The Everglades: Finding a Balance

Adapted from a GIS lesson by Kathryn Keranen
GIS version available on the Awareness Week Website for GIS Day!

Grade Level: Secondary

Time: 1-2 class periods

Objectives: Students will:
1. learn a brief history of how the Everglades were formed
2. be able to briefly explain the hydrology of the Everglades
3. be able to interpret a timeline of man’s intervention of the Everglades
4. be able to analyze data and graph land use data
5. write a brief summary of their findings

Materials:
Florida Map of the Everglades on the 2001 River Poster
Graph paper
Background information on the Everglades: found in the Water Atlas of Florida (also found on the FGA Geography Action Website under Water Atlas of Florida Background Information or attached abbreviated teacher background provided with this lesson)
Florida Wetland maps for student handouts (need 2 per student: 1 for 1900 and 1 for 1995)

Procedures:
Initiating Activity:
Put this question on the board or on a transparency before class: What one name is given to “the area of swamps, marshes, sloughs, prairies, tree islands, and forests of southeastern Florida west of the west Atlantic Coastal Ridge”? Answer: Everglades

Ask students if any of them have ever been in the Everglades and what was it like, or what they know about the Everglades if they have never been there. List their responses on the board. Discuss some of the background issues mentioned in the teacher background as the concepts they will be learning in the next activity. There are four things that the students will learn during this lesson. 1) Where are the Everglades?, 2) What is landuse and why is it important to the Everglades past, present and future?, 3) Where have the wetlands gone? and 4) How has landuse changed during the period of time from 1900 to 1995?

Strategies:
1. Using the poster map “Comparison of Historical and Remnant Everglades”, ask students to describe what they see on the map and locate this inset map on the larger map of Florida on the poster. Brainstorm possible reasons for the change they see and list these either on the board or in their notebooks. Ask the students to look at the location of the Everglades on the larger map and name the types of man-made structures near or around the Everglades.
2. Talk to the students about the categories of landuse.
   *Remind them that not all landuse activities destroy nature, direct their attention to the state and federal lands protected from development on the map.

   Landuse Categories:
   1=Settled (Urban)
   2=Agriculture
   3=Natural Upland
   4=Natural Wetland
   5=Water
   6=Barren

3. Using the Wetlands 1900 to 1995 map provided and Water Atlas data or the teacher background attached to this lesson, discuss where have all the wetlands gone. Have students use the two maps provided to make this comparison.

4. Using the Data table Percent Change of Landuse 1900-1995; have students graph the data and analyze what they see. Once they have analyzed the graph have them write their own explanation of what they see happening as a writing assignment.

Culminating Activity:
Break students into two groups. Group 1 would be a time traveling group who would go to the past (year 1900) charged with the task to save the Everglades before people began to change the face of the Everglades for human use. Group 2 would be a time traveling group who would go to the future (year 2100) to see what has happened to the Everglades because of the plans made to protect the Everglades today. Each group must come back to the present time and report what they saw as well as write a compelling argument that would convince the political powers of the day that funds provided for Everglades protection are dollars well spent. Reports should use facts, maps and graphics when appropriate and be based on things that could really happen, not complete fantasy.

Extension Activity:
If you have access to a computer lab and ARCVIEW GIS software, go to the Geography Action site lesson plans and find “The Everglades: Finding A Balance” and allow your students to create the maps and graphs needed for analyzing the data used in this lesson. This would be an excellent activity for GIS day during the week!

National Geography Standards:
Standard 1: how to use maps and other geographic representations, tools and technologies to acquire, process, and report information from a spatial perspective.
Standard 4: the physical and human characteristics of places.
Standard 8: the characteristics and spatial distribution of ecosystems on Earth’s surface.
Standard 14: how human actions modify the physical environment.
Standard 15: how physical systems affect human systems.
Standard 16: the changes that occur in the meaning, use, distribution, and importance of resources.
Standard 17: how to apply geography to interpret the past.
Standard 18: how to apply geography to interpret the present and plan for the future.

**Sunshine State Standards:**
SS.B.1: The student understands the world in spatial terms.
SS.B.1.3.1: uses various map forms and other geographic representations, tools, and technologies to acquire, process and report geographic information including patterns of land use.
SS.B.2: The student understands the interaction of people and the physical environment.
SS.B.2.3.2: knows the human and physical characteristics of different places in the world and how these characteristics change over time.
SS.B.2.3.4: understands how the landscape and society change as a consequence of shifting from a dispersed to a concentrated settlement form.
SS.B.2.3.6: understands the environmental consequences of people changing the physical environment in various world locations.
SS.B.2.3.9: understands how the interaction between physical and human systems affects current conditions on Earth.
SS.B.2.4.4: understands the global impacts of human changes in the physical environment.
SS.B.2.4.5: knows how humans overcome “limits to growth” imposed by physical systems.
Percent Change of Landuse 1900-1995

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Background Information

1) **Everglades**
   
   *There are no other Everglades in the world.*
   
   [Images of the Everglades]

2) **History of the Everglades**
   
   Originally whole area under water.

3) **Historic**
   
   Became land locked.
   * Fresh water between Atlantic and Gulf Ridges.

4) Rains an average of 53 in/year.
   * 67% of rain is from May thru September.
   
   Distinct dry and wet season.

5) **Lake Okeechobee**
   
   * Fills up and overflows into sheet.
   * Planes to the sea:
     - Loss of Everglades
   * By-product of water movement is depositing of peat:
     - Mostly condition makes the year:
     - Very rich soil.

6) **Man and the Everglades**
   
   Control of Water
   Agriculture

7) **More remote water is the land more hospitable to people.**
   1. More water to water the land
   2. More water for the Everglades
   3. Irrigation for Agriculture
   4. Creation and Location
   5. Deap Water
   6. Land and Dams

8) **Takes water from Lake Okeechobee.**
   1. Contains flow of water.
   2. System contains flood control and storage and irrigation.
   3. Draws water from Everglades—giant sheet of water doesn’t flow anymore. About 48% of original Everglades is now gone.
   4. Draining and filling in wetlands for agricultural use and paving for extensive urbanization has increased runoff and risk of flooding.
   5. Agriculture is putting fertilizer into the water.
   6. More salt water infiltration because of lower groundwater elevation.
Background Information

9) 

Restoration of the Everglades

- National Environmental Protection Act
  - Passed in 1969
  - Damage to environment must be considered in all management decisions.
  - Passage of this act required control and regulation of water supplies and their use.

10) 

- Starting 1980's
  - Trying to control human use of water
  - Developing water management plans
  - Land acquisition of sensitive areas
  - Studying long-term trends in weather conditions - major droughts on 16 year cycle, major rainfall years on 6 year cycle
  - Trying to restore parts of Kissimmee River watershed to historical natural conditions

11) 

Population and Landuse

- Population concentrated along East coast, 1/3 of people live in South Florida.
- Agriculture is the major economy and occurs in the center portion of the region. The Everglades Agricultural Area (EAA) south of Lake Okeechobee is one of the most productive farming regions of the country.