

**Soils 361 - Forest Soils**  
**Fall 2020**  
**Les P. Werner**

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An examination of soil characteristics and processes observed in forested environments. Discussions and lab exercises will focus on describing the physical and chemical potential of the soil, soil forming processes under forested environments, soil as nutrient supplier, factors limiting to forest productivity and the influence of management practices on forest soils.

*Course Objectives:*

- Explain the important physical, chemical and biological properties and processes of forest soils as they relate to tree growth.
- Make basic inferences and interpretations concerning potential effects of various forest management practices on forest soils.
- Describe the effects of nutrient deficiencies and limitations in forest stands

*Learner Outcomes*

At the end of the semester students will be able to:

1. Describe the major forest soil types in Wisconsin
2. Describe the unique properties associated with soil formation under forested environments
3. Describe the role of soil in managing forest productivity
4. Describe the decomposition of forest litter and the major groups of organisms driving this process
5. Describe the impacts, potential and real, associated with various timber harvesting systems
6. Describe the impacts of fire on forest soils.

The content and learner outcomes associated with SOIL 361 are aligned with the following **SAF accreditation competences**:

*Ecology and Biology*

- knowledge of soil properties and processes, hydrology, water quality, and watershed functions;

- an understanding of ecological concepts and principles, including the structure and function of ecosystems, plant and animal communities, competition, diversity, population dynamics, succession, disturbance, and nutrient cycling;
- an ability to make ecosystem, forest, and stand assessment;
- knowledge of tree physiology and the effects of climate, fire, pollutants, moisture, nutrients, genetics, insects and diseases on tree and forest health and productivity.

**Lecture presentations are the intellectual property of Dr. Les Werner and cannot be distributed or made public without consent.**

***Text***

Fisher, R.F. and D. Binkley. 2000. Ecology and management of forest soils. 4th Edition. John Wiley and Sons, New York. 489 pp.

***Additional Readings (REQUIRED)***

Peer reviewed, journal articles will be assigned to you over the course of the semester. These articles are meant to supplement lecture/lab topics. All articles are in a PDF format and will be placed in Canvas.

***Participation and Assessment***

Participation is required in all laboratory exercises. Exams will be generated from both lecture and lab materials.

**Grading**

Exam I	25%
Exam II	25%
Exam III	25%
Lab Reports	25%

Letter grades will be assigned as follows:

90 – 100	A range
80 – 89	B range
70 – 79	C range
60 – 69	D range
< 60	Failing

The instructor reserves the right to adjust the grading scale downwards.
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**Students are expected to abide by University policies regarding academic conduct/integrity.**

## **SOCIETY OF AMERICAN FORESTERS CODE OF ETHICS**

### **Principles and Pledges**

1. Foresters have a responsibility to manage land for both current and future generations. We pledge to practice and advocate management that will maintain the long-term capacity of the land to provide the variety of materials, uses, and values desired by landowners and society.
2. Society must respect forest landowners' rights and correspondingly, landowners have a land stewardship responsibility to society. We pledge to practice and advocate forest management in accordance with landowner objectives and professional standards, and to advise landowners of the consequences of deviating from such standards.
3. Sound science is the foundation of the forestry profession. We pledge to strive for continuous improvement of our methods and our personal knowledge and skills; to perform only those services for which we are qualified; and in the biological, physical, and social sciences to use the most appropriate data, methods, and technology.
4. Public policy related to forests must be based on both scientific principles and societal values. We pledge to use our knowledge and skills to help formulate sound forest policies and laws; to challenge and correct untrue statements about forestry; and to foster dialogue among foresters, other professionals, landowners, and the public regarding forest policies.
5. Honest and open communication, coupled with respect for information given in confidence, is essential to good service. We pledge to always present, to the best of our ability, accurate and complete information; to indicate on whose behalf any public statements are made; to fully disclose and resolve any existing or potential conflicts of interest; and to keep proprietary information confidential unless the appropriate person authorizes its disclosure.

Professional and civic behavior must be based on honesty, fairness, good will, and respect for the law. We pledge to conduct ourselves in a civil and dignified manner; to respect the needs, contributions, and viewpoints of others; and to give due credit to others for their methods, ideas, or assistance.

### **Anti-Harassment Statement**

The forestry discipline, following the lead of the Society of American Foresters which accredits the B.S. forestry degree, believes we all have a responsibility in creating a safe, inclusive,

professional environment in all forestry-related activities and events. All forms of discrimination, harassment, and bullying are prohibited. This applies to all participants in all settings (online and in-person) and locations (on- and off-campus) where forestry classes and associated activities are conducted, including student organization events and activities, committee meetings, workshops, conferences, and other work and social functions where employees, volunteers, sponsors, vendors, or guests are present.

