Documents & Appendices
for
Society of American Foresters’ Continued Accreditation of Bachelor of Science Degree in Forest Ecology and Management

Department of Wildland Resources
Quinney College of Natural Resources
Utah State University
Logan, UT 84322-5230

November 2019
DOCUMENTS AND APPENDICES
Table of Contents
(internal document links are provided below, and page may be viewed with a navigation pane)

<table>
<thead>
<tr>
<th>Page</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Document AB-1: Required Courses</td>
</tr>
<tr>
<td>8</td>
<td>Document AB-2: Restricted Electives</td>
</tr>
<tr>
<td>9</td>
<td>Document C-1: Background Summary for Faculty reporting to the Wildland Resources Department Head</td>
</tr>
<tr>
<td>13</td>
<td>Document C-2: Background Summary for Faculty in the FEMA program NOT reporting to the Wildland Resources Department Head</td>
</tr>
<tr>
<td>14</td>
<td>Document D: Academic Summary for Faculty Reporting to the Wildland Resources Department Head</td>
</tr>
<tr>
<td>21</td>
<td>Document E: Individual Faculty Information</td>
</tr>
</tbody>
</table>

Peter Adler       Justin DeRose   Eric LaMalfa    Douglas Ramsey
Ryan Bosworth    Paul Grossl     James Lutz      Clark Rushing
Soren Brothers   Sarah Klain     Zachary Miller  Kari Veblen
Mark Chynoweth   Michael Kuhns   Darren McAvoy   Larissa Yocom
Layne Coppock    Andrew Kulmatiski Karen Mock

91 | Document F: Forestry Graduate Employment Summary |
91 | Table F_1: Employment status of FEMA majors at graduation based on the WILD Graduating Seniors Survey (see Standard II.7.2). |
91 | Table F_2: Employment status of FEMA majors at graduation based on USU Career Services First Destination Survey 2011-2017. |
92 | Table F_4: Employment Status based on WILD survey of FEMA alumni 2010-2019. |
93 | Table F_5: Satisfaction with employment based on WILD survey of alumni 2010-2019. |

94 | Document G: Student Data Summary |
95 | Appendix 1: WILD Graduating Senior Surveys |
104 | Appendix 2: FEMA and the OPM Requirements |
106 | Appendix 3: Journal Subscriptions |
109 | Appendix 4: Professional course instructor survey results |
114 | Appendix 5: Syllabi for Required Professional Courses andRestricted Electives. Syllabi for inclusion in a proposed menu of courses for Fall 2020 are also provided (see Standard V.5). |
114 | Table A5-1. Syllabi for required professional courses in the FEMA program. Syllabi for inclusion in a proposed menu of courses for Fall 2020 are also provided (see Standard V.5). |
115 | Table A5-2. Catalog course descriptions for required courses and highly recommended electives in the USU FEMA program (as of 5 November 2019) |
<table>
<thead>
<tr>
<th>Page</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>Syllabi for required professional courses in the FEMA program</td>
</tr>
<tr>
<td>119</td>
<td><strong>APEC 3012</strong> Introduction to Natural Resource and Regional Economics (DSS) 3 cr.</td>
</tr>
<tr>
<td>121</td>
<td><strong>BIOL 4400</strong> Plant Physiology 4 cr.</td>
</tr>
<tr>
<td>122</td>
<td><strong>ENVS 3010</strong> Fundamentals of Natural Resource Policy 3 cr.</td>
</tr>
<tr>
<td>125</td>
<td><strong>ENVS 3300</strong> Fundamentals of Recreation Resources Management 3 cr.</td>
</tr>
<tr>
<td>131</td>
<td><strong>ENVS 4000</strong> Human Dimensions of Natural Resource Management 3 cr.</td>
</tr>
<tr>
<td>136</td>
<td><strong>WATS 2220</strong> General Ecology 3 cr.</td>
</tr>
<tr>
<td>142</td>
<td><strong>WATS 3700</strong> Fundamentals of Watershed Science (CI) 3 cr.</td>
</tr>
<tr>
<td>150</td>
<td><strong>WILD 1800</strong> Introduction to Geographic Information systems 3 cr.</td>
</tr>
<tr>
<td>156</td>
<td><strong>WILD 2000</strong> Introduction to Wildland Resources 3 cr.</td>
</tr>
<tr>
<td>165</td>
<td><strong>WILD 2400</strong> Wildland Resource Techniques 3 cr.</td>
</tr>
<tr>
<td>172</td>
<td><strong>WILD 3100</strong> Introduction to Wildland Fire 3 cr.</td>
</tr>
<tr>
<td>176</td>
<td><strong>WILD 3800</strong> Wildland Ecosystems 4 cr.</td>
</tr>
<tr>
<td>183</td>
<td><strong>WILD 3810</strong> Plant and Animal Populations 3 cr.</td>
</tr>
<tr>
<td>192</td>
<td><strong>WILD 3820</strong> Forest Plants: Identification, Biology, and Function 3 cr.</td>
</tr>
<tr>
<td>197</td>
<td><strong>WILD 3850</strong> Vegetation and Habitat Management 3 cr.</td>
</tr>
<tr>
<td>203</td>
<td><strong>WILD 4700</strong> Ecological Foundations of Restoration 3 cr.</td>
</tr>
<tr>
<td>208</td>
<td><strong>WILD 4570</strong> Forest Ecology of the Sierra Nevada and White Mountains 3 cr.</td>
</tr>
<tr>
<td>212</td>
<td><strong>WILD 4750</strong> Monitoring and Assessment in Nat. Res. and Environmental Mgt. 4 cr.</td>
</tr>
<tr>
<td>217</td>
<td><strong>WILD 4880</strong> Genetics in Conservation and Management 3 cr</td>
</tr>
<tr>
<td>223</td>
<td><strong>WILD 4950</strong> Scientific Communication for Natural Resource Professionals 2 cr.</td>
</tr>
<tr>
<td>228</td>
<td><strong>WILD 5350</strong> Wildland Soils 3 cr.</td>
</tr>
<tr>
<td>231</td>
<td><strong>WILD 5700</strong> Forest Assessment and Management 3 cr.</td>
</tr>
<tr>
<td>234</td>
<td><strong>WILD 5710</strong> Wildland Disturbance: Ecology and Management 3 cr.</td>
</tr>
<tr>
<td>239</td>
<td><strong>WILD 5750</strong> Applied Remote Sensing 3 cr.</td>
</tr>
<tr>
<td>245</td>
<td><strong>PSC 3000</strong> Fundamentals of Soil Science 4 cr.</td>
</tr>
<tr>
<td>249</td>
<td><strong>PSC 3500</strong> Structure and Function of Plants 3 cr.</td>
</tr>
<tr>
<td>251</td>
<td><strong>PSC 5130</strong> Soil Genesis, Morphology, and Classification 3 cr.</td>
</tr>
</tbody>
</table>
### Document AB-1: Required Courses

**Institution Name:** Utah State University  
**Academic Year:** 2018-2019  
**Degree Program:** Forest Ecology and Management

<table>
<thead>
<tr>
<th>Required Course # and Title</th>
<th>Credit Hours in SAF-Required Areas of Study</th>
<th>Course Contains Significant Content in</th>
<th>TOTAL Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Communications</td>
<td>Basic Science and Mathematics</td>
<td>Social Sciences and Humanities</td>
</tr>
<tr>
<td>USU Breadth/Depth Requirements not otherwise listed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 1010 (CL1) Intro. to Writing: Academic Prose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 2010 (CL2) Intermed. Writing: Research Writing in a Persuasive Mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scientific Foundation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 1610 Biology I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 1615 Biology I Laboratory</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 1620 (BLS) Biology II</td>
<td>0.50</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>BIOL 1625 Biology II Laboratory</td>
<td>0.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 1050 (QL) College Algebra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 1100 (QL) Calculus Techniques</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PSC 3000 Fundamentals of Soil Science</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATS/BIOL 2220 General Ecology</td>
<td>1.00</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>CHEM 1110 (BPS) General Chemistry</td>
<td>0.20</td>
<td>3.60</td>
<td>0.20</td>
</tr>
</tbody>
</table>
### Document AB-1: Required Courses (cont’d)

<table>
<thead>
<tr>
<th>Required Course # and Title</th>
<th>Communications</th>
<th>Basic Science and Mathematics</th>
<th>Social Sciences and Humanities</th>
<th>Ecology and Biology</th>
<th>Measurement of Forest Resources</th>
<th>Management of Forest Resources</th>
<th>Policy, Economics, and Administration and Law</th>
<th>Field Work</th>
<th>Ethics</th>
<th>Oral and Written Communications</th>
<th>Integrated Resource Management</th>
<th>Technological Literacy</th>
<th>TOTAL Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>WILD Departmental Common Courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NR Professional Orientation</td>
<td>0.50</td>
<td>0.25</td>
<td>0.25</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD/GEOG 1800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introduction to Geog. Info. Systems</td>
<td>2.75</td>
<td>0.25</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 2400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildland Resource Techniques</td>
<td>1.00</td>
<td>2.00</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 3800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildland Plants and Ecosystems</td>
<td>3.00</td>
<td>1.00</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>4.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 3810</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant and Animal Populations</td>
<td>2.50</td>
<td>0.50</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 3820</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Plants: Identification, Biology, and Function</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 3850</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation and Habitat Management</td>
<td>1.00</td>
<td>2.00</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 4750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring &amp; Asst. in NR and Environmental Management</td>
<td>3.00</td>
<td>1.00</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>4.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Document AB-1: Required Courses (cont’d)

<table>
<thead>
<tr>
<th>Required Course # and Title</th>
<th>Credit Hours in SAF-Required Areas of Study</th>
<th>Course Contains Significant Content in</th>
<th>TOTAL Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FEMA-specific Coursework</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APEC 3012 (DSS) Intro. to Natural Resources and Regional Economics</td>
<td>0.30 2.70 x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>ENVS 3010 Fundamentals of Natural Resource Policy</td>
<td>0.30 2.70 x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>ENVS 3300 Fundamentals of Recreation Resource Management</td>
<td>1.50 0.75 0.75 x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>ENVS 4000 (DSS) Human Dimensions in Natural Resource Management</td>
<td>0.40 1.30 1.30 x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>WATS 3700 (CI) Fund. Watershed Sci.</td>
<td>1.00 1.00 1.00 x x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>WILD 5350 Wildland Soils*</td>
<td>1.00 1.00 1.00 x x x (3.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILD 3100 Intro. to Wildland Fire**</td>
<td>1.00 1.00 1.00 x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>WILD 5700 (CI) Forest Assesst.&amp; Mgt.</td>
<td>1.00 1.50 0.50 x x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>WILD 5710 Forest Vegetation, Disturbance Ecology, and Management</td>
<td>1.00 1.00 1.00 x x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>WILD 5750 Applied Remote Sensing</td>
<td>2.50 0.50 x x x</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Required Course # and Title</td>
<td>Credit Hours in SAF-Required Areas of Study</td>
<td>Course Contains Significant Content in</td>
<td>TOTAL Credit Hours</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------</td>
<td>---------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td></td>
<td>Credit Hours</td>
<td>Communications</td>
<td>Basic Science and Mathematics</td>
</tr>
<tr>
<td>Total Required Courses</td>
<td>2.70</td>
<td>14.10</td>
<td>0.20</td>
</tr>
<tr>
<td>Total Restricted Electives</td>
<td>2.50</td>
<td>2.00 or 3.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Total FEMA Requirements without 18-19 cr. Free Electives</td>
<td>5.20</td>
<td>16.00 or 17.00</td>
<td>10.20</td>
</tr>
</tbody>
</table>

* WILD 5350 will no longer be required in Fall 2020, and is not counted in total, but will appear in a restricted menu of courses from which one course is required for FEMA.
**WILD 3100 will be require starting Fall 2020.
**Document AB-2: Restricted Electives**

**Institution Name:** Utah State University  
**Academic Year:** 2018-2019  
**Official Degree Program Title:** Forest Ecology and Management

<table>
<thead>
<tr>
<th>Required Course # and Title</th>
<th>Credit Hours in SAF-Required Areas of Study</th>
<th>Course Contains Significant Content in</th>
<th>TOTAL Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Communications</td>
<td>Basic Science and Mathematics</td>
<td>Social Sciences and Humanities</td>
</tr>
<tr>
<td><strong>Breadth/Depth Requirements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breadth American Institutions (BAI)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breadth Humanities (BHU)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breadth Creative Arts (BCA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Depth Humanities (DHA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Breadth Social Sciences (BSS)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 course</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statistics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>either:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 2000 (QI) Statistical Methods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT 3000 (QI) Stat. for Scientists</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0 or 3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.0 or 19.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Document C-1: Background Summary for Faculty reporting to the Wildland Resources Department Head  

Institution Name: Utah State University  
Academic Year: 2019-2020  
Degree Program Title: Forest Ecology and Management

