Archbold Biological Station's

An Interactive Virtual Tour of Habitats and Science In the Headwaters of the Florida Everglades

TEACHER GUIDE for GRADES 3-5

Archbold Biological Station, 2023

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Archbold's My Florida Explorers

This document is a teacher's guide supplementing the My Florida Explorers virtual tour found here: https://www.thinglink.com/card/1483263202669101057

Learning Objectives: In My Florida Explorers, students explore an immersive and interactive virtual nature experience to practice observation skills and learn about the process of science.

Student Scavenger Hunt:

We recommend that students complete the one-page worksheet individually, with time saved for sharing out to small groups or the whole class. The activity can be completed in 40 minutes and requires very little prep time.

Scientist Portraits:

My Florida Explorers takes a novel approach to virtual 360° habitat tours by incorporating Dustin Angell's photographic portraits of scientists and land managers posing with their occupational tools at their respective field sites. These portraits are intended as career role models - helping students develop their own science identities - and visual aids for practicing observational skills.

The Next Generation Sunshine State Standards:

In imitation of a real outdoor nature tour, each student is granted some autonomy in where they choose to give their attention, resulting in each student finding different content during their scavenger hunt. The worksheet is aligned not to specific content areas, but to the science standards' Big Ideas #1 and #2.

Big Idea 1: The Practice of Science

A: Scientific inquiry is a multifaceted activity; The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data, and the communication of this evaluation.

B: The processes of science frequently do not correspond to the traditional portrayal of "the scientific method."

C: Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.

D: Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things. Not only does science require creativity in its methods and processes, but also in its questions and explanations.

Big Idea 2: The Characteristics of Scientific Knowledge

A: Scientific knowledge is based on empirical evidence, and is appropriate for understanding the natural world, but it provides only a limited understanding of the supernatural, aesthetic, or other ways of knowing, such as art, philosophy, or religion.

B: Scientific knowledge is durable and robust, but open to change.

C: Because science is based on empirical evidence it strives for objectivity, but as it is a human endeavor the processes, methods, and knowledge of science include subjectivity, as well as creativity and discovery.

My Florida Explorers:
A Virtual Tour of Habitats and Science in the Headwaters of the Florida Everglades.

STUDENT SCAVENGER HUNT

Name: _____ Date: _____

1. Spend a few minutes visiting different habitat scenes and becoming familiar with the controls. Then choose a scene, find its habitat name, and write it in the box below. Ignoring the portrait photos for now, make at least three observations about the habitat. For example: maybe you see bushes, tall trees, water, clouds, or flowers.

Name of Habitat: Observations:

2. Find a video in your scene and watch it.
Summarize the main idea of the video. What was it about?

What ideas or feelings did you have about the video while you were watching?

3. Choose a scientist from your habitat scene. Answer the following questions and then take 5 minutes to draw a sketch of the scientist on the back of this page.

Scientist Name:

What question or problem are they working to understand or solve?

Describe how they go about this. Identify at least one method, tool, or observation they use? Look to the photos and text for clues.

HABITAT SCENES

Habitat Scene	Featured Portraits
Scene 1: Scrubby Flatwood	Michelle Dent Seth Raynor Barbara Hansen
Scene 2: Florida Sandhill	Tori Bakley Chelsea Moore Katherine Arquez
Scene 3:	Elysia Dytrych Kevin Main Bill Parken
Scene 4: Rosemary Bald	Aaron Davis
Scene 5: Florida Oak Scrub	Young Ha Suh Alexis "AJ" Jackson Yosvany Rodriguez
Scene 6: Longleaf Pine Flatwood	Marissa Langager Greg Thompson
Scene 7: Cypress Dome Swamp	Paul Gray Emily Angell
Scene 8: Seasonal Depression Marsh #1	Ann Dunn
Scene 9: Florida Dry Prairie	Chelsea Wisner Shayna Jacques Andrew Schumann
Scene 10: Seasonal Depression Marsh #2	Scott Ward Becca Tucker
Scene 11: Semi-Native Pasture	Avarna Jain Amartya Saha Maya Zambrano-Lee
Scene 12: Mesic Pine Flatwood	Laura Elston Jennifer Korn Warren "Abe" Abrahamson
Scene 13: Recently Burned Seasonal Pond	Hilary Swain Reed Bowman

SCENE 1: SCRUBBY FLATWOOD

Habitat Description: This shrubby wonderland is the best of both worlds, pine forests and Florida scrub. Just like the scrub, it has short scrub trees and white sandy patches. It also has a light scattering of slash pine trees.

Portraits

Michelle Dent: Florida Scrub-Jays

"As a fifteen-year-old I had no clue that a job like this even existed. And if I did, I would have started working toward it way back when instead of when I was an adult."