Discrimination is prejudicial treatment of individuals or groups of people based on their race, color, creed, religion, age, sex, sexual orientation, gender identity or expression, national origin, ethnicity, ancestry, disability, pregnancy, marital or parental status, veteran status, or any other category protected by law.

Sexual harassment is unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature that creates an intimidating, hostile, or offensive environment. Sexual harassment constitutes discrimination and is illegal under federal, state, and local laws.

Bullying is unwelcome, aggressive behavior involving the use of influence, threat, intimidation, ridicule, hazing or coercion to dominate others in the professional environment. Bullying behavior may go beyond characteristics protected by applicable laws, including but not limited to, political views, dress, or other outward physical appearances.

Other types of harassment include any verbal or physical conduct directed at individuals or groups of people because of their race, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, disability, veteran status, or any other characteristic protected by applicable laws, that creates an intimidating, hostile, or offensive environment.

The following list, while not exhaustive, includes examples of unacceptable behavior: slurs, jokes, threats, or derogatory comments relating to the characteristics noted above. Examples of inappropriate physical harassment that violate this statement include, but are not limited to: assault, unwanted touching, or impeding or blocking movement. In addition, no individual may be denied admission to, or participation in or the benefits of, any UWSP-associated events. Similarly, the display or circulation of derogatory or demeaning posters, cards, cartoons, emails, texts, videos, and graffiti which relate to characteristics noted above violate this statement.

## **Reporting**

Students, staff, faculty, or guests associated with Forestry-related programming who experience or witness incidents of harassment are strongly encouraged to report the incident. The Forestry discipline strongly urges the prompt reporting of complaints or concerns so that rapid and constructive action can be taken. Reporting can be done online or in person, to a faculty or staff member, and/or the UWSP Dean of Students. Anonymous reporting is available.

The UWSP Title IX Website is the home for all information related to harassment and discrimination, including reporting options, student and employee resources, and information about what happens after a report is submitted:

<https://www.uwsp.edu/titleix/Pages/default.aspx>

**Forest Soils – Soils 361 – Fall 2020**

<b>Week</b>	<b>Lecture Topic</b>	<b>Reading/Assignment</b>
<b>1</b>	Introduction to the Course	Chapter 1
<b>2</b>	Forest Soils of the World	Chapter 2
	Forest Soils of the World	
<b>3</b>	Forest Soils of the World	
	Forest Soils of Wisconsin	
<b>4</b>	Forest Soil Development	Chapter 3
	Forest Soil Development	
<b>5</b>	Forest Soil Development	Chapter 4
	Forest Soil Development	
<b>6</b>	Forest Soil Development	Chapter 5
	<b>Exam I</b>	
<b>7</b>	Trees and Soil	Chapter 11
	Soil Chemistry and Nutrient Availability	Chapter 8
<b>8</b>	Soil Chemistry and Nutrient Availability	
	Biological Properties of Forest Soils	Chapter 6
<b>9</b>	Decomposition	
	Decomposition	
<b>10</b>	Decomposition	
	Decomposition and Nutrient Cycling	Chapter 7, Chapter 9
<b>11</b>	Decomposition and Nutrient Cycling	
	<b>Exam II</b>	
<b>12</b>	Soil Quality and Site Indexes	Chapter 11
	Harvesting Systems/Site Productivity	Chapter 12
<b>13</b>	Harvesting Systems/Site Productivity	
	Harvesting Systems/Site Productivity	
<b>14</b>	Fire and Forest Soils	Chapter 13
	Fire and Forest Soils	
<b>15</b>	Nutrient Management	Chapter 14
	Open	
<b>Final</b>	<b>TBD</b>	

### Lab Schedule: 2020

<b>Week</b>	<b>Lab Topic</b>	<b>Location/Objective</b>
<b>1</b>	No Lab	
<b>2</b>	Set up Litter Decomposition Study	Schmeekle – 1 per student Directions - home
<b>3</b>	Set up Litter Collection Study	Schmeekle – 5 total Directions - home
<b>4</b>	O horizon & Soil Profile, EW extraction	Online demonstration
<b>5</b>	Litter Decomposition – 1 month	Collect 50% bags & dry
<b>6</b>	Litter Collection – Retrieve & drying	Retrieve bags & dry litter
<b>7</b>	O horizon sampling	Dry & weigh/digest litter
<b>8</b>	Litter Decomposition – 2 months	Retrieve & dry
<b>9</b>	Data Processing – new litter samples/mass loss	Digest O horizon
<b>10</b>	Report Preparation	
<b>11</b>	Data Processing – O horizon	
<b>12</b>	Report Preparation	
<b>13</b>	Report Preparation	
<b>14</b>	Report Due	
<b>15</b>		