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank or Title</th>
<th>Major Field</th>
<th>Highest Degree Held (Degree/Institution)</th>
<th>Experience (years)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Peter Adler*</td>
<td>Professor</td>
<td>Terrestrial Ecology</td>
<td>PhD Colorado State University</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Tal Avgar</td>
<td>Assistant Professor</td>
<td>Animal Movement Ecology</td>
<td>PhD University of Guelph, Ontario, Canada</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Karen Beard</td>
<td>Professor</td>
<td>Conservation Biology</td>
<td>PhD Yale University</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Beth Burritt</td>
<td>Extension Associate Professor</td>
<td>Rangeland Management</td>
<td>MS Utah State University</td>
<td>39</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Mark Chynoweth*</td>
<td>Assistant Professor</td>
<td>Wildlife Ecology</td>
<td>PhD University of Utah</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Mary Connor</td>
<td>Research Associate Professor</td>
<td>Quantitative Ecology</td>
<td>PhD Colorado State University</td>
<td>13</td>
<td>9</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Michael Conover</td>
<td>Professor</td>
<td>Human-Wildlife Interactions</td>
<td>PhD Washington State University</td>
<td>23</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>David Dahlgren</td>
<td>Assistant Professor</td>
<td>Wildlife and Rangeland Habitat</td>
<td>PhD Utah State University</td>
<td>6</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Return to Table of Contents
<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank or Title</th>
<th>Major Field</th>
<th>Highest Degree Held (Degree/Institution)</th>
<th>Experience (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. Justin DeRose*</td>
<td>Assistant Professor</td>
<td>Silviculture and Forest Ecology</td>
<td>PhD Utah State University</td>
<td>1 10</td>
</tr>
<tr>
<td>Thomas Edwards</td>
<td>Professor, Federal Collaborator</td>
<td>Landscape Ecology</td>
<td>PhD University of Florida</td>
<td>31 0 0</td>
</tr>
<tr>
<td>Shandra Frey</td>
<td>Extension Associate Professor</td>
<td>Wildlife Management</td>
<td>PhD Utah State University</td>
<td>7 0 4</td>
</tr>
<tr>
<td>Eric Gese</td>
<td>Professor, Federal Collaborator</td>
<td>Wildlife Ecology</td>
<td>PhD University of Wisconsin at Madison</td>
<td>24 3 1</td>
</tr>
<tr>
<td>Frank Howe</td>
<td>Associate Professor, State Collaborator</td>
<td>Wildlife Ecology</td>
<td>PhD Colorado State University</td>
<td>13 13 5</td>
</tr>
<tr>
<td>Michael Kuhns*</td>
<td>Professor, WILD Department Head</td>
<td>Forestry</td>
<td>PhD Auburn University</td>
<td>27 6 3</td>
</tr>
<tr>
<td>Andrew Kulmatiski*</td>
<td>Associate Professor</td>
<td>Plant/soils Interactions</td>
<td>PhD Utah State University</td>
<td>10 3 1</td>
</tr>
<tr>
<td>Eric LaMalfa*</td>
<td>Assistant Professor</td>
<td>Natural Resources Teaching</td>
<td>PhD Utah State University</td>
<td>1 0 12</td>
</tr>
<tr>
<td>James Lutz*</td>
<td>Associate Professor</td>
<td>Forest Ecology</td>
<td>PhD University of Washington</td>
<td>6 5 18</td>
</tr>
<tr>
<td>Faculty Member</td>
<td>Academic Rank or Title</td>
<td>Major Field</td>
<td>Highest Degree Held (Degree/Institution)</td>
<td>Experience (years)</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>----------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Daniel MacNulty</td>
<td>Associate Professor</td>
<td>Wildlife Ecology</td>
<td>PhD University of Minnesota</td>
<td>8 4 0</td>
</tr>
<tr>
<td>Kezia Manlove</td>
<td>Assistant Professor</td>
<td>Quantitative Ecology</td>
<td>PhD Pennsylvania State University</td>
<td>2 7 5</td>
</tr>
<tr>
<td>Darren McAvoy*</td>
<td>Extension Associate Professor</td>
<td>Forestry</td>
<td>MS Utah State University</td>
<td>22 0 11</td>
</tr>
<tr>
<td>Terry Messmer</td>
<td>Professor</td>
<td>Range and Wildlife Management</td>
<td>PhD North Dakota State University</td>
<td>30 5 7</td>
</tr>
<tr>
<td>Karen Mock*</td>
<td>Professor, Associate Department Head</td>
<td>Genetics of Natural Populations</td>
<td>PhD Northern Arizona University</td>
<td>19 10 2</td>
</tr>
<tr>
<td>Douglas Ramsey*</td>
<td>Professor</td>
<td>GIS, remote sensing</td>
<td>PhD University of Utah</td>
<td>29 6 2</td>
</tr>
<tr>
<td>Clark Rushing*</td>
<td>Assistant Professor</td>
<td>Population Ecology</td>
<td>PhD University of Maryland</td>
<td>2 0 7</td>
</tr>
<tr>
<td>Eugene Schupp</td>
<td>Professor</td>
<td>Rangeland Ecology</td>
<td>PhD University of Iowa</td>
<td>27 0 5</td>
</tr>
<tr>
<td>David Stoner</td>
<td>Research Assistant Professor</td>
<td>Wildlife Ecology</td>
<td>PhD Utah State University</td>
<td>8 1 18</td>
</tr>
<tr>
<td>Eric Thacker</td>
<td>Associate Professor</td>
<td>Rangeland Management</td>
<td>PhD Utah State University</td>
<td>6 2 1</td>
</tr>
</tbody>
</table>
### Faculty Member Information

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank or Title</th>
<th>Major Field</th>
<th>Highest Degree Held (Degree/Institution)</th>
<th>Experience (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johan du Toit</td>
<td>Professor</td>
<td>Wildlife Ecology and Management</td>
<td>PhD University of the Witwatersrand, Johannesburg, South Africa</td>
<td>14 25 0</td>
</tr>
<tr>
<td>Kari Veblen*</td>
<td>Associate Professor</td>
<td>Rangeland Ecology</td>
<td>PhD University of California at Davis</td>
<td>8 3 2</td>
</tr>
<tr>
<td>Juan Villalba</td>
<td>Professor</td>
<td>Rangeland Ecology, Animal Science</td>
<td>PhD Utah State University</td>
<td>25 1 3</td>
</tr>
<tr>
<td>Larissa Yocom*</td>
<td>Assistant Professor</td>
<td>Forest and Fire Ecology</td>
<td>PhD Northern Arizona University</td>
<td>3 5 0</td>
</tr>
<tr>
<td>Julie Young</td>
<td>Associate Professor, Federal Collaborator</td>
<td>Wildlife Behavior</td>
<td>PhD Utah State University</td>
<td>9 0 6</td>
</tr>
</tbody>
</table>

* FTE Faculty substantively connected to FEMA program (see Table 26, Self-Evaluation Report)
**Institution Name:** Utah State University  
**Academic Year:** 2019-2020  
**Degree Program Title:** Forest Ecology and Management

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank</th>
<th>Major Field</th>
<th>Highest Degree Held (Degree/Institution)</th>
<th>USU College</th>
<th>Department</th>
<th>Experience (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryan Bosworth</td>
<td>Associate Professor</td>
<td>Economics</td>
<td>PhD University of Oregon</td>
<td>Agriculture</td>
<td>Applied Economics</td>
<td>13</td>
</tr>
<tr>
<td>Soren Brothers</td>
<td>Assistant Professor</td>
<td>Limnology</td>
<td>PhD University of Potsdam (Germany)</td>
<td>QCNR</td>
<td>Watershed Sciences</td>
<td>2</td>
</tr>
<tr>
<td>Layne Coppock</td>
<td>Professor</td>
<td>Human dimensions of natural resources</td>
<td>PhD Colorado State University</td>
<td>QCNR</td>
<td>Environment &amp; Society</td>
<td>28</td>
</tr>
<tr>
<td>Paul Grossl</td>
<td>Professor</td>
<td>Soil Science, Biogeochemistry</td>
<td>PhD Montana State University</td>
<td>Agriculture</td>
<td>Plant, Soils &amp; Climate</td>
<td>15</td>
</tr>
<tr>
<td>Sarah Klain</td>
<td>Assistant Professor</td>
<td>Resources, Environment &amp; Sustainability</td>
<td>PhD University of British Columbia</td>
<td>QCNR</td>
<td>Environment &amp; Society</td>
<td>1</td>
</tr>
<tr>
<td>Zach Miller</td>
<td>Assistant Professor</td>
<td>Forest and Conservation Science</td>
<td>PhD University of Montana</td>
<td>QCNR</td>
<td>Environment &amp; Society</td>
<td>1</td>
</tr>
</tbody>
</table>
**Institution Name:** Utah State University  
**Academic Year:** 2019-2020  
**Degree Program Title:** Forest Ecology and Management

<table>
<thead>
<tr>
<th>Faculty Member (Rank/Position)</th>
<th>Budgeted Time Allocation (%)</th>
<th>All Courses Taught</th>
<th>Title &amp; Course #</th>
<th>Required for FEMA</th>
<th>Credit Hours</th>
<th>Contact Hours</th>
<th>Total Undergrad Enrollment</th>
<th>Grad</th>
<th># Undergrad. Advises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adler, Peter (Professor)*</td>
<td>40/50/0/10</td>
<td></td>
<td>WILD 3800 Wildland Plants and Ecosystems (Fa)&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Y</td>
<td>4</td>
<td>4</td>
<td>59</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WILD 6770 – Community Ecology (Fa odd years)</td>
<td>3</td>
<td>2.5</td>
<td>0</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avgar, Tal (Assistant Professor)</td>
<td>40/50/0/10</td>
<td></td>
<td>WILD 2200 Ecology of Our Changing World (Fa)</td>
<td>3</td>
<td>2.5</td>
<td>65</td>
<td>0</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WILD 6900 – ST: Space Use Ecology (Sp)</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beard, Karen (Professor)</td>
<td>30/55/0/15</td>
<td></td>
<td>WILD 4600 Conservation Biology (Sp)&lt;sup&gt;1,4&lt;/sup&gt;</td>
<td>3</td>
<td>2.5</td>
<td>53</td>
<td>0</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WILD 6900 – ST: Invasion Ecology (Sp)&lt;sup&gt;1,4&lt;/sup&gt;</td>
<td>3</td>
<td>2.5</td>
<td>0</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WILD 6720/7720 – Advanced Conservation Biology&lt;sup&gt;1&lt;/sup&gt;</td>
<td>3</td>
<td>2.5</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burton, Julia (Research Assistant Professor, resigned Summer 2019)</td>
<td>15/75/0/10</td>
<td></td>
<td>WILD 5700 - Forest Assessment and Management (CI) (Sp2019)</td>
<td>3</td>
<td>2.5</td>
<td>9</td>
<td>3</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Busby, Fee (Professor, retired Summer 2019)</td>
<td>90/0/0/10</td>
<td></td>
<td>WILD 2000 - Natural Resources Professional Orientation (Sp2019)</td>
<td>1</td>
<td>2</td>
<td>54</td>
<td>na</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>WILD 3850 - Vegetation and Habitat Management (Sp2019)</td>
<td>3</td>
<td>2.5</td>
<td>53</td>
<td>0</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>Faculty Member (Rank/Position)</td>
<td>Budgeted Time Allocation (%)</td>
<td>All Courses Taught</td>
<td>Title &amp; Course #</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------</td>
<td>------------------</td>
<td>-----------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching</td>
<td>Research</td>
<td>Extension</td>
<td>Other</td>
<td></td>
<td>Required for FEMA</td>
<td>Credit Hours</td>
<td>Contact Hours</td>
<td>Total Enrollment</td>
</tr>
<tr>
<td>Chynoweth, Mark (Assistant Professor)*</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>WILD 2000 - Natural Resources Professional Orientation (Fa)</td>
<td>Y</td>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 2400 - Wildland Resource Techniques (Fa)</td>
<td>Y</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 3810 - Plant and Animal Populations (Sp)</td>
<td>Y</td>
<td>3</td>
<td>2.5</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 4500 – Principles of Wildlife Management (Sp)</td>
<td></td>
<td>3</td>
<td>2.5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 4600 - Conservation Biology (Sp)</td>
<td></td>
<td>3</td>
<td>2.5</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 4750 - Monitoring and Assessment in Natural Resource and Environmental Management (Fa)</td>
<td>Y</td>
<td>4</td>
<td>5.2</td>
<td>40</td>
</tr>
<tr>
<td>Connor, Mary (Research Associate Professor)</td>
<td>10</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>WILD 6900 – ST: Analysis and Modeling of Wildlife Populations (Sp)</td>
<td>V</td>
<td>V</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Conover, Michael (Professor)</td>
<td>35</td>
<td>55</td>
<td>0</td>
<td>10</td>
<td>WILD 3300 – Management Aspects of Wildlife Behavior (Sp)</td>
<td></td>
<td>3</td>
<td>2.5</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 5300 – Human-Wildlife Interactions (Sp, Fa)</td>
<td></td>
<td>3</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 7300 – Human-Wildlife Interactions (Sp, Fa)</td>
<td></td>
<td>3</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Dahlgren, David (Assistant Professor Extension)</td>
<td>0</td>
<td>0</td>
<td>90</td>
<td>10</td>
<td>WILD 6900 – ST: Wildlife Harvest Management (Sp)</td>
<td></td>
<td>2</td>
<td>1.5</td>
<td>0</td>
</tr>
<tr>
<td>Faculty Member</td>
<td>Teaching</td>
<td>Research</td>
<td>Extension</td>
<td>Other</td>
<td>Title &amp; Course #</td>
<td>Required for FEMA</td>
<td>Contact Hours</td>
<td>Total Enrollment</td>
<td>Undergrad</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>-----------</td>
<td>-------</td>
<td>--------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>-----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>DeRose, Justin (Assistant Professor, FEMA faculty advisor)*</td>
<td>40</td>
<td>50</td>
<td>0</td>
<td>10</td>
<td>WILD 2000 - Natural Resources Professional Orientation (Fa)</td>
<td>Y</td>
<td>1</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 3850 - Vegetation and Habitat Management (Sp2020)¹</td>
<td>Y</td>
<td>3</td>
<td>1.25</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 5700 - Forest Assessment and Management (CI) (Sp2020)¹</td>
<td>Y</td>
<td>3</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Du Toit, Johan (Professor)</td>
<td>30</td>
<td>60</td>
<td>0</td>
<td>10</td>
<td>WILD 4500 – Principles of Wildlife Management (Sp)</td>
<td>Y</td>
<td>2.5</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 7000 – Wildlife Ecology and Management (Sp even years)</td>
<td>Y</td>
<td>2.5</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Edwards, Thomas (Professor, Federal Collaborator)</td>
<td>10</td>
<td>80</td>
<td>0</td>
<td>10</td>
<td>WILD 4580 - Management and Manipulation of Ecological Data Using R (Sp)</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 6580 - Management and Manipulation of Ecological Data Using R (Sp,Fa)</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Forero, Leslie (Instructor)</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>WILD 3830 Range Plant Taxonomy and Function (Fa 2019)³</td>
<td>Y</td>
<td>3</td>
<td>2.5</td>
<td>25</td>
</tr>
<tr>
<td>Garrard, Chris (Instructor)</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>WILD 6920 – Python Programming for GIS (Sp) ᵃ</td>
<td>Y</td>
<td>3</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>Germain, Sara (Instructor)</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td>WILD 3820 – Forest Plants: Identification, Biology, and Function (Fa)³</td>
<td>Y</td>
<td>3</td>
<td>2.5</td>
<td>41</td>
</tr>
<tr>
<td>Howe, Frank (Associate Professor, State Collaborator)</td>
<td>40</td>
<td>30</td>
<td>0</td>
<td>30</td>
<td>WILD 5560 – Applied Avian Ecology (Sp even years)</td>
<td>Y</td>
<td>2.5</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WILD 4550 – Wildlife Law Enforcement (Sp)</td>
<td>Y</td>
<td>2.5</td>
<td>19</td>
<td>0</td>
</tr>
</tbody>
</table>
### Document D, continued

