America's Amazon

Part Two: Human Effects on Biodiversity

AL COS Standards Addressed

- Biology COS #14: Trace biogeochemical cycles through the environment, including water, carbon, oxygen, and nitrogen.
    - Relating natural disasters, climate changes, nonnative species, and human activity to the dynamic equilibrium of ecosystems

- Environmental Science COS #1: Identify the influence of human population, technology, and cultural and industrial changes on the environment.

- Marine Science COS #11: Describe positive and negative effects of human influence on marine environments.

- Zoology COS #8: Differentiate among organisms that are threatened, endangered, and extinct.
    - Identifying causative factors of decreasing population size

Notes:

- **1.** The above are high school standards. Most of the activities would also fulfill middle school standards. Also, be aware the current science COS is in a new DRAFT stage. http://www.alsde.edu/dept/coss
- **2.** The film is also addresses Social Studies Standards. Link to the Alabama COS for Social Studies is http://alex.state.al.us/staticfiles/2010_AL_Social_Studies_Course_of_Study.pdf

Learning Outcome: Students will evaluate the status and importance of the biodiversity of the Mobile-Tensaw Delta. They will document and evaluate the impacts of humans on the watershed and communicate their findings. Students will investigate the contributions of Dr. E.O. Wilson to the protection of biodiversity and the state of Alabama.

Materials

For the class: chart paper, marker
For the teacher: movie "America's Amazon" (Classroom Edition), rivers and dams maps, projector
For each student: science notebook, access to the Internet

Engage (Lesson time will depend age and skill level of the students.)

1. Instruct students to look at the Major Rivers of Alabama map again. Notice the many lakes and reservoirs. How do you think these were created? Discuss this with your partner.
2. Guide a quick class discussion on man-made dams. Allow students to share what they know about them. Project the two maps illustrating some of the many dams in Alabama and invite students to comment. Make sure the students understand the function of the dams.
3. Instruct students to brainstorm how these dams and the changes have affected the biodiversity of the Mobile-Tensaw Delta (MTD). Remind them that humans have both positive and negative influences on the environment. Encourage students to think back to the first part of the movie, where they learned that much of the state of Alabama is part of the Mobile Tensaw Watershed, which directly affects the MTD.
4. Using the www.alabamamaps.ua.edu or Google Earth to look at the satellite images or aerial photos around a specific dam or major river near a major Alabama City. On the website there will be images showing changes to the areas over time by county and city. On Google Earth, there is a clock image at the top of the screen that will regress the images over time. Discuss the visible changes like deforestation, increased residential space, and increased commercial space. This could be done as a group or as a class. Did the first portion of the movie give you any clues as to the potential impacts? Document the changes.

   Evaluate: Listen to the students' discussions and brainstorming. Use their level of understanding to guide your teaching.

Explore

1. Working in pairs, have students explore the topic of the effects of humans on the biodiversity using computers, tablets, or their personal devices. If these are unavailable, work as a class, allowing a student to "drive" the class computer while others "navigate." Assign a time limit based on your schedule. 10-15 minutes is suggested. Students should record their findings in their science notebooks.
2. When the time is up, have a class recorder record the compiled results of their searches on chart paper.
3. Ask students to add any factors to their lists that they didn't have, and circle any they think might apply to the MTD.

Evaluate: Circulate throughout the room as students are searching. Ask purposeful questions to prompt them to think critically about what they are finding. Redirect any unrelated activity. Spot-check their lists, noticing the circled items, and ask questions to probe their reasons for selecting them. It is really important to refocus students from just the dams to include the impacts to biodiversity include sedimentation, habitat destruction and degradation, and deforestation to mention a few.

Explain

1. Inform students that they will now watch a 20-minute segment of the movie "America's Amazon." (This segment runs from 22:24 – 41:53.)
2. **Choose vocabulary/concept words appropriate to the COS you are following. Ask the students to predict connections between the words. Present the list to the students so they can gather supporting evidence towards understanding while watching the video segment.**
3. Ask students to take notes on the influences of humans on the MTD. They should make a table for their notes. You should help them determine sections. Examples might be: Habitats, organisms, Human Changes to the watershed, Dr. E.O. Wilson, etc.
4. Have students copy the words *shoals, natal,* and *spawn* into their science notebooks, and to be prepared to discuss the meaning of these words as they occur in the movie.
    - Shoals: shallow place in a body of water (appears at 34:18)
    - Natal: relating to the place of one's birth (appears at 35:38)
    - Spawn: to deposit or release eggs (appears at 35:38)
5. Challenge students to keep a list of the many plants and animals mentioned in the movie. (Add to chart) Include an area in the chart that lists the groups of organisms in the Alabama ranks as tops in biodiversity.
6. There are many strong statements about Alabama's legacy of environmental protection in this section of the movie. Students learn that the damming of the Coosa River is believed to have caused more extinctions than any other factor in the history of the United States, and that Alabama ranks as the highest state in the country when it comes to extinctions, but the 49th in what it spends on protection. Be prepared to discuss these issues with the class.
7. Show the video clip. Stop occasionally to allow students to catch up on note taking, and have brief discussions on what they are learning.
8. After viewing, have students compare their notes to the original class list. Encourage discussion.

