SYLLABUS – NATURAL RESOURCES 459/659
ECOSYSTEM MANAGEMENT & RESTORATION
Spring, 2021

GENERAL COURSE INFO.:

Lecture: 9:00-9:50 T, R URL :
https://uwsp.zoom.us/j/95227445938?pwd=SmRLejNrNnVGYnlPTmN2K3JHc0Ewdz09

Discussion: 9-9 :50 [or 8-9:50 Friday for a couple of days; see below] ; TNR 153 or 157
URL: https://uwsp.zoom.us/j/97561212730?pwd=ZUl1K0IxUUR0Z0dNbGY4NS9aU2dldz09

Instructor:

Dr. James Cook (346-2269; jcook@uwsp.edu). Office: 242 CNR

Virtual Office Hour for this class: Wed 10-11; URL:

https://uwsp.zoom.us/j/95728228610?pwd=Mmw1Q1FlZUZTaTBUUDdNNTVTdUR4UT09

COURSE OBJECTIVES:

The overarching goal of this course is provide the ecological and technical background for ecosystem management so you can analyze the need for, and effectively plan, ecosystem management and restoration projects in a specific, socio-political context. You will attain a broad understanding of: 1) ecological and conceptual underpinnings of ecosystem management & restoration; 2) ecosystem function of forest, grassland, floodplain and wetlands, 3) restoration and monitoring techniques for several types of ecosystems, and 4) social and political constraints.
Scope: The emphasis is on the structure and function of communities/ecosystems and the landscapes within which they are embedded. The climatic focus is the temperate zone.

COURSE STRUCTURE: THIS IS RATHER UNIQUE – PLEASE READ CAREFULLY!
Because this course is the Capstone Course for the Ecosystem Restor & Mngt. [ER&M] Option, but not all class members are in that major, the class has two tracks – one for the ER&M majors, and a second for all other majors. The assignments and grade determination differ between these two groups. The major difference is that the ER&M majors will complete a group project and present their plan to the class. The non-resotration majors do NOT have complete a project, but you DO HAVE two ADDITIONAL assignments [see below]. For most weeks, the Discussion on Friday is for ER&M majors only. So, if you are not a Restoration major, you do not have class on Friday UNLESS I TELL YOU OTHERWISE. That is, there are a few weeks we will have a lecture for everyone on Friday at 9am. On a couple of Fridays in late March or early April, the ER&M majors will go to the field and will leave at 8am.

Organization of Lecture Content:

I. Foundations of ecosystem management (EM) and restoration (R)
II. Importance of temporal scales, spatial scales, uncertainty & disturbance regimes
III. Overview of landscape and forest ecology
IV. Role of genetics in EM&R
V. Adaptive management & monitoring
VI. Restoration techniques

VII. Ecology and restoration of grasslands & wetlands
VIII. Case studies – San Juan Mts., NWFP, Moses Creek
IX. Role of climate change & large fires in ER&M

Text: There is not a text for the course. Journal articles are used extensively, and are available in CANVAS.

Course Structure: Due to the pandemic, all lectures will be delivered virtually using Zoom. A link for the "class meeting' is listed above and is available in Canvas. All powerpoints and outlines are also posted in Canvas; all lectures will be recorded and posted. The Canvas site is structured in "Modules". There is a Module for each week and these correspond to the week indicated below. There are additional modules in Canvas for topics such as Exams and one labelled 'Assignments'; this latter one only pertains to the non-restoration majors. The material included in an exam will be the same for everyone.

LECTURE SCHEDULE, TOPICS & READINGS:

Week	Date	Topic	Reading Assignment	Instructor
1	1/26	Basis of EM. How does restoration compare?	Grumbine 1994	Cook
1	1/28	Charac's of targets; HRV & Evol. environment	Moore et al. 1999 ; H/O^	Cook
1	1/29, 9am	Introduction to project, group structure; TNR 153	H/O	Cook
2	2/2	What temporal scales are relevant?		Cook
2	2/4	Issues of spatial & temporal scale – reliability of the record	Swetnam et al. 1999 – H/O	Cook
2	**2/5, 8:30 am – Group A; 9:15 – Group B**	Context, constraints, objectives of unit		Cook
3	2/9	Ecosystem process in EM	-----	Cook
3	2/11	Landscape ecology (LE)	-----	Cook
3	2/12, 9am	Informational needs – EM plan & plan process	Goebel et al. 2005, Allen et al. 2002	Cook
4	2/16	Role and importance of disturb. regime (DR)	Powell 2000, pages 10-19	Cook
4	2/18	DR based EM	Cissel et al 1999 Look carefully at methods	Cook
4	2/19, 9am	Disturb regimes – Greak Lakes region	Brose et al. 2014, Chap. 2, Frelich &	Cook

