TARPUM BAY WATER FRONT

ELEUTHERA, BAHAMAS

WILDLIFE

TARPUM BAY MARINE WILDLIFE

HUMAN IMPACT

The waters surrounding Eleuthera, and more specifically Tarpum Bay, is full of diverse and colorful aquatic life. From the vibrant coral reefs, to the expansive mangroves, and the depths of the Atlantic Ocean, countless species call the area around Eleuthera "Home."

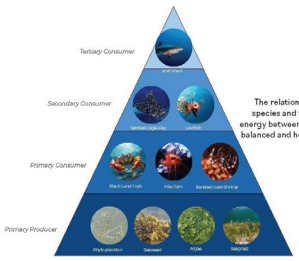
Unfortunately, human impacts have had extremely negative effects on the area. The destruction of mangroves has been recognized as an issue that continues to spread. It has been estimated that aproximately 1/3 of the worlds mangrove habitats have been destroyed due to coastal development in the last 50 years. In addition to this, global temperature rises have caused many coral reefs to undergo a process called "bleaching." This causes the coral to turn white as it expels algae, and become susceptible to disease and reproduction issues.

The Blue Marlin is the Bahama's national marine animal

Mass destruction of a mangrove forest

An example of coral bleaching

ENERGY TRANSFER



The relationship between species and the transfer of energy between them is vital to a balanced and healthy ecosystem

HABITATS

CORAL REEFS

Current Cut

Devil's Backbone

Oleander Reef

Gaulding's Cay

4th Hole

Twin Coves

Coral reefs are the main hub for the majority of aquatic species around Eleuthera. In addition to being extremely biodiverse, coral reefs also protect coastlines from erosion and provide recreational activities such as snorkeling.

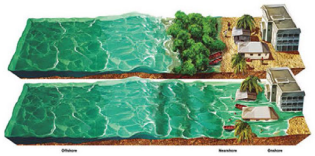
MANGROVES

Mangroves serve as a crtically important habitat that is in desperate need for protection. Mangroves are the only trees capable of surviving in salt water causing them to have tangled root systems that not only provide protection and nurseries for marine life, but also protect shorelines from erosion and storm surges.

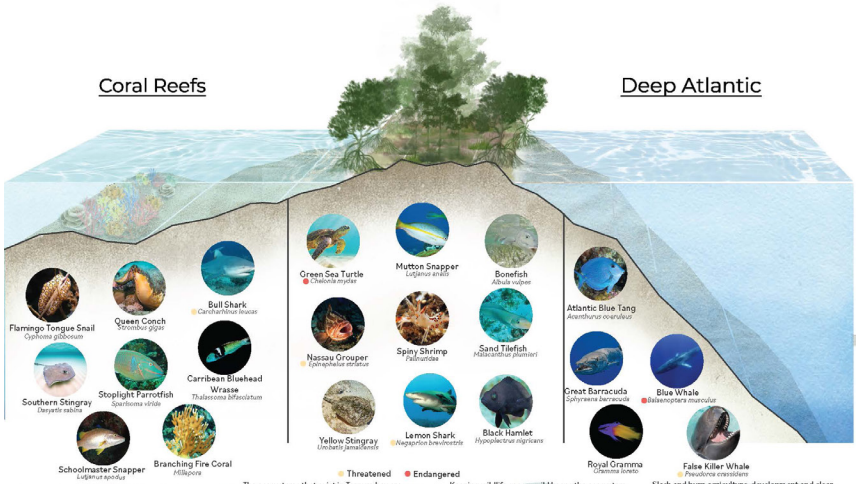
The importance of this ecosystem calls for a high level of proection and the destruction of mangroves worldwide is concerning. All of the Bahama's coastal habitats are highly connected, which means any damage to one habitat, especially the mangroves, will cause negative impacts throughout the entire coastal ecosystem.

CONCH

Conch are extremely important to the ecosystem as well as the economy in Tarpum Bay. The Queen Conch specifically, is a key food group that start their lives as larvae, and build their conical shells after about a month. In areas around Tarpum Bay, conch is famously used in many food dishes. Salads, sandwiches, fritters, and soups are all made using conch and are enjoyed across the Carribean islands. However, the demand for the shellfish has made it difficult for it to reproduce fast enough to keep up with demand, threating its ability to sustain its population.



Mangroves



Threatened Endangered

There is immense biodiversity of terrestrial wildlife within Eleuthera and Tarpum Bay specifically. The wildlife contributes to the beauty of the island.

Migratory birds increase biodiversity and promotes bird watching throughout Tarpum Bay.

The intricate systems of Eleuthera and Tarpum Bay's waters provides abudant resources and incredible biodiversity

The ecosystems that exist in Tarpum bay are sensitive and need to be protected in order for them to be sustained. Development must be clearly thought out in order to protect these systems

Developing can be a challenge when accounting for the numerous bird species that come through this area

Because all habitats are so closesly connected, any small disruption could cause a domino effect and completely alter surrounding habitats

Keeping wildlife spaces wild keeps the ecosystem thriving and promotes the beauty of the island itself which in turn keeps people coming back.