    Evaluate: Use comments during the movie to guide instruction. Check their notebooks to see that they are writing appropriate notes.

Extend

1. Students work together to apply what they have learned about the effects of human activity on the biodiversity of the MTD.
2. Instruct students to compose a letter to a legislator summarizing what they have learned about biodiversity and human impacts. Letters should be brief, and include a topic sentence expressing a call to action based on evidence, and at least two specific examples to support their statement. They should also include an appeal for legislators to act on behalf of Alabama based on the student's opinions.

3. For students interested in sending their letters, the following site has a "Find Your Legislator" feature which can be used to direct them. http://www.legislature.state.al.us/aliswww/AlisWWW.aspx

4. Champion Dr. Wilson's National Park effort or champion a particular local hero & their work to protect Alabama's Rvers. Dr. Wilson has many efforts they could support. There are many groups that protect the rivers and biodiversity of Alabama. Write a letter to share what you have learned or invite a representative of these organizations to connenct with your classroom.

Evaluate: Assess the letters for mastery of the content. Use their letters to address the need for clear scientific statements when communicating, and model how they might improve a letter. Providing time to rewrite letters if needed.

Note on evaluation: The instructional time you spend on the format of the letters will depend on the level of your students' understanding of persuasive writing. Adapt your evaluation as appropriate.

Be creative in designing connections for your classroom. There are many opportunities through technology to connect to the real world.

Further Extend

1. Alabama Science in Motion (ASIM) provides a water quality testing experiment built on a story line about the Alabama Sturgeon. Please contact your local ASIM biology specialist for more information on using that lab in your class. The ASIM's home page is: https://cws.auburn.edu/asim/Home/Home
2. Investigate the impacts of dams on the volume and timing of water flow and its impacts on the local biodiversity. The volume and timing data are easily available on the www.usgs.gov gauge site.
3. Organize service projects at your school to decrease impacts locally and raise awareness of our responsibilities.

CREDITS: *America's Amazon* was funded by **Alabama Nature Partners**, with additional funding from the **Weeks Bay Foundation** for classroom education.

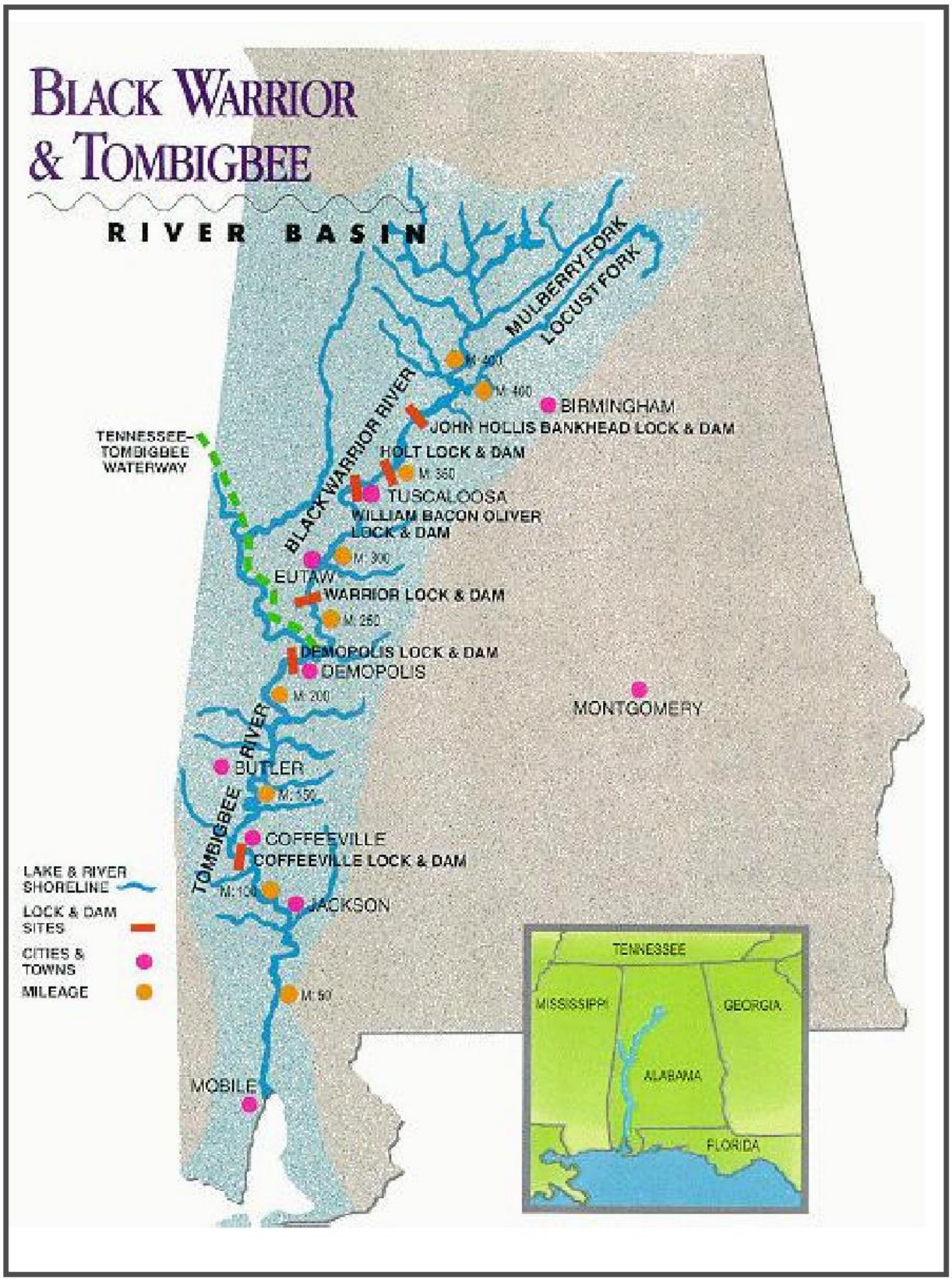
America's Amazon was produced by **Mary Riser**, **Lynn Rabren** and **Ben Raines** and can be purchased through the Alabama Nature Partners website at http://americasamazon.net.

