Kate Zerbi	**Science in Society**
Endeavor H.S.	
Channelview, TX	**Environmental Science**
2004	**10^{th}-12^{th} grade**
Salmon Hotspots of the Skagit River	**2 weeks**

Time Allotment: This project should start concurrently with either a unit on endangered species or a unit on watershed systems. The book used as a parallel discussion for your debate will take some time for the students to read. I suggest at least two weeks for preparation on the project, keeping in mind this is to be partially done outside of class and is a supplement to the units discussed above.

Academic Standards:
Environmental Science Standards for the Texas Essential Knowledge and Skills

) Scientific processes. The student, for at least 40% of instructional time, conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(3) Scientific processes. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:

(A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;

(B) make responsible choices in selecting everyday products and services using scientific information;

(C) evaluate the impact of research on scientific thought, society, and the environment;

(4) Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes. The student is expected to:

(C) evaluate the impact of human activity such as methods of pest control, hydroponics, organic gardening, or farming on ecosystems;

(D) predict how the introduction, removal, or reintroduction of an organism may alter the food chain and affect existing populations; and

(E) predict changes that may occur in an ecosystem if biodiversity is increased or reduced.

(5) Science concepts. The student knows the interrelationships among the resources within the local environmental system. The student is expected to:

(A) summarize methods of land use and management;

(B) identify source, use, quality, and conservation of water;

(E) analyze and evaluate the economic significance and interdependence of components of the environmental system; and

(F) evaluate the impact of human activity and technology on land fertility and aquatic viability.

(8) Science concepts. The student knows that environments change. The student is expected to:

(A) analyze and describe the effects on environments of events such as fires, hurricanes, deforestation, mining, population growth, and municipal development;

(B) explain how regional changes in the environment may have a global effect;

(C) describe how communities have restored an ecosystem; and

(D) examine and describe a habitat restoration or protection program.

Source: The provisions of this §112.44 adopted to be effective September 1, 1998, 22 TexReg 7647.

Abstract: This is a role-play debate based off the book The Final Forest: the Battle for the Last Great Trees of the Pacific Northwest by William Dietrich. The activity could be concurrent with an endangered species or watershed unit, to show how the disappearance of one piece of an ecosystem can affect the entire balance. The students will be quizzed over the book and asked to brainstorm over watershed concerns in their area. The teacher will then create a situation that puts science under scrutiny and society into upheaval by

creating a new "law" based off the student's vote on what is their biggest watershed concern. They are placed in different roles of society from scientist to governor and asked to defend their position on the law. They will debate according to their role based on research the students will do. They will turn in a group poster board, an individual paper with proper citation with open discussion and write in their journal.

Goal: How can the students effectively make an impact on their immediate surroundings? What process does it follow?

Objectives:

- Demonstrate the role of science as used in economics, politics and society.
- Analyze student's role as a scientist and citizen and how to reconcile sometimes-conflicting attitudes peacefully.
- Evaluate Texas beach use and ecological importance.
- Compare and contrast watershed uses, endangered species issues, and other environmental concerns to other states to that of Texas.

Background Information: The students should be receiving lecture on water cycles, riparian zones, etc. Their labs should include water testing including coli forms, dissolved oxygen, nitrites, nitrates, measuring slope, thalweg, etc. You should include discussion of important life cycles that occur within water and comparisons of different areas of the country and world. Some very good information for comparison to the Northwest can be located in the book Salmon Without Rivers by Jim Lichatowich.

Materials: Each student will need a copy of the book The Final Forest: The Battle for the Last Great Trees of the Pacific Northwest by William Dietrich. They will also need internet and library access to build their debate. You may want to give a mini-introduction to the different groups you have put together and the difficulties they will face concerning the problem you have developed for the debate.

Technology: Internet access with approved websites that pertain to the student's chosen focus for research purposes.

Instructional Procedure: The goal for this particular lesson plan is to have students do a role-play in the form of a debate to show the influences on scientific research and the effects of decisions made based on the needs of society. The students will read the book The Final Forest: The Battle For the Last Great Trees of the Pacific Northwest, by William Dietrich. There should be deadlines for specific chapters and mini quizzes to ensure all students are reading along. Although this book is about the great old growth forests and the fight between the logging industry and the spotted owl, it is a perfect example of showing ecosystem degradation. From the research, I did on the fellowship I intend to tie logging and development into the degradation of the watershed systems that have propagated the decline of the salmon, during lecture and lab on water systems. From this exercise, I then would like the students to brainstorm about a particular water issue that has occurred in their area, fresh or ocean water. Each class will then get to vote on which issue concerns them the most. The teacher will then design the government action

that will take place to parallel what happened in the spotted owl fight. Then the teacher will assign groups of students to specific roles, and the students will have to research a specific position to defend in the class debate. For example, the students may find the biggest threat to their watershed ecosystem is over fishing in the Gulf of Mexico. The catalyst that you throw in may put a pound limit on how shrimp may be harvested, a ban on red drum fishing, or a 100-mile ban for sea turtle protection. Whatever it is, you have to research it based on what the students decide. Then you place students in groups of three to four and you assign them their roles. In our example, one group may represent scientists, fisherpersons; another group may represent the game wardens, other government officials from the seaport towns, an environmental activist group, etc. The student's responsibility is then to decide whether their group is for or against the proposal. The groups then must effectively debate on a specified date, their position. Each group will have five minutes to present, but leave enough time for ten minutes of open debate. You should set aside at least three days of library use, for internet and book use. I also encourage you to provide class time, after school availability, and your own "personal" library, newspapers, magazines, etc. The set up will parallel the book and the different viewpoints it expresses. Ground rules should include no swearing, yelling, or talking over each other. Each group should turn in a poster for their group grade, each individual a two to three page paper, and after the debate, their should be some open discussion about how the students felt about their position. The students should be allowed to reflect what they learned in their scientific journal.

Assessment: Depending on your time and focus, I suggest quizzes or essays to help keep students on task with their reading. I will use a rubric for both the individual paper and group poster board and presentation. Participation in the debate I use as extra credit. I have included a copy of one version of rubric that I use, though there are many adaptations you may choose.

Extensions: If you would like to cross-curriculum teach the book the students read is a Pulitzer Prize winning book that the English department in your schools may be able to do literature activity. There is also the possibility of collaborating with the government teacher and have students write letters of concern about their causes to their respective legislatures.

Acknowledgements: I am sure this is not the first time an activity of this magnitude or type was developed, but as far as I know the link I have made between this particular book and subject matter has not been used and is a cumulative grouping of popular activities.

Email Kate Zerbi: kzerbi@yahoo.com