Tarpum Bay can become a tourist attraction for bird watchers all around the world while simultaneously getting tourists involved in important ecological activities.

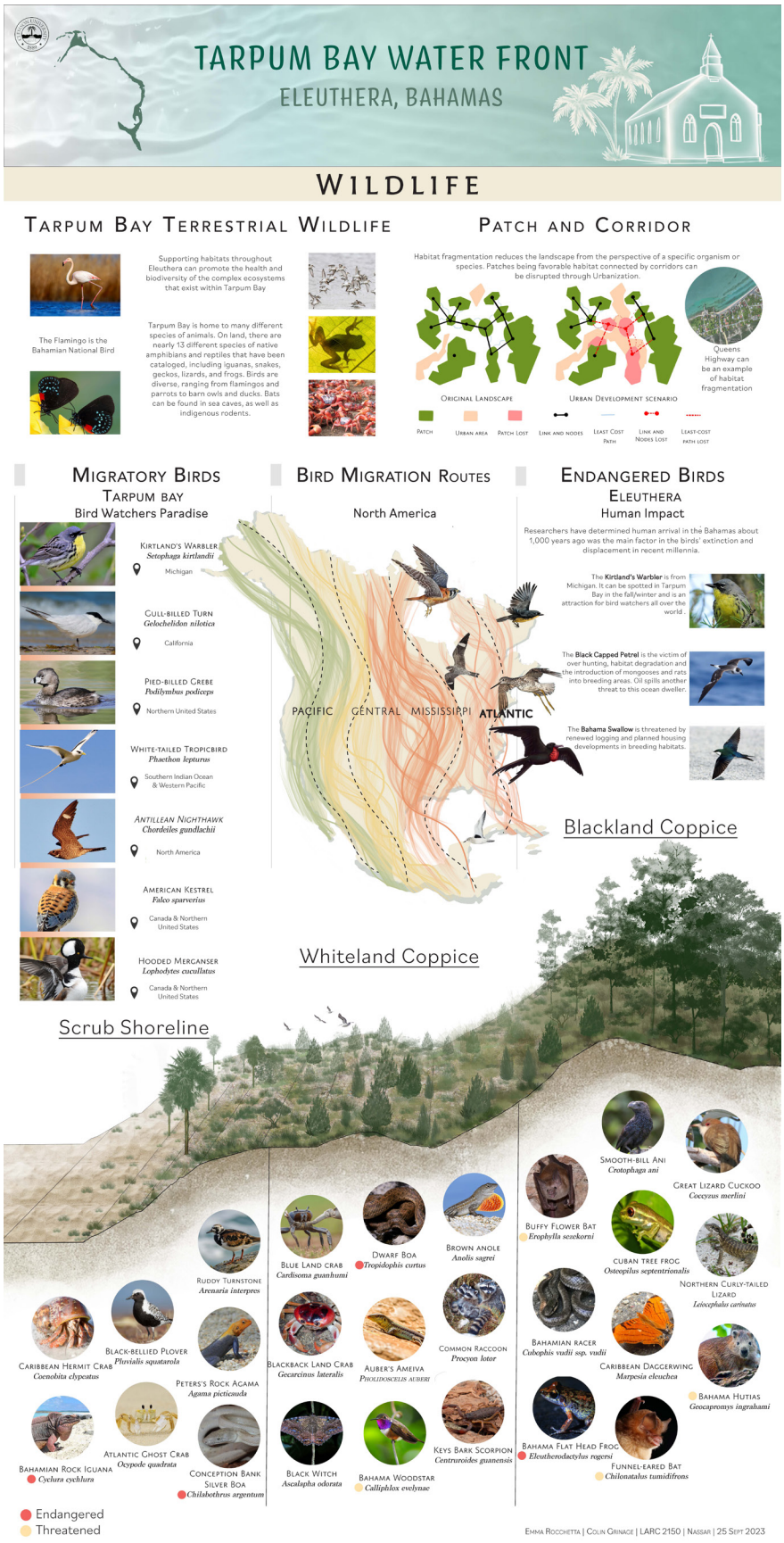
Continuing to fight against practices such as overfishing and pollution as well as habitat destruction can help reestabilize these beautiful environments

Slash and burn agriculture, development and clearing land is truly a threat to wildlife habitats. Habitat loss and habitat fragmentations creates negative effects on all ecosystems throughout the island.