<table>
<thead>
<tr>
<th>Faculty Member (Rank/Position)</th>
<th>Budgeted Time Allocation (%)</th>
<th>All Courses Taught</th>
<th>Title &amp; Course #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hulvey, Kris (Assistant Professor, resigned Summer 2019)</td>
<td>35 55 0 10</td>
<td>WILD 4910 - Assessment and Synthesis in Natural Resource Science (CI) (Sp2019)</td>
<td>3 2.5 8 0 0</td>
</tr>
<tr>
<td>King, Michael (Associate Professor, retiring Summer 2020)</td>
<td>90 0 0 10</td>
<td>WILD 2200 – Ecology of Our World (Fa2019)</td>
<td>3 2.5 39 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 2400 - Wildland Resource Techniques (Fa2019)</td>
<td>3 5 5 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 4500 - Principles of Wildlife Management (Sp2019)</td>
<td>3 2.5 0 0 0</td>
</tr>
<tr>
<td>Kulmatiski, Andrew (Associate Professor)*</td>
<td>40 50 0 10</td>
<td>WILD 5350 – Wildland Soils (Sp)³</td>
<td>Y 3 2.5 2 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 6350 – Wildland Soils (Sp)</td>
<td>Y 3 2.5 0 3 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 3830 Range Plant Taxonomy and Function (Fa)³</td>
<td>Y 3 4 25 0 0</td>
</tr>
<tr>
<td>LaMalfa, Eric (Assistant Professor)*</td>
<td>90 0 0 10</td>
<td>WILD 2000 - Natural Resources Professional Orientation (Fa, Sp)⁴</td>
<td>1 2 32 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 2400 - Wildland Resource Techniques (Fa)</td>
<td>Y 3 5 64 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 3850 - Vegetation and Habitat Management (Sp2020)⁴</td>
<td>Y 3 1.25 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 3800 - Wildland Plants and Ecosystems (Fa2019)³</td>
<td>Y 3 2.5 59 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 4910 - Assessment and Synthesis in Natural Resource Science (CI) (Sp2020)⁴</td>
<td>Y 3 4 0 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 4950 – ST: Range Plants (Fa)</td>
<td>2 4 6 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 4950 – Undergraduate Range Management Examination (Sp)</td>
<td>2 2 3 0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILD 6900 – Wildlife Ecology and Management (Sp)²</td>
<td>3 2.5 0 2 0</td>
</tr>
</tbody>
</table>

*Undergrad.  Grad  # Undergrad. Advises  

|  |  |  | |
|---|---|---|---|---|---|
| Hulvey, Kris |  |  |  |  |  |
| King, Michael |  |  |  |  |  |
| Kulmatiski, Andrew |  |  |  |  |  |
| LaMalfa, Eric |  |  |  |  |  |

---

17
### All Courses Taught

<table>
<thead>
<tr>
<th>Faculty Member (Rank/Position)</th>
<th>Budgeted Time Allocation (%)</th>
<th>All Courses Taught</th>
<th>Title &amp; Course #</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teaching</td>
<td>Research</td>
<td>Extension</td>
</tr>
<tr>
<td>Lutz, James*</td>
<td>30</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>35</td>
<td>55</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>60</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MacNulty, Daniel (Associate Professor)</th>
<th>WILD 5580 – Mammalogy (Fa)</th>
<th>WILD 6400 – Ecology of Animal Populations (Fa)</th>
<th>WILD 6500 – Design and Analysis of Ecological Experiments Using R (Fa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>6</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manlove, Kezia (Assistant Professor)</th>
<th>WILD 5220 – Conservation Partnerships (Sp)</th>
<th>WILD 7220 – Conservation Partnerships (Sp)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Messmer, Terry (Professor Extension)</th>
<th>WILD 4880 – Genetics in Conservation and Management (Sp)</th>
<th>WILD 5750 – Applied Remote Sensing (Fa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mock, Karen (Professor)</th>
<th>WILD 3810 - Plant and Animal Populations (Sp)</th>
<th>WILD 6900 – ST: Applied Bayesian Analysis of Ecological Data (Sp)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ramsey, Doug (Professor)*</th>
<th>WILD/GEOG 1800 - Introduction to Geographic Information Systems (Sp)</th>
<th>WILD 5750 - Applied Remote Sensing (Fa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Y</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rushing, Clark (Assistant Professor)*</th>
<th>WILD 4570 – Forest Ecology of the Sierra Nevada and White Mountains (Fa)&lt;sup&gt;1&lt;/sup&gt;</th>
<th>WILD 6750 - Forest Ecology of the Sierra Nevada and White Mountains (Fa)&lt;sup&gt;1,3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>WILD 4880 – Genetics in Conservation and Management (Sp)</th>
<th>WILD 5750 – Applied Remote Sensing (Fa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>Faculty Member (Rank/Position)</td>
<td>Teaching</td>
<td>Research</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Schupp, Eugene (Professor)</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stoner, David (Research Assistant Professor)</td>
<td>10</td>
<td>80</td>
</tr>
<tr>
<td>Terletsy-Gese, Patricia (Instructor)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Thacker, Eric (Associate Professor Extension)</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veblen, Kari (Associate Professor)*</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Villalba, Juan (Professor)</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yocom, Larissa (Assistant Professor)*</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Document D Supplement:
Faculty teaching courses required for the FEMA degree but NOT reporting to the WILD Department Head.

<table>
<thead>
<tr>
<th>Faculty Member (Rank/Position)</th>
<th>Budgeted Time Allocation (%)</th>
<th>All Courses Taught</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Teaching</td>
<td>Research</td>
</tr>
<tr>
<td>Belmont, Shannon (Lecturer, ENVS)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Bosworth, Ryan (Associate Professor, APEC)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Brothers, Soren (Assistant Professor, WATS)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Coppock, Layne (Professor, ENVS)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Grossl, Paul (Professor, PSC)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Howe, Peter (ENVS)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Klain, Sarah (Assistant Professor, ENVS)</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Miller, Zach (Assistant Professor, ENVS)</td>
<td>na</td>
<td>na</td>
</tr>
</tbody>
</table>

### Notes:

- * Core faculty for Forest Ecology and Management program
- 1 Enrollment estimated based on enrollments prior to Spring 2019
- 2 Enrollment from Spring 2019
- 3 Enrollment from Fall 2019
- 4 Sabbatical/Leave replacement 2019-2020
- 5 Sabbatical/Leave 2019-2020
- ST = Special Topics
- V = variable credit/contact hours
Peter Adler
Professor, plant community ecology, 9-month appointment

**Academic education background:**
PhD, Colorado State University, ecology, 2003
AB, Harvard College, environmental studies, 1994

**Professional and research experience:**
2016-present  Professor, Dept. Wildland Resources, Utah State University
2012-2016  Associate professor, Dept. Wildland Resources, Utah State University
2006-2012  Assistant professor, Dept. Wildland Resources, Utah State University
2005-2006  Post-doctoral fellow, National Center for Ecological Analysis and Synthesis (NCEAS), Santa Barbara, California
2003-2005  Post-doctoral fellow, University of California, Santa Barbara
(Advisor: Jonathan Levine)
1998-2003  Graduate research assistant, Colorado State University
(Advisor: William Lauenroth)

**Teaching experience:**
WILD3800: Wildland Plants and Ecosystems, Utah State University, 47-65 students, 2014-2018
WILD6900: Ecological Dynamics and Forecasting, 13 students, 2018
WILD6900: Climate Change Vulnerability Assessment, 4 students, 2012, 2013
WILD6960: Graduate Ecology, Utah State University, guest lectured 4 contact hours, 20 contact hours, 2006, 2007
RS-332: Range Measurements, Colorado State University (Co-Instructor)

**Publications during the last five years:**


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:

2019 Fellow, Ecological Society of America
2018 Teacher of the Year, Quinney College of Natural Resources, Utah State University
2017, 2018 Clarivate Highly Cited Researcher (top 1% Ecology/Environment)
2015 Eminent Ecologist, Kellogg Biological Station, Michigan State University

Membership and offices held in professional organizations:
Member: Society for Range Management

Major professional self-improvement activities during past 10 years (including sabbatical):
2019 Fulbright Scholar (Argentina) (Sabbatical 2019-2020)

External grants and other research funding during the last five years:

Lead-PI: National Science Foundation: “Collaborative research: RoL: Using reaction norms to link genomic and phenotypic variation with regional-scale population responses to environmental change.” 2020-2023. $1,800,000 total, $1,046,000 to USU.


Co-PI: USDA-NIFA, "Livestock ranching, rangelands, and resilience: ensuring adaptive capacity in an increasingly variable climate." 2018-2021. PI: K. Suding. $1,260,000 total, $325,000 to USU.


Co-PI and lead author: North Central Climate Science Center, USGS, "Forecasting changes in sagebrush distribution and abundance under climate change: integration of spatial, temporal, and mechanistic models." 2015-2017. PI: Ben Poulter. $197,400 (to Montana State University).

PI: Great Basin Landscape Conservation Cooperative, USFWS, "Forecasting changes in sagebrush distribution and abundance under climate change: integration of spatial, temporal, and mechanistic models." 2015-1016. $85,000.

Ryan Bosworth
Associate Professor, Department of Applied Economics

Academic education background:
Ph.D., Economics, University of Oregon, 2006, Dissertation: Demand for Environmental Health Policies
M.S., Economics, Utah State University, 2001, Thesis: Economies of Scale in Wyoming Public Education
B.S., Economics, Utah State University, 2000

Professional and research experience:
Associate Professor, Department of Applied Economics, Utah State University (2015-present)
Assistant Professor, Department of Applied Economics, Utah State University (2010-2015)
Assistant Professor, School of Public and International Affairs, North Carolina State University (2006-2010)
Graduate Teaching Fellow, Department of Economics, University of Oregon (2002-2006)

Teaching experience:

Publications during the last five years:


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
Teacher of the Year, College of Agriculture and Applied Sciences, Utah State University, 2014-2015
Faculty Affiliate, Center for Society, Economy, and the Environment, Utah State University, 2014
Faculty Fellow, Center for Persons with Disabilities, Utah State University, 2014
Faculty Affiliate, Center for Environmental and Resource Economic Policy, North Carolina State University, (2008-2012)

External grants and other research funding during the last five years:
“Effects of Alternative Fuel Infrastructure on Key Transportation Economic Metrics”, Washington State Department of Transportation (with Kevin Heaslip), July 2011, ($200,000), Co-PI.
Soren Brothers
Assistant Professor, Watershed Sciences Department
Return to Table of Contents

Academic education background:
PhD Limnology (magna cum laude) (2013) The University of Potsdam, Potsdam, Germany
  Thesis title: Carbon gains, losses, and feedbacks in shallow, eutrophic lakes of phytoplankton and macrophyte dominance.
BSc Major in Biology (Option Conservation Biology), Minor in Political Science (2005) University of British Columbia, Vancouver, Canada
Associate of the Royal Conservatory (ARCT) Performers Diploma (Piano) (2001) Royal Conservatory of Music, Toronto, Canada

Professional and research experience:
2017-present Assistant Professor of Limnology, Utah State University My research examines carbon cycling, greenhouse gas dynamics, primary production, and regime shifts in aquatic systems.
2013-2017 Post-doctoral Fellow, University of Guelph (Dr. Paul Sibley) My post-doctoral research examined long-term shifts in the Great Lakes, focusing on changes in ecological structure (especially autotrophic structure), carbon cycling, hypoxia formation in Lake Erie, and long-term oxygen dynamics in Lake Superior.
2014-2016 Field and Laboratory Assistant for Mitacs Project “The Effects of Natural and Anthropogenic Disturbance on Arctic Wildlife”, University of Guelph (Dr. Andrew Derocher and Dr. Paul Sibley)
2014 Field Research and Laboratory Assistant, Western University (Dr. Irena Creed)
2010-2013 Researcher, Leibniz-Institute of Freshwater Ecology and Inland Fisheries (IGB) in Berlin, Germany (Dr. Ursula Gaedke, Dr. Jan Köhler, and Dr. Sabine Hilt)

Teaching experience:
WATS 4510 “Aquatic Ecology Practicum” (Course design and instructor, Aug. 29th – Dec. 4th) Utah State University
WATS 3700 “Fundamentals of Watershed Science” (Course design and instructor, Jan. 8th – May 4th) Utah State University
WATS 6220 “Advanced Limnology” (Course design and instructor, Jan. 8th – Feb. 26th) Utah State University
ENVS 6470 “The Science and Management of Stressors in the Great Lakes Basin” University of Guelph
ENVS 6504 “Classification and Assessment of Aquatic Ecosystems” University of Guelph
**Publications during the last five years:**


**Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:**

2015 Early Career Travel Award, Association for the Sciences of Limnology and Oceanography

**Membership and offices held in professional organizations:**
Association for the Sciences of Limnology and Oceanography (2013 to present)
International Association of Great Lakes Research (2014 to 2018)
Ecological Society of America (2016 to present) • International Society of Limnology (2018 to present)
Society for Advancement of Chicanos/Hispanics and Native Americans in Science (2018 to present)

External grants and other research funding during the last five years:
2018 Henry’s Fork Foundation: “Hydrological and Ecological Assessment of the Henry’s Fork River and Island Park Reservoir to Support Multi-Stakeholder Management” ($277,596.85 total, $67,495.12 to me; PI: Soren Brothers, co-PIs: Phaedra Budy, Sarah Null)
2017 Utah State University office of Research and Graduate Studies Research Catalyst Seed Grant: “Assessing the effects of climate change on the net metabolism and carbon cycling of arctic lakes” ($19,913, PI: Soren Brothers, co-PIs: Trisha Atwood, Janice Brahney, Phaedra Budy)
Mark Chynoweth
Assistant Professor, conservation biology and biodiversity

Academic education background:
PhD, Department of Biology, University of Utah, 2017
MS, Department of Natural Resources & Environmental Management, University of Hawai‘i at Mānoa, 2012
BA, Department of Geography, State University of New York at Geneseo, 2006

Teaching experience:
Instructor, Conservation Biology Field Lab, University of Utah 2008-2009
Instructor, Conceptual Physics, National Science Foundation GK-12 Fellow, University of Utah, 2013-2014
Co-Instructor, Pacific Internship Programs for Exploring Science, Scientific Writing, University of Hawai‘i at Mānoa, 2012
Instructor, Marine Science, Catalina Island Marine Institute, 2007-2009

Dates of appointment and promotions at present institution:
Assistant Professor 2017

Publications during the last five years:


Horns J, E Buechley, MW Chynoweth, L Aktay, E Çoban, MA Kırpik, JM Herman, Y Şaşmaz, ÇH Şekercioğlu (2016) Geolocator tracking of Great Reed-Warblers (Acrocephalus arundinaceus) identifies key regions for migratory wetland specialists in the Middle East and sub-Saharan East Africa. The Condor 118(4):835-849. DOI: 10.1650/CONDOR-16-63.1


Membership and offices held in professional organizations:
Society for Conservation Biology
The Wildlife Society
Ecological Society of America
Layne Coppock
Professor, Environment and Society Department

Academic education background:
Ph.D., International Animal Science, Colorado State University 1985
M.S., Wildlife Biology, Colorado State University 1981
B.S., Zoology, Colorado State University 1977

Professional and research experience:
2013 – present Professor, Utah State University
1996-2012 Associate Professor, Utah State University
2011-2012 Faculty Advisor, Environmental Studies Degree, Utah State University
2010-2011 Interim Associate Dean, Utah State University
1999-1996 Assistant Professor, Utah State University, Logan
1985-1991 Research Scientist and Team Leader, International Livestock Center for Africa
(CGIAR System), Addis Ababa, Ethiopia
1978-1985 Graduate Research Assistant, Natural Resource Ecology Laboratory, Colorado
State University, Fort Collins

Teaching experience: (USU)
2019- ENVS 1350, Introduction to Environmental Science (3 semester credits, average enrollment of 80)
2014-18 ENVS 4000, Human Dimensions of Natural Resource Management (3 semester credits, average enrollment of 75)
2011-18 ENVS 6840/7840, Graduate Orientation Seminar (1 semester credit; average enrollment of 6)
2011 ENVS 4960, Undergraduate Directed Readings—Environment and Society (3 semester credits; 1 enrolled)
2007-18 ENVS 3330, Environment and Society (3 semester credits; average enrollment of 40)
2007 ENVS 6900, Graduate Study Abroad—Kenya (3 semester credits; 6 enrolled)
2008 ENVS 4950, Undergraduate Study Abroad—Ethiopia (3 semester credits; 4 enrolled)
2006 ENVS 7910, Graduate Directed Readings—African Governance and Leadership (2 semester credits; 1 enrolled)
2005-9 ENVS 6000/7000, Graduate Human Dimensions Research Theory (3 semester credits; 8 enrolled)
2004-8 ENVS 6700/7700, Graduate Human Dimensions Research Approaches (3 semester credits; 6 enrolled)
2004-5 ENVS 6810, Graduate Human Dimensions Research Applications (3 semester credits; 4 enrolled)
2007 ENVS 6800, Graduate Departmental Seminar (1 semester credit; 25 enrolled)
2001-2 RLR 5410, Vegetation Analysis for Livestock and Wildlife (3 semester credits; 10 enrolled)
1998-2002  RLR 6800, Graduate Departmental Seminar (1 semester credit; 25 enrolled)
1993-5  RLR 776, Range Animal Nutrition Techniques (2 quarter credits; 10 enrolled)
1992-4  RLR 775, Range Animal Nutrition (3 quarter credits; 5 enrolled)
1992-2003  NR 360/3600, Quantitative Assessment for Natural Resources (4 quarter credits/3 semester credits; 60 enrolled)

Publications during the last five years:

Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
2020  Recipient, W.R. Chapline Stewardship Award, Society for Range Management (for human capacity building in international rangeland settings)
2019  Recipient, Faculty Undergraduate Mentor of the Year, Quinney College of Natural Resources, Utah State University
2018  Nominated by the USU Vice President for Research Office for the Utah Governor’s Medal for Science and Technology (in recognition of impact related to the PARIMA project in eastern Africa, 1997-2009)
2016  Appointed as one of 70 members of eight working groups addressing “The Challenge of Change: Engaging Public Universities to Feed the World,” a 2050 Global Food Security Initiative coordinated under the auspices of the Association of Public & LandGrant Universities (APLU), Washington DC
2016-9  Appointed as a member of a technical advisory council for the Foundation for Food and Agricultural Research, Washington DC
2016  Nominated, D. Wynne Thorne Career Research Award. Office of Research and Graduate Studies, Utah State University.
2015  Recipient, *Career Achievement Award,* Ethiopian Society for Animal Production, Addis Ababa, Ethiopia, August 27. Recognition for 35 years of outstanding research and outreach on behalf of pastoralists and rangelands in eastern Africa (Ethiopia and Kenya.)


2012  Researcher of the Year, College of Natural Resources, Utah State University

2011  Plenary Keynote Speaker, IX International Rangelands Congress, Rosario, Argentina

2009  Recipient, Communication Award, co-author on a paper by D. Bailey et al. on milk marketing in the Kenyan rangelands: 19th Annual Symposium of the International Food and Agribusiness Management Association, Budapest, Hungary

2007  Recipient, team leader et al. of the PARIMA project, gold medal for meritorious service to Ethiopia, Ethiopian Society for Animal Production, Addis Ababa

2004  Faculty Advisor of the Year, College of Natural Resources, Utah State University

Membership and offices held in professional organizations:
Society for Range Management member since 1990

Major professional self-improvement activities during past 10 years (including sabbatical):

2000  Visiting Fellow, Institute of Development Studies at the University of Sussex, United Kingdom (USU sabbatical leave)

External grants and other research funding during the last five years:


2016-2017  D.L. Coppock (major professor) with Thomas Derr (graduate student). Climate change perceptions and adaptation among small-scale farmers in Uganda: A community-based approach. Funding sources: United States Peace Corps and Eco-Agric, Uganda. Funding estimated as $2,000 (cash and in-kind) for student stipend support and project operations in Hoima District, Uganda. [Derr was a USU student in the Peace Corps Masters International (PCMI) program].


2012-2015  D.L. Coppock (co-PI) with Rob Gillies (USU PI) *et al.*: *Climate and Risk Assessment to Engender Resiliency and Capacity Building in Livestock Systems and Nutrition in Far Western Nepal*. Funding source: USAID Global Bureau, Livestock and Climate Change Collaborative Research Support Program (later renamed the Feed the Future Livestock and Climate Change Innovation Lab). Funding for the participatory research component I directed was $33,600. Total funds = $449,986

2011-2014  D.L. Coppock (co-PI) with Juan Villalba (USU PI) *et al.*: *Using New Knowledge on Grazing Behavior to Control Medusahead in the Western United States*. Funding source: USDA National Initiative for Food and Agriculture (NIFA). Funding for the participatory research component which I directed was $54,000. Total funds = $416,000
R. Justin DeRose  
Assistant Professor, silviculture and forest ecology, 9-month appointment

Return to Table of Contents

Academic education background:
PhD Ecology, Utah State University, 2009
MS Forestry, University of Maine, 2004
BS Forestry, Utah State University, 2002
Summer visiting student, Hochschule für Forstwirtschaft, Rottenburg, Germany

Professional and research experience:
2019 -present  Assistant Professor, Wildland Resources Department, Utah State University
2011-2019  Research Ecologist, USDA Forest Service, Forest Inventory and Analysis, Rocky Mountain Research Station, 507 25th Street, Ogden, UT 84401
2010-2011  Postdoctoral Fellow, Department of Wildland Resources, Utah State University
2005-2009  Research Assistant, Department of Wildland Resources, Utah State University
2002-2004  Research Assistant, Department of Forest Ecosystem Science, University of Maine
2001  Forestry Technician, Ochoco National Forest, Paulina Ranger District, Oregon

Teaching experience:
WILD 4950/6900—Dendroclimatology, Utah State University, 2 credits (spring 2014).
WILD 5700—Forest Assessment and Management, Utah State University, 3 credits (spring 2011).

Publications during the last five years:


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
2007-2018 Society of American Foresters, Certified Forester
2005-2009 First T.W. Daniel Graduate Fellow, Utah State University.
2004 Ralph H. Griffin scholarship for outstanding work in silviculture, University of Maine.

Membership and offices held in professional organizations:
Society of American Foresters
Xi Sigma Pi
Ecological Society of America
Tree-Ring Society

External grants and other research funding during the last five years:
2019-2021 Collaborative research on Navajo forest vulnerability. U.S. Geologic Survey, Southwest Climate Adaptation Science Center $225,328.
2019-2020 Cedar Mountain Initiative’s own aspen monitoring network: establishment of remeasurement plots to evaluate long-term trends. USU Cedar Mountain Initiative Research Program. $44,000.

2015-2016 Fire occurrence and frequency in aspen forests on Cedar Mountain. Cedar Mountain Initiative. $78,850.


2014-2018 Building high-density, long range hydroclimate resource information from Forest Service survey data. Utah Agricultural Experiment Station, Utah State University. $307,104.
Paul Grossl  
Professor, Plant Soils and Climate Department, College of Agriculture, USU

*Return to Table of Contents*

**Academic education background:**
PhD, Montana State University, 1991. Major: Crop and Soil Science  
Supporting Areas of Emphasis: Environmental Soil Chemistry  
MS, University of Minnesota, 1985. Major: Soil Science  
Supporting Areas of Emphasis: Soil Chemistry  
BS, University of Illinois, 1981. Major: Agricultural Sciences/Agronomy

**Professional and research experience:**
Professor, Utah State University. (July 2012 - Present).  
Associate Professor, Utah State University. (July 2000 - July 2012).  
Assistant Professor, Utah State University. (March 1994 - July 2000).

**Teaching experience:** (Utah State University)
PSC 3000, Fundamentals of Soil Science, 43 courses. PSC 4000, Soil and Water Conservation, 1 course.  
PSC 4000, 6900, Soil and Water Conservation, 1 course.  
PSC 4500, Urban Soil Management, 16 courses.  
PSC 5530, 6530, Soils and Plant Nutrient Bioavailability, 1 course.  
PSC 5740, Environmental Quality: Soil and Water, 4 courses.  
PSC 6890,7890, Plants, Soils, and Climate Graduate Seminar, 1 course.  
PSC 6900, Special Problems in Plants, Soils, and/or Climate, 3 courses.  
PSC 6970, RESEARCH & THESIS, 2 courses. SOIL 3000, Fundamentals of Soil Science, 28 courses.  
SOIL 4500, Soil Reclamation, 3 courses.  
SOIL 4900, Special Problems: Soil Reclamation, 1 course.  
SOIL 5050, Principles of Environmental Soil Chemistry, 9 courses.  
SOIL 5550, Soil Nutrient Bioavailability, 5 courses.  
SOIL 5750, Environmental Quality: Soil and Water, 5 courses.  
SOIL 6050, Principles of Environmental Soil Chemistry, 9 courses.  
SOIL 6550, Soil Nutrient Bioavailability, 5 courses.

**Publications during the last five years:**

Lan, Y., Larson, S., Jensen, K., Staub, J. E., & Grossl, P. (2015, September). Quantitative trait loci (QTL) and candidate genes associated with trace element concentrations in perennial grasses grown on phytotoxic soil contaminated with heavy metals. Plant and Soil.


**Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:**
Recognized for a Highly Cited Paper, American Chemical Society. (November 6, 2007).
Teacher of the Year, USU College of Agriculture. (July 30, 2007).
Faculty of Semester, USU College of Agriculture. (July 30, 1998).

**Membership and offices held in professional organizations**
Officer, Secretary, Treasurer for Western Society of Soil Science. 2006 - 2008.
Officer, President/Elect/Past, Western Soil Science Society of America. 2005.
Officer, President/Elect/Past, Western Soil Science Society of America. 2004.

