

Module 1: Florida Scrub-Jays: At Home in the Florida Scrub

By the Archbold Biological Station Education Department, 2014
with support from the Southwest Florida Water Management District

At a Glance

In this lesson, students learn how Florida Scrub-Jays have adapted to survive in the Florida scrub ecosystem, and how scientists use banding and long-term research to understand and protect this endangered species. Students watch a video, then work in pairs to identify parts of the Florida Scrub-Jay's family life.

Directions

1. Watch "At Home in the Florida Scrub" video.
2. Review concepts from video with questions about Scrub-Jay habits, cooperative breeding, and the graph shown in the video. Questions supplied on next page.
3. Divide students into pairs for The Bird Search Story narrative game.

Learning Goals

- Florida Scrub-Jays have very specific needs and require scrub habitat.
- Some animals, such as Florida Scrub-Jays, live in family groups, headed by a breeding pair, with members that help each other. This adaptation of behavior is called cooperative breeding and has specific advantages.
- Cooperative breeding evolved in scrub-jays because: 1) scrub habitat and resources were limited, forcing scrub-jays to cooperate 2) individual scrub-jays benefited from helping their siblings so were more successful when raising their own young (experience matters) and 3) scrub-jay families were stronger when siblings helped and more young birds survived.
- Animals such as Florida Scrub-Jays have complex relationships with each other and with their habitats—and they deal with these daily.
- Relationships can exist *within* species and *between* species, including humans.
- Florida Scrub-Jays disappear if their habitat gets overgrown without fire or is cleared.
- Some animals are unable to live in residential developments, even if they have caring human neighbors.
- Scientists often need to study a species for a long time in order to understand what that species needs to survive.
- Florida Scrub-Jays and other endangered species may sometimes need to be protected and managed by humans in very specific ways.
- By studying one animal in a habitat, such as the scrub-jay, scientists can learn about other animals and plants living in the same habitat.
- Graphs are a type of scientific model that help scientists analyze and understand data.

LENGTH

1 hour prep
20 minute video
30 minute activity

MATERIALS

Video
Jay Family jpeg
Printouts
Tape or Glue
Pens or pencils

KEY VOCABULARY

Dense Oak Scrub
Ecosystems
Empirical
Food Chains
Habitat
Interdependence
Scrub Habitat
Thicket

NEXT GENERATION FLORIDA SUNSHINE STATE STANDARDS

SC.3.N.1.1
SC.3.N.1.7
SC.3.N.3.2
SC.4.N.1.7
SC.4.L.16.3
SC.4.L.17.4
SC.5.L.15.1
SC.5.L.17.1

Background Information

Basic Features of Florida Scrub

- Found only in Florida
- Deep sand for soil (relic sand dunes) with poor nutrients
- Dominated by dense shrubby oaks, low palmettoes and scattered pines
- Scrub plants adapted to fire and resprout or grow from seed after a burn
- Large bare patches of sand without vegetation
- Frequent fire (ignited by lightning)
- Depends on fire for renewal
- Dry winters, like a desert
- Wet summers
- Home to many rare and threatened species of plants and animals
- Only a small percentage of original scrub remains
- Once lost, cannot be restored.

Florida Scrub-Jay Natural History

- Live only in Florida (but a closely related species lives out west)
- Live only in Florida scrub and no other habitat
- Are cooperative breeders (family has a breeding pair with offspring that help take care of younger siblings). Cooperative breeding in scrub-jay is a behavioral adaptation, partly in response to limited scrub habitat and available resources.
- Benefit from helping because the experience allows them to be more successful when raising their own young
- Benefit from helping because the entire family is more successful
- Help watch for predators and defend territories as part of family group
- Line their nests with fibers from scrub palmetto
- Nest from March to June with females laying 3-4 eggs
- Feed nestlings highly nutritious insects, like caterpillars and grasshoppers. Nestlings cannot survive without insects.
- Eat acorns in winter when insect food is scarce and will continue to recover acorns into spring
- Need open sandy areas for burying acorns every fall—with each individual jay burying approximately 8,000 acorns every year
- Dig up about half of the buried acorns in winter
- Can live up to 15 years
- Need regular fire because, without it, oaks produce fewer acorns
- Need scrub kept low by fire so predators are easier to see
- Can't live in overgrown scrub or highly fragmented scrub found in urban areas
- Need humans to manage remaining scrub habitat

