

## ***Evaluating perspectives within a discipline: thinking critically about values and science in ecological reconstruction.***

**Education Unit for** New England Workshop on Science and Social Change, 2006  
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### **Level**

Honors level community college or lower division college students

### **Goals**

- I. Immerse students in the reality that some disciplines, particularly newer ones, are exciting, dynamic, and contested sites of knowledge production in which proponents of different approaches or perspectives vie for validation and acceptance by the field's practitioners and scholars.
- II. Provide a structured framework in which such a debate can be discovered, analyzed, and evaluated.
- III. Provide students with practice in identifying assumptions and arguments in texts and in defending a point of view.
- IV. Provide students with practice in applying perspectives to real world cases and vice versa.
- V. Directed use of internet resources.

### **Previous knowledge & rationale for unit**

Critical thinking skills are important for the kind of thoughtful citizens we need in order to be better stewards of our environments, including everyone and everything in them. The critical thinking skills that students use in this unit are transferable to a whole array of disciplines and issues. Prior to this unit, students should be introduced to the idea that all disciplines have their own literatures, theories, perspectives, and – if they are well-established – canons of knowledge. Special subject encyclopedias, literature searches, and citation indexes are tools that will enable students to learn something of the dominant ideas, paradigms, scholars and debates within the discipline.

In the discipline of ***restoration ecology*** the perspectives on science and values can be closely scrutinized via the arguments advanced in the literature. By critically reading and analyzing representative texts, students can form an opinion or judgment about the strength or weakness of different positions and learn how to defend a position. Synthesizing the ideas and arguments in their own words will enable them to better argue from a chosen position or perspective. Guiding questions that may spur additional directions for the students include: 1) what might be behind the desire of practitioners in a field to call what is does "science"? 2) are there other metaphors used in restoration ecology that also cause problems for some people? 3) What would be the reaction among restoration ecologists if their work were characterized as being informed by 'technical' rather than 'scientific' knowledge? 4) Is anything implied by saying that ecological restoration's goals and objectives are 'value-based' rather than scientifically-based?

## **Suggested Activities**

### ***Activity 1. Evaluating perspectives within a discipline***

#### **Notes for the teacher**

The first session is designed to introduce students to a debate within the discipline of restoration ecology by having them read short texts representing opposing points of view. Students should initially read the texts through without trying to identify the arguments. Checklists are then provided for the second critical reading. By the time they have re-read the second (opposing) piece, they should be in a position to identify the arguments and counterarguments for each point of view.

Articulating their positions to each other gives the students a sense of realism and ownership of their authors' point of view. It can also open up additional questions and, most importantly for self-directed learning, greater motivation for further investigation of some of the other literature cited.

The second session is designed to factor in a competitive spirit – it allows students to find a role where they are most comfortable and can best contribute. It should be stressed to the students that between the end of session 1 and the beginning of session 2 they have an opportunity to delve more deeply into these perspectives and their associated themes.

The attached critical thinking rubric can be simplified for the scoring of the juried presentations.

#### **Outline of unit** (conducted over 2 x 1.5 hour class periods)

##### **Session 1**

1. Ask students to read two texts, one of which is a short position piece (Text A) and the other the response to the piece (Text B).
2. Working in pairs, the students each take one of the positions. They critically re-read and identify (via a checklist handout) the argument(s) put forward in their respective texts.
3. The pair then exchanges texts and works up counter-arguments based upon their reading of the opposing text.
4. Each student orally presents his/her respective text's arguments to his/her partner. Each student may make notes during the other student's presentation.
5. Instruct students that they may consult any of the references given at the end of the texts in order to strengthen their arguments and/or better prepare for the next session.
6. Homework assignment: Students use the checklist as a basis for a short, one-page précis of their text's main arguments and turn this in for grading at the end of the first session. A template rubric is provided that can be used to evaluate the written work.

## **Session 2**

1. Ask the students to form two groups – Group A will defend the position taken by Davis and Slobodkin; Group B will defend the position taken by Winterhalder, Clewell, and Aronson (depending on the size of the groups, it may be necessary to divide into two groups of A's and B's – no more than 8 individuals per group. Instructor will also need to insure that the total numbers of students in the A Group(s) and B Group(s) are roughly equivalent).
2. Group A collates all the arguments pertaining to the position taken by Davis and Slobodkin, and Group B does the same with respect to Winterhalder, Clewell, and Aronson. Allow time (and a whiteboard or pen & paper) for students to compare, eliminate duplications, and choose the best wording of their respective positions.
3. Have two students from Group A and two students from Group B self-select to present again as two teams. The remaining students will become members of the jury that will evaluate and give points to the presentations. Students forming the jury must undertake to be as neutral as possible with respect to their former positions.
4. In this final presentation, jury members will issue points based on how well the teams present and represent their respective perspectives, including offering context that indicates additional reading was done.

### **The texts**

Davis, M. A. and Slobodkin, L. B. (2004). The Science and values of restoration ecology, *Restoration Ecology*, 12(1):1-3.

Winterhalder, K., Clewell, A. F., and Aronson, J. (2004). Values and science in ecological restoration – a response to Davis and Slobodkin, *Restoration Ecology*, 12(1):4-7.