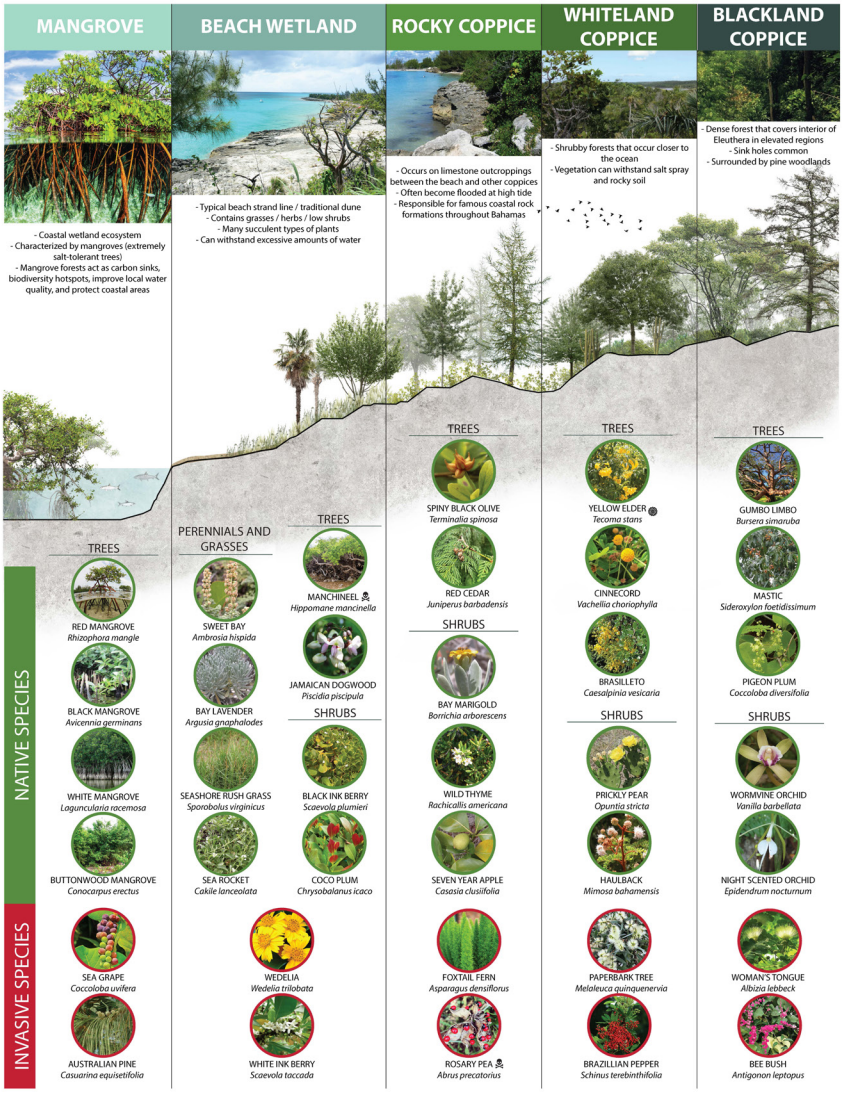
Global warming is changing migration routes and effecting migratory birds in various negative ways

The destruction of habitats such as the coral reefs and mangroves is a major threat to the many species that inhabit the waters of the island, but also the species on the island itself