Scrub-jay Research At Archbold Biological Station

- Archbold has studied scrub-jays since 1969, making it one of the longest and most complete studies of birds in the world.
- Long-term research can reveal patterns that can't be seen in shorter research projects.
- Many different researchers have collaborated through the years and continue to contribute to scrub-jay research.
- Researchers locate nests from all scrub-jay territories on Archbold property every breeding season (around 115-125 territories with one active nest per territory per year.)
- Some jay families have been observed for up to 13 generations.
- All nestlings are given a numbered aluminum band and different patterns of color bands on their legs which operate like a name and helps researchers identify birds through the years. Scientists know who and where family members are by observing bands.
- Scientists collect and analyze data, write scientific papers and attend conferences to present results of their research.
- Archbold scrub-jay research provides essential scientific information. Scrub-jays are an "umbrella" species (i.e. what is good for jays is good for most other scrub-dependent species), so by knowing the habitat requirements that allow scrub-jays to persist, we can manage scrub to maximize biodiversity. The more we know, the better managers we can be.

Vocabulary and Going Further

Key Vocabulary

- *Dense oak scrub*: low growing, shrubby oaks that are crowded closely together and are difficult to walk through.
- *Ecosystems*: a complex set of relationships among the living resources, habitats and residents of an area
- *Empirical*: relying on or derived from observation or experiment.
- *Food chains*: Linkages of organisms within an ecosystem; each link feeds on the one before it and is fed by the one after it.
- *Habitat*: the place or environment where a plant or animal naturally lives.
- *Interdependence*: reliant on each other
- *Scrub habitat*: low growing shrubs with scattered pines in a dry, sandy, nutrient poor soil.
- *Thicket*: a dense or thick growth of shrubs or bushes.

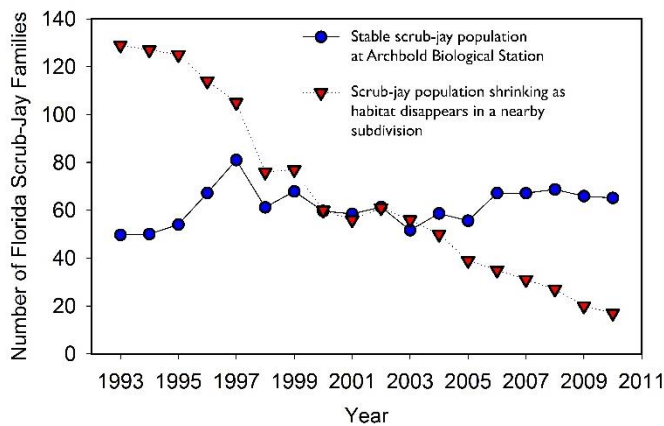
Additional Challenges for the Classroom:

- This simple exercise of comparing 1-second observations to 5-second observations can help students understand the advantages of long-term research. Because your classroom is familiar, this exercise may work best in a less well-known space. Ask your students to close and cover their eyes and put their heads down. When you say “look”, students will pick up their heads and open their eyes for 1 second. When you say “stop”, students will close and cover their eyes put their heads down again. Students will raise their hands to share what they observed during 1-second observations. Repeat this process, giving students 5 seconds to observe. Compare the differences between the 1-second observations and the 5-second observations. Encourage students to consider the different details, behaviors or events a scientist might observe if he studied an organism short-term vs. long-term.
- Using information students learned about Florida Scrub-Jays, can they create their own bird search story?
- The Florida Scrub-Jay is an example of a social animal. Cooperation is an important characteristic of social animal. Other examples of social animals include ants, coyotes, bees, dolphins, penguins and humans. The opposite of a social animal is a solitary animal. These individual animals remain by themselves most of the time rather than live in a group. Examples of solitary animals include bobcat, Florida Panther, and Black Bear. What advantages would a solitary animal have? What disadvantages?
- Scrub-jays are *habitat specialist* and can only live in scrub habitat, despite the harsh conditions. Scrub-jays have adapted to scrub and need specific resources that scrub provides. A *habitat generalist* doesn't depend on one habitat, but uses a variety of habitat types. Can you think of a habitat generalist that lives in Florida? What are the advantages of being a habitat generalist? Which animal would be most threatened by loss of habitat? Which type of animal has the best chance of survival?

