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ENST 570.01: Ethics and Restoration

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ETHICAL ISSUES IN ECOLOGICAL RESTORATION
EVST 570_01, Fall 2018
FR 9:30—12:30 pm; LA 336
CRN: 73174

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“The real future of environmentalism is in rehabilitation and restoration. Environmentalists have told the story of the Garden of Eden and the fall from grace over and over again. But we haven’t yet told the story of redemption. Now we need to tell that story.” • Steven Pyne

COURSE DESCRIPTION

We possess the machinery, engineering skills and science to dramatically alter ecosystems for different uses or back to a reference condition. The work of ecological restoration involves decisions at every step about how and to what should we restore an ecosystem. These inflection points bring up a host of ethical and philosophical issues. Diving deep into on-the-ground work underway on Rattlesnake Creek, the Clark Fork River, and in headwater tributaries of the Big Hole River, we will come to understand the constraints, timeframes and on-the-ground outcomes of recent and active restoration projects. We’ll also come to understand the human communities and networks involved in and affected by restoration and the connection between restoration and sustainable human communities, bioregions and landscapes. From this practical understanding of the work, we will each be looking to articulate our own “restoration ethic” as a philosophical and moral grounding. Just because we can restore ecosystems does not necessarily mean that we *should* do so in all contexts. How would you make decisions about what to restore and how?

Environmental legislation of the 1970s and 1980s created the foundation for legal settlements and government programs to restore ecosystems. In particular here in Western Montana and the Upper Clark Fork watershed, the EPA’s Superfund Program has spurred a vibrant restoration economy and millions of dollars of restoration projects. The first section of the course reviews central concepts and practices in ecological restoration from the perspective of non-profit groups and state land managers and other experts as we examine community dimensions of the restoration process. Before the snow flies, we will have had practical exposure to the work of restoring streams degraded by mining and other human impacts and we will have seen low-tech and high-tech solutions.

The second section of the course examines several case studies relating to current large-scale restoration of fisheries and reduction of sediment in the Big Hole River watershed and the Clark Fork River. We will explore the ethical dimensions concerning genetic manipulation of fisheries populations, the use of lawsuits and the role of regulation in promoting or inhibiting restoration, and look at examples outside of the Big Hole where restoration is occurring in wilderness to explore the question of whether active restoration in wilderness is ever ethically merited. The final section of the class is an extended philosophical exploration of what counts as “good” restoration, and why. Within this discussion we will look at emerging issues around restoration in the context of novel ecosystems and climate change. Over the course of the semester students will have the opportunity to develop a framework for what counts as good restoration in our changing, dynamic 21st century context.

OBJECTIVES & LEARNING OUTCOMES:

Upon completion of this course, students should be able to:

1. Analyze, critically evaluate, and correctly apply basic ethical concepts and forms of moral reasoning from the field of environmental ethics to contemporary issues and practices in the field of ecological restoration.
2. Think critically about the moral, social and environmental effects of the practices of ecological restoration in diverse social and ecological contexts.
3. Apply moral analysis to a contemporary case study in restoration of native fisheries in the Upper Big Hole River watershed.
4. Incorporate information literacy into the moral analysis of restoration issues and writing assignments by finding, evaluating, analyzing, and synthesizing information from diverse sources.
5. Write more clearly and effectively about complex ethical issues related to ecological restoration and be able to communicate these issues and multiple perspectives fairly and clearly to diverse audiences.

REQUIRED TEXTS

Nature By Design. Eric Higgs (MIT Press: 2003; ISBN: 0-262-58226-0)
Readings on Moodle

Recommended:

Ecological Restoration: Principles, Values, and Structure of an Emerging Profession [Second Edition]. Andre Clewell and James Aronson (Island Press: 2013; ISBN: 978-1-61091-168-7)

Ethical Adaptation to Climate Change: Human Virtues of the Future. Allen Thompson and Jeremy Bendik-Keymer, eds. (MIT Press: 2012; ISBN: 978-0-262-51765-2)