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### ***Activity 2. The nature of restoration ecology: application of a perspective to real restoration project/cases.***

#### **Notes for teacher**

For this activity, students will locate and examine the literature on actual restoration projects in order to apply the perspectives found in the two foundational articles. Applying abstract principles or philosophical positions to the more concrete accounts typical of case studies in discipline journals will not be easy, however. Students may be encouraged to look for overviews of the debate by searching with the phrase "issues in ecological restoration" in a search engine. A variety of articles can be retrieved which can then lead to more focused scholarly database searches using the personal names of advocates of different perspectives and additional concepts uncovered in the more general articles. Ethical aspects, social aspects, economic aspects, and political aspects, are all secondary terms that can be searched in combination with a general concept such as restoration ecology, ecosystem health, sustainability, and the like.

Armed with a context in which to evaluate actual restoration projects, students can look for case studies using the strategies outlined below in (2.) below. Moreover, instructors can model moving from the "micro" level of discourse to the "macro" level by encouraging discussions around questions such as: what counts as science; how people seek to draw boundaries around disciplines, nature, themselves/others; how we use metaphors to understand science and society.

### **Outline of unit**

**Sessions 1-4** (conducted over four X 1.5 hour class periods)

1. As in Activity 1, have students read the two texts listed above and complete the checklist.

2. Strategies for finding **case studies/projects**:

- Search the major discipline journals, which include *Restoration Ecology*, *Ecological Restoration*, *Ecological Management and Restoration*, with the keyword "case study."
- Peruse **Restoration Project Showcase** at the [Society for Ecological Restoration](#) (SER) web site
- Use the Discovery Engine at the [National Academies Press](#) (NAP) web site to search for online books and documents on "restoration ecology" "restoration projects" and/or "ecological restoration". Have students select an item from the list, and then click on the **Research Dashboard** link on the right of the screen. Depending on the content of the chosen book or document, additional keywords are presented that can be added or substituted for the original keywords. Links to automatic searches in Google Scholar, Google Print, Yahoo Web Search, and MSN Search are accessible from the Research Dashboard.

4. Students can be given the option of working individually or in small groups to gather information about and provide analysis of their case studies.

For students who elect to work individually, a term paper of 5-10 pages would be required. An assessment rubric is provided.

For students who elect to work in a small group, roles should be assigned (or self-selected) as follows:

- Literature searcher (at least two students, depending on the size of the group)
- Analyzers (at least two students, depending on the size of the group)
- Writer
- Presenter

Final products for this option could include: a group-written report (with individual contributions clearly delineated), a PowerPoint presentation, or a web-based presentation.

5. A **standard research paper** option that explores one or more of the “macro” issues listed above in *Notes for the Teacher* could also be offered as an alternative to the case studies.

**Focus questions for this option might include the following:**

- 1) What might be behind the desire of practitioners in a field to call what is does “science”?
  - 2) Are there other metaphors used in restoration ecology that are considered problematic?
  - 3) What would be the reaction among restoration ecologists if their work were characterized as being informed by ‘technical’ rather than ‘scientific’ knowledge?
  - 4) Is anything implied by saying that ecological restoration’s goals and objectives are ‘value-based’ rather than scientifically-based?
  - 5) What counts as science?
  - 6) How do people seek to draw boundaries around disciplines, nature, & themselves/others?
  - 7) How do we use metaphors to understand science and society?
  - 8) How important is participation in restoration practice?
  - 9) How important are cultural practices (e.g., agriculture, burning) to restoration?
  - 10) Should we feel uneasy about corporately-sponsored restoration projects?
  - 11) Who should pay for restoration?
  - 12) Is the risk of unforeseen outcomes (e.g. an invasive species becoming established in an area which, pre-restoration, it had difficulty in populating) an argument against restoration practices until the current state of knowledge is more robust and comprehensive?
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**Activity 3. Proposal for an instructor-compiled restoration ecology bibliography.**

There is always a good argument to be made for not reinventing the wheel. If readers know of relevant articles that would be useful for this unit and to other instructors, consider adding them to the *Educational Unit Bibliography*. For starters, here is a selection of articles consulted in the creation of this educational unit:

Allison, S.K. (2004). What do we mean when we talk about ecological restoration? *Ecological Restoration*, 22(4):281-286.

Cairns, J. (2003). Ethical issues in ecological restoration. *Ethics in Science and Environmental Politics (ESEP)*, June 24, 50-61.

Cairns, J. (2005). Ecological overshoot and ecological restoration. *Asian Journal of Experimental Sciences*, 19(2):1-12.

D'Avanzo, C. (2003). Application of research on learning to college teaching: ecological examples. *BioScience*, 53(11):1121-1128

Davis, M. A. and Slobodkin, L. B. (2004). The Science and values of restoration ecology, *Restoration Ecology*, 12(1):1-3.

Gold, W., Ewing, K., Banks, J. et.al. .(2006) Collaborative ecological restoration. *Science*, 312(5782):1880-1881.

Higgs, E.S. (1997). What is good ecological restoration? *Conservation Biology*, 11(2):338-348.

Green, C. and Richards, L. (2000). *Restoration Ecology: Selected Bibliography*. Retrieved on October 29, 2006 from <http://www.lib.washington.edu/fish/subjects/bibliography.html>

Winterhalder, K., Clewell, A. F., and Aronson, J. (2004). Values and science in ecological restoration – a response to Davis and Slobodkin, *Restoration Ecology*, 12(1):4-7.