			Lorimer 1991, Cook 2000	
5	2/23	Complete: DR-based EM	-----	Cook
5	2/25	Wetland processes	-----	Hermann??**
5	2/26, 9am	Landscape influences; evaluating future conditions	-----	Cook
6	3/2	Basics of plant genetics	------	Cook
6	3/4	Application of genetics to restoration	Bischoff et al. 2010	Cook
6	3/5, 9am **Entire class**	Prep for exam	-----	Cook
7	3/9	EXAM #1	-----	Cook
7	3/11	Adaptive Mngt. & Monitoring	Haney and Power 1996 ; H/O	Cook
7	3/12	Discuss outline, refine; prepare for site visit Group A – Rm 153 Group B – Rm 157	-----	Cook
8	3/16	Grassland restor.	Rowe 2010	Barzen??**
8	3/18	Restor. techniques - forest	-----	Cook
8	3/19	Site visit – Group B	To the field*	Cook
10	3/30	Complete forest techniques; San Juan project Case Study	H/O	Cook
10	4/1	Grassland ecolgy	Knapp et al. 1999, H/O	Cook
10	4/2	Site visit – Group A	To the field*	Cook
11	4/6	Case study: Northwest Forest Plan – background, objectives	Thomas et al. 2006	Cook
11	4/8	NWFP – presciprtion & evaluation	Davis et al. 2011 – Abstract+ Summary	Cook
11	4/9	Assessment of site visits; data summaries	-----	-----
12	4/13	Riverine/floodplain ecology	-----	Cook
12	4/15	History/Overview – Moses Crk project	-----	Bucholz??**

12	4/16	Q & A; group time Group A – Rm 153 Group B – Rm 157		Cook
13	4/20	Floodplain ecology	Molles et al. 1998	Cook
13	4/22	Restor. tech -- wetlands	Hazelton et al. 2014	???? Jon G.**
13	4/23	Flex time – group work; Q & A Group A – Rm 153 Group B – Rm 157	Field*	Cook
14	4/27	Plant community assessment – metrics	{Matthews et al. 2009, Mushet et al. 2002}^	Cook
14	4/29	Plant comm. Assess - complete	-----	Cook
14	**4/30, 9am**	**Presentation – Group B**	----	Student group
15	5/4	Restoration & climate change	Harris et al. 2006	Cook
15	5/6	Climate change implications	-----	Cook
15	**5/7, 9am**	**Presentation – Group A**		Student group
16	5/11	High severity fires – implications for EM	Stephens et al. 2014	Cook
16	5/13	Challenges on NIP lands, landscapes	----	Cook
16	5/14	Review for final	-----	Cook

^ H/O means that a handout will be provided. Enclosed in { } means not required.
** These are tentative dates. Each involves a guest speaker. I will confirm these dates or announce the changes as soon as I can. These will also be posted in Canvas.
*=yes, we are going to the site so be prepared

GRADE DETERMINATION

ER&M majors Weightings:		All other majors Weightings:	
1st hour exam…….	28%	1st hour exam	28%
Final exam (comprehensive)	32%	Final exam	32%
Project presentation…….	22%	**Evolution. Envir.**	**17%**
Group report…… ……..	8%	**Article Summary**	**15%**
Peer evaluations ……	10%	Critique of present.	8%

FINAL EXAM, scheduled for: Monday, 5/17, 8:00-10:00 am

Grades on assignments and the final grade will be assigned as follows: 92.5+ = A; 89.5-92.4 = A-; 86.5-89.4 = B+; ETC. If you are late turning in the Group Report or Evolutionary Environment assignment a penalty will be assessed between 5 – 25% based on how late it is.

EXAMS – same material & content for everyone. Final will be comprehensive but completed in a "Take-Home" format. You will be able to use your notes, the powerpoints and the articles.

RESTORATION MAJORS:
Project Presentations: You are expected to prepare a 40-45 **minute presentation** with appropriate visual aids. At least 2 people from the group must present. Provide the class with a copy of the outline of your presentation. More detail will be provided in discussion.
Group Report: This will be a 2-page, summary of your presentation, an outline and the resources you used (i.e., it should include a Bibliography). It is due 5 days after your presentation; turn it in through the DropBox in Canvas. More detail will be provided in discussion.