Further Reading

- US Fish and Wildlife Service Species Profile for Florida scrub-jay (*Aphelocoma coerulescens*)
- www.floridascrubjay.com
- www.birds.cornell.edu (http://www.allaboutbirds.org/guide/Florida_Scrub-Jay/id)

Classroom Discussion on Video



Discussion Questions on the video

- How do we learn about scrub-jays?
- Why do we study scrub-jays or other animals ?
- What do scrub-jays need to survive?
- What happens to scrub-jays if their habitat gets overgrown without fire or is cleared?
- Why are scrub-jays important?

Discussion Questions on the Family Tree

- Why would young birds stay at home and help raise their siblings? (example answer: limited habitat and resources)
- How would an individual bird benefit from helping to raise its brothers and sisters (example: experience matters)
- How would a scrub-jay family benefit from having helpers? (example: the family is more successful)

Discussion Questions on the Graph Showing Population Decline

- How we learn about scrub-jays (practice of science)
- Why we study scrub-jays or other animals
- What scrub-jays need to survive
- Why scrub-jay families are important
- What happens to scrub-jays if their habitat gets overgrown without fire or is cleared?

The Bird Search Story Directions

Directions

Following the discussion, students will play a numbered, narrative game called “The Bird Search Story”.

1. Display the Florida Scrub-Jay family scene in the classroom. (large jpeg is included in the curriculum)
2. Students cut out sentence fragments from printout
3. Students reorder the sentence fragments to match the proper sequence that corresponds to the numbers in the Florida Scrub-Jay family scene.
4. When the students are finished, work through the answers together as a class.
5. Select a student to read the full completed story aloud to the class.
6. Students make corrections to their order and tape or glue them to the worksheet.

Alternatively, students tape/glue their answers on before discussing as a group. Papers can be collected for a grade or to assess student comprehension.

Correct Narrative Sequence

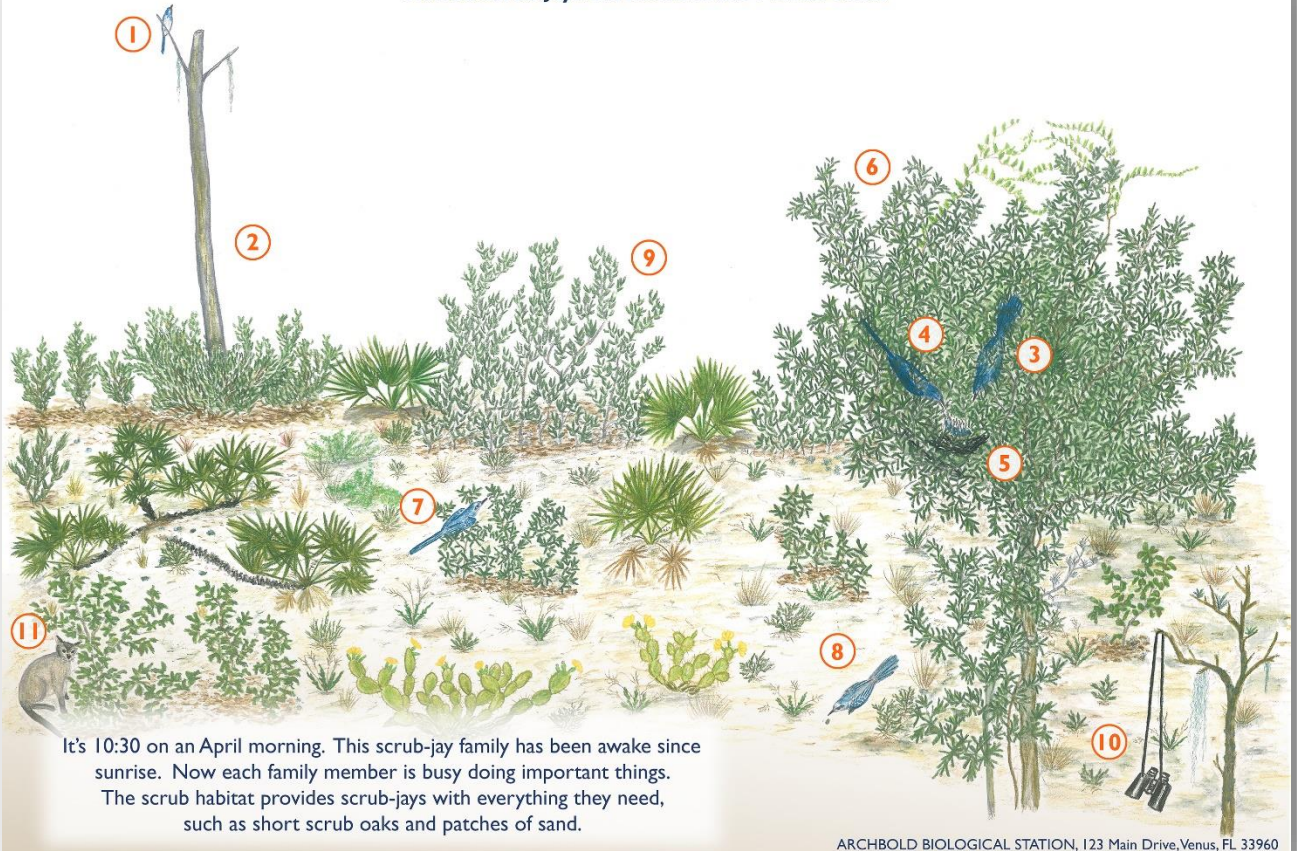
1. A male parent scrub-jay is carefully watching for hawks, snakes, and other predators from....
2. a small dead tree that is a good watching post.
3. A mother scrub-jay who has been sitting on her nest moves aside, so that...
4. a young scrub-jay can feed a grasshopper to its baby sister and brother in a...
5. snug nest made from oak twigs and scrub palmetto threads within the shelter of a...
6. dense scrub oak.
7. One young scrub-jay is hunting for caterpillars in a small scrub oak, while...
8. another has just dug up an acorn that she buried in the sand last fall. What a great memory she has! If the father scrub-jay sees a hawk, he will call a warning and the two young scrub-jays will dive into...
9. a thicket of small oaks where a hawk cannot go.
10. A pair of binoculars was left hanging from a tree limb by a research biologist who has gone back to her vehicle for her notebook. On her way back to observe the scrub-Jays she will chase away...
11. a house cat that has strayed into the scrub preserve and has his eye on one of the young scrub-jays.