COURSE SCHEDULE

Date	Class Topic and Assigned Readings	Reading Location
8/31 FR 1	Introduction to the course	
9/7 FR 2	What is Ecological Restoration.	
	<u>Readings</u>	
	The SER International Primer on Ecological Restoration	Moodle 1
	Ch 1: "Overview: Basic Terms and Concepts"	Clewell & Aronson, Moodle 2
	Ch 2: "Values and Ecological Restoration"	Clewell & Aronson, Moodle 3
	Dan Spencer: "Ethics and Restoration: A Fascinating and Vexing Time"	Moodle 8
	Marion Hourdequin: "Ecological Restoration"	Moodle 9
	Eric Higgs: "What is Good Ecological Restoration?"	Moodle 10

9/14 FR 3 Field Trip: Rattlesnake Dam Removal
[Depart from Campus 9:30 am. Return 12:30pm]

Speaker: Rob Roberts, Trout Unlimited

[2017 Site visit to Rattlesnake Dam Project- https://www.youtube.com/watch?v=OS-Ads1_wZE](https://www.youtube.com/watch?v=OS-Ads1_wZE)

9/21 FR 4 Upper Clark Fork/Big Hole Field Trip: Big Hole floodplain restoration.
[Depart from Campus 9:30 am; Stay night at Sugarloaf Lodge]

In the morning we will visit an active restoration project in a backcountry environment along the continental divide in the Anaconda Uplands Superfund Site. Heavy equipment will be deep into the backcountry, dramatically altering the landscape to accomplish restoration objectives.

In the afternoon we'll get our hands dirty and learn the ins and outs of building beaver mimicry structures for sediment catchment and improvement of hydrologic function. We will construct a series of beaver mimicry structures in California Creek, part of the Anaconda Uplands Superfund project, with support from professional contractors.

Readings

Montana Standard: "First aid for the Big Hole: Major restoration work targets tributaries"

Mt. Haggin Uplands Remedy and Restoration Work Plan (Skim the Appendices)

Recommended

California Creek Final Report (skim)

DNRC Uplands Final Report (skim)

Big Hole Watershed Committee Projects Page: www.bhwc.org/projects

9/22 SA 4 Upper Clark Fork/Big Hole Field Trip: Upper Clark Fork Superfund.
[Return to Campus by: 5:00 pm]

We will meet up with Len Broberg and other UM students for tours of the Berkeley Pit in Butte and other areas treated under Superfund (Details being coordinated by Len).

9/28 FR 5 Advocacy and Action for the Clark Fork River: An NGO perspective

Speakers: Alex Leone and Will McDowell, Clark Fork Coalition

Readings

Ch 4: "Recovery" **Clewell & Aronson, Moodle 14**

Ch 5: "Ecological Attributes of Restored Ecosystems" **Clewell & Aronson, Moodle 15**

10/5 FR 6 Field Trip: Milltown Dam

[Depart from Campus 9:30 am. Return 12:30 pm]

Readings

Milltown Dam News Overview January 2010 **Moodle 17**

(www.cfrtac.org/images/pdf/january2010/dam_news_09_single_panel.pdf)

The Three R's of the Milltown Reservoir Superfund Project **Moodle 18**

(www.cfrtac.org/061009b.html)

The Other End of the Dam Project (www.cfrtac.org/061009d.html) **Moodle 19**

YouTube video: Breaching the Dam:

<https://www.youtube.com/watch?v=ISLInzprz3M>

Opportunity, MT: "Toxic Turmoil": http://missoulia.com/news/state-and-regional/toxic-turmoil-like-it-or-not-people-of-opportunity-are/article_a08b1062-527f-5409-b39f-cfbd68fefdf2.html

Speaker: Mike Kustudia, Manager, Milltown State Park

10/12 FR 7 Clark Fork River Superfund Restoration Field Trip

[Depart from Campus 9:30 am. Return 2:00 pm]

Readings

TBD

10/19 FR 8 Ethical Dilemmas in Restoration in Wilderness

Readings

Peter Landres et al: "Naturalness and Wildness: The Dilemma and Irony of Ecological Restoration in Wilderness" **Moodle 20**

Peter Landres: "Let It Be: A Hands-Off Approach to Preserving Wildness in Protected Areas" **Moodle 21**

Gregory Aplet & David Cole: "The Trouble with Naturalness: Rethinking Park and Wilderness Goals" **Moodle 22**

The Wilderness Act of 1964 **Moodle ___**

Beth Hahn, Peter Landres, Eric Biber, Dan Spencer "Asking the Right Questions: Integrating Law, Science, and Ethics to Support Decisions about Ecological Intervention In Wilderness" [Draft] **Moodle 23**

Michael Soulé: Should Wilderness Be Managed? **Moodle 24**

10/26 FR 9 Restoration Case Study I: Native fisheries restoration in the Upper Big Hole-Grayling and the French Creek Fish Barrier.