Michelle Dent, a Research Assistant at Archbold Biological Station, is responsible for monitoring a population of Florida Scrub-Jays at the Avon Park Air Force Range. In the photo she is holding a trap she employs when she needs to catch adult jays to put identifying let bands on them. Jays are usually banded when still nestlings (babies living in the nest), but sometimes an adult will lose a band and need a replacement or a new bird will fly in from another area. Florida Scrub-Jays, like their relatives the crows and ravens, are very smart. In order to catch an adult, Michelle needs to spend days getting it used to the trap before she actually triggers it. If she triggers it too soon and misses the bird, she may never get another chance because the bird will avoid the trap.

Michelle Interview Link: https://youtu.be/S3eHbH_h28M

Archbold's My Florida Explorers

Seth Raynor: Lichen Hunter

"Most of us think of community as just our human neighbors, but field biologists and other scientists are taught that community is made up of populations of multiple organisms. I think a problem with stewardship today is we have disconnected ourselves from that natural community and we first need to reconnect with nature in order to become better stewards ourselves."

Seth Raynor, an independent botanical and ecological contractor, holds a notebook and a chisel. He uses the notebook to record observations of the organisms he sees in the field. The small chisel is for collecting samples of lichen from trees for his projects. Lichens appear as single organisms to our eyes but are actually a fungi species and at least one algae species living together symbiotically. The fungus provides a home for the algae, which then provides energy through photosynthesis. Compared to other biology specialties, like birds or plants, there are still a vast number of unknown and understudied species. Using online databases, help from other lichenologists, and his own personal collections Seth increased the station's species list from 49 to 178 lichen in the six months he worked there.

Seth Interview Link: https://youtu.be/3DdyZ4DD5jo

Barbara Hansen: Ice Age Pollen Detective

"Every single plant has a different looking pollen grain. My work ranges from tedious to great fun."

Barbara Hansen is an internationally known expert on fossil pollen analysis. At the bottom of some of Florida's deeper lakes, there are undisturbed layers of ancient pollen and dead microorganisms. Just like how counting tree rings can tell you the age of some tree species, when researchers like Barbara drill and collect tubular cores of these lake bottom sediment layers, they can see into the past. At Archbold's Lake Annie, these cores have sediment layers going back 37,000 years. Using a microscope to look at the fossil pollen, Barbara identifies the flower species they belong to. Her work helps researchers improve their models of how climate and plant communities have changed in Florida over many thousands of years. Watch of video of a lake core being taken at Lake Annie: https://youtu.be/tSau8Utwcyl

SCENE 2: FLORIDA SANDHILL

Habitat Description: The Florida Sandhill is easily mistaken for Florida Scrub. Both are found on the dry sandy soils of Florida's uplands (higher areas) and have pines and scrubby oaks. In contrast, the sand in the Florida Sandhill is more yellow in color and the habitat has identifying plants, like Turkey Oak, Scrub Hickory, and Scrub Lupine.

Portraits

Chelsea Moore: Scoping Burrows for Tortoises

When Chelsea Moore, Research Intern at Archbold Biological Station, got down to demonstrate how to "scope" a burrow, she found to her surprise that the Gopher Tortoise was right there sitting just below the entrance. Burrows are several yards long and even up to 30 feet. The scope she is using has a video camera on the end. It is plugged into a digital screen, so Chelsea has a live feed of the burrows she checks. Gopher Tortoises are called "keystone species," because their burrows are so important to the ecosystems where they live. Their burrows are used by hundreds of animals, mostly bugs, but also mammals, reptiles, and even sometimes birds.

Tori Bakley: Searching for Jays

"A typical day in the field studying the Florida Scrub-Jay starts around 7 a.m, which is when the sun rises and the birds wake up. My ideal field weather is a nice sunny day, maybe between 80 and 90 degrees, with a cool breeze and a cloud here and there."

For Tori Bakley, a research intern at Archbold Biological Station, a good pair of binoculars is her most important tool. She uses them to read the colored leg bands on Florida Scrub-Jays, a species found only in Florida. Individuals of this species look the same to us humans, so to tell them apart a unique set of colored bands, like bracelets, is put on their legs. Since most only ever fly a mile or two from the nest they hatched from, researchers have been able to observe many generations of them. The data they collect teaches us about how animal families work, ways they adapt to their habitat, and

gives us clues on how to better care for their environment. This is important, because Florida Scrub-Jay populations are declining around the state and could go extinct in your lifetime. One of the largest and most stable populations of Florida Scrub-Jays, with over 100 families, is at Archbold Biological Station in the Headwaters of the Florida Everglades.

Tori Interview Link: https://youtu.be/IBtjZqUj5GE

Katherine Arguez: Catching Beetles

Katherine Arguez, a research intern at Archbold Biological Station and current PhD student at Arizona State University, builds and deploys different kinds of traps to catch insects. The specimens she collects add to Archbold's already large collection of 150,000 preserved insects. Insects are an important part of the ecosystems in the Headwaters of the Florida Everglades. Katherine's work helps us determine the health of the insect populations, know which species live here, and track changes over time.