Emma Rocchetta | Colin Grinage | LARC 2150 | Nassar | 25 Sept 2023


TARPUM BAY WATER FRONT
ELEUTHERA, BAHAMAS
WILDLIFE
TARPUM BAY TERRESTRIAL WILDLIFE
Supporting habitats throughout Eleuthera can promote the health and biodiversity of the complex ecosystems that exist within Tarpum Bay
The Flamingo is the Bahamian National Bird
Tarpum Bay is home to many different species of animals. On land, there are nearly 13 different species of native amphibians and reptiles that have been cataloged, including iguanas, snakes, geckos, lizards, and frogs. Birds are diverse, ranging from flamingos and parrots to barn owls and ducks. Bats can be found in sea caves, as well as indigenous rodents.
PATCH AND CORRIDOR
Habitat fragmentation reduces the landscape from the perspective of a specific organism or species. Patches being favorable habitat connected by corridors can be disrupted through Urbanization.
Queens Highway can be an example of habitat fragmentation
ORIGINAL LANDSCAPE
URBAN DEVELOPMENT SCENARIO
PATCH
URBAN AREA
PATCH LOST
LINK AND NODES
LEAST COST PATH
LINK AND NODES LOST
LEAST-COST PATH LOST
MIGRATORY BIRDS
TARPUM BAY
Bird Watchers Paradise
KIRTLAND'S WARBLER
Setophaga kirtlandi
Michigan
GULL-BILLED TURN
Gelochelidon nilotica
California
PIED-BILLED GREBE
Podilymbus podiceps
Northern United States
WHITE-TAILED TROPICBIRD
Phaethon lepturus
Southern Indian Ocean & Western Pacific
ANTILLEAN NIGHTHAWK
Chordeiles gundlachii
North America
AMERICAN KESTREL
Falco sparverius
Canada & Northern United States
HOODED MERGANSER
Lophodytes cucullatus
Canada & Northern United States
BIRD MIGRATION ROUTES
North America
PACIFIC
CENTRAL
MISSISSIPPI
ATLANTIC
ENDANGERED BIRDS
ELEUTHERA
Human Impact
Researchers have determined human arrival in the Bahamas about 1,000 years ago was the main factor in the birds' extinction and displacement in recent millennia.
The Kirtland's Warbler is from Michigan. It can be spotted in Tarpum Bay in the fall/winter and is an attraction for bird watchers all over the world.
The Black Capped Petrel is the victim of over hunting, habitat degradation and the introduction of mongooses and rats into breeding areas. Oil spills another threat to this ocean dweller.
The Bahama Swallow is threatened by renewed logging and planned housing developments in breeding habitats.
Blackland Coppice
Whiteland Coppice
Scrub Shoreline
SMOOTH-BILL ANI
Crotophaga ani
GREAT LIZARD CUCKOO
Coccyzus merlini
BUFFY FLOWER BAT
Erophylla sezekorni
CUBAN TREE FROG
Osteopilus septentrionalis
NORTHERN CURLY-TAILED LIZARD
Leiocephalus carinatus
BAHAMIAN RACER
Cubophis vudii ssp. vudii
CARIBBEAN DAGGERWING
Marpesia eleuchea
BAHAMA HUTIAS
Geocapromys ingrahami
BAHAMA FLAT HEAD FROG
Eleutherodactylus rogersi
FUNNEL-EARED BAT
Chilonatalus tumidifrons
BLUE LAND CRAB
Cardisoma guanhumi
DWARF BOA
Tropidophis curtus
BROWN ANOLE
Anolis sagrei
COMMON RACCOON
Procyon lotor
BLACKBACK LAND CRAB
Gecarcinus lateralis
AUBER'S AMEIVA
Pholidoscelis auberi
KEYS BARK SCORPION
Centruroides guanensis
BLACK WITCH
Ascalapha odorata
BAHAMA WOODSTAR
Calliphlox evelynae
RUDDY TURNSTONE
Arenaria interpres
BLACK-BELLIED PLOVER
Pluvialis squatarola
CARIBBEAN HERMIT CRAB
Coenobita clypeatus
PETER'S ROCK AGAMA
Agama picticauda
ATLANTIC GHOST CRAB
Ocypode quadrata
BAHAMIAN ROCK IGUANA
Cyclura cychlura
CONCEPTION BANK SILVER BOA
Chilabothrus argentum
Endangered
Threatened
EMMA ROCCHETTA | COLIN GRINAGE | LARC 2150 | NASSAR | 25 SEPT 2023

VEGETATION ECOSYSTEMS



LEON LEVY NATIVE PLANT PRESERVE

Leon Levy was the first national park to be designated in the Bahamas. Located in Eleuthera and operated by the Bahamas National Trust, it serves as a key resource for sustainability and resiliency throughout the island. The preserve was built with the intention of promoting education, conservation, preservation, and research. It includes a research center that studies the usage of Bush medicine, the restoration of a former dump, a propagation facility, and an educational center.

BUSH MEDICINE

Bush medicine is a practice that was brought to the Bahamas from Africa through the transatlantic slave trade. It is the use of a wide variety of plants for medicinal purposes. Often this practice is used to make tea, but it also includes types of salves.

NATIVE SPECIES VALUE

OLIVIA HOLLEMAN AND KAI KOOPMAN - 2ND YEAR STUDIO - LANDSCAPE ARCHITECTURE 2150 - PROFESSOR NASSAR - FALL 2023

TARPUM BAY WATER FRONT

ELEUTHERA, BAHAMAS

VEGETATION

GREEN SPACE TYPES

in Tarpum Bay

KEY

- Remnant Forest
- Residential Greenspace
- Open Greenspace
- Scrubland
- Marshland
- Rocky Surface & Shore
- Sandy Shore

HARDINESS ZONE 11

A hardiness zone is a geographical area defined by a certain average minimum temperature. The U.S.D.A. has developed the most widely used system, classifying much of the Caribbean in zone 11 (40 to 50 degrees Fahrenheit minimum temperature). No freeze occurs in zone 11 and growing seasons occur year-round.

Zone 11 Zone 12 Zone 13

REMNANT FOREST

A remnant forest is an ecological community of native plants, especially trees, that have never been cleared or significantly altered for human use. Plant communities present in the remnant forest include the Blackland Coppice and Pine Woodland. The Caribbean pine (*Pinus caribaea* var. *bahamensis*) is the most common species of pine on the island. The Blackland Coppice is created by decomposing leaf matter inside the Pine Woodland, which nurtures understory trees, including Jamaican Dogwood (*Piscidia piscipula*) and Lancewood (*Ocotea coriacea*). The shade created by the dense tree cover in the Blackland Coppice creates habitat for ferns and other plants, including Night Scented Orchid (*Epidendrum nocturnum*).