Fisheries restoration in the Mt. Haggin Wildlife Management Area, Upper Big Hole River Montana

Readings: On Moodle

Facilitators:

11/2 FR 10 **Restoration Case Study II: Whitebark Pine Restoration in Wilderness**

Readings: On Moodle

Facilitators:

11/9 FR 11 **Restoration Case Study III: Upper Clark Fork River Restoration**

Readings: On Moodle

Facilitators:

11/16 FR 12 **What is Good Restoration?**

Ch. 1: A Tale of Two Wildernesses: Jasper National Park,
Meet Disney World

Higgs, NBD

Ch. 2: Boundary Conditions (skim 59-75)

Higgs, NBD

Ch. 3: What is Ecological Restoration?

Higgs, NBD

Ch. 4: Historicity and Reference in Ecological Restoration

Higgs, NBD

11/23 FR 13 **Thanksgiving- NO CLASS**

11/30 FR 14 **Restoration in an Age of Climate Change and Novel Ecosystems**

Readings:

Ronald Sandler: Global Warming and Virtues of Ecological
Restoration

Ch. 3, EACC

Rachel Standish, et al.: Concerns about novel ecosystems

Moodle 31

Brian Starzomski: Novel ecosystems and climate change

Moodle 30

Richard Hobbs, Eric Higgs, Carol Hall: What do we know about,
and what do we do about, novel ecosystems?

Moodle 32

Ned Hettinger: Nature Restoration as a Paradigm for the Human
Relationship with Nature

Ch. 1, EACC

Andrew Light: The Death of Restoration?

Ch. 5, EACC

12/7 FR 15 **Wrap up & Discussion: What Makes an Ethic of Good Restoration?**

Paul Hirsch & Bryan Norton: Thinking Like a Planet

Ch. 16, EACC

12/10-14 **Final Exam Period:** Final Take Home Exam Essay

WEIGHT AND TIMELINE OF ASSIGNMENTS

The total number of points available for class assignments is 500 points.

In order of due dates, the assignments are:

	<u>points</u>	<u>%</u>	<u>due date</u>
1. Wilderness Restoration Case Study Essay	100	20%	Oct 17, 19, 24
2. Class Facilitated Essays	100	20%	Oct 31, Nov 2, 7
3. Higgs Critical Response Essay	125	25%	Nov 28
4. Group Projects on Restoration at Dry Cottonwood Creek & Thomas Ranches & Individual Reflection Papers	50	10%	Nov 14
5. Take-Home Final Exam Essay	125	25%	Dec 15

Note: final grades will use pluses and minuses.

1. Ethical Analysis of a Case Study in Restoration in Wilderness: Class Facilitation and Reflective Essay. Each class member will have the opportunity to work in a small group to facilitate class discussion on a case study involving restoration in wilderness, using a framework by Peter Landres of the Aldo Leopold Wilderness Research Institute. The case studies and instructions for the class facilitation will be given in class. The dates for the case studies are Tuesday, October 10, Thursday, October 12, and Tuesday, October 17. Each student will then write up a 6-8 page reflective essay on her/his case, reflecting on and analyzing the ethical dimensions of the case, and making a recommendation for how best to resolve it. Specific instructions will be given in class. **Essay due in class on TBD.**

2. Facilitation of Class Discussion and Critical Response Essay: Each student will have the opportunity to facilitate class discussion of one set of article(s) assigned for Section III of the class: "Ethical Issues and Debates in Ecological Restoration." The class should be organized as a discussion of the texts, not a presentation. You will then write a critical response paper to the article(s) discussed in that class. Your paper should contain (a) a clear summary exposition of the main points of the reading(s) (3-4 pages) as well as (b) your thoughtful assessment of and response to the materials and ideas presented in the text (3-4 pages). (Total Length: 6-8 pages, double-spaced), **Due in class Tuesday, October 31, Thursday, November 2 or Thursday, November 7.**