Other Video Links

Mr. Dustin Sees a Florida Pine Snake https://youtu.be/J94y7rEbIPQ

Mr. Dustin and Skyblue Lupine https://youtu.be/_AyrHz20OX0

SCENE 3: BURNED FLORIDA SCRUB

Habitat Description: The Florida Scrub is a habitat created by fire. Without it, the scrub becomes overgrown and turns into a Sand Pine forest. As Florida is the lightning strike capital of North America, scientists think that natural lightning-caused fires used to burn the scrub about every 5-20 years. The Florida Scrub on the Lake Wales Ridge (seen here) is some of the oldest in Florida, perhaps over 2 million years old. That is 400 times older than the sawgrass marshes in Everglades National Park, which have only been there for around 5,000 years. This ancient scrub site is home to rare species, like the Florida Scrub Jay and Sank Skink.

Portraits

Elysia Dytrych: Fire Cleanup

"Seeing how tall/big the oaks are in the picture makes me want to find other areas that could use some of the fire that the trees in this picture received. Restoring an area long-overgrown is the first step of many to recovery and perfect ecosystem health; I'm happy to have been part of that first step and look forward to the next ones!"

Elysia Dytrych is a biologist for the Florida Fish and Wildlife Conservation Commission. One part of her job includes working on prescribed fires. This photograph was taken the day after a fire, when Elysia went to check the site and make sure everything was safe. Behind her, you can see the forest still smoking. Within weeks, new bright green plant growth will return to the area.

Archbold's My Florida Explorers

Kevin Main: Burn Boss

"Land managers are somewhat like doctors for the land, checking the health of the ecosystems they have charge over and prescribing "medications" (fire, exotics removal, etc) so that the land can either stay healthy or be restored to health if it is "sick" (lack of fire, neglect, disturbance). This is necessary because we can no longer rely on natural processes to maintain ecosystems on their own. For example, we can't let lightning strikes burn over large areas due to issues with human developments. If we want healthy ecosystems we must now intervene with prescribed fires set in a way so that they are controlled and safe."

Prescribed fires require planning and a well-trained team. The "burn boss" is the person who plans, organizes, and leads prescribed fires. This is one of the responsibilities of Kevin Main, Archbold's Land Manager. Before he can gather his crew, Kevin consults the site-wide map he developed that designates each section of the property into burn units with specific years to be burned. He also works with Archbold's researchers to make sure the fire will not ruin research projects or burn up active Florida Scrub-Jay nests. Even after he has selected the unit and the date, he can only burn if the conditions are just right, which includes: temperature, rain, wind speed and direction, and how wet the plants and soil are. Without fire, the Florida scrub would become overgrown and the special plants and animals that live there might go extinct.

Bill Parken: Ridge Ranger

Fire is essential for maintaining the structure of the Florida scrub, but what happens when an area has become so overgrown that a fire would be too dangerous to light, even for an experienced fire crew? That is where people like Bill Parken come in. When this photo was taken, he worked for the Florida Fish and Wildlife Conservation Commission as the Volunteer Coordinator for the Ridge Rangers. This group, made of volunteers from across the state, spend their free time helping to restore habitats on the Lake Wales Ridge in Central Florida. When scrub is overgrown with Sand Pines, like in the photo, Bill organizes chainsaw workdays. The crew of 10-12 people can cut down hundreds of trees in one morning. After the trees are felled, the area becomes safer to burn. This method has proven successful in bringing back the rare Florida Scrub-Jay to places it once lived.

Other Video Links

How to age Saw Palmetto: https://youtu.be/tkrOCiGQmr4

SCENE 4: ROSEMARY BALD

Location: 27,7.4846667N, 81,21.731W

Habitat Description: One type of Florida Scrub is called Rosemary Scrub or Rosemary Bald. This habitat occurs on the highest and driest white sands in Florida. It is dominated by the Florida Rosemary and has lots of open spaces. The word "bald" originally meant white, not hairless, so Rosemary Bald refers to the white sand.

Portraits

Aaron Davis: Think Global, Study Local

Aaron David, Director of Plant Ecology at Archbold Biological Station, is using a PVC quadrat and metal grid to document the plant species here. This is one of 27 spots at Archbold where he is doing this. Dozens of places around the world are participating in the project, which is called the Ecological Fractal Network. All this data will help scientists compare how biodiversity (variety of life) is different around the world.

Other Buttons

Florida Rosemary

Florida Rosemary successfully competes with nearby plants by producing chemicals that keep other species from growing. This technique is called allelopathy. Some of the plants that do manage to adapt and thrive in the toxic sand are rare species. When visiting Rosemary Balds at Archbold, you may see little flags in the sand marking these rare species so the researchers can study them. Another interesting thing about Florida Rosemary is that each individual bush is either male or female. Researchers have to learn to identify which by looking at its tiny flowers. Florida Rosemary is not related to the rosemary people use to flavor their food.

