

# **FORS331 Wildland Fuel Management**

**Carl Seielstad, Professor - Fire Science & Management**

**FORS331 – 01; CRN: 31831**  
**Wildland Fuel Management**  
**8:00-9:20am Tue-Thu**  
**Social Science 352**  
**Spring Semester 2024**

**WA Franke College of Forestry and Conservation**  
**CHCB428, 243.6200, [carl.seielstad@umontana.edu](mailto:carl.seielstad@umontana.edu)**  
**Office Hours: Mon 10-11:30; Tue 11:00-12:00 or by appt.**  
**Zoom: <https://umontana.zoom.us/my/carl.seielstad>**

## **Logistics**

**Location: Social Science 352 (In person, face-to-face)**

Web Site: <https://moodle.umt.edu>

## **Course Overview**

Broadly, fire management is the process of manipulating fire and fuels to protect people, property, and natural resources, and to restore and maintain ecosystem integrity. Historically, we have prevented or suppressed most wildland fires in favor of using mechanical interventions and planned ignitions (prescribed fires) to meet land management objectives. More recently, unplanned ignitions are also being used to manage fuels and restore landscapes. Integrated fuels management, then, combines the treatments provided by wildfire with prescribed treatments in the form of thinning/harvesting, grazing, and burning. In practice, treatments achieved by wildfire dwarf all other treatments in scope and scale, and thus are an important consideration in fuel management.

In this class, students will consider how fire and fuels are managed. We will start by examining how wildfires are managed in the context of fire policy, land management planning, hazards, values, and probability. Students will work through a decision document step by step to understand opportunities and constraints in fire decision-making. From there, we will examine the fire management organization and command structure and its strategies, tactics, and tools. Students will develop incident action plans for an incident and discuss and defend proposed actions. Finally, we will study the practices of treating fuels using mechanical techniques and prescribed fire.

The class is targeted at students who have gained at least modest exposure to fire science and management through an introductory fire class (e.g., FORS230 or similar) and/or experience working fire in summer jobs. It is intended to provide a current overview of the complexities of decision-making, incident action-planning, and fuels treatments in the United States.

The class will combine lecture, reading, discussion, writing, quizzes, and group activities.

## Learning Outcomes

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

- Conceive of wildfire as fuels treatment and discuss the major issues related to treating fuels with wildfire.
- Articulate fire/land management policy, provide an historical context for it, and relate it to current management practices.
- Understand the decision process for managing fires and complete a rational decision document for a wildfire that considers hazards, values, and probability.
- Describe the American fire management organization, command structure, its strategies, tactics, and tools and develop an incident action plan to achieve desired results from a wildfire.
- Understand terminology, measurements and sampling techniques related to fuel treatments.
- Describe common techniques and approaches for fuels management, and develop SMART objectives for managing wildfires and fuels.
- Know the basic principles of fuel reduction.
- Measure fuels in the field, calculate basic fuel metrics from them, and estimate fire behavior from them across a range of environmental conditions.
- Contrast effectiveness of various treatments.
- Develop well-informed opinions on current societal issues involving fire and fuels, including climate change, forest management, restoration, and land use.

## Course Organization

The class is organized in three sections

Unit 1. Wildfire as a Fuels Treatment; Wildfire Management (weeks 1 – 6)

Unit 2. Incident Action Planning (weeks 7 – 9)

Unit 3. Fuels Management (weeks 10 – 16)

## Readings

The assigned readings include parts of book chapters, reports, and peer-reviewed literature. They will be made available through Moodle. Although you are required to read only parts of some of these readings, I have selected them in part because they are good references for the future. In each assigned reading, you should check the required page numbers in the table at the end of this document. Where TBA appears in the table, a reading has not yet been assigned.

## Course Polices

*Attendance:* Attendance is required and will be taken randomly. If you are going to miss class, please let me know ahead of time. Take good notes, and if you miss a class, get notes from a classmate. I am happy to answer questions, clarify issues, and elaborate on lecture and reading topics during office hours.

*Communication:* Moodle and email will be the primary forms of communication. All course materials will be made available through Moodle, along with announcements, updates, and changes. Please check Moodle often and refer to it first if you have questions about what to read or do.

*Academic Honesty:* All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. [Student Conduct Code](#).

*Cell Phone Use:* Please disengage from cell phones (texting, browsing, etc.) during lecture. If you need to engage in these activities, please remove yourself from the classroom before doing so. If we are using zoom, please respect your fellow student's learning experience by muting your mic and sharing your video appropriately. In general, your video should be on during class (unless you are unable to do so, for whatever reason), and your mic should be off until you wish to speak. Although the impacts of electronic device use are different in online, synchronous settings, we remind you that distractions such as texting, browsing, and checking-email take away from your focus and learning. Please be conscious of the things that will distract you from class and minimize them.