3. Critical Response Essay Eric Higgs' Nature By Design: A 8-10 page critical response essay to the primary course text, Eric Higgs' book, *Nature by Design: People, Natural Process, and Ecological Restoration*. The first part of this essay should be a thoughtful exposition (i.e. summary and explanation) of the overall argument and main themes from the book with 1-2 paragraphs dedicated to each chapter (Note: this should be a well-written, flowing essay, not a compilation of chapter summaries. *Develop* Higgs's argument to reflect how he does this in the book). The second section should be your response to the issues Higgs raises and argues about what counts as *good* restoration, and *why*: where do you agree with Higgs, disagree, and why? Does Higgs provide a helpful framework for assessing the ethical dimensions of ecological restoration? Where is his framework most helpful, least helpful, and where could it or should it be developed further or differently? **Due in class, Tuesday, November 28.**

NOTE: Your audience for the papers in 1, 2, & 3 is someone who has *not* read these texts. This means your exposition section must be clear and sufficiently well-developed so that the

position and arguments of the author(s) would be clear to someone who has not read them, and would satisfy the author of a fair representation of his or her arguments.

4. Small Group Projects: The entire class will partner with the Clark Fork Coalition in their restoration and monitoring work on the Dry Cottonwood Ranch south of Deer Lodge and the Thomas Ranch on Gold Creek. We will meet to get an overview of the Dry Cottonwood Creek Ranch and their restoration and monitoring work with Maggie Schmidt on Saturday, Sept 9th in the morning. Small group teams will then be expected to carry out their individual projects on one of the additional field days scheduled for Fri-Sat [Dates TBD] in September and October. More information about the structure of the projects will be given in class.

Following your experience(s) on the Dry Cottonwood Creek Ranch and/or the Thomas Ranch write a short (3-4 page) reflection essay where you do three things: (1) Describe briefly what you did for your project(s) related to the Dry Cottonwood Creek / Thomas Ranch; (2) Discuss any insights about Restoration you gained from the project and/or time spent on the DCCR; (3) Reflect on the quality of the Restoration (ecological, social, cultural) being done there in light of our conversations to this point of the semester about what counts for *good* restoration and why. To what extent can we see the work being done on the DCCR as an example of *good* restoration, and why? Due in class Tue, Nov 14 (flexible deadline depending on when projects are finished).

5. Class Facilitation of readings from *Ethical Adaptation to Climate Change*: These three classes will each focus on a different section of the text, *Ethical Adaptation to Climate Change*. Student teams will facilitate each class. In preparing for class, assume that everyone has read the chapters carefully, so you do not need to present on the content of the chapters. Rather, facilitate a critical conversation on the key themes and concepts, and what contributions, if any, they make to the discussion of what counts as *good* ecological restoration and why. Plan to have a structured facilitation for the first 20-25 minutes, and then open discussion of the readings from there.

6. TAKE-HOME FINAL EXAM ESSAY:

Option A: Throughout the semester, we have considered ethical issues in ecological restoration through two primary lenses: (1) the philosophical question, “What is *good* ecological restoration?” posed most acutely by philosopher Eric Higgs (and posed by others as “*Can* restoration even be good?”); (2) the on-the-ground restoration planning and projects, both in Wilderness, and in the Clark Fork watershed being stimulated by the Superfund cleanup of the Clark Fork River and the community planning being spearheaded by the Clark Fork Coalition and other organizations involved in restoration.

In light of this semester-long conversation, write an 8-10 page essay (double-spaced) addressing these three questions:

- (1) “What kind of restoration ethic is needed to guide ecological restoration efforts, and why?”
- (2) “What difference, if any, do emerging factors of climate change and novel ecosystems make for developing a restoration ethic, and why?”
- (3) “Is the restoration and clean up process ongoing in the Clark Fork watershed an example of *good* restoration? Why or why not?”

In your essay, please draw on several of the assigned readings as “conversation partners” in developing your response, as well as insights gained from class discussions, field trips, speakers

and any additional reading you have done. In your answer, please consider and integrate responses to these questions:

- Which authors have been most helpful to you in formulating your ethic, which most problematic, and why?
- What are the strengths and weaknesses, problems and potential, of ongoing restoration in the Clark Fork watershed, such as the Superfund clean up of the Clark Fork River in the Deer Lodge valley and the work of the Clark Fork Coalition on the Dry Cottonwood Ranch?
- What are the most important insights you have gained about restoration from this semester-long immersion?