The Bird Search Story

Florida Scrub-Jay Family Scene

SCIENCE in the SCRUB

Florida Scrub-Jays: At Home in the Florida Scrub



It's 10:30 on an April morning. This scrub-jay family has been awake since sunrise. Now each family member is busy doing important things. The scrub habitat provides scrub-jays with everything they need, such as short scrub oaks and patches of sand.

ARCHBOLD BIOLOGICAL STATION, 123 Main Drive, Venus, FL 33960

A large jpeg version of this image is available in the curriculum package.

Florida Scrub-jay Family Scene Caption:

"It's 10:30 on an April morning. This scrub-jay family has been awake since sunrise. Now each family member is busy doing important things. The scrub habitat provides scrub-jays with everything they need, such as short scrub oaks and patches of sand."

Further discussion may include these challenges:

- Other than scrub-jays, what living things do you see in the story illustration?
- Can you find 2 ways the depicted family of scrub-jays interacts with other species in the Florida scrub? (Example: Scrub oaks provide acorns for scrub-jays)
- Can you describe 2 ways members of this scrub-jay family might interact with each other? (examples: 1) Young scrub-jay will feed baby sisters and brothers or 2) scrub-jays alert each other when danger is near.)
- The artist for the bird-search story drew big patches of bare sand and low-growing shrubs---two scrub features that are very important to scrub-jays. Why are these important? How does scrub stay low and open?
- Refer to jay family in diorama and speculate about a bird "story".

The Bird Search Story Cutouts

Use scissors to cut out each of the sentence fragments and put them in the proper order on your worksheet.

a young scrub-jay can feed a grasshopper to its baby sister and brother in a...

A male parent scrub-jay is carefully watching for hawks, snakes, and other predators from....

dense scrub oak.

another has just dug up an acorn that she buried in the sand last fall. What a great memory she has! If the father scrub-jay sees a hawk, he will call a warning and the two young scrub-jays will dive into...

a house cat that has strayed into the scrub preserve and has his eye on one of the young scrub-jays.

a small dead tree that is a good watching post.

A mother scrub-jay who has been sitting on her nest moves aside, so that...

a thicket of small oaks where a hawk cannot go.

One young scrub-jay is hunting for caterpillars in a small scrub oak, while...

snug nest made from oak twigs and scrub palmetto threads within the shelter of a...

A pair of binoculars was left hanging from a tree limb by a research biologist who has gone back to her vehicle for her notebook. On her way back to observe the scrub-Jays she will chase away...

The Bird Search Story Worksheet

Names:

Date:

Teacher:

1

2

3

4

5

6

7

8

9

10

11