SCENE 5: FLORIDA OAK SCRUB

Habitat Description: Florida Oak Scrub is a rare and imperiled habit, but some of the best locations still exist on the Lake Wales Ridge in Central Florida. Florida Oak Scrub has white sand, up to four different kinds of scrub oak species, and very few tall trees. This habitat is maintained by fire. After about 20 years without fire, the scrub becomes very overgrown and is taken over by Sand Pines. That is bad for the rare animals and plants that depend on the scrub.

Portraits

Alexis "AJ" Jackson: Plants, Ponds, and Elevation

"If eight-year-old me saw me she would be so confused, like 'how did you do this how did you get here' and I could tell her, you just got to go along for the ride. So, it's actually a huge privilege to be the person that I needed to see when I was younger, and I think it just kind of motivates me to keep going."

Alexis "AJ" Jackson is a Research Intern at Archbold. In addition to contributing to Archbold's decades-long plant projects, she designed an experiment to better understand the relationship to plants, elevation, and distance from ponds in the Florida scrub. Check out the nearby video links to learn more about AJ and the see her give a tour of the Plant Ecology Research Program's offices.

AJ Interview Link: https://youtu.be/TirxJKPK08s

AJ Presentation Video: https://youtu.be/mrvhP8jUSR4

Archbold's My Florida Explorers

Yoszany Rodriguez: Florida Scrub-Jays

Yoszany Rodriguez is a Research Intern at Archbold Biological Station. His binoculars are for observing the Florida Scrub-Jay. In his hand is a clipboard and printout of a map at Archbold. Maps are important for studying this bird. Every month, Yoszany and others on the Avian Ecology team go to mapped out locations to check-up on the scrub-jays and see how the families are doing. Every year, each family of scrub-jays have their territory mapped, which lets Yoszany know where to go.

Young Ha Suh: Tracking Backpacks

"Fieldwork is a crucial component of my research and was a large deciding factor on what graduate programs I wanted to be in. I did not grow up spending a lot of time outdoors, so the fact that I can work outdoors on something I enjoy is a privilege I value deeply."

Young Ha Suh, a PhD candidate at the Cornell Lab of Ornithology, is working with Archbold to use new technology that mimics satellite GPS tracking for birds. She puts tiny backpacks on Florida Scrub-Jays. These are read by a grid of tracking stations. This technology will give researchers much more information about how birds travel through the habitat, who they socialize with, and how much of the day is spent on different activities.

Other Video Links

Rare Pygmy Fringe-tree in Bloom: https://youtu.be/TUlT5EGGTZg

Research Intern Haley (Part One): Plant Defense: https://youtu.be/4El4hGI74Ik

Research Intern Haley (part two): Researching Fire and Herbivory on Lyonia: https://youtu.be/TR_iobPeujs

SCENE 6: LONGLEAF PINE FLATWOOD

Habitat Description: This habitat consists of well-spaced Longleaf Pines with their branches held high above prairie-like fields of Saw Palmettos, grasses, and flowers. It is one of the most biodiverse habitats in North America, meaning that it supporting a large variety of organisms. It is also home to rare animal species like Red-cockaded Woodpeckers, Gopher Tortoises, and Florida Panthers. Unfortunately, although this habitat was once the most dominant habitat across most of the southeastern USA, only about 3% remains. This is because the trees were cut down for timber and the land cleared to make room for towns and other things. And on top of that, areas that weren't managed with fire became overgrown and lost some of their biodiversity.

Portraits

Greg Thompson: Chainsawing for the Birds

A chainsaw might not be a tool you associate with helping birds. In this case, the saw isn't for cutting down trees, but making artificial cavities (holes) in them for the endangered Red-cockaded Woodpecker to live. Greg Thompson, a Research Assistant at Archbold Biological Station, works with the birds at the Avon Park Air Force Range. He searches for areas in the pine forest with enough good-sized trees to house a family of woodpeckers. He must look at aerial photographs and visit different sites to measure the width of the tree trunks. It is also good if he can find spots with other Red-cockaded Woodpeckers nearby, so their future descendants will mix. Then Greg and his team pick several of the trees to cut the artificial cavities in. Each woodpecker gets its own tree and cavity. In fact, Greg makes sure there are extras, so the birds can pick their favorite ones. After a new "tree cluster" is ready, birds are moved there from areas that are already full, which helps increase the overall population.