Pinus caribaea *Piscidia piscipula* *Epidendrum nocturnum*

RESIDENTIAL GREENSPACE

Residential spaces contain more ornamental plant arrangements, often including a pop of color from specimen trees like poinciana (*Delonix regia*)—known for its fern-like leaves and prolific red blooms. Palms, flowering shrubs and zone 11 lawn grasses like bahiagrass (*Paspalum notatum*) are also popular choices. Scattered remnant and scrubland species can also be found in residential areas that have been partially cleared.

Delonix regia *Chamaerops humilis* *Plumeria obtusa*

OPEN GREENSPACE

Open greenspace in Tarpum Bay that is non-residential is generally used for recreation. This land is mostly cleared and is planted with grass and ornamental tree species like Cabbage Palm (*Roystonea borinquena*). Agressive invasive species like Australian Pine (*Casuarina equisetifolia*) can also take hold in these areas. It has a flat and open character used for baseball and other sports, as well as for community gatherings.

Paspalum notatum *Casuarina equisetifolia* *Roystonea borinquena*

SCRUBLAND

Scrubland is a transitional, partially sheltered space that exists as a border between the shoreline or swamps and more densely vegetated zones. In Tarpum Bay, the Rocky Coppice and Whiteland Coppice can be found in scrubland. Whiteland Coppice can withstand salty spray from the ocean and rocky soil. Common species include the Clinkercord tree (*Acacia chrisophylla*) and Yellow Elder (*Tecoma stans*), the national flower of the Bahamas. Rocky Coppice are also tough and include semi-succulent shrubs.

Acacia chrisophylla *Tecoma stans* *Metopium toxiferum*

MARSHLAND

This lush and biodiverse environment forms around bodies of brackish (or salty) inland water. The marshes are characterized by mangroves, salt-tolerant trees with gnarled root systems that provide habitat for myriad other species. Red (*Rhizophora mangle*), White, and Black Mangroves can be found in the marshland, as well as ferns like Giant Leather Fern (*Acrostichum Danaeifolium*) and orchids like Christmas Orchid (*Encyclia altissima*).

Rhizophora mangle *Acrostichum Danaeifolium* *Encyclia altissima*

ROCKY SURFACE AND SHORE

"The Window" on Eleuthera provides an example of the type of plant community forming on exposed limestone formations. High wind, heat, and rainfall are a factor for the sturdy shrubs found in this rugged zone, including: Mang Tree (*Terminalia spicesa*), and Wild Thyme (*Rachicallis americana*). Trees such as Red Cedar (*Juniperus barbadensis*), and Mahogany (*Swietenia mahagoni*) are also found here.

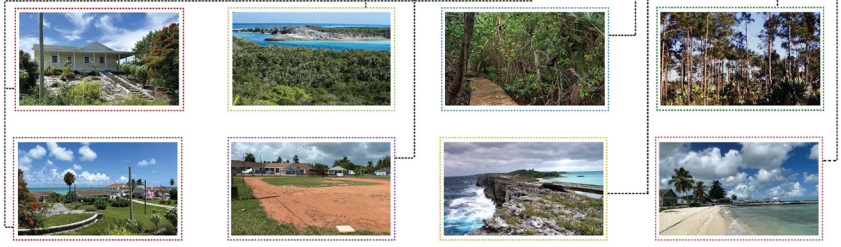
Terminalia spicesa *Rachicallis americana* *Juniperus barbadensis*

SANDY SHORE

Sandy beaches along Eleuthera, sometimes colored pink by crushed coral, are notable not just for their color but for the plant life they contain. Like plants in the Rocky Coppice, shoreline plants must also withstand harsh conditions. Dune grasses, like Seashore Rush Grass (*Sporobolus virginicus*), herbs like Sweet Bay (*Ambrosia hispida*), and low shrubs populate the shoreline. Flowers, including the Spider Lily (*Hymenocallis arenicola*) can also be found.

Sporobolus virginicus *Hymenocallis arenicola* *Ambrosia hispida*

VISUAL CHARACTER



S.W.O.T. ANALYSIS

Strengths

-Eleuthera has an incredible biodiversity of plant species.

-The Leon Levy Native Plant Reserve in Governor's Harbor is a world-class resource.

-People are able to access and experience important ecosystems and plant communities outside their door.

-There is resurging cultural value associated with plants through traditional medicine and agriculture.

-Remnant forest composes a high percentage of greenspace in Tarpum Bay.

Weaknesses

-High presence of invasive and dangerous species.

-Humans live close to nature without a sufficient buffer.

Opportunities

-Use Leon Levy as a resource for reinvigorating native plant species.