The Teachers Guide was a collaborative effort among the film's producers, **Dr. Tina Miller-Way** of the **Dauphin Island Sea Lab's Discovery Hall** educational program, and Environmental Sciences teacher **Janet Ort** of Hoover High School.

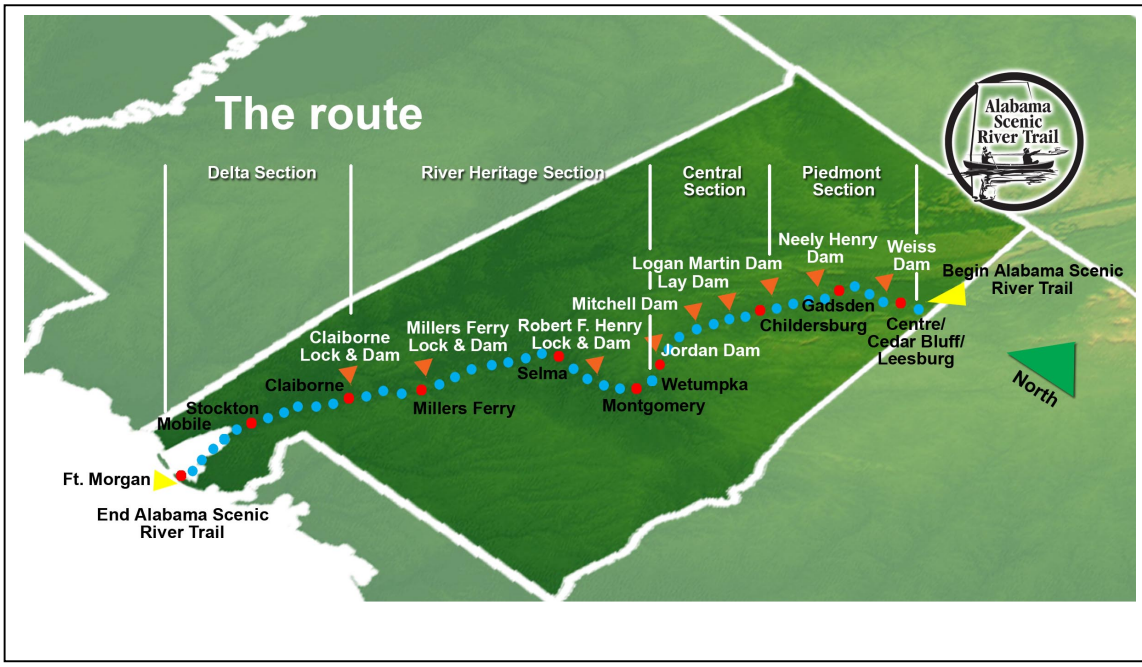
Major Rivers

Produced by the Dept. of Geography
College of Arts and Sciences
The University of Alabama

Figure 5: Locks and Dams of the Black Warrior and Tombigbee River Basin



Source: U.S. Army Corps of Engineers


The route
Alabama Scenic River Trail
Delta Section
River Heritage Section
Central Section
Piedmont Section
Neely Henry Dam
Weiss Dam
Logan Martin Dam
Lay Dam
Begin Alabama Scenic River Trail
Mitchell Dam
Gadsden
Childersburg
Centre/ Cedar Bluff/ Leesburg
Claiborne Lock & Dam
Millers Ferry Lock & Dam
Robert F. Henry Lock & Dam
Jordan Dam
Claiborne
Selma
Wetumpka
Stockton
Mobile
Millers Ferry
Montgomery
North
Ft. Morgan
End Alabama Scenic River Trail