Red-cockaded Woodpeckers and Artificial Cavities: https://youtu.be/A45VF3VJKx4

Marissa Langager: Homes for Woodpeckers

Marissa Langager is a Seasonal Technician for Archbold Biological Station. She works with Greg (see other portrait in this habitat scene), helping the Red-cockaded Woodpeckers at the Avon Park Air Force Range. Since most of today's longleaf pine forests are still recovering from being clear cut in the early 1900's, the trees aren't as old as they should be. Red-cockaded Woodpeckers like trees that are over 100 years old, because their insides are softer and easier to peck out to make a home. In order to give the birds a hand, biologists like Marissa and Greg cut cavities in the trees and install wooden birdhouses inside. The woodpeckers seem to like the birdhouses and will live in them for years. After a few years, the birdhouses need to be replaced. Marissa is holding one of the old boxes after retrieving and replacing it.

Other Buttons

Woodpecker Matchmakers

Even though most Longleaf Pine flatwoods are not fully recovered from logging done around 100 years ago or more, they have recovered enough to support a growing number of Red-cockaded Woodpeckers. A translocation is when a biologist captures birds from one site with many birds and brings them to a location with extra room. The biologists catch them at sunset, just after the birds return to their tree cavities for the night. Before bringing the birds to their new homes, the biologists prepare a few trees with artificial woodpecker cavities. The biologists bring single males and females to these tree clusters with hope they will become mates and continue to expand the population. The whole translocation must take place in one night so as to reduce the stress of the move.

SCENE 7: CYPRESS DOME SWAMP

Habitat Description: These wetlands are dominated by cypress trees. Due to the tallest trees living in the center of the habitat, a dome shape is formed that looks like a forested hill from far away. When walking around these swamps you can sometimes find burn scars on the trees, because fire is part of the ecosystem here.

Portraits

Paul Gray: Birds and Ecology throughout the Headwaters

Paul Gray, a biologist for Florida Audubon, works throughout the Headwaters of the Florida Everglades. His job is to consider the health of the whole region and how human activities in one area can affect the birds and other wildlife in other areas. His portrait wasn't taken in a cypress dome swamp, but on the edge of a lake. He is surrounded by the Bald Cypress trees and Spanish Moss.

Emily Angell: Acoustic Monitoring

"At the property I work at we put out these acoustic monitors to detect the presence of the endangered Florida Bonneted Bats. It comprises of a monitor and pole and microphone setup that we put all around the property to detect the presence of the bats as they fly over at night, and then we go back and pick them up and analyze the data after that."

Emily Angell, a biologist with the US Fish and Wildlife Service, sets out sound recording equipment in remote habitats. After 3-5 days (depending on the project), the memory card is collected, and the equipment is dismantled and re-deployed in another site. In addition to bats, Emily spends a lot of her time

using the recordings to identify the birds in the area. She can identify each species by their calls and some by the shape of the audio patterns they make on her playback software.

Emily Interview Link: https://youtu.be/r9Ka6ThKty4

Other Video Links

Spanish Moss with Mr. Dustin: https://youtu.be/fpKyhxJK7Ew

Other Buttons

Cypress Trees. Pond Cypress are coniferous trees closely related to pines. They grow in wet areas and have a strange root system that grows "knees" near the parent tree (see photos). Scientists are still working out what exactly these structures do, but probably help stabilize the trees and keep them from falling over.

SCENE 8: SEASONAL DEPRESSION MARSH #1

Habitat Description: Seasonal depression marshes are areas with elevation a little lower than the land surrounding them. This allows rainwater to accumulate in them during the rainy season, changing the water depth by inches or even several feet. After a hurricane or particularly rainy year, seasonal ponds can get so high that they form a water network and species like small fish can move between them. Some wetlands can occasionally be totally dry, but this one, called "Neofiber Pond" or "Muskrat Pond" always has some water in it. Just beyond this pond is the dry and sandy scrubby flatwoods.

Portraits

Ann Dunn: Fairy Shrimp Discoverer

"It turns out that they are found in several of Archbold's ponds, and swimming along with them are other small crustaceans called clam shrimp and water fleas."

There is still so much for researchers to learn from Florida's natural area and plenty of room for young scientists to make discoveries. For example, until 2016 no one knew that fairy shrimp, tiny invertebrates also called "sea monkeys" lived in inner Central Florida. But then Ann Dunn, a college student at the time, found a population of them living in a seasonal pond at Archbold. In fact, when consulting with another researcher, they determined that she had discovered a new species. They even wrote up their findings and published them in order to make it official. Ann returned to Archbold as a Research Intern and continued her work on fairy shrimp. In the photo she holds a plastic bag with dirt from a seasonal pond. Ann travels around the state gathering these samples. Then she returns to her lab where she puts the dirt in separate trays and adds water to them. Fairy shrimp eggs can lay dormant for decades waiting for water before they hatch, which may seem more like a seed than an animal egg, but the adaptation is perfect for seasonal wetlands which change from year to year depending on how much it rains.