-Plant ecosystems are an available reference for planting plans.

-Add ecosystem services by restoring native species like mangroves.

-Bush tea and bush medicine are an important cultural resource to showcase.

Threats

-Invasive species threaten native plants and ecosystems.

-Some invasive species are harmful to humans as well as other plants.

-Development and growth could outcompete conservation interests.

South 6th St. — Dr. MLK Way

Seneca, South Carolina

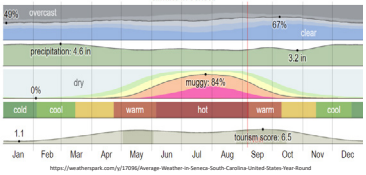
CLIMATE AND MICROCLIMATE

CLIMATE refers to the weather conditions occurring in a large area in general over a long period. This includes sunlight, temperature, wind, humidity, and precipitation among other conditions.

CLIMATE IN SENECA

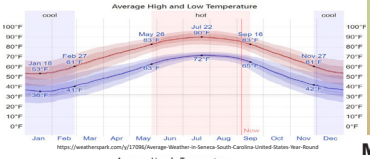
In Seneca, the climate is moderate. Summers are typically hot and muggy while winters are cold. On average Seneca receives 53 inches of rain (The US average is 38) and 220 sunny days (the US average is 205). Winds are not very strong.

Climate in Seneca



https://weathenspark.com/y/17096/Average-Weather-in-Seneca-South-Carolina-United-States-Year-Round

Average High and Low Temperature



https://weathenspark.com/y/17096/Average-Weather-in-Seneca-South-Carolina-United-States-Year-Round

MICROCLIMATE refers to areas where the climate significantly differs from the immediate surroundings. For example, climate conditions at a park, garden, or part of a city may be slightly different from its surroundings. Microclimate is heavily affected by the climate, the site conditions, vegetation, the sun's path and the Urban Heat Island Effect.

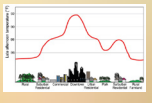
Urban Heat Island Effect

"Heat islands" are urbanized areas that experience higher temperatures than outlying areas. Man made structures (buildings, parking lots, and paved roads) absorb and re-emit the sun's heat more than natural landscapes, ex:(forests and water bodies). Plants adjacent to homes and buildings provide shade and help cool the interior. Trees and vegetation planted along medians and sidewalks can decrease evaporative emissions from cars and filter pollution from the air.

The Heat Island Effect is a subject of concern because it leads to an increase in energy (ex: air conditioning), elevated air pollution levels and heat-related illnesses.

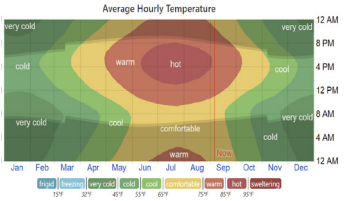
How to minimize the Heat Island effect?

- Planting & Preserving trees and vegetation
- Rooftop Gardens
- Decrease pavement areas
- Using Porous Paving Material



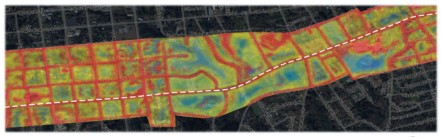
https://www.epa.gov/heatislands

Average Hourly Temperature



The average hourly temperature, color coded into bands. The shaded overlays indicate night and civil twilight.

MICROCLIMATE MAP: SOUTH 6th ST - DR. MLK WAY

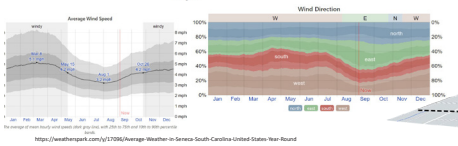


Cooler Areas due to vegetation, water bodies

Warm areas due to open fields, grasses, areas adjacent to hot areas

Hottest area: buildings, houses, paved surfaces

E South 6th St, Seneca SC



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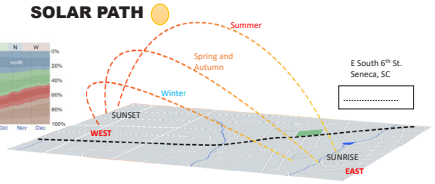
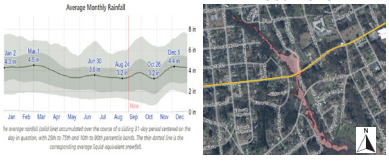
SOLAR PATH