**Major professional self-improvement activities during past 10 years (including sabbatical):**

**External grants and other research funding during the last five years:**
Grossl, Paul R (Principal), "Reclamation of Disturbed Arid Land Soil," Sponsored by DOI-BLM, Federal, $125,000.00. (September 1, 2016 - August 31, 2021).
Grossl, Paul (Principal), "Assessment of rangeland and turf grasses for abiotic stress response," Sponsored by Ag. Research Service (ARS), Utah State University, $90,000.00. (September 15, 2011 - September 14, 2016).
Jacobson, Astrid (Principal), Norton, Jeanette M. (Principal), Reeve, Jennifer (Co-Principal), Grossl, Paul (Co-Principal), MacAdam, Jennifer W. (Co-Principal), Jones, Scott B. (CoPrincipal), Carman, John G. (Co-Principal), "Request for matching funds towards the acquisition of a refrigerated superspeed centrifuge for plants and soils research," Sponsored by The Office of Research and Graduate Studies Annual Grants Program, Utah State University, $4,600.00. (July 1, 2014 - June 30, 2015).
Jacobson, Astrid (Co-Principal), Norton, Jeanette M. (Co-Principal), Reeve, Jennifer (Supporting), Grossl, Paul (Supporting), Jones, Scott B. (Supporting), MacAdam, Jennifer W. (Supporting), Carman, John G. (Supporting), "Acquisition of a superspeed refrigerated
centrifuge for separations of molecular, microbial, soil and plant tissue suspensions,"
Sponsored by UAES, Utah State University, $15,203.00. (July 1, 2014 - June 30, 2015).
Sarah Klain  
Assistant Professor, Department of Environment and Society, Ecosystem Services  

**Academic education background:**  
PhD University of British Columbia Resources, Environment, and Sustainability, 2016  
MS University of British Columbia, Environment, and Sustainability, 2010  
BA Reed College Alternate Biology and Economics, 2003

**Professional and research experience:**  
2018-present  Assistant Professor, Department of Environment and Society, Ecosystem Services  
2016-2018  Institutional Post-doctoral Research Associate, Oregon State University  
Geography, College of Earth, Ocean and Atmospheric Science  
2015  Researcher, analysis of engagement with communities, Island Institute, Community Energy  
2012  Consultant, methods to assess the social and cultural importance of wild salmon to local communities, Wild Salmon Policy  
2009  Fisheries Sustainability Consultant, Resource Conservation Section, Western and Northern Service Centre, Parks Canada  
2008  Geographic Information System (GIS) Analyst, Marine Fisheries, Knowledge Systems, Ecotrust  
2003-2005  GIS Technician & Socioeconomic Research Assistant, Marine Fisheries, Knowledge Systems, Ecotrust  
2001-2002  Environmental Economics Research Assistant, Economics, Reed College

**Teaching experience:**  
Utah State University  
ENVS 3010 Fundamentals of Natural Resource and Environmental Policy (regular instructor)  
Visiting Assistant Professor of Economics, course designer and instructor for Ecological Economics 300, Reed College 2018

**Publications during the last five years:**  

Membership and offices held in professional organizations:
North American Society for Conservation Biology, Board Member
Phi Beta Kappa, Member

Major professional self-improvement activities during past 10 years (including sabbatical):
2017 Presenting data and information by Edward Tufte, Graphics Press LLC, Portland Oregon
2016 Python training, Code Academy, online
2015 Data wrangling, exploration, and analysis with R, Stat 545A, University of British Columbia, Vancouver BC
2009 Scientific Diver training, Canadian Association for Underwater Sciences at University of British Columbia, Vancouver, BC, Canada

External grants and other research funding during the last five years:
2013-2014 The Values of Place: Recreation and Cultural Ecosystem Services in Puget Sound, Puget Sound Institute, Kai MA Chan (PI) Sarah Klain (coapplicant), $59,400
2009-2012 The Contribution of Marine Ecosystems to Local Communities, Environmental Issues Research Development Initiative, Social Sciences and Humanities Research Council of Canada (SSHRC), Kai MA Chan (PI) Sarah Klain (coapplicant), $39,540
2007-2008 Palau Marine Turtle Conservation & Monitoring, Joint Institute for Marine and Atmospheric Research, National Oceanic and Atmospheric Administration (NOAA), Sarah Klain (co-PI) Joshua Eberdorg (co-PI) Rachael Nash, $21,500

Michael Kuhns  
Professor/Extension Forestry Specialist, WILD Department Head  
*Return to Table of Contents*

**Academic education background:**

PhD March 1986, Auburn University. Major: Tree Physiology.  
BS December 1977, University of Missouri-Columbia. Major: Forest Management.

**Professional and research experience:**

Professor/Extension Forestry Specialist, Department of Forest Resources/Wildland Resources, Utah State University. April 1992 to present (Assistant Professor April 1992 to April 1995; Associate Professor April 1995 to June 2005).


**Teaching experience:**

WILD 2000 Natural Resources Professional Orientation, Utah State University.

Helped design and teach a 3 credit online Urban Forestry course using WebCT, one of the first such courses in the country.

**Publications during the last five years:**

**Journal Publications**


**Fact Sheets/Circulars (pr indicates peer reviewed)**


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
Consulting
Hired by the LDS Church and FFKR Architects 9/18 to 11/18 to conduct a tree inventory and write an assessment and a management plan for trees in their historic Temple and Tabernacle grounds at Church Headquarters in Salt Lake City. This was an important part of the information needed to make decisions about tree management and preservation for the complete renovation of the site that was just announced.
Consulting
Hired by the Neighborhood House and FFKR Architects 12/18 to 2/19 to conduct a tree inventory and write an assessment and a management plan for trees on the Neighborhood House grounds in preparation for a complete renovation of the site.
Honors
E.G. Peterson Extension Award; the highest award for Extension faculty at USU; presented at USU Awards banquet and citation read at university commencement; May 2019.
Lifetime Achievement Award, Utah Community Forest Council and Utah Chapter ISA, February 2016.
Membership and offices held in professional organizations:
Association of Natural Resources Extension Professionals, Member and Past President.
Society of American Foresters, Member and past Chapter Chair and past State Society Chair.
International Society of Arboriculture (including Utah Chapter), Member, past Chapter Chair
and International Conference Program Chair.
International Union of Forestry Research Organizations, Member; co-coordinator for and led a
tour during International Congress in 2016.
WCC Western Extension Forestry Coordinating Committee, Member.
Tree Utah Technical Advisory Committee, Member.
Education Committee, Utah Community Forest Council and Utah Chapter ISA, Member.

Major professional self-improvement activities during past 10 years (including sabbatical):
Head, USU Wildland Resources Department, July 2012 to June 2020. Learning how to be an
effective head of a large, varied, and very successful academic department has take most of
my time since July 2012.

External grants and other research funding during the last five years:
Kuhns, M. R. (PI), "A cooperative, science-based, plan for sustainable aspen ecosystems in the
western U.S.", BLM. January 1, 2015 - Present. $40,000. Funded and ongoing.
Nischwitz, C. (PI), Black, B. L. (Co-PI), Rupp, L. A. (Co-PI), Kuhns, M. R. (Co-PI), "Screening
walnut genotypes for disease resistance, cold hardiness, and for horticultural and forestry
traits", IPPFBE (Private Donor), July 2015 - June 2017. $20,000. Funded and complete.
Kuhns, M. R. (PI), "Urban Forestry Assessment for Utah National Guard", Utah National Guard,
February 10, 2016 - September 30, 2016. $20,000. Funded and complete.
Mock, K. E. (PI), Long, J. N. (Co-PI), Kuhns, M. R. (Co-PI), Ryel, R. J. (Co-PI), Bentz, B. (Co-
PI), Rogers, P. (Co-PI), Ma, Z. (Supporting), "Managing for resilience in forested ecosystems
of the Intermountain West: A model for training future researchers and managers", USDA
NIFA National Needs Graduate and Postgraduate Fellowships Program, Federal, (2011-
Andrew Kulmatiski
Associate Professor, plant-soil interactions, 9-month appointment

Academic education background:
PhD, Utah State University (Biology), 2005
MFS, Yale School of Forestry & Environmental Studies, 1999
BA, Colby College, 1994

Professional and research experience:
2019- present  Associate Professor, Wildland Resources Department, USU
2013-2019  Assistant Professor, Wildland Resources Department, USU
2012-2013  Research Assistant Professor, Department of Plants, Soils and Climate, USU
2009-2012  Assistant Professor, Department of Biological Sciences, University of Alaska
2009-2012  Adjunct Assistant Professor, University of Alaska, Fairbanks
2009-2012  Adjunct Assistant Professor, USU
2006-2009  Post-doctoral Fellow, Department of Wildland Resources, USU
2005-2006  Post-doctoral Researcher, Self-funded through USDA-NRI, USU

Teaching experience:
WILD 5350/6350: Wildland Soils, USU. (Spring 2018)
WILD 3830: Range plant taxonomy and function, USU. (Fall 2014, 2015, 2016, 2017)
WILD 6900: Analysis and communication of plant / soil data, USU. (Spring 2016)
WILD 7200: Plant physiological ecology, USU. (Spring 2015)
WILD 3850: Vegetation and Habitat Management, USU. Co-taught. Undergraduate course (Spring 2014, 2015)
Ecosystem Ecology, UAA. Undergraduate/graduate course (Spring 2011)
Biogeochemistry, UAA. Undergraduate/graduate course (Spring 2009, 2010)
Ecology, UAA. Undergraduate course (Spring 2010, 2011)
Ecology Laboratory, UAA. Undergraduate course (Spring 2010, Fall 2010, Spring 2011)
Invasion Ecology, USU. Graduate-level seminar (Spring 2006, 2008)

Publications during the last five years:


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
2017: Teacher of the Year, Quinney College of Natural Resources, USU

Membership and offices held in professional organizations:
Ecological Society of America member 2008-2017

Major professional self-improvement activities during past 10 years (including sabbatical):
Sabbatical 1 July 2019 to 30 June 2020

External grants and other research funding during the last five years:
Quantifying plant-soil feedback effects in classic diversity-productivity experiments, NSF Population and Community Ecology, Principal Investigator ($590,000; 2014-2018)
Eric LaMalfa
Assistant Professor, forest and rangeland science, 9-month appointment

Academic education background:
B.S. in Range Science, cum laude, Utah State University, 2004

Professional and research experience:
2013-present Quinney Doctoral Research Fellow Utah State University
2012-2013 Planning Coordinator (NEPA) US Bureau of Land Management, West Desert District, UT
2008-2012 Prescribed Fire and Fuels Management Specialist US Forest Service, Uinta Wasatch Cache National Forest, UT
2005 & 2008 East Africa Fire and Natural Resource Consultant Utah State University, Ethiopia
2007 Senior Range Technician US Bureau of Land Management, UT
2003 Invasive Plant Survey Technician Utah State University Extension, UT
1999-2001 Forest Field Technician Pikes Peak National Forest, CO Dixie National Forest, UT
1998-2000 Range Ecology Lab Technician Utah State University, UT

Teaching experience:
Fall 2019 Special Topics: Range Plants – (WILD 4950, face to face instruction).
Fall 2019 Special Topics: Undergraduate Range Management Exam (URME) – (WILD 4950, face to face instruction)
Fall 2019 Wildland Ecosystems Lecture – (WILD 3800, broadcast and face to face instruction)
Fall 2019 Wildland Resource Techniques Lecture – (WILD 2400, face to face instruction)
Fall 2019 Natural Resource Professional Orientation Lecture – (WILD 2000, face to face instruction)
2018-2019 Vegetation and Habitat Management – Forest (WILD 3850, broadcast and face to face instruction).
2017-2019 Fire Ecology and Management (WILD 6900, online), New course developed for the Masters of Natural Resources program.
2018 Instructor - Firefighter training, Mpala Research Centre, Kenya
2013 Instructor - Wildland Fire Behavior Calculations (S-390), Utah Valley University
2010 Instructor - Introduction to Fire Effects (RX-310), U.S. Forest Service
2005 Designer/ Instructor - Prescribed Fire in Range Management, USAID, Yabelo Ethiopia
2005 TA- Introduction to Natural Resources (WILD 2200), Utah State University
2004 TA - Wildland Flora of Utah (WILD 3200), Utah State University
Dates of appointment and promotions at present institution:
Appointed Fall 2019 as Assistant Professor

Publications during the last five years:

Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
2018  BLM momentum of appreciation: One Millionth Acre of Fuels Treatment
2012  BLM Superior Performance Award

Membership and offices held in professional organizations:
Society for Range Management

Major professional self-improvement activities during past 10 years (including sabbatical):
2019  Empowering Teaching Excellence (ETE) conference, Utah State University
2019  Foundations in Teaching Workshop, Utah State University
2019  Ally (LGBTQA+) training seminar, Utah State University
2018  Empowering Teaching Excellence (ETE) conference, Utah State University
2018  Inclusive and Accurate Approaches for Teaching Sex and Gender in Biology Workshop, Ecological Society of America, LA
2016  ETE E-Learning Workshop, Utah State University
2014  Climate Change Vulnerability Assessment Workshop, Utah State University

External grants and other research funding during the last five years:
2017-2018  National Geographic Society, “Savanna synergies: complex interactions between fire and wild and domestic herbivores” ($24,400 to T.P. Young, PI; co-investigators: Veblen, Kimuyu, and Odadi)
James Lutz  
Associate Professor, Wildland Resources Department, USU

**Academic education background:**
2008 PhD, Ecosystem Analysis, College of Forest Resources, University of Washington, Committee Chair; Jerry Franklin.  
2005 MS, Ecosystem Analysis, College of Forest Resources, 2005. Committee Chair; Charlie Halpern.  
1985 MS/MBA, Sloan School of Management, Massachusetts Institute of Technology.  
1985 MS with industrial internship, Department of Electrical Engineering & Computer Science, Massachusetts Institute of Technology.  
1985 BS, Electrical Engineering, Massachusetts Institute of Technology

**Professional and research experience:**
2019 to present. Associate Professor of Forest Ecology, Utah State University, Logan, UT  
2013 to 2019. Assistant Professor of Forest Ecology, Utah State University, Logan, UT  
2013 to present. Affiliate Assistant Professor, University of Washington, Seattle, WA  
2011 to 2013. Research Scientist (Principal), University of Washington, Seattle, WA  
2008 to 2011. Research Associate, University of Washington, Seattle, WA

**Teaching experience:**
WILD 3820 Forest Plants (undergraduate). 2014, 2015, 2016 USU  
WILD 6730 Forest Community Ecology (graduate). 2013, 2015 USU  

**Publications during the last five years:**
reconstructing forest conditions from General Land Office survey records. Ecological Applications 27(5): 1498-1513.


