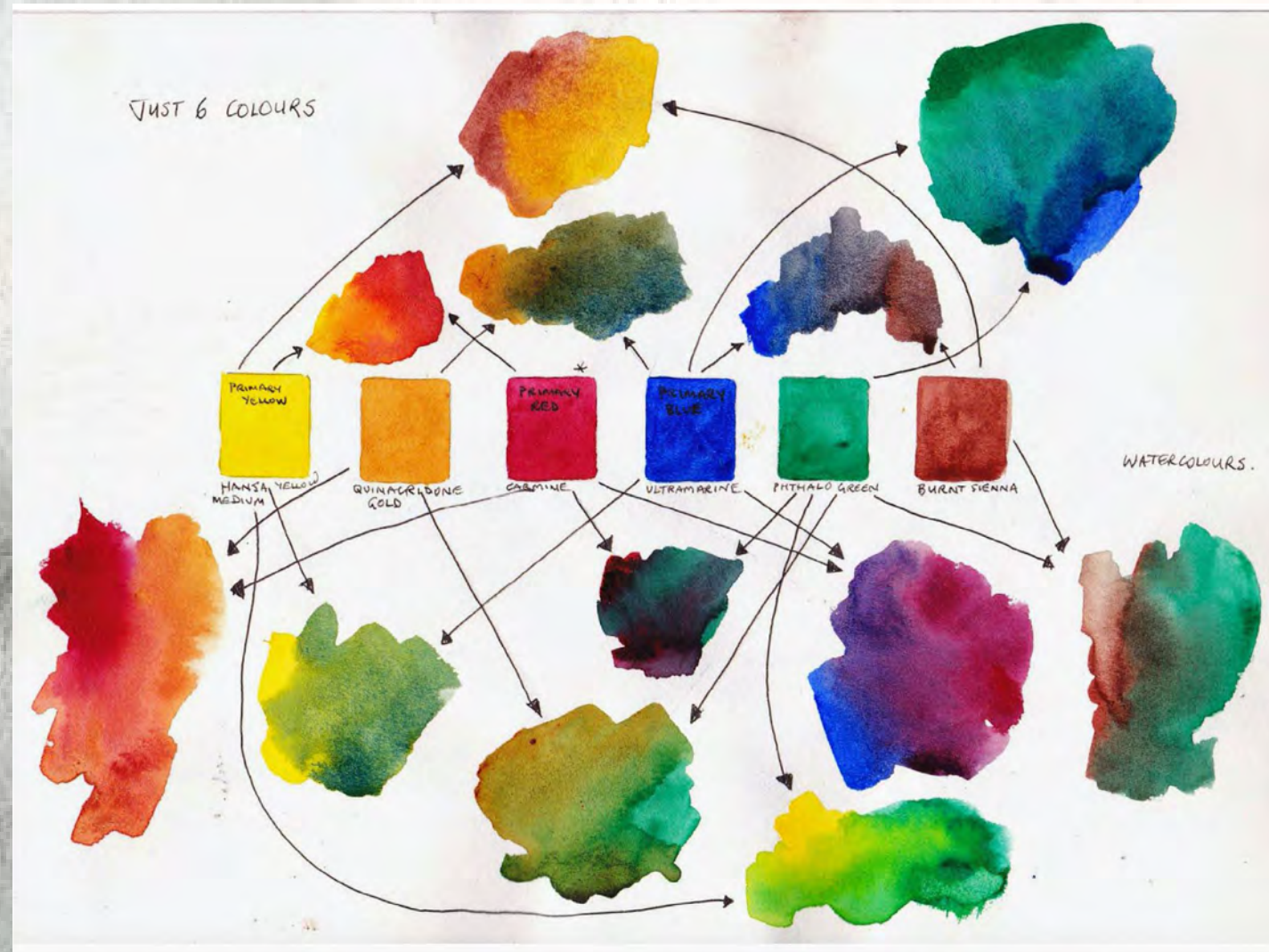
- Texas
- Florida
- Honduras
- Oregon
- Ecuador



Close up images of work in progress



Thesis Color Palette



Cerulean Warbler Progress





Symbiotic Relationship 01; Ecuador.



Symbiotic Relationship 02; Honduras.



Symbiotic Relationship 03; Texas.



Symbiotic Relationship 04; Oregon.



Symbiotic Relationship 05; Florida.