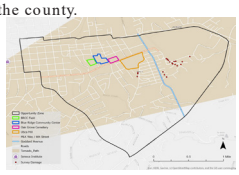
Flood Zone



Tornado Path – April 2020

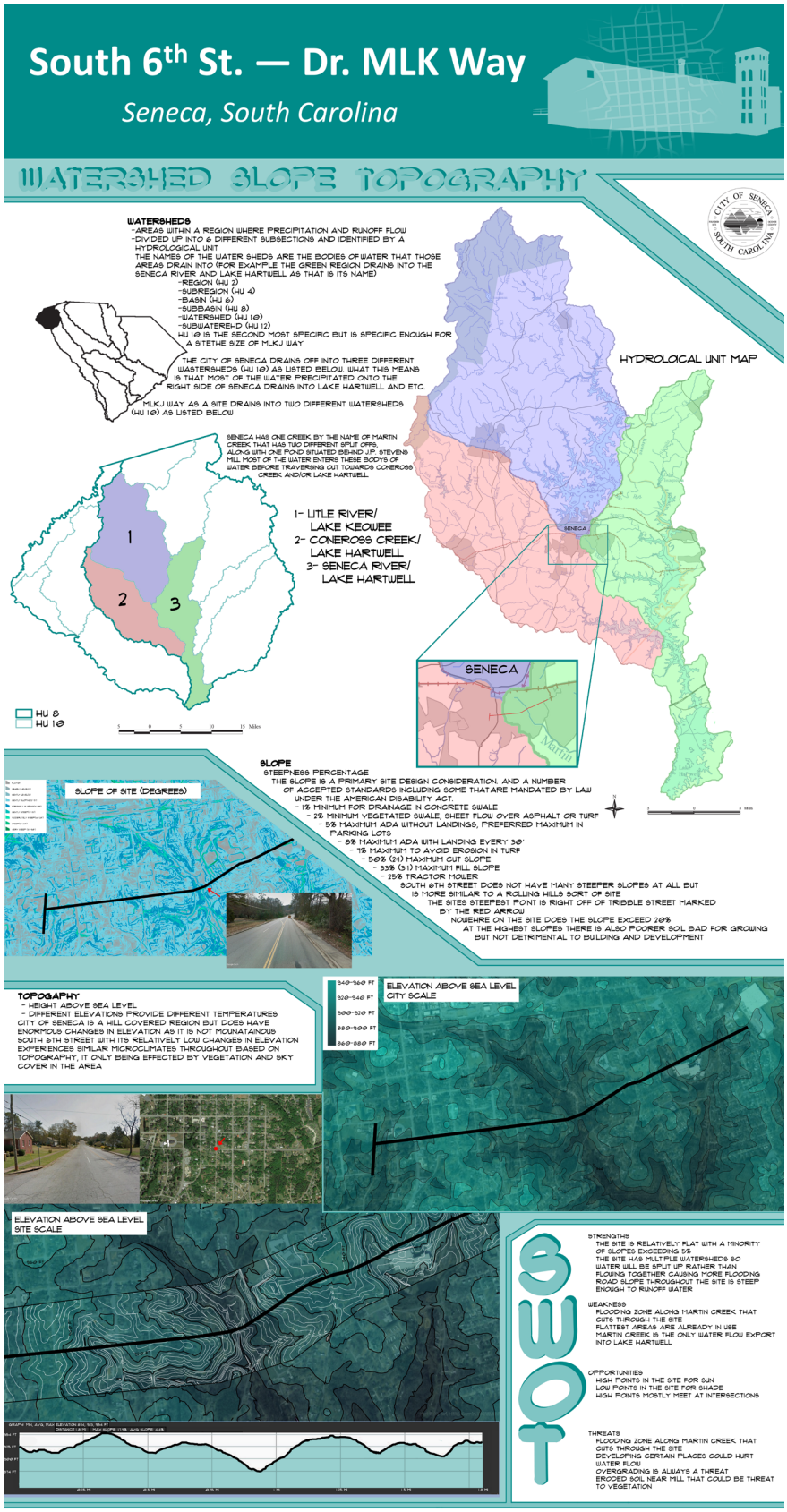
In April of 2020, an EF-3 tornado touched down in Oconee County. The tornado moved across the county at a speed of 160 miles per hour. As a result, the tornado brought many damages to the communities. Many roofs and walls were torn off from houses, trees uprooted, and cars were lifted off the ground. A year later an EF1 tornado hit the county.

Images of the tornado damage



S	W	O	T
Strengths	**Weakness**	**Opportunities**	**Threats**
-Non extreme temperatures provide a moderate climate year round -Average wind speed is not strong enough to cause damage. -Seneca receives above average amount of sunny days compared to US average. -Seneca receives above average yearly rainfall compared to US average.	-Urban heat effect due to density and high nonporous concrete surfaces -Urban Heat effect raises demand for electricity in the summer -Weather fluctuations (tornados)	-Integration of plant material to lessen urban heat effect: gardens, roof gardens, trees/ plants along sidewalks -Site receives sufficient sunlight for solar panels -Enough rainfall for water harvesting and to provide water for vegetation -Pond and creek restoration	-Weather fluctuations such a tornadoes may continue to cause damage to the community. Any new construction projects runs the risk of future damage. -Increased effect of the Urban heat effect poses risk to climate. -Any structures or buildings along the flood zone (area adjacent to Tribble St.) could become flooded during excessive rain.