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
2017-2018 QCNR Graduate Mentor of the Year
2011 DISCCRS VI Scholar (Dissertations Initiative for the Advancement of Climate-Change Research)
2011 UW School of Forest Resources Award for Research Funding
2012 UW School of Forest Resources Award for Outreach and Public Relations
2006 UW School of Forest Resources Faculty Teaching Award
2005 UW Top Scholar Fellowship
2005 NSF IGERT Fellowship
2005 ARCS Fellowship
2003 Byron and Alice Lockwood Fellowship

2/11 to 7/13 University of Washington, College of the Environment Research Scientist Seattle, WA Investigated long-term vegetation change in western coniferous forests including climate-fire relationships, spatial and structural patterns of fire in Yosemite National Park (LiDAR/Landsat), multidecadal trends in carbon sequestration in the presence of fire in Sequoia Kings Canyon and Yosemite National Parks, and relationships between canopy structure and snow accumulation and retention.

8/08 to 2/11 Research Associate: Analyzed relationships between understory and overstory during canopy closure in Pseudotsuga–Tsuga forests, effects of scaling on species envelope models and climate change.


Membership and offices held in professional organizations:
Ecological Society of America
Society of American Forests
Association for Fire Ecology

Major professional self-improvement activities during past 10 years (including sabbatical):
Utah State University Sabbatical: 2019-2020

External grants and other research funding during the last five years:
The Western Forest Initiative, PI, Earthwatch $67,775
Graduate Climate Adaptation Research that Enhances Education and Responsiveness of science at the management-policy interface, Co-PI, National Science Foundation, 9/15/2016 – 9/15/2021 $2,689,908
Using multi-scale spatial data to improve predictions of immediate and delayed postfire mortality, PI, Joint Fire Science Program, 9/1/2016 – 8/31/2019 (includes cash match from the USU Ecology Center of $25,649) $305,371
Landscape evaluations and prescriptions for post-fire landscapes, Co-PI, Joint Fire Science Program, 9/1/2016 – 8/31/2019 $16,666
Dynamical interactions between plant and oomycete biodiversity in a temperate forest, Co-PI, National Science Foundation, 9/30/2015-10/1/2019. $153,981
Climate correlates of unburned islands, Co-PI, USGS PNW Climate Science Center, 1/1/2015 – 12/31/2016 $91,679
Forest management tools to maximize snow retention under changing climate, Co-PI, USGS PNW Climate Science Center, 1/1/2015 – 12/31/2016 $5,000
Tree spatial patterns in the Utah Forest Dynamics Plot, PI, Utah Agricultural Experiment Station, 7/1/2014 – 6/30/2016. $20,000
Spatial and climatic correlates of tree mortality in mixed-conifer forests, PI, USU Research Catalyst Program, 7/1/2014 – 6/30/2015. $19,999
Do wildfire and prescribed fire treatments conserve or promote important structural elements of fisher habitat? Co-PI, National Park Service, 6/1/2014 – 12/31/2016 $45,929
Zachary Miller
Assistant Professor, Environment and Society Department, QCNR, USU

Academic education background:
Ph.D. 2017 University of Montana. Missoula, Montana Forest and Conservation Sciences Department of Society and Conservation
M.S. 2014 Clemson University. Clemson, South Carolina Parks, Recreation, and Tourism Management Concentration area: Park and Conservation Area Management
B.S. 2012 California State University, Chico. Chico, California Recreation Administration: Natural Resources Pattern: Environmental Education and Interpretation

Professional and research experience:
2019- present Assistant Professor, Environment and Society Department, Utah State University
Oct. 2018 – 2019 Assistant Research Professor, Pennsylvania State University, Department of Recreation, Park, and Tourism Management Human Dimensions of Natural Resources and the Environment
July 2016 – Sept. 2018 Post-Doctoral Research Associate, Pennsylvania State University Department of Recreation, Park, and Tourism Management, Human Dimensions of Natural Resources and the Environment
June 2014 – July 2016 Management Graduate Research/Teaching Assistant, University of Montana, Department of Society and Conservation Park, Tourism, and Recreation
Jan. 2013 – May 2014 Graduate Research/Teaching Assistant, Clemson University, Department of Park, Recreation, and Tourism Management

Teaching experience:
UTAH STATE UNIVERSITY
2019-present
ENVS 3300 Fundamentals of Recreation Resources Management
THE UNIVERSITY OF MONTANA
2015-2016 PTRM 150: Current Issues in Parks, Recreation, and Tourism Management Planned and instructed a field-based class designed for freshman and transfer students that introduces them to different professional and academic focuses in the major.
PTRM 310: Natural Resource Interpretation and Communication Planned and instructed a class for juniors and seniors involving interpretive, education, and communication skills, methods, theories, and equipment.
CLEMSON UNIVERSITY
2013-2014 PTRM 2200: Foundations of Parks, Recreation, and Tourism Management Instructed a class regarding the theoretical, philosophical, and historical foundations of parks, recreation, and the natural environment.
LS 1450: Camping and Backpacking Planned and instructed semester-long courses focused on backpacking skills. Semester ended in a 3-day backpacking trip in a wildland setting.
LS 1000: Birding Planned and instructed a semester long class pertaining to recreational birding skills.
LS 1650: Flatwater Kayaking in Everglades National Park Co-instructed a course over several weeks designed to build flatwater kayaking skills. Course concluded with a weeklong kayaking trip through Big Cypress National Preserve and Everglades National Park.

Publications during the last five years:

Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:

PROFESSIONAL ACTIVITIES
2012 Outdoor Classroom Instructor and Land Steward, Big Chico Creek and Butte Creek Ecological Reserves, California Developed and instructed programs for K-12 students and the local community. Additionally, focused on ecological restoration and natural resource management, including pyrogeography.

AWARDS
George Wright Society. George Melendez Wright Student Diversity (LGBTQ+) Travel Scholarship to attend to 2017 George Wright Society Conference on Parks, Protected Areas, and Cultural Sites. (2017)

Membership and offices held in professional organizations:

MEMBERSHIPS
International Association for Society and Natural Resources
George Wright Society
Academy of Leisure Sciences
International Union for the Conservation of Nature (IUCN)’s World Commission on Protected Areas’ (WCPA) Tourism and Protected Areas Specialist Group (TAPAS).
Wildlife partner of the Wildlife Society

Major professional self-improvement activities during past 10 years (including sabbatical):

External grants and other research funding during the last five years:

US National Park Service (Division of Natural Sounds and Night Skies). Developing visitor use concepts related to natural sounds in Death Valley National Park ($48,000). Co-PI. (2018)
Subaru of America in collaboration with Leave No Trace ($82,500). The Zero Landfill Initiative 2.0. Co-PI. (2018)
University of Montana ($5,000) and George Wright Society ($3,000). The Inaugural George Wright Student Summit in Glacier National Park. (2016)
Darren McAvoy  
Extension Assistant Professor, Wildland Resources Department, USU  
*Return to Table of Contents*

**Academic education background:**  
M.S. Communications, 1999, Utah State University  
B.S. Forestry, 1987, Colorado State University

**Professional and research experience:**  
Extension Assistant Professor, Utah State University, Logan, Utah, 2016-present  
Forestry Associate, Utah State University, Logan, Utah, 1999-2016  
Producer and Director, Utah State University, Logan, Utah, 1997-1999  
Forestry Technician, US Forest Service, Ogden, Utah 1997-1998  

**Teaching experience:** Institutions, rank, specialization, dates, total academic years

**Publications during the last five years:** (peer-reviewed)


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
Fellow, Society of American Foresters
Extension Innovator Award, Utah State University
Association of Natural Resource Extension Professionals Gold Award: USU Forestry Extension
Learn at Lunch Webinar Series
State Director’s Public Land Partner Award, Utah Bureau of Land Management
Forest Stewardship Achievement Award, Utah Division of Forestry, Fire and State Land
Communications Award, Society of American Foresters Spirit of the Land Award, Salt Lake
Olympic Organizing Committee Scholarship Award, Outdoor Writers Association of America

Membership and offices held in professional organizations:
Fellow and member of the Society of American Foresters
Member of the Association of Natural Resource Extension Professionals
Member and Chair Elect, Western Coordinating Committee of Extension Foresters
Member of the National Association of County Agents

External grants and other research funding during the last five years:
2019: Bureau of Land Management, PI, $34,000.00, McAvoy, D.J. BLM-Utah biomass resources partnership.
2018: Bureau of Land Management, PI, $50,000.00, McAvoy, D.J. BLM-Utah biomass resources partnership.
2018: USU Public Lands Initiative Grant, PI, $52,000, McAvoy, D.J., Kuhns, M.R., and Lutz, J. Big box burning for hazardous fuels reduction and biochar production.
2017: Bureau of Land Management, PI, $50,000.00, McAvoy, D.J. BLM-Utah biomass resources partnership.
2016: Joint Fire Science Network, Co-PI, $27,000, Cheng, T., and McAvoy, D.J. Southern Rockies fire science network.
2016: Bureau of Land Management, PI, $50,000.00, McAvoy, D.J. BLM-Utah biomass resources partnership.
2015: Bureau of Land Management, PI, $50,000.00, McAvoy, D.J. BLM-Utah biomass resources partnership.
2015: USDA Forest Service, PI, $20,000, McAvoy, D.J., FY15 Utah biomass resources group.
2014: Western Sustainable Agriculture Research and Education Professional and Producer Grant, US Dept. of Agriculture, PI, $60,000, Hunter, B., Cardon, G., Murray, M., Alston, D., McAvoy, D.J., and Olsen, S. Biochar amendment to enhance tomato and melon productivity and protect against phytophthora root rot disease.
Karen Mock
Professor, population genetics and aspen ecology, Wildland Resources Department, USU

Academic education background:
PhD Biology, with distinction, Northern Arizona University 2000
MS Environmental Health, with honors, Colorado State University 1985
BS Microbiology, with honors, University of Texas at Austin 1980

Professional and research experience:
Associate Department Head, Department of Wildland Resources, Utah State University, Logan, UT, August 2017-present.
Full Professor, Department of Wildland Resources, Utah State University, Logan, UT, 2014-present.
Director: Molecular Ecology Laboratory, Utah State University, Logan, UT 2015-present.
Associate Dean, Quinney College of Natural Resources, Logan, Utah, 2013-2016. Associate Professor, Department of Wildland Resources, Utah State University, Logan, UT 2008-2014.
Assistant Professor (tenure track), Department of Wildland Resources, Utah State University, Logan, UT 2002-2008.
Research Associate, Department of Fisheries & Wildlife, Utah State University, Logan, UT 2000-2002.
Full time continuing faculty member, Biology Department, Yavapai College, Prescott, AZ 1989-1999.

Teaching experience:
WILD 7900 Bayesian Data Analysis (3 credit hrs.) Spring 2017 (organized study group)
WILD 4880 Genetics in Conservation and Mgt. (3 credit hrs.) Typical enrollment: 25 students per semester, Fall 2004-present
WILD 2000 Introduction to Wildland Resources (1 credit hr.) Typical enrollment: 30 students per semester (1 day per semester) Fall & Spring 2009-present
FRWS 2200 Ecology of Our World (3 credit hrs.) Typical enrollment: 80 students per semester, Fall 2000-2007, 2009
FRWS 2200 (401) Ecology of Our World (3 credit hr.) Compressed video/web delivery for federal employees Fall 2005
FRWS 6900/7900 Special topics: Genetics in Conservation and Management (1-3 credit hrs.) Typical enrollment: 3 students per semester, Fall 2004, 2005
FRWS 6960 Graduate Ecology (5 credit hrs.) (co-lecturer) Typical enrollment: 30 students per semester, Fall 2000-2004, 2009-19 (4 days of instruction per semester)
2013-present: Invited annual guest lecturer for University of Utah honors course: Doing Science: The Biology of Variation, offered Fall semester in collaboration with Dr. Jon Seger, course instructor.
2012 & 2014: Utah State University coordinator for Distributed Graduate Education course in Landscape Genetics (multi-university consortium)
Publications during the last five years:


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
Utah Forest Stewardship Achievement Award 2019
College of Natural Resources Researcher of the Year 2014

Membership and offices held in professional organizations:
Member: Society of American Foresters, 2014-present
Member: Society for Wildlife Forensic Science 2015-2017
Editor, Animal Conservation, 2007-2011
Editorial Board, Animal Conservation, 2006-2007
Associate Editor: Wildlife Society Bulletin, 2005-2006

Major professional self-improvement activities during past 10 years (including sabbatical):
Audited USU course BIOL 6750 Programming for Biologists, 3 cr. hrs. Fall 2016
Audited online course in R programming, 1 cr. hr., Fall 2015.

External grants and other research funding during the last five years:
Mock KE. Genetic diversity and divergence patterns in Utah's Main Creek leatherside chub population to inform the long-term management strategy. Utah Division of Wildlife Resources. $9,492.00. July 2019 – June 2020.
Long JN, Gompert Z, Mock KE. Long-term aspen common garden exclosures along an elevational gradient. Utah Agricultural Experiment Station Seed Grant Program. $78,582. July 2016-June 2017.


Mock KE, Miller SW. Habitat modeling and genetic data synthesis. Awarded by the Northwest Power and Conservation Council (Bonneville Power Authority) through the Confederated Tribes of the Umatilla Indian Reservation. $38,926 October 2009 – September 2010, extended by $44,072 October 2010-September 2011 and $62,185 October 2011-September 2012.


Mock KE. Forest Inventory and Analysis: aspen genetics. Joint Venture Agreement between Utah State University and the USFS Rocky Mountain Research Station. $28,000. September 2009-2012.