OTHER MAJORS:

1) For the '**Evolutionary Environment'** [EE] assignment you need to select a specific ecosystem from the temperate or boreal region of the world. The system may be terrestrial, wetland or floodplain, but not aquatic. Using one or more published, refereed sources [books and/or articles], describe four factors that are important parts of the "evolutionary environment" [per Moore et al. 1999] for the system. You may not use the pondereosa pine ecosystem, any of the articles in the list below or ones that I discuss explicitly in class. Attach the citation of any article(s), and other resources, you use to complete this. This assignment is DUE March 19th and should be submitted to the Dropbox in Canvas. You are expected to work alone on this.
2) Article Summary – find a article in a peer-reviewed journal that describes some active restoration. The paper must describe the system, the treatments and two or more outcomes. Write a summary of no more than two pages that describes a) the general characteristics of the system and how it has been degraded, b) the function of the system and all important influences [local or larger] on the system, c) the details of the treatments, d) the outcomes – i.e., the responses to the treatments, and e) implications of the results.
3) Critique of Presentation – you must attend one of the student group presentations (see schedule above for dates) and critique it. A form will be provided. If you attend and critique a second one, you will get 3extra credit points that I will add to your "EE" assignment grade.

ATTENDENCE POLICY:

I expect your interest in the topic will motivate you to be in class unless there is a personal emergency or illness. No penalty will be imposed for missing a lecture. Because we do not have a text, and only a portion of the content comes from the readings, your performance and understanding will be SUBSTANTIALLY better if you attend all lectures. You are expected to meet schedule changes that are announced in class, even if you were not present.

STUDENT RESPONSIBILITY

It is your responsibility to be FULLY prepared to discuss the assigned readings, and to get ALL notes if you miss a lecture. You will have access to all lectures via recordings that will be posted in Canvas. Also, if any material is not clear, YOU need to let me know; I will be happy to discuss any topic with you one-on-one during the office hour for the class. As always, you are expected to follow the U.W. System rules for student conduct.

Citations for assigned lecture readings (just in case you need one or two):

Bischoff, A, T. Steinger and H. Muller-Scharer. 2010. The importance of plant provenance and genotypic diversity of seed material used for ecological restoration. Restor. Ecol. 18(3):338-48.

Cissel, John H., Frederick J. Swanson and Peter J. Weisberg. 1999. Landscape management using historical fire regimes: Blue River, Oregon. Ecol. Applications 9:1217-1231.

Davis, R.J. and others. 2011. Status and trends of northern spotted owl populations and habitats. USDA For Serv., Gen.. Tech. Rep. PNW-GTR-850.

Grumbine, R. Edward. 1994. What is ecosystem management? Conserv. Biol. 8(1):27-38.

Haney, Alan and Rebecca L. Power. 1996. Adaptive management for sound ecosystem management. Environ. Mngt. 20(6):879-86.

Harris, J.A., R.J. Hobbs, E. Higgs and J. Aronson. 2006. Ecological restoration and global climate change. Restor. Ecol. 14(2):170-176.

Hazelton, E. L., Mozdzer, T. J., Burdick, D. M., Kettenring, K. M., & Whigham, D. F. 2014. Phragmites australis management in the United States: 40 years of methods and outcomes. *AoB Plants*, *6*, plu001.

Knapp, Alan and others. 1999. The keystone role of bison in North American tall grass prairie. BioSci. 49(1):39-50.

*Matthews, Jeffrey W., Greg Spyreas and Anton G. Endress. 2009. Trajectories of vegetation based indicators used to asses wetland restoration progress. Ecol. Appl. 19(8):2093-2107.

Molles, M.,C., Jr., C.S. Crawford, L.M. Ellis, H. M. Valett and C.N. Dahm. 1998. Managed flooding for riparian ecosystem restoration. BioSci. 48(9):749-56.

Moore, M.M., W.W. Covington and P.Z. Fule. 1999. Reference conditions and ecological restoration: a southwestern ponderosa pine perspective. Ecol. Applic. 9(4):1266-77.

*Mushet, David M., Ned H. Euliss, Jr. and Terry L. Shaffer. 2002. Florisitc quality assessment of one natural and three restored wetland complexes in North Dakota, USA. Wetlands 22(1):126-138.

Powell, D. C. 2000. Potential vegeation, disturbance, plant succession and other aspects of forest ecology. USDA For. Serv. F14-SO-TP-09-00.

Samuels, Corey L. and Julie L. Lockwood. 2002. Weeding out surprises: incorporating uncertainty into restoration models. Ecol. Restor. 20(4):262-68.

Stephens, S., N. Burrows and others. 2014. Temperate and boreal forest mega-fires: characteristics and challenges. Frontiers Ecology & Environment 12(2):115-122.

Swetnam, T. C.D. Allen and J.L. Betancourt. 1999. Applied historical ecology: using the past to manage for the future. Ecol. Appl. 9(4):1189-1206.

Thomas, Jack W., J. F. Franklin, J. Gordon and K. Johnson. 2006. The Northwest Forest Plan: origins, components, implementation experience and suggestions for change. Conser. Biol. 20:277-287.