Maria Balderas | LARC 2510 | Professor Nassar | September 20, 2021



LARC 2510 LANDSCAPE ARCHITECTURE DESIGN FUNDAMENTALS
PROFESSOR HALA NASSAR
POSTER BY JACOB HARRELSON
9/22/2021

South 6th St. — Dr. MLK Way

Seneca, South Carolina

istorical Analysis of Seneca, South Carolina

meline of Major Events

1868 Oconee County is formed out of the Pickens District of South Carolina and is named after a Cherokee word meaning "the land beside the water."

1870 Atlanta and Charlotte Air Line Railway is built through Oconee County. It intersects with the Blue Ridge Railway near the Cherokee town of "Esseneca."

1874 Seneca City founded by A.W. Thompson and J.J. Norton of the ACAL Railway. A stake is planted on the tracks designating the center of the city.

1893 Newry Mill and village built by Courtenay Manufacturing Company on the Little River.

1898 The Utica Mill is built by investor J.W. Jordan, and Utica Mill Village is built to house its workers.

1900 First recorded burial in Oak Grove Cemetery.

1908 Seneca City drops the "City" from its offical name.

1946 US Route 123 is built to replace SC 13. The new route bypasses Seneca's downtown by 3/4 of a mile to the North, drawing business from the city center.

1955 Blue Ridge High School is built as a segregated school.

1962 Lake Hartwell is built to produce hydropower.

1970 Lake Keowee is built. The water is used to cool the Oconee Nuclear Generating Station.

1974 Several homes south of the railroad tracks are added to the National Register of Historic Places, creating Seneca's Historic District.

1975 Newry Mill closes.

1984 Norfolk Southern Railway formed from the Norfolk and Western Railway and Southern Railway. Its trackage includes both rail lines through Seneca.

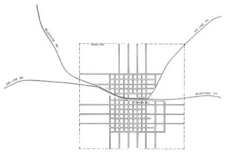
2000 Ram Cat Alley is added to Seneca's Historic District.

2001 Utica Mill closes.

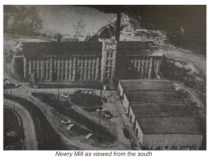
2020 Utica Mill property bought by Studio Investment Group, LLC.

2020 EF1 tornado touches down, causing widespread damage to homes and factories.

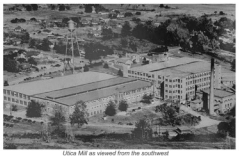
Blue Ridge Railroad locomotive no. 3



ORIGINAL CITY PLAN



Newry Mill as viewed from the south



Utica Mill as viewed from the southwest

Lake Keowee

Oconee Nuclear Generating Station

Blue Ridge High School

Lunney House Museum

Historical Progression of Built Form

Seneca, 1947

Seneca, 1994

Seneca, 2005

Seneca, 2018

Historical Sites

LEGEND
- Seneca City Limits
- Historic Sites on Sixth Street
- Utica Township Limits
- Former Historic Sites
- Existing Historic Sites
- Houses in the Historic District
- Seneca Historic District

E South Sixth Street
1. Trinity Baptist Church
2. Walnut Street Grocery
3. Blue Ridge Field
4. Blue Ridge Comunity Center/ Former High School
5. Oak Grove Cemetery
6. Former Car Garage
7. Utica Mill

Downtown Seneca
8. Ram Cat Alley
9. Norton-Thompson Park/Former Central Park
10. Former Palmetto Hotel
11. Former Oconee Inn
12. Former Oil Mill
13. Seneca Library
14. Former Seneca Grade School
15. Former Seneca Institute

SWOT Analysis

Strengths: Ram Cat Alley and Seneca Historic District are centralized, architecturally significant, and create spaces of pedestrian interest. The Blue Ridge Community Center, Oak Grove Cemetery, and Utica fabric mill are integral to the area's cultural history, as they were places of upbringing, eternal rest, and employment, respectively. The industrial history and railroad history of Seneca was the main source of development of this town since its creation in 1874. The energy history resulted in the creation of two lakes that contribute to recreation and residential land value, as well as a new source of jobs since the decline of the industrial era.

Weaknesses: Much of the historical narrative of Seneca has been lost to time, and many of the historically significant landmarks have since disappeared. The manufacturing and railroad industries have declined over time. The tragic treatment of Native American populations in the 19th century remains a stain on this area's history.

Opportunities: The Mill site holds great possibilities for future residential, mixed-use, or public development. The Blue Ridge Community Center has the ability to become an anchor point for all activities, expositions, and seminars in the area. The active railroad in Seneca can spur economic development in the nearby industrial park, which will provide jobs and investments that this area requires. An expansion of existing passenger