Option B: Throughout the semester, we have considered the philosophical question, “What is *good* ecological restoration?” We have looked at this question through several lenses, especially through Eric Higgs’s text, *Nature By Design*. For this essay, use Higgs’s text as a departure point to investigate and analyze in greater depth *an issue* you believe is central to the question of *good* ecological restoration, but that Higgs either does not address, or addresses inadequately. Your paper should *not* be a rehashing of the issues in Higgs or your response paper to Higgs, but rather a new and more in-depth examination of *other* dimensions you believe need to be factored into the question of what counts for good ecological restoration, and why. Draw on other authors (including those we read in class or others you bring in), to help develop your analysis. What I am looking for in this essay is your ability to take the conversations and readings we have engaged this semester about good ecological restoration as a *starting point* that you move beyond and address a new or additional issue(s) in greater depth. Your final essay should be 8-10 pages, double-spaced. Please clear your topic with me prior to writing it.

Bring your completed essay to our classroom during the final exam period, **Friday, December 15, 3:20—5:20 pm**, where each of you will have the opportunity to share a synopsis of what you have written. Baked goodies to share with your classmates are also appropriate at this time. 😊

CLASS POLICIES:

Note Re Papers: Papers are due in class **on or before** the date listed in the syllabus. Unless you have made a prior agreement with me, I will take off one grade level (A becomes A-) for each class day an assignment is late. Papers with an undue number of errors of punctuation, spelling, or grammar will be marked down and may be returned ungraded for correction. Written work will be evaluated in terms of your depth of critical analysis, thoughtfulness of reflection, clarity of writing, and ability to address issues raised in the text and in class on the topic at hand. Grades given reflect the following criteria of judgment:

- F: Failure to meet minimum requirements
- D: Unsatisfactory, but some effort to meet minimum requirements
- C: Satisfactory; meets minimum requirements of assignment but not much more
- B: Good to Very Good: thoughtful reflection, good analysis, clear writing style
- A: Excellent depth of critical analysis, thoughtfulness of reflection, and writing style; demonstrate creativity and mature analytical skills in going beyond the primary requirements of the assignment

Attendance: Regular attendance and participation in the class is expected. More than **three** (3) absences will result in losing any benefit of the doubt on your final grade. More than **four** (4) absences will result in one grade reduction. More than **five** (5) absences will result in a failing course grade. Late arrivals in class will count as an absence. (**Note:** If you have a valid reason for missing several classes, such as illness or other conflicting commitments, you still **must** speak with the instructor).

Academic Dishonesty and Plagiarism: All work submitted is expected to be the student's own. Any acts of plagiarism or academic dishonesty will result in automatic failure of the course, and may result in further academic punishment. If you have any doubts about definitions of plagiarism or academic dishonesty, please review the relevant sections of the University Catalog.

Students with Disabilities: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you think you may have a disability adversely affecting your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommason Center 154 or 406.243.2243. I will work with you and Disability Services to provide an appropriate modification. I am in the process of converting all of the materials in the class to an accessible format. If you find any course materials are not in an accessible format for you, please let me know and I will work with DSS to change the format.

Important University Policies, Dates and Deadlines

For Important Dates and University policies, check Cyberbear at <http://cyberbear.umt.edu/>

Incomplete Grade: Please see the criteria that must be met for an Incomplete in the University Catalog. No exceptions will be made for these criteria.