Other Video Links

Sweetbay Magnolia at Muskrat Pond: https://youtu.be/CpizKHLcCL0

Drinking Tannin Water at Muskrat Pond: https://youtu.be/6Lgyy-XIDiE

Pond Trapping: https://youtu.be/vADKW1G5c14

Tadpoles and Invertebrates at Muskrat Pond: https://youtu.be/Wqr2zFrk8JQ

SCENE 9: FLORIDA DRY PRAIRIE

Habitat Description: Found only in Florida, this habitat is flat, lacks trees, loves fire, and is carpeted by wiregrass and palmettos. Despite the name, the "dry" prairie is often temporarily flooded during summer rain events.

Portraits

Shayna Jacques: Searching for Florida Grasshopper Sparrows

One of the most imperiled bird species in North America is the Florida Grasshopper Sparrow. This sub-species is found today at only a few sites within the Headwaters. Researchers like Shayna Jacques, a biologist for Florida's Fish and Wildlife Commission, are part of a team of biologists from multiple government agencies, universities, and non-profits like Archbold Biological Station, who are monitoring and helping the Florida Grasshopper Sparrow survive.

Chelsea Wisner: Sheltering the Nests

Chelsea Wisner, a research assistant at Archbold Biological Station, is shown here carrying the equipment needed to put up a small fence around Florida Grasshopper Sparrow nests found in the dry prairie. The fences help keep out predators like snakes and skunks.

Andrew Schumann: Captive Breeding

Andrew Schumann is a biologist at White Oak Conservancy, where he oversees the breeding of Florida Grasshopper Sparrows. These birds, hatched in the large cages seen behind Andrew, are later released into the wild. Scroll through the photos to see pictures of Andrew and the birds at White Oak, which is in northern Florida.

Other Video Links

Fighting Fire Ants to Save the Sparrows: Interview with Wildlife Biologist, Becky Windsor
https://youtu.be/_DCr7pknebw

Saving Florida's Sparrow: https://youtu.be/dt32HgSQhn4

Other Buttons

Releasing the Birds

With very few Florida Grasshopper Sparrows left in the wild, hope for the survival rests mostly on raising and releasing captive bred birds into the wild and then having them survive and breed once there. Before the birds are released, they get comfortable with the sights and sounds of their new home by spending the night in a safe temporary enclosure (seen in photo). In the morning, researchers open the door and wait for them to come out. These releases are an honor to be part of and are witnessed by few people outside of the biologists who study the bird.

The Illusion of Hills

The Florida Dry Prairie is very flat. The illusion of hills in the distance is actually from cypress domes, swamps with tall trees in the middle.

SCENE 10: SEASONAL DEPRESSION MARSH #2

Habitat Description: Seasonal depression marshes are areas with elevations a little lower than the land surrounding them. This allows rainwater to accumulate in them during the rainy season, changing the water depth by inches or even several feet. After a hurricane or particularly rainy year, seasonal ponds can get so high that they form a water network and species like small fish can move between them. Some wetlands can occasionally be totally dry. Notice signs of a recent fire in the vegetation near the pond. Sometimes, fires will even burn across depression marshes when the water levels are low.

Portraits

Scott Ward: Search for Rare Plants

"I want people to know that plants are endlessly fascinating and can tell ecologists very important things about what has historically happened in a natural area. Plant communities can tell us if an area has been recently burned, or recently disturbed by other means. Plants also tell us if an area is very important to conserve if there is an especially high number of rare plants. The landscape has the potential to tell us very telling aspects of its past by simply looking at the plant species that grow there. Plus, they are fun to search for."

Scott Ward, a Research Assistant at Archbold Biological Station, poses in one of the wetlands at the Carter Creek nature preserve. He chose this spot for his portrait because he is working on a large inventory project, collecting at least one specimen from every plant species at the preserve. In only a little over half a year, Scott collected more than 400 specimens from over 350 species. In the portrait he holds a plant press, which he uses to dry and flatten the plants so he can put them in folders and preserve them.

Scott Interview: https://youtu.be/cWd7V7P3CoE

Becca Tucker: Pond Checkup

Each time you visit a place it is a little different than the time before. In the case of natural areas, a repeat visitor can observe the change of seasons, rise of wetlands in the rainy season, and the rebirth of life after a fire. Becca Tucker, a Research Assistant at Archbold Biological Station has the task of visiting dozens of seasonal ponds multiple times a year to measure their water depth. These data, taken year after year, give Archbold a picture of the environmental conditions and natural cycles across the property. Seasonal ponds play a huge role in web of life at Archbold, so any changes to their yearly cycles, even if natural, can have big impacts on the frogs, invertebrates, and other organisms that rely on them. In most years, many of the ponds will dry up for part of the year. At other times, like after Hurricane Irma in 2017, it took two years for the ponds to dry down again. In really wet years, Becca even uses a paddle board to get to her water measuring locations.