Douglas Ramsey  
Professor, Wildland Resources Department, USU  

Academic education background:  
PhD University of Utah, Salt Lake City, Utah, Geography. 1989.  
MS Brigham Young University, Provo, Utah, Botany (plant ecology) 1983. Masters topic - Influence of Tree Overstory on Understory Production and Composition in Aspen Forests of Central Utah.

Professional and research experience:  
Professor and Director of the Remote Sensing and GIS Laboratory: Department of Wildland Resources, College of Natural Resources, Utah State University, Logan, Utah 84322-5230. April 2007 to present.  
Associate Professor and Director of the Remote Sensing and GIS Laboratory: Department of Wildland Resources, College of Natural Resources, Utah State University, Logan, Utah 84322-5230. April 1995 to April 2007. Responsibilities include research, teaching, and proposal preparation in digital image processing and Geographic Information Systems. Also responsible for development of laboratory facilities and the administration of the remote sensing and GIS laboratory in the Department of Geography and Earth Resources and subsequently in the Department of Wildland Resources.  
Assistant Professor: Department of Geography and Earth Resources, College of Natural Resources, Utah State University, Logan, Utah 84322-5240. July 1989 to April 1995. Same as above  
Program Manager: University of Utah Research Institute, Center for Remote Sensing and Cartography, 391 Chipeta Way Suite D, Salt Lake City, Utah 84108, July 1986 to December 1988. Responsible for the coordination and management of all projects related to the Center for Remote Sensing and Cartography. Involved primarily in the application and integration of geographic information systems (GIS) and remotely sensed data in various landscapes / ecosystems to enhance the knowledge of these ecosystems and aid in the success of management, planning, and exploration techniques. Executive functions include technical supervision of cartographic and data entry personnel, proposal preparation, workshop planning and presentation, and promotional activities for the Center. Computer hardware and software purchasing and upkeep are also among general duties performed. GIS and image processing software experience includes ELAS (Earth Resource Application Software) and ERDAS (Earth Resource Data Analysis System).  
Project Scientist: University of Utah Research Institute, Center for Remote Sensing and Cartography, 391 Chipeta Way Suite D, Salt Lake City, Utah 84108. June 1984 to July 1986. Responsible for research dealing with the application of geographic information systems and
digital remote sensing techniques to the study of desert, riparian and forest ecosystems employing MSS, TM, SPOT, TIMS imagery, digital terrain data, and other digitized ancillary data. Interpretation and mapping from low and high altitude 35mm, Enviropod, and large format aerial photography to identify vegetation cover types and critical management areas in riparian ecosystems and to suggest future management strategies. Further experience includes programming of image processing software, model design and integration, GIS development, marketing of institute capabilities, proposal generation, and final report preparation.

Range Research Technician: USDA, Intermountain Forest and Range Experiment Station, Shrub Sciences Laboratory, Provo, Utah, October 1981 to December 1983 Responsible for research support in rangeland environments with particular emphasis in strip mine reclamation techniques, including species suitability, seedbed preparation and seedling establishment. Applied research into genetic separability between varieties of big sagebrush (Artemisia tridentata) and their respective environments.


Teaching experience:
WILD 1800 – Introduction to Geographic Information Science
WILD 3800 – Wildland Ecosystems (USU)
WILD 3710 – Monitoring and Assessment of Natural Resources (USU)
WILD 5750/6750 – Applied Remote Sensing (USU)
WILD 6740 – Physical Processes in Remote Sensing (USU)
WILD 6740 – Geospatial Data Fusion and Landscape Monitoring (USU)
WILD 6740 – Feature and Information Extraction from Remotely Sensed Images (USU)
WILD 6900 – Seminar in Ecogeography (USU)
Geography 390 - Spatial Analysis (USU) Geography 575/675 - Remote Sensing I (USU)
Geography 576/676 - Remote Sensing II (USU)
Geography 596/696 - Computer Cartography (USU)
Geography 593/693 - Geographic Information Systems (USU)
Geography 594/694 - Geographic Information Analysis (USU)
Physical Geography 120 (U. of U.)
Spatial Analysis 302 (U. of U.)
Quantitative Techniques 300 (U. of U.)
Watershed Management 561 (BYU)

Publications during the last five years:
Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:
U.S. Forest Service Chief's Award, 2016, U.S. Forest Service. (December 2016).

Membership and offices held in professional organizations:
Association of American Geographers
American Society of Photogrammetry and Remote Sensing
Society for Range Management
International Association of Landscape Ecologists

External grants and other research funding during the last five years:
Ramsey, Robert, "COGO and data entry for the Utah Division of Wildlife Resources," Sponsored by UT Dept. of Nat. Res. - UT Division of Wildlife Resources, State, $100,000.00. (June 15, 2015 - September 30, 2020).


Hulvey, Kristin (Principal), Thacker, Eric (Co-Principal), Veblen, Kari E (Co-Principal), Brunson, Mark W. (Co-Principal), Ramsey, Robert (Co-Principal), "Using grazing systems to manage ecosystem services in Utah and Western landscapes," Sponsored by Utah Agricultural Experiment Station, Utah State University, $79,997.00. (June 2015 - June 2017).

Ramsey, Robert (Principal), Hulvey, Kristin (Co-Principal), Thacker, Eric (Co-Principal), Veblen, Kari E (Co-Principal), "GBCESU: Estimation of plant height using photogrammetrically derived point clouds," Sponsored by USDA Natural Resources Conservation Service, Federal, $13,917.00. (2015 - 2016).

Hulvey, Kristin (Principal), Thacker, Eric (Co-Principal), Burritt, Elizabeth (Co-Principal), Rothlisberger, Darrell (Co-Principal), Veblen, Kari E (Co-Principal), Brunson, Mark W. (Co-Principal), Ramsey, Robert, "Using livestock grazing systems to manage ecosystem services on Utah rangelands," Sponsored by USU Extension, Utah State University, $10,000.00. (June 2015 - May 2016).
Academic education background:
2008–14 Ph.D. Behavior, Ecology, Evolution, & Systematics University of Maryland, College Park, MD. Causes and consequences of long-distance dispersal in a migratory bird Co-advisers: Dr. Pete Marra & Dr. Michele Dudash
2001–05 B.A. Ecology & Evolutionary Biology Princeton University, Princeton, NJ. Effects of beach nourishment on loggerhead sea turtle nesting success Adviser: Dr. Rosemary Grant

Professional and research experience:
2018 – present Assistant Professor, Department of Wildland Resources, Utah State University.
2016 - 2018 Research Associate, Migratory Bird Center Smithsonian Conservation Biology Institute Washington, DC
2016 – 18 Post-doctoral fellow Patuxent Wildlife Research Center US Geological Survey Laurel, MD
2015 – 16 George Didden post-doctoral fellow Migratory Bird Center Smithsonian Conservation Biology Institute Washington, DC

Teaching experience:
2019 Professor WILD 3810: Plant and animal populations Department of Wildland Resources Utah State University, Logan, UT
2019 Professor WILD 6500: Bayesian population modeling for ecologists Department of Wildland Resources Utah State University, Logan, UT
2019 Workshop instructor Get Spatial! Using R as GIS American Ornithological Society Annual Meeting Anchorage, AK
2018 Instructor Stable isotope analysis in migratory bird research Applications of integrated population models for ornithological research, Ecology and Conservation of Migratory Birds Smithsonian-Mason School of Conservation Front Royal, VA
2008–13 Teaching Assistant Human Anatomy & Physiology Department of Biology University of Maryland, College Park
2014–16 Instructor Stable isotope analysis in migratory bird research Developing effective conservation strategies for migratory birds: challenges and opportunities Ecology and Conservation of Migratory Birds Smithsonian-Mason School of Conservation Front Royal, VA

Publications during the last five years:


Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:

2013 Cooper Ornithological Society Student Presentation Award
2013 Jane Pritchard Outstanding Teaching Assistant Award

**Membership and offices held in professional organizations:**
2018- Member, Early Professionals committee American Ornithological Society
2015- Member, Demographic Monitoring subcommittee U.S. North American Bird Conservation Initiative
2014–2017 Member, International Wood Thrush Conservation Alliance
2014–15 Chair, Transitional membership subcommittee Young Professionals Committee, American Ornithologists Union

**External grants and other research funding during the last five years:**
2018 Neotropical Migratory Bird Conservation Act, USFWS, $41,960
2016 Conservation Grant, Disney Conservation Fund, $25,000
Kari Veblen  
Associate Professor, Wildland Resources Department, USU  
*Return to Table of Contents*

**Academic education background:**
Ph.D., Ecology, University of California at Davis, 2008. Dissertation: Livestock and wildlife effects on the successional development of a savanna landscape mosaic in East Africa. Advisor: Dr. Truman Young.


**Professional and research experience:**
2017- present  Associate Professor, Dept. of Wildland Resources and Ecology Center, Utah State University
2011-2017 Assistant Professor, Dept. of Wildland Resources and Ecology Center, Utah State University
2010-present Research Associate, Dept. of Land Resource Management and Agricultural Technology, University of Nairobi
2008-2011 Research Ecologist, USGS Forest and Rangeland Ecosystem Science Center, Supervisor: Dr. David Pyke
2007-2008 Contractor, USGS Forest and Rangeland Ecosystem Science Center, Supervisor: Dr. David Pyke
2005-2006 Project Manager, Kenya Long-Term Exclosure Experiment (KLEE), Mpala Research Centre, Kenya, Supervisor: Dr. Truman Young
1998-2000 Community Forester, Peace Corps Ghana

**Teaching experience:**
WILD 6700/WATS 6700: Restoration Ecology (team taught with Dr. Karin Kettenring); 4 credits, Spring 2012, 2014, 2016; ~11 students per year

**Publications during the last five years:**


24. Holthuijzen, M.F.* and K.E. Veblen. 2016. Grazing effects on precipitation-driven associations between sagebrush and perennial grasses. Western North American Naturalist 76: 313-325 [IF=0.5].


**Membership and offices held in professional organizations:**
Ecological Society of America
Society for Range Management
Society for Ecological Restoration
Laikipia Wildlife Forum, Kenya

**Off-campus consulting, or other professional activities, special honors, recognition, during the past five years:**
2016 Quinney College of Natural Resources graduation escort for valedictorian (selected by valedictorian)
2016 Quinney College of Natural Resources Undergraduate Research Mentor of the Year ($500)
2015 Quinney College of Natural Resources Teacher of the Year ($1,000)
2014 Quinney College of Natural Resources Commencement, Inspirational Speaker (selected by students)
2013 Department of Wildland Resources Outstanding Graduate Mentor
2009 Shapiro Family Award for most outstanding PhD graduate in Dept. of Plant Sciences, UC-Davis ($1,000)
2003-2008 National Science Foundation Graduate Research Fellowship ($124,000)
2003-2008 UC Davis Biological Invasions NSF-IGERT Fellowship ($75,000)
2006 Science and Society/Career Discovery Group Fellowship, UC-Davis ($3,600)
2002 UC Davis, Ecology Graduate Group Block Grant Fellowship ($24,000)

85
Major professional self-improvement activities during past 10 years (including sabbatical):
Teaching workshop “Empowering teaching excellence: How do you (try to) keep your students on the edge of their seats, focusing on your lecture or engaged in classroom activity, even when you have a lot of students?”, USU, Oct 2015
Introductory and Advanced Structural Equation Modeling workshop, ESA 2013
Teaching workshop “Teaching and evaluating process skills in the classroom”, ESA 2012
Ecology of Grazing Land Systems class, NV/CA/AZ, 2009
Teaching Methods for Undergraduates seminar, UC Davis, Fall 2006

External grants and other research funding during the last five years:
2018-2021 Monsanto, “Monsanto greater sage-grouse habitat rehabilitation study - Caldwell Canyon Mine Project”, ($162,431 to Eric Thacker, PI) (co-investigator: K.E. Veblen)
2017-2021 USDA-AFRI, “A pre-emptive rangeland restoration approach to improving biodiversity and provision of ecosystem services”, ($500,000 total; $310,938 to Veblen, PI) (co-investigators: M. Brunson, J. Baggio, and D. Pyke)
2017-2020 Private donation, “Rangeland restoration as a tool to enhance the recovery of hirola antelope in eastern Kenya”, ($69,500 to Veblen, PI) (co-investigator and primary fundraiser: Abdullahi Ali)
2017-2018 National Geographic Society, “Savanna synergies: complex interactions between fire and wild and domestic herbivores”, ($24,400 to T.P. Young, PI); (co-investigators: Veblen, D. Kimuyu, and W. Odadi)
2017 National Science Foundation, REU supplement ($8,178 to T.P. Young, PI); (coinvestigators E. Forbes, K.E. Veblen)
2016-2021 Bureau of Land Management, “Restoration and monitoring of Antelope Pasture, southern ID”, ($80,000 to Veblen, PI) (co-investigators: J. Boettinger and T.A. Monaco)
2015-2020 USGS-USFWS Science Support Partnership, “Perennial grass response to post-fire grazing management” ($272,961 total; $97,789 to Veblen, PI); (co-investigators: B. Newingham, D. Pyke)
2015-2020 Utah Division of Wildlife Resources, “Interactive effects of soils and browsing on sagebrush: implications for restoration success”; ($227,200 to Veblen, PI); (coinvestigators K. Nehring, M. Duniway, J. Boettinger, E. Schupp, T. Monaco, E. Thacker, J. Villalba, C. Brungard)
2015-2018 USDA-ARS Specific Cooperative Agreement, “Comprehensive assessment of seeded restoration species: factors controlling establishment and persistence”; ($41,000 to Veblen, PI)
2015-2017 Utah Agricultural Experiment Station, “Using grazing systems to manage ecosystem services in Utah and western landscapes”; ($79,997 to K. Hulvey, P.I.); (coinvestigators: E. Thacker, K.E. Veblen, M. Brunson)
2015-2017 USU office of Research and Graduate Studies, “Integrating ecological, economic, and social components to improve effectiveness of landscape restoration”; ($54,000 total; $18,000 to Veblen, co-PI); (co-investigators K. Kettenring, K. Mock, M. Brunson, E. Edwards, R. Whitesides)