*Make-up/Extra Credit:* There will be no make-up assignments and no opportunities for extra credit. I will not administer exams early or late except under the most extenuating of circumstances and with at least 60 hours of advanced notice. Assignments will lose 10% for each day past the due date.

Students with disabilities may request reasonable modifications by contacting me. The University of Montana assures equal access to instruction for students with disabilities in collaboration with instructors and Disability Services for Students, which is located in Lommasson Center 154. The University does not permit fundamental alterations of academic standards or retroactive modifications.

## Assignments

*Projects:* Three group projects are required. The first will be to complete and justify a decision document for a fire including a wildfire risk assessment. The second will be to develop a specific incident action plan. The third is to conduct a fuels assessment and present findings.

*Writing/Quizzes/Exercises:* Land management requires that you make and justify decisions but also effectively communicate those decisions along with the reasoning behind them. There will be four short written assignments, no more than *two* pages in length related to course material. A short analytical exercise and write-up of data and findings may replace a writing assignment, TBD. These are not intended to be busy-work but to spur critical thought and hone concise writing skills. Additionally, a relative risk assessment will be completed individually as part of the first group project (decision document).

**Field Trip: We will travel to Lubrecht Experimental Forest to sample fuels in a variety of fuel treatments. This activity may occur on a weekend if we can't find a time during the week, likely during the weeks of April 10 or 17 (dependent on snow cover). Reasonable accommodations will be made if you cannot attend and will be evaluated on a case-by-case basis.**

### Grading

Decision Document & Presentation (group)	20
Fuels Assessment & Presentation (group)	20
Writing/Exercises/Quizzes (individual) - 5	20
Wildfire Risk Assessment (individual)	10
Incident Action Plan (group)	10
Participation/Field Trip	05
Final Exam	<u>15</u>
	100%

### Tips for success

- READ and TAKE NOTES! We will not cover everything in the readings during class but all of it is important in gaining comprehensive understanding of fire.
- It is imperative that your university email works and that you can use Moodle. These will be the primary means of communication between me and you. I will update Moodle frequently with notes, class material, assignments, and readings.
- PARTICIPATE! Your contributions will significantly improve the learning environment. The three projects are all group-based and will require coordination and effort from each team member.
- Ask questions and take advantage of office hours. Don't wait until the last minute to do the work.
- Be enthusiastic, curious, and open-minded.

### Tentative Course Schedule:

Subject to change, updates will be given in class and on Moodle.

Week	Date	Topic	Readings (due on day listed)	Assignments	
		<b>Course</b>		<b>Distributed</b>	<b>Due</b>
1	Jan 18	Introduction			
2	Jan 23	<b>Unit 1: Wildfire Management</b> Fire Management Issues and Trends	Pyne, Call of the Wild, 2012 Wildfire Crisis Strategy 2022 Calkin et. al. PNAS 2023	Complete readings before class – be prepared to discuss	
2	Jan 25	Federal Policy and Guidance	RedBook – Chapter 1; Hubbard Letter 2012	Writing 1	

Week	Date	Topic	Readings (due on day listed)	Assignments	
		<b>Course</b>		<b>Distributed</b>	<b>Due</b>
3	Jan 30	Fire Planning – LRMPs and FMPS	RedBook – Chapter 9 Flathead Draft Forest Plan; BMWC FMP		
3	Feb 1	A Review: Fire Ecology, Fuels, People	JFSP Synthesis Chapter 3		Writing 1
4	Feb 6	WFSa, WFIP, WFDSS- Relative Risk – Hazards, Value, Probability – START PLANNING	WFDSS Author Guide WFDSS_Paper_Form_2016	Risk Assessment (individual) & Planning Exercise (group)	
4	Feb 8	Risk – Webinar (no class meeting?)	<b>NO CLASS – Webinar Instead</b> Scott et al. 2013		
5	Feb 13	Review Risk. Introduce WFF and RRA	NFDRS PMS 932 Parts 1.02, 1.03, 1.07		QUIZ
5	Feb 15	Workday	Decision Documentation		Risk Assessment (individual)
6	Feb 20	Planning Areas/MAPS then Workday	TBA	Writing 2	
6	Feb 22	Fire Behavior – Lone Mtn Scenario schedule presentations	Uncle Stu		
7	Feb 27	Fire Danger Rating/Decision Support	TBA		
7	Feb 29	Workday			Planning Exercise (group)
8	Mar 5	Presentations			Writing 2
8	Mar 7	<b>Unit 2. Incident Planning</b> Incident Organization	Guide to ICS	Incident Action Plan (Group)	
9	Mar 12	IAP plus workday	TBA		