SCENE 11: SEMI-NATIVE PASTURE

Habitat Description: Around one million acres of the Headwaters of the Florida Everglades is owned by cattle ranchers and used for raising beef cattle. This is mostly good news for plants and wildlife, because even though some alterations have been made to the land, these ranches are great for many wild species. This field is called a "semi-native pasture," which means that some non-native plant species have been added to provide better nutrition for the cattle, but it has mostly been left alone and still has many of its original Florida plants and insects. Semi-native pastures are important on ranches, because they have more biodiversity (variety of living things) than the fully "improved pastures" that are growing almost 100% of only one species, an imported grass from South America.

Portraits

Amartya Saha: Global Vision

Amartya Saha has multiple duties as an ecohydrologist and environmental monitoring instrumentation specialist at Archbold. Flip through the photos to see him working on a tower that is part of the PhenoCam Network. This tower, along with others from across the world, has a camera at the top that photographs the same field each day, to see how the green color of leaves changes through seasons.. All of these "eyes" across continents help scientists understand seasonal changes in vegetation and how habitats recover from hurricanes, fires or frost. The camera images are also used to understand images taken from high in the sky, from satellites orbiting the Earth.

Archbold's My Florida Explorers

Avarna Jain: Measuring Greenhouse Gasses

Avarna Jain, a Research Intern at Archbold's Buck Island Ranch carries a tool used for measuring greenhouse gases. These are the invisible chemicals in the air that act like a blanket for our planet, trapping heat inside and making life habitable on Earth. Scientists worldwide are concerned that our atmosphere is getting too much greenhouse gas, which is affecting the planet's oceans and climates. Avarna's intern research project measures how much methane (a greenhouse gas) is produced from different habitats at the ranch. Jain enjoys learning new practical skills, "working with sensors, troubleshooting electronics problems, are things I have never done before and are totally different from the type of research I conducted before," she says.

Maya Zambrano-Lee: Sampling Soils

"I feel proud when I look at this photo because I didn't used to believe in myself and my ability to become a scientist. I am a very silly person, so it's empowering to see myself looking confident and serious in this profession. To anyone like me who maybe didn't do the best at math in school but adores playing outside and asking questions, did you know you can still be a scientist? I highly recommend it!"

Maya Zambrano-Lee is an Research Intern at Archbold's Buck Island Ranch. In the photo she is holding a soil corer, which she uses for sampling soil. She explains, "I press the corer down into the earth and twist it, and when I pull it out, it contains a soil core showing the different layers of soils. We can analyze a core sample for things like the soil profile (the layers, the makeup of sand, silt, and clay, etc.), nutrient content, and roots." Maya's research helps scientists, landowners, and lawmakers understand and make smarter choices about how ranch lands can balance the needs for food production and healthy ecosystems.

Maya Interview: https://youtu.be/bcfFxmA206Q

Other Video Links

Selfie Short - Visiting Florida's Buck Island Ranch with Mr. Dustin: https://youtu.be/Fp6YHVTy-3o

Conservation Artist: Deborah Mitchell: https://youtu.be/qh19Hik_6is

COWBOYS and SCIENTISTS: https://youtu.be/y6_WhY3aZB0

Other Buttons

Cowboys and Scientists.

This scene was photographed at Buck Island Ranch, which Archbold Biological Station has run since 1988. It is both a 10,500 acre beef cattle ranch and a natural research laboratory. Researchers there are studying how ranches work as semi-natural lands. The cowboys and scientists work with other ranchers, government agencies, universities, and other groups to protect and improve these important places.

Nutrient Network

"We are participating in a grassland experiment where the same experiment is being conducted in over 60 grasslands around the globe." - Archbold's Director of Agroecology Research, Dr. Betsey Boughton

Scientific research is a powerful tool for gaining knowledge about Earth's ecosystems, but most experiments are focused locally, making observations about only one place at a time. This is limiting, for even if your data reveals something important happening to the grasslands in one place, how do you know if the same thing is happening elsewhere? The Nutrient Network (NutNet) solves that problem by bringing together grassland researchers from around the world. In this multi-year planet-wide project, the same experiment is being carried out in different places and the results are being compared. Betsey Boughton says, "I really enjoy being in the network because I get to interact with ecologists all over the world. Sharing data with others is a fulfilling part of my job."

SCENE 12: MESIC PINE FLATWOOD

Habitat Description: This Slash Pine trees dominate in this semi-wet (mesic) pine forest. Mesic Pine Flatwoods are habitats for Florida Black Bears and Florida Panthers. This location has a nearly 100 year old ditch nearby, which likely means the land here used to be wetter. What exactly the plant community looked like then - did it have Slash Pines and Saw Palmettos like it does now - is unknown. Sites like this are tricky for land managers, because it is difficult to know if you have a healthy habitat when you don't know what habitat you have.

