

ESRM302/CFR590

Restoration Design

This class reviews disturbance-based examples of restoration

- Agriculture
- Grazing
- Water storage
- Recreation
- Brownfields
- Mining
- Urban environments
- Wetland dredge and fill
- Marine bed disturbance
- Coastal diking
- Forestry
- Transportation

- Ecosystem-based restoration examples are presented in ESRM 473, Winter.

Week 1: Introduction, Design Process, Landscape Impacts

Weeks 2,3: Elements of a Restoration Project

Weeks 4-10: Project examples and Design Exercises

Week 1	Weeks 2,3	Weeks 4-10
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Design labs

- 1 Design case studies
 - 2 Site assessment
 - 3 Designing ecological services
- Designing restoration projects for:
- 4 Agricultural modification
 - 5 Grazing damage
 - 6 Wetland dredge or fill
 - 7 Surface mining
 - 8 Brownfields
 - 9 Recreation damage
 - 10 Urban creeks

- Each design lab will be based upon the Wednesday morning project example or lecture.
- You will work in teams.

Grading

- 10% Weekly reading report
- 20% Take-home test covering first three weeks' material
- 35% Each design lab exercise will be turned in for review (7 labs, 5% for each)
- 35% Final compilation of design lab solutions

- Project grades for individuals will be determined by:
 - 1. The grade that instructors assign the project,
 - 2. Adjusted by the peer evaluation you are given by your group members.



McLaren Gold Mine, Cooke City, Montana



Mid-reach of Daisy Creek



Lower reach of Daisy Creek

Important steps to go through in any restoration design problem

Site Analysis

- Determine ecosystem type, condition before disturbance (including ecological elements: successional state, diversity, stability, resilience, natural disturbance regime), functions that should be performed by such a system in good shape.

Ecological Functions

- Assess damage done.
- Estimate functions lost.

Constraints

- List the constraints.

What level of repair is possible?

- Predict the level of repair that is possible.
- What is possible in such an ecosystem?
- What is possible in such an ecosystem with a modified surrounding environment?

What is the prospect for autogenic repair?

- Estimate level (and speed) of autogenic repair that can be expected.

What are your options?

- Determine a range of restoration outcomes.
 - Low: stabilize the site and allow autogenic repair to occur.
 - High: create a site that functions as well as the original. Provide many shortcuts to assist plant growth, soil development, structure.

What resources are required?

- Plants, materials, equipment, manpower, transport.

Prepare a site design.

- Grades, plant material, access, sediment control, storage, ecological elements.

Sequencing and timing

- Lay out sequencing (flow) and timing (when events must occur) for the site preparation and installation.

Continuing activities

- What must be done continually during project preparation and installation?
- What must be done after installation?