

Biology 468
RESTORATION ECOLOGY

January 2022

Instructor: Dr. Barry R. Taylor

Office: JBB 315 (Hours: After each lecture or any time I am near a computer)

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Lecture: JBB 236

Blocks K4-K6: Tuesday 11:15, Wednesday 1:15, Friday 12:15

Laboratory: JBB Room 335M [Subject to change depending on space requirements]

Thursday 2:15 to 5

Course Objectives: This course introduces students to the variety of ways that degraded ecosystems, terrestrial and aquatic, can be restored by the application of ecological principles. Elements of ecotoxicology, environmental chemistry, soil ecology and hydrology are introduced to describe how environmental degradation can be assessed. Then principles of community ecology and ecosystem theory are used to guide the restoration of degraded sites. These ideas are illustrated with Nova Scotia case studies involving invasive species, stream restoration, reforestation and contaminated sites.

Course Text: Galatowitsch, S.M. 2012. Ecological Restoration. Sinauer Associates, Sunderland, MA. 630 pp.

Other Resources: Greipsson, S. 2011. Restoration Ecology. Jones & Bartlett Learning, Sudbury, MA. 408.

Perrow, M.R. and Davy, A.J. 2008. Handbook of ecological restoration. Volume 1: Principles of restoration. 444 pp. Volume 2: Restoration in practice. 600 pp. Cambridge University Press, U.K.

Prerequisites: Second year core biology courses. Biology 345 recommended

Evaluation: Midterm examination	15% (Wednesday, 2 March, 1:15 p.m.)
Final examination	35% (Sometime in April)
Weekly Quizzes (10)	10%
Laboratory Report	10% (due two weeks after laboratory)
Case Studies (6)	30%

Pandemic Provisions: Because of the uncertainty associated with Covid-19, *the structure of the course must be considered provisional*. Lecture mode, evaluation, and course requirements may be subject to change, if necessary. You will be given as much warning as possible if something changes, and the class will be consulted, if time permits.

Laboratory and Case Studies:

1. This year there are only three scheduled laboratory periods in this course, all of which take place as soon as face-to-face classes begin. These exercises will explore ecotoxicology of soil and water and methods used to assess contamination.
2. Students are to submit results from one of the three laboratories as a formal report, in the style of a research note suitable for submission to Environmental Toxicology and Chemistry.
3. The remaining laboratory periods will be devoted to examining a selection of restoration case studies, drawn from Nova Scotia or Atlantic Canada. These studies will involve analyzing a degraded site and suggesting an ecologically based restoration plan, or critiquing an extant plan.
4. **Four** of the case studies will require a *brief* (2-3 pages) written report, to be submitted at the beginning of the succeeding laboratory period.

Lecture Schedule

Week Beginning	Number	Topic	Text Reference
17 January 2022	1	Introduction; History; Diagnosis	Chapters 1, 2
24 January	2	Planning and Social Aspects	Chapters 3, 4
31 January	3	Soil and Soil Contamination	Notes
7 February	4	Ecotoxicology	Notes
14 February ♡	5	Monitoring and Evaluation	Chapter 5
21 February		[Break Week]	
28 February	6	Landforms and Hydrology	Chapter 6
7 March	7	Water Pollution and Contamination	Chapter 7
14 March	8	Soil Organisms and Plant Roots	Notes
21 March	9	Soil Restoration and Succession	Chapter 7
28 March	10	Revegetation and Forestry	Chapter 8
4 April	11	Rare Plants and Animals	Chapters 8-10
11 April	12	Rewilding	Notes

Tentative Laboratory Schedule

Monday,	17 January	Classes begin
Thursday	20 January	(No Laboratory)
Thursday	27 January	(No Laboratory)
Thursday	3 February	Laboratory: Soil contamination
Thursday	10 February	Laboratory: Ecotoxicology 1
Thursday	17 February	Laboratory: Ecotoxicology 2
Thursday	24 February	[Break Week]
Thursday	3 March	Case Study 1: Gaspereaux Lake
Thursday	10 March	Case Study 2: South River
Thursday	17 March	Case Study 3: Contaminated site: BT Woodyard
Thursday	24 March	Case Study 4: Kaolinite Mine
Thursday	31 March	Case Study 5: West Street property
Thursday	7 April	Case Study 6: Rewilding
Thursday	14 April	Completion of Case Study 6