Portraits

Laura Elston: Fighting the Weeds

Laura Elston, a Research Assistant at Archbold Biological Station, works at the never-ending task of clearing invasive species from natural habitats. Some species that provide benefits to the ecosystems in their home ranges can become invasive when moved to a new home in another part of the world. There, they may not have natural predators or other environmental conditions, like freezing winters, to keep them in check. While some species become naturalized, finding a place in their new ecosystem's web of life, others do not. These invasives can upset the balance of Florida's ecosystems by spreading quickly, leaving little space or resources for other species, spreading disease, or even eating too many of the local animals. Laura removes invasive plants by hand-pulling, chopping with a machete, and spraying with herbicide chemicals.

Warren "Abe" Abrahamson: Abe the Palmetto Puzzler

"Now that I've had almost 75 years to view things, I have seen the resilience of nature, but I've also seen a lot of loss of nature. The curse of our short lifetime is that we think short term."

Ecologist Dr. Warren "Abe" Abrahamson lives in Pennsylvania, but he and his wife/field assistant Chris have regularly visited Florida for 50 years to study plants, insects, and prescribed fire. Some of his projects take years to complete. To figure out how fast Saw Palmettos (Serenoa repens) grow in the Florida scrub, Abe and his assistants measured the same 120 palmettos every year for four years. From those observations they figured out that Saw Palmetto growth is extremely slow, only about a ½ inch each year. After a 19 year study, Abe found that few new Saw Palmettos grew from seeds, but instead most branched off of nearby palmettos using underground stems. After even more observations, Abe found that Saw Palmettos can take 200 years to mature into an adult! Each of Abe's discoveries gives him better understanding and the chance to ask more challenging questions. For example, here is my favorite Abe discovery: Recently, Abe and others used his decades of research on hundreds of Saw Palmettos to combine the 1/2 inch growth rate, the 200 year maturity rate, and newly collected DNA samples, to discover that Saw Palmettos live for thousands of years. Abe thinks that many are likely 10,000 years or older!

Jennifer Korn: Tracking Panthers

"My passion is endangered cats. Some people think that we snuggle panthers all day, but actually seeing a cat or touching a cat is a small part of the job. It is a lot of remote camera work, working with the public for education and outreach, and working with private landowners."

Jennifer Korn, a wildlife biologist with Johnson Engineering, collaborates with the Florida Fish and Wildlife Conservation Commission (FWC), to set up motion detecting wildlife cameras in locations throughout the Headwaters. Florida panthers, who once roamed across the southeastern United State, were listed as a federally endangered subspecies in 1967, five years before the Endangered Species Act. After a low point in the early 1990s, when biologists estimated less than 30 adults were still alive, the panthers have been recovering. Today, the Florida Fish and Wildlife Commission estimates between 120-230 wild adults. Jennifer believes that a combination of science and sensible solutions will help the panthers. "Road kill is very high. If we can figure out which bridges are already important corridors for panthers, the Florida Department of Transportation can add "shelves" on the sides of bridges especially for panthers. That is what they did at one location on State Road 80, and panthers use this bridge often."

Other Video Links:

Fungal Herbarium with Elan Tran: Collecting Mushrooms: https://youtu.be/-O0sDsg_FEU

Fungal Herbarium with Elan Tran: Mushrooms 101: https://youtu.be/jVLAUPMfj8M

SCENE 13: RECENTLY BURNED SEASONAL POND

Habitat Description: This scene was photographed a few weeks after a fire swept through in the spring. Notice both the fire-blackened vegetation and the bright new plant growth. Fire is a normal part of life for the plants here. Even this seasonal wetland burns once a decade or so. If you are wondering why there is no water in this wetland, it is because this happened before summer rain could fill it up. Notice how all the palmettos form a ring around this wetland? They can't survive in the water, even if it is just a few inches deep for only part of the year, but this habitat is a happy home for species adapted to it, like these grasses and Slash Pines.

Portraits

Hilary Swain: The Big Picture

Hilary Swain has been the Executive Director at Archbold Biological Station for almost 30 years! Her job is to keep in mind the BIG PICTURE: ensuring that Archbold's work contributes to the long-term health and understanding of the natural areas in the Headwaters of the Florida Everglades and beyond. She also builds Archbold's connections with researchers across the world, ensuring that what we learn and accomplish in Florida can help others, too.

Reed Bowman: Birds, Fire, and Time

Reed Bowman is Archbold's Director of Avian Ecology and he has studied birds at Archbold for nearly 30 years. He is one of the top authorities on Florida Scrub-Jays. Reed has also participated in many prescribed fires and helps Archbold's Land Manager plan them for times when they won't burn up jay nests. He and his team have observed that fire is very beneficial to Florida Scrub-Jays, who need habitats

with low vegetation. In fact, after ten years without fire in the Florida scrub (the habitat surrounding this small pond), the jay population starts to drop.

Other Video Links

Archbold's Weather Station: https://youtu.be/avHhbsWxuhQ

Slash Pine Fire Adaptation: https://youtu.be/zc9GSsRir1c