Moodle: Course assignments and readings are also posted on Moodle, which may be accessed at <https://moodle.umt.edu>

Readings on Moodle, ENST 570_01, Fall 2017
Ethical Issues in Ecological Restoration

1. The SER International Primer on Ecological Restoration
(www.ser.org/docs/default-document-library/english.pdf).
2. Andre F. Clewell and James Aronson. 2013. "Values and Ecological Restoration" in *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession* (Second Edition). Washington DC: Island Press, pp. 15-31.
3. Andre F. Clewell and James Aronson. 2013. "Overview: Basic Terms and Concepts" in *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession* (Second Edition). Washington DC: Island Press, pp. 3-13.
5. 2005 State of the Clark Fork: Understanding Our Watershed
www.clarkfork.org/publications/state_of_clark_fork/index.html
6. Cassandra Hemphill. 2007. History of Upper Clark Fork River Basin Litigation: Background, Status, and Opportunities to Restore the Basin. Unpublished paper, The University of Montana.
7. Sarah Carvill. 2009. The Focal Politics of the WRC in *On This Piece of Ground: Landowner Perceptions of Restoration in the Deer Lodge Valley*. Unpublished Master's Thesis, The University of Montana.
8. Dan Spencer. 2016. "Ethics and Restoration: A Fascinating and Vexing Time." *SER News*, Vol. 30, Issue 4, August 2016.
9. Marion Hourdequin. 2015. "Ecological Restoration" in *Environmental Ethics: From Theory to Practice*. London and New York: Bloomsbury, pp. 169-193.
10. Eric Higgs. 1997. What is Good Ecological Restoration? *Conservation Biology*, Vol. 11, No. 2, April 1997, 338-348.
11. Andre F. Clewell and James Aronson. 2013. "Disturbance and Impairment" in *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession* (Second Edition). Washington DC: Island Press, pp. 33-51.
12. Jim A. Harris and Rudy van Diggelen. Ecological restoration as a project for global society. In Jelte van Andel and James Aronson, eds. *Restoration Ecology: The New Frontier*. Malden, MA: Blackwell, 2006, 3-15.
13. Jelte van Andel and Ab P. Grootjans. Concepts in restoration ecology. In Jelte van Andel and James Aronson, eds. *Restoration Ecology: The New Frontier*. Malden, MA: Blackwell, 2006, 16-28.
14. Andre F. Clewell and James Aronson. 2013. "Recovery" in *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession* (Second Edition). Washington DC: Island Press, pp. 73-87.

15. Andre F. Clewell and James Aronson. 2013. "Ecological Attributes of Restored Ecosystems" in *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession* (Second Edition). Washington DC: Island Press, pp. 89-112.
16. Andre F. Clewell and James Aronson. 2013. "Semicultural Landscapes and Ecosystems" in *Ecological Restoration: Principles, Values, and Structure of an Emerging Profession* (Second Edition). Washington DC: Island Press, pp. 113-124.
17. **Milltown Dam News Overview January 2010**
(www.cfrtac.org/images/pdf/january2010/dam_news_09_single_panel.pdf)
18. **The Three R's of the Milltown Reservoir Superfund Project**
(www.cfrtac.org/061009b.html)
19. **The Other End of the Dam Project** (www.cfrtac.org/061009d.html)
20. Peter Landres, Mark Brunson, and Linda Merigliano. Naturalness and Wildness: The Dilemma and Irony of Ecological Restoration in Wilderness. *Wild Earth*, Winter 2000/2001, Publication #417, 77-82.
21. Peter Landres. Let it Be: A Hands-Off Approach to Preserving Wildness and Naturalness in Wilderness. In David N. Cole and Laurie Yung, eds. *Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change*. Washington, D.C.: Island Press, 2010, 88-105.
22. Gregory Aplet & David Cole. The Trouble with Naturalness: Rethinking Park and Wilderness Goals. In *Beyond Naturalness: Rethinking Park and Wilderness Stewardship in an Era of Rapid Change*. David Cole and Laurie Yung, eds. Washington D.C.: Island Press, 2010, 12-29.
23. Beth Hahn, Peter Landres, Eric Biber, Dan Spencer. 2017. "Asking the Right Questions: Integrating Law, Science, and Ethics to Support Decisions about Ecological Intervention in Wilderness." *Unpublished Draft*.
24. Michael Soule. 2001. Should Wilderness Be Managed? In Ted Kerasote, ed. *Return of the Wild: The Future of Our Natural Lands*. Washington DC: Island Press, 2001: pp. 136-152.
25. John Hendee, George Stankey, and Robert Lucas. 1990. Wilderness Management: Philosophical Directions. In John Hendee, George Stankey, and Robert Lucas, eds. *Wilderness Management*. Golden, CO: North American Press, 1990; pp. 3-25.
26. Robin Kimmerer. Restoration and Reciprocity: The Contributions of Traditional Ecological Knowledge. In *Human Dimensions of Ecological Restoration: Integrating Science, Nature, and Culture*. Dave Egan, Evan Hjerpe, and Jesse Abrams, eds. Washington D.C.: Island Press, 2011, 257-276.
27. Robin Kimmerer. Selections from *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*. Minneapolis: Milkweed, 2013.

