SYLLABUS – NATURAL RESOURCES 459/659
ECOSYSTEM MANAGEMENT & RESTORATION
Spring, 2020

GENERAL COURSE INFO.:
Lecture: 9:00-9:50 T, R TNR 240
Discussion: 8-9:50 Friday, TNR 240
Instructor:
Dr. James Cook (346-2269; jcook@uwsp.edu). Office: 242 CNR
Office Hours: M 9-11; T 2-4; W 9-10; R 10-11; F 1-2:45
Prerequisites: Summer Camp or the Eur. Environmental Seminar; FOR 332 or BIOL 305 or BIOL 355; NR 458 or WLDF 458.

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, 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 second half of the Discussion on Friday is for ER&M majors only. On a couple of Fridays in March, the ER&M majors will go to the field, and on those days the other majors will have a day off.

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. All powerpoints and outlines are also posted in Canvas.

LECTURE SCHEDULE, TOPICS & READINGS:

Week	Date	Topic	Reading Assignment	Instructor
1	1/21	Basis of EM. How does restoration compare?	Grumbine 1994	Cook
1	1/23	Charac's of targets; HRV	Moore et al. 1999 ; H/O^	Cook
1	1/24	A. Temporal scales*** B. Introduction to project	----- H/O	Cook
2	1/28	Issues of spatial & temporal scale – reliability of the record	Swetnam et al. 1999 – H/O	Cook
2	1/30	Uncertainty – why? How to address it	Samuels & Lockwood 2002	Cook
2	1/31	A. Complete 'uncertainty' B. Context, constraints, objectives of unit	Same as 1/30	Cook Rose**
3	2/4	Ecosystem process in EM	-----	Cook
3	2/6	Landscape ecology (LE)	-----	Cook
3	2/7	A. Relevance of LE to EM B. Informational needs – EM plan & plan process	----- Goebel et al. 2005, Allen et al. 2002	Cook
4	2/11	Wetland processes	-----	Hermann**
4	2/13	Role and importance of disturb. regime (DR)	Powell 2000, pages 10-19	Cook
4	2/14	A. DR (compete) B. Disturb regimes – Greak Lakes region	---- Brose et al. 2014, Chap. 2	Cook
5	2/18	Disturbance regime (DR) based EM	Cissel et al. 1999	Cook
5	2/20	DR based EM - complete	-----	Cook
5	2/21	A. Disturb. regimes other systems B. Case study – evaluating future conditioins	----- TBA	 Cook
6	2/25	Role of genetics	------	Cook
6	2/27	Application of genetics to restoration	Bischoff et al. 2010	Cook
6	2/28	A. Prep for exam B. Landscape influences	----- No reading – evaluate the area	 Cook
7	3/3	EXAM #1	-----	Cook
7	3/5	Adaptive Mngt. & Monitoring	Haney and Power 1996 ; H/O	Cook
7	3/7	A. Monitoring, completed		

		B. Discuss outline, refine; prepare for site visit	-----	Cook
8	3/10	Restoration techniques – forests	H/O	Cook
8	3/12	Forest techniques – complete; San Juan Restor. Project	H/O	Cook
8	3/13	Site visit – Restor. Majors Day off for non-ER&M majors	To the field*	Cook
9	3/24	Grassland ecology & dynamics	Knapp et al. 1999, H/O	Cook
9	3/26	Grassland restoration	Rowe 2010	Barzen**
9	3/28	Site visit – Restor. Majors Day off for non-ER&M majors	To the field*	Cook
10	3/31	Case study: Northwest Forest Plan – background, objectives	Thomas et al. 2006	Cook
10	4/2	NWFP – presciprtion & evaluation	Davis et al. 2011 – Abstract+ Summary	Cook
10	4/3	No class – CNR URS	-----	-----
11	4/7	Riverine/floodplain ecology	-----	Cook
11	4/9	Floodplain restoration	Molles et al. 1998	Cook
11	4/10	A. Management of SNA's (WI) B. Q & A; Group time	-------	Robaidek**
12	4/14	Restor. Tech's – wetlands	Hazelton et al. 2014	Gumtow**
12	4/16	Case study - Moses Creek, History & Overview	-----	Bucholz**
12	4/17	A. **Moses Creek – meet o @ bridge, north end.*** B. No additional mtg	Field*	Cook
13	4/21	Plant community assessment – metrics	{Matthews et al. 2009, Mushet et al. 2002}^	Cook
13	4/23	Complete 'assessment metrics'; begin Challenges of EM on NIP lands	-----; H/O	Cook
13	4/24	A.Complete "Challenges" B.Flex time for preparation	----	Cook
14	4/28	Restoration & climate change	Harris et al. 2006	Cook

14	4/30	Group presentation (1)	-----	Student group
14	5/1	Group presentations (2)	-----	Student group
15	5/5	Climate change implications	-----	Cook
15	5/7	Catastrophic fires – what do they mean for EM?	Stephens et al. 2014	Cook
15	5/8	Review for final	-----	Cook

^ H/O means that a handout will be provided; TBA means to be announced. Enclosed in { } means not required

***= The topic under 'A' is for the first half of the period; 'B' is for the second half

** These are tentative dates. Each involves a trip off campus or a guest speaker. I will confirm these dates or announce the changes as soon in the semester 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	31%
Final exam (comprehensive)	32%	Final exam	37%
Project presentation…….	19%	Evolution. Envir.	18%
Group report…… ……..	5%	Critique of present.	8%
Quizzes	8%	Quizzes	8%
Peer evaluation ……...	8%		

FINAL EXAM: Wed.., 5/13, 12:30-2:30 pm

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 & QUIZZES – same material & content for everyone. There will be 3 quizzes, each based on an assigned reading. They will not be announced so be prepared each time a class rolls around for which there is an assigned reading. The first possibility is Thursday, 1/23, and the article is by Margaret Moore and others. This article discusses restoration of the ponderosa pine ecosystem of the Southwest.

RESTORATION MAJORS:

Project Presentations: You are expected to prepare a **35-40 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 in a hardcopy to me. More detail will be provided in discussion.

OTHER MAJORS:

1) For the '**Evolutionary Environment'** assignment you need to select a specific ecosystem from the temperate or boreal regions of the world. The system may be terrestrial, wetland or floodplain, but not solely 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 any of the articles in the list below or 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 13th and should be submitted to the Dropbox in Canvas. You are expected to work alone on this.

2) Critique of Presentation – you must attend one of the student group presentations and critique it. A form will be provided. If you attend and critique a second one, you will get extra credit.

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 unless there was a quiz. No make-ups will be given so you will receive a zero unless you have a valid, documented excuse. 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. If you have an emergency or are ill, accommodations will be made. Also, if any material is not clear, YOU have to let me know; I will be happy to sit down with you one-on-one and discuss it as much as needed. 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.