Week	Date	Topic	Readings (due on day listed)	Assignments	
		<b>Course</b>		<b>Distributed</b>	<b>Due</b>
9	Mar 14	Burned Area Recovery – Resource Advising			
<b>10</b>	<b>Mar 19/21</b>	<b>SPRING BREAK</b>	<b>NO CLASSES</b>		
11	Mar 26	<b>Unit 3. Fuel Treatments:</b> Intro to Fuel Treatments	Agee and Skinner 2005 Keyes et al. Chapters 5-7		
11	Mar 28	Fire-Fire Surrogate Experiments	Stephens et al. 2009		
12	Apr 2	FSS – Mountain Pine Beetle		Fuel Project (Group)	
12	Apr 4	Fuel Measurements	FIREMON Fuel Load (rmrs gtr 164) and TBA		
13	Apr 9	Fuel Calculations - Analysis	See CHEATSHEET		
13	Apr 11	Field Prep			QUIZ
14	Apr 16	Fuel Calculations		Calculate Forest Residue after Treatment	
14	Arrange	FSS Field Trip	Lubrecht Experimental Forest		
14	Apr 18	Review Field Trip – work up data	TBA		
15	Apr 23	Workday			
15	Apr 25	Fire Modeling	BehavePlus User Guide		
16	Apr 30	Workday			Forest Residue Project
16	May 2	Course Review			Fuel Project (group)
		FINAL EXAM	FINAL EXAM, MONDAY, MAY 6 0800 – 1000		

**Important Dates for Dropping a Course ([2024 Official Dates and Deadlines calendar](#))**

<b>Deadline</b>	<b>Description</b>	<b>Date</b>
To 15 <sup>th</sup> instructional day	Students can drop classes on CyberBear with refund & no “W” on Transcript	Feb 07 @5 PM
16 <sup>th</sup> to 45 <sup>th</sup> instructional day	A class drop requires a form with instructor and advisor signature, a \$10 fee from registrar’s office, student will receive a ‘W’ on transcript, no refund.	Feb 08 - March 28 @5 PM
Beginning 46 <sup>th</sup> instructional day	Students are only allowed to drop a class under very limited and unusual circumstances. Not doing well in the class, deciding you are concerned about how the class grade might affect your GPA, deciding you did not want to take the class after all, switching majors, and similar reasons are not among those limited and unusual circumstances. If you want to drop the class for these sorts of reasons, make sure you do so by the end of the 45 <sup>th</sup> instructional day of the semester. Requests to drop must be signed by the instructor, advisor, and Associate Dean (in that order) so if you pursue this request, leave sufficient time to schedule meetings with each of these individuals (generally this will take at least 3-5 working days). A \$10 fee applies if approved. Instructor must indicate whether the individual is Passing or Failing the class at the time of request.	March 29 – May 03 @5 PM

## Writing Grading Rubric

Score	Content	Organization	Development	Use of Language
4 (A)	Answer is appropriate to the question and demonstrates critical thinking.	Clear sense of order. Thesis or topic sentence is apparent. Supporting points are logically presented.	Develops each point with details. Answers question entirely.	Uses language appropriately. No major grammatical or spelling errors.
3 (B)	Answer is appropriate.	May lack a clear thesis but argument is somewhat logically presented.	Each point with some support. Points answer question sufficiently.	Accurate word choice. No more than 2 major language errors and few minor errors.
2 (C)	Content relates only peripherally to the question and/or contains significant factual errors or lack of critical thinking.	Argument is minimally perceivable. Supporting points presented somewhat randomly but do still support argument.	Sparse details or evidence. Question only partially answered.	Ordinary word usage. Avoids any technical terminology. Some serious language errors but don't significantly impair communication.
1 (D)	Content unrelated to the question.	Lacks any organization.	Statements unsupported by detail or explanation. Incoherent development.	Limited vocabulary; language errors impair communication.

Each writing grade will be calculated from the average of each category score with half scores rounded up. Scores of 0 (F) will only be applied if no essay is turned in.

*Example:* Content = 4 (A); Organization = 3 (B); Development = 4 (A); Use of Language = 3 (B)

Final Grade = 3.5  $((4+3+4+3)/4) = A$