28. Selections from *Explore the River: Bull Trout, Tribal People, and The Jocko River*. Confederated Salish and Kootenai Tribes, I&E, FRWC, Natural Resource Department, CSKT, PO Box 278, Pablo, MT, 59855.
29. Lauren Hallett, et al. Towards a Conceptual Framework for Novel Ecosystems. In *Novel Ecosystems: Intervening in the New Ecological World Order*. Richard Hobbs, Eric Higgs, and Carol Hall, eds. Hoboken, NJ: Wiley-Blackwell, 2013, pp. 16-28.
30. Brian Starzomski. Novel ecosystems and climate change. In *Novel Ecosystems: Intervening in the New Ecological World Order*. Richard Hobbs, Eric Higgs, and Carol Hall, eds. Hoboken, NJ: Wiley-Blackwell, 2013, pp. 88-101.
31. Andrew Light, Allen Thompson, Eric Higgs. Valuing novel ecosystems. In *Novel Ecosystems: Intervening in the New Ecological World Order*. Richard Hobbs, Eric Higgs, and Carol Hall, eds. Hoboken, NJ: Wiley-Blackwell, 2013, pp. 257-268.
32. Richard Hobbs, Eric Higgs, Carol Hall: What do we know about, and what do we do about, novel ecosystems? In *Novel Ecosystems: Intervening in the New Ecological World Order*. Richard Hobbs, Eric Higgs, and Carol Hall, eds. Hoboken, NJ: Wiley-Blackwell, 2013, pp. 353-360.
33. Robert Elliot, "Faking Nature." *Inquiry* Vol. 25, No. 1, March 1982, 81-93. Reprinted in Robert Elliot, ed. *Environmental Ethics* (Oxford: Oxford University Press, 1995), 76-88.
34. Eric Katz. The Big Lie: Human Restoration of Nature. *Research in Philosophy and Technology*, 1992, Vol. 12, 231-243.
35. Eric Katz. 2000. Another Look at Restoration: Technology and Artificial Nature. In Paul Gobster and R. Bruce Hull, eds. *Restoring Nature: Perspectives from the Social Sciences and Humanities*. Washington DC: Island Press, 2000; pp. 37-48.
36. Andrew Light. 2000. Ecological Restoration and the Culture of Nature: A Pragmatic Perspective. In Paul Gobster and R. Bruce Hull, eds. *Restoring Nature: Perspectives from the Social Sciences and Humanities*. Washington DC: Island Press, 2000; pp. 49-70.
37. Steven Vogel. 2003. The Nature of Artifacts. *Environmental Ethics*, Vol. 25, Summer 2003, pp. 149-168.
38. William Jordan. Sunflower Forest: Ecological Restoration as the Basis for a New Environmental Paradigm. In A. Dwight Baldwin, Jr., Judith de Luce, and Carl Pletsch, eds. *Beyond Preservation: Restoring and Inventing Landscapes* (Minneapolis: University of Minnesota Press, 1994), 17-34.
39. G. Stanley Kane. Restoration or Preservation? Reflections on a Clash of Environmental Philosophies. In A. Dwight Baldwin, Jr., Judith de Luce, and Carl Pletsch, eds. *Beyond Preservation: Restoring and Inventing Landscapes* (Minneapolis: University of Minnesota Press, 1994), 69-84.

40. William Jordan. Weeding Key Biscayne. In William R. Jordan, III, *The Sunflower Forest: Ecological Restoration and the New Communion with Nature* (Berkeley: University of California Press, 2003), 10-27.
41. Katherine Suding, et al.: 2015. Committing to Ecological Restoration. *Science* 8 May 2015, Vol. 348, Issue 6235, 638-640.
42. Albert Borgmann. Excerpts on focal practices from *Technology and the Character of Contemporary Life*. Chicago: University of Chicago Press, 1984, 200-208.
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