

# Seminole County Water Atlas Learning Kit

## Graphing Exotic Plants *Teacher's Guide*

*Students find the percent of exotic and native plants in lakes and compare and analyze with graphs.*

Water Atlas Curriculum Lesson #

**Grade Level:** 5<sup>th</sup>-6<sup>th</sup>

### **Performance Objectives:**

*References are to the Next Generation Sunshine State Standards (2007).*

#### **Math**

MA.6.A.3.6 Construct and analyze tables, graphs and equations to describe linear functions and other simple relations using both common language and algebraic notation.

MA.5.S.7.1 Construct and analyze line graphs and double bar graphs.

#### **Science**

- SC.5.L.14
- A. All plants and animals, including humans, are alike in some ways and different in others.
  - B. All plants and animals, including humans, have internal parts and external structures that function to keep them alive and help them grow and reproduce.
  - C. Humans can better understand the natural world through careful observation.

### **Academic Outcomes/Lesson Objectives:**

- The students will increase their understanding of percents and circle graphs in real-life situations by using computer-generated data to gather, interpret and create a percentage circle graph.
- Students will see how these plants compete with native species.

### **Background Information:**

Exotic plants are plants that have been brought to Florida by people. Some may have arrived with the first European explorers (water lettuce, for example) and more arrive yearly. Exotic plants become invasive when the insects and other animals that eat them are not here, and they flourish. The plant may have toxins or other factors that are tolerated by species that eat them and keep them in check back home, but no Florida species are adapted to eat them. Plants are always competing for space, minerals, water, and sun. The invasives have an unfair advantage!

Invasive plants may produce a toxin that keeps other plants from growing around them, creating monocultures, like the melaleuca in south Florida. The plants that should be there for a Florida habitat are not there and the animals have no food. They die, move away, or don't raise any young.

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There may be fungi or bacteria that keep the plant in check in its home range that are missing here.

Invasive aquatic species can cover the surface of the water and shade out the eelgrass that is food and shelter (substrate) for both fish and macroinvertebrates, or they can form dense growths that even fish can't get through. Fish can't find a place to lay eggs, and food supply is diminished. Waterways may become clogged so that boats can't get through.

Many invasive plants were first introduced as landscape plants or grown for aquariums and released into streams and lakes. Invasive plants are often spread from place to place as hitchhikers on boat trailers.

In preparation for this activity, preview the exotic plants. Go to [www.Seminole.WaterAtlas.org](http://www.Seminole.WaterAtlas.org) and click Explore > Water Resources. Type in "Lake Jesup" (This is a good one to use.) into the Water Resource Search box and select it. Next, click Habitats/Ecology tab > Plant Species (Located on left side of page) > List of Plant Species link. At the top are the reports by date. Some lakes have only one report; some have none. Two sources of information are cited under the word, Key. Click on them to reach the home page of each website.

### Resources:

- Photo-Murals, available from University of Florida's IFAS [Center for Aquatic and Invasive Plants](#).
- [Atlas of Florida Vascular Plants](#) website.
- [Florida Exotic Pest Plant Council](#) website.
- "[Invaders in Paradise: Invasive Species in Florida](#)" Teaching Guide
- [Florida Invasive Plant Education Initiative and Curriculum](#) website

### Materials:

- Computer with Internet access, and [www.Seminole.Wateratlas.org](http://www.Seminole.Wateratlas.org) bookmarked
- Printer –or– pencil and paper, protractor

### Vocabulary:

#### Aquatic plant

A plant that grows in water. Aquatic plants can be emergent (rooted in soil but sticking up above the water), submersed (with their roots, stems and leaves underwater), or floating (rooted in soil, with leaves and flowers that float on the surface).

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### **Exotic plant**

A plant that has been introduced to an area from outside its native range, either purposefully or accidentally.

### **Invasive plant**

A naturalized exotic plant that is expanding its range into natural areas and disrupting naturally occurring native plant communities.

### **Native plant**

In Florida, a native plant is considered to be one whose natural range included Florida at the time of European contact (around 1500 A.D.).

### **Naturalized plant**

An exotic plant that can sustain itself outside of cultivation, that is, without human care or assistance.

### **Pie graph (or pie chart)**

A circular chart divided into sectors, with each sector showing the relative size of a value as compared to the sum of all the values.

### **Percent**

A fraction or ratio with 100 understood as the denominator; for example,  $\frac{49}{50}$  equals 0.98, which gives a percentage of 98, or 98%.

### **Species**

A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding. A species is a group subordinate to a genus and contains individuals agreeing in biological attributes and called by a common name.

### **Procedure:**

1. Students will choose from the list of lakes provided for the teacher. The following lakes will yield a variety of graphs for comparison:
  - a. Banana Lake
  - b. Bear Gully Lake
  - c. Lake Brantley
  - d. Lake Catherine
  - e. Lake Harney
  - f. Lake Howell
  - g. Lake Jesup
  - h. Lake Monroe
  - i. Lake Orienta
  - j. Little Bear Lake
  - k. Prairie Lake
  - l. Puzzle Lake



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2. Direct the students to go to [www.Seminole.Wateratlas.org](http://www.Seminole.Wateratlas.org) > Explore > Water Resources. Have them select the Habitat/Ecology Tab for each lake and review the List of Plant Species.
3. Students should next record the number of species of plants in each of these categories: native, exotic (invasive), exotic (not listed as invasive), unknown
4. Using this data, students should create a pie chart (circle chart) on paper using a protractor or by employing a computer graphing program.
5. Students should repeat steps 2-4 for the other lakes that are chosen.
6. Have students compare the graphs and decide which lakes have the most and the least exotic plants.

**Extension:** Groups of students may be assigned different lakes. They can then present this information to the class. PowerPoint-type presentations can be another way to present this information to the group and increase use of technology.

**Assessment:** Review students' graphs for accuracy.

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*Note that there is no student handout for this activity.*