2015-2017 Utah Division of Water Quality, “Water quality impacts of cattle grazing in Great Salt Lake Wetlands”; ($39,093 total; 3,924 to Veblen, co-PI); (PI and co-investigator, K. Kettenring)


2015-2016 USDA Natural Resources Conservation Service, “GBCESU: Estimation of plant height using photogrammetrically derived point clouds”; ($13,917 to D. Ramsey, PI); (co-investigators: K. Hulvey, E. Thacker, K.E. Veblen)

2015-2016 USU Extension, “Using livestock grazing systems to manage ecosystem services in Utah rangelands”; ($10,000 to K. Hulvey, P.I.); (co-investigators: E. Thacker, B. Burritt, D. Rothlisberger, K.E. Veblen, M. Brunson, D. Ramsey)

2015-2016 South Davis Sewer District, “Impacts of grazing for Phragmites control on soil nitrogen and phosphorus in Great Salt Lake wetlands” ($65,000 to K. Kettenring, PI); (coinvestigators: K. E. Veblen, J.F. Shah)

2015 National Park Service, “Monitoring aspen and tall shrubs for ungulate browsing at Fossil Butte National Monument”; ($10,000 to P. Rogers, PI); (co-investigator K.E. Veblen)

2015 National Science Foundation, REU supplement ($9,398 to Veblen, PI); (coinvestigators G.K. Charles, T.P. Young)

2014-2017 Utah Division of Forestry, Fire & State Lands, “Effectiveness of grazing and herbicide as a Phragmites control and wetland restoration approach”; ($94,720 total; $3,140 to Veblen); (PI and co-investigator: K. Kettenring

2014-2015 Utah Agricultural Experiment Station, “Competitive variation among bottlebrush squirreltail (Elymus elymoides) populations and identification of potential environmental drivers” ($19,994 to Veblen, PI); (co-investigators: R. Mann, T.A. Monaco)


2014 USU Extension Mini-Grant, “Assessment of Cattle Distribution in Rich County UT” ($10,000 to E. Thacker, PI); (co-investigators: D. Rothlisberger, K.E. Veblen)

2013-2019 National Science Foundation, “Renewal: Collaborative research: KLEE- scaling up and out at the Kenya Long-term Exclosure Experiment” ($449,773 total; $145,235 to Veblen, PI); (co-investigators: T.P. Young [PI] and C. Riginos)
Larissa Yocom
Assistant Professor, Wildland Resources Department, USU

Academic education background:
M.E.Sc., 2006, Environmental Science. Yale School of Forestry & Environmental Studies.

Professional and research experience:
2017 – present Assistant Professor, Department of Wildland Resources, Utah State University
2016 – 2017 Research Associate and Postdoctoral Scholar, School of Informatics, Computing, and Cyber Systems, Northern Arizona University
2012 – 2017 Research Associate & Instructor, School of Forestry, Northern Arizona University
2011 – 2012 Lecturer, School of Forestry, Northern Arizona University

Teaching experience:
WILD 6900: Fire Ecology, 3 credits, USU, graduate students (Fall 2019)
WILD 5710: Forest Vegetation Disturbance Ecology & Management, 3 credits, USU, undergraduate/graduate students (Fall 2017, 2018)
WILD 3100: Introduction to Wildland Fire, 3 credits, USU, undergraduates (Fall 2018, 2019)
WILD 4960: Directed reading course, 1 credit, Etta Crowley (Fall 2017)
WILD 4960: Directed reading course, 2 credits, Jonathan Cooper (Fall 2018)
FOR 382/582: Ecological Restoration Applications, NAU, undergraduate/graduate students (Fall 2013)
FOR 317: Silviculture and Fire Applications, NAU, professionals (Spring 2013)
FOR 251: Introduction to Wildland Fire, NAU, undergraduates (Spring & Fall 2011, Spring 2012)
FOR 449: Fire Modeling & Monitoring, NAU, undergraduates (Spring 2012)
FOR 351: Fire Modeling and Monitoring for Professionals, NAU, professionals (Fall 2015)
FOR 450: Fire Ecology for Professionals, NAU, professionals (Spring 2012, 2015)
FOR 310: Forest Ecology for Professionals, NAU, professionals (Fall 2011, 2015)
FOR 101: Forestry 101, NAU, undergraduates [forest ecology module, 3 sections] (Fall 2011, 2012)
FOR 517: Dendroecology: Applied Tree-ring Analysis (co-taught), NAU, graduate students (Fall 2009)

Publications during the last five years:

Membership and offices held in professional organizations:
Association for Fire Ecology
Ecological Society of America
Society of American Foresters
Tree-Ring Society
External grants and other research funding during the last five years:


2019-2020 Utah BLM, USFS Region 4, Utah FFSL, and Quinney Foundation. Yocom, L.L., J.A. Lutz. Fuel treatment effects on fire outcomes in Utah. $60,000.

2018-2019 Utah Department of Natural Resources. Mock, K.M., L.L. Yocom. Restoration on the Brian Head fire using aspen seedlings. $28,936


Document F: Forestry Graduate Employment Summary

Institution Name: Utah State University  Academic Year: 2018-2019

Official Degree Program Title: Forest Ecology and Management

Table F_1: Employment status of FEMA majors at graduation based on the WILD Graduating Seniors Survey (see Standard II.7.2).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Full time, permanent, related to degree</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Full time, temporary, related to degree</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Part time, temporary, related to degree</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Unrelate to degree</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>No job</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Graduate School</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>8</strong></td>
<td><strong>3</strong></td>
<td><strong>3</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

Table F_2: Employment status of FEMA majors at graduation based on USU Career Services First Destination Surveys 2011-2017. NREM = Natural Resources Ecology and Management.

<table>
<thead>
<tr>
<th>Post Graduation Status</th>
<th>Number of FEMA and FORE graduates for past five years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13-14</td>
<td>14-15</td>
</tr>
<tr>
<td>Permanent Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed permanent:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry/Urban Forestry/NREM</td>
<td>2</td>
<td>66%</td>
</tr>
<tr>
<td>Forestry/Urban Forestry/NREM - related</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other employed</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Temporary Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed temporary:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry/Urban Forestry/NREM</td>
<td>1</td>
<td>33%</td>
</tr>
<tr>
<td>Forestry/Urban Forestry/NREM - related</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other employed</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Graduate Study</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Unknown (no survey response)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Response rate</td>
<td>3 of 3</td>
<td>100%</td>
</tr>
<tr>
<td>Total number of FEMA/FORE graduates</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Survey Year</th>
<th>Degree</th>
<th>First employment destination after graduation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-17</td>
<td>BS FORE</td>
<td>Utah Department of Natural Resources, Central Area Forester</td>
</tr>
<tr>
<td>2015-16</td>
<td>BS FORE</td>
<td>US Forest Service, Forester</td>
</tr>
<tr>
<td>2014-15</td>
<td>BS FORE</td>
<td>Davey Resource Group, Consulting Utility Forester</td>
</tr>
<tr>
<td>2014-15</td>
<td>BS FORE</td>
<td>Georgia Forestry Commission</td>
</tr>
<tr>
<td>2013-14</td>
<td>BS FORE</td>
<td>Bureau of Land Management, Forester</td>
</tr>
<tr>
<td>2013-14</td>
<td>BS FORE</td>
<td>Montana Department of Natural Resources and Conservation, Pest Management Specialist</td>
</tr>
<tr>
<td>2013-14</td>
<td>BS FORE</td>
<td>US Forest Service, Forestry Technician</td>
</tr>
</tbody>
</table>

Table F.4: Employment Status based on WILD survey of FEMA alumni 2010-2019.

<table>
<thead>
<tr>
<th>Status</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time employment in forest management with: a federal or state</td>
<td>77%</td>
<td>10</td>
</tr>
<tr>
<td>government agency, the private sector, or a non-governmental organization (e.g. non-profit).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-time employment as a natural resource professional (not primarily forestry) in: a federal or state government agency, the private sector or consulting, or a non-governmental organization (e.g. non-profit).</td>
<td>8%</td>
<td>1</td>
</tr>
<tr>
<td>Full-time employment not related to forestry or natural resources</td>
<td>8%</td>
<td>1</td>
</tr>
<tr>
<td>Seasonal or part-time employment in a forest management position</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Seasonal or part-time employment in a natural resources position (not primarily forestry)</td>
<td>8%</td>
<td>1</td>
</tr>
<tr>
<td>Enrolled in a forestry-related graduate program</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Enrolled in a natural resources-related graduate program</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Enrolled in a graduate program unrelated to natural resources</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Unemployed</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>
Table F_5: Satisfaction with employment based on WILD survey of alumni 2010-2019.

<table>
<thead>
<tr>
<th>Level</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely satisfied</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Satisfied</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Unsatisfied</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Completely unsatisfied</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>No opinion</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100%</td>
</tr>
</tbody>
</table>
Document G: Student Data Summary
Enrollment, demographic, and graduation data for FEMA program as of mid-September for the past four years.

Return to Table of Contents

Institution Name: Utah State University
Current Academic Year: 2018-2019
Official Degree Program Title: Forest Ecology and Management (formerly Forest Science)

<table>
<thead>
<tr>
<th>Students Enrolled</th>
<th>Freshman</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>2019</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>9</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>2018</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>11</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>2017</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>9</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>2016</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>12</td>
<td>12</td>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Students Enrolled</th>
<th>Ethnicity: Total Number of FEMA Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>African American</td>
</tr>
<tr>
<td>2019</td>
<td>0</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projected Total Enrollment for Next Three Years</th>
<th>Year 2020</th>
<th>Year 2021</th>
<th>Year 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45</td>
<td>50</td>
<td>55</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graduating Class</th>
<th>Ethnicity: Total Number of Graduating FEMA Students (na = not available)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>2019</td>
<td>1</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>2</td>
</tr>
<tr>
<td>2016</td>
<td>2</td>
</tr>
</tbody>
</table>
Appendix 1: WILD Graduating Senior Surveys

Standard II: Program Organization
Graduating Senior Surveys: 2017-2018

Wildland Resources Undergraduate Exit Survey Summary, May 2019

This survey was emailed in December 2018 and May 2019 to all 65 graduating seniors, 54 of whom responded for a 83% response rate (22 in Fall 2018 and 35 in Spring 2019).

**Question 1** – What degree(s) did you or will you obtain from USU? Check all that apply. **Of the 54 who responded, 32 (59%) graduated in WEM, 3 (6%) in FEM, 13 (24%) in CREC, and 6 (11%) in REM.**

**Question 2** – What year did you (or will you) graduate? If more than one degree, check the most recent year. **21 respondents graduated in December 2018 and 33 in May 2019.**

**Question 3** – Do you currently have a job, or a job pending your graduation? Check one. **FT = full time, PT = part time, P = permanent, T = temporary, R = related to degree, Unrel = unrelated. WEM = Wildlife Ecology and Management, FEM = Forest Ecology and Management, REM = Rangeland Ecology and Management, CREC = Conservation and Restoration Ecology. N = 53.**

**Question 4** – If you have a job to go to after graduating, who has hired you? Check one. **35 answered this question; 7 non-NR organization (1 Lee’s Marketplace, 1 Zootah, 1 Veteran Administration, 1 Shepard Exposition Services, 1 Private Business, 1 Disney Animal Kingdom, 1 unspecified); 7 US Forest Service; 1 Bureau of Land Management (BLM); 8 UDWR; 5 university/college; 2 Private ranch/farm/forest/woodlot; 3 said State NR agency other than UDWR (1 UT National Guard, 1 City of Fort Collins, 1 UT School of Institutional Trust Lands Administration), 2 said other NR agency (1 WY Cooperative Research Unit, 1 USGS).**
**Question 5** – Select the choice that best describes your agreement about the following experiences at USU. Numbers are the percentage that gave a particular rating for a given experience. Bold indicates most selected rating. *N = 50.*

<table>
<thead>
<tr>
<th>Experience</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>My faculty advisor was generally helpful in guiding my progress through the program.</td>
<td>24%</td>
<td>42%</td>
<td>24%</td>
<td>8%</td>
<td>2%</td>
<td>50</td>
</tr>
<tr>
<td>The CNR Academic Advising Center was generally helpful in guiding my progress through the program.</td>
<td>48%</td>
<td>38%</td>
<td>10%</td>
<td>4%</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>I feel that little or no student advisement is needed.</td>
<td>2%</td>
<td>0</td>
<td>30%</td>
<td>54%</td>
<td>14%</td>
<td>50</td>
</tr>
<tr>
<td>There was too much repetition of course content in my classes.</td>
<td>0</td>
<td>24%</td>
<td>18%</td>
<td>54%</td>
<td>4%</td>
<td>50</td>
</tr>
<tr>
<td>I feel laboratories in courses are necessary to apply skills and knowledge learned in classrooms.</td>
<td>30%</td>
<td>60%</td>
<td>8%</td>
<td>0</td>
<td>2%</td>
<td>50</td>
</tr>
<tr>
<td>Course field trips and field exercises are important for professional development.</td>
<td>58%</td>
<td>42%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>The best teachers illustrate classroom principles with examples from their research.</td>
<td>30%</td>
<td>46%</td>
<td>20%</td>
<td>0%</td>
<td>4%</td>
<td>50</td>
</tr>
<tr>
<td>I feel the WILD Department has a responsibility to help its students find employment.</td>
<td>24%</td>
<td>48%</td>
<td>28%</td>
<td>0</td>
<td>0</td>
<td>50</td>
</tr>
<tr>
<td>The WILD Department did an adequate job of informing students about job prospects in my field.</td>
<td>42%</td>
<td>36%</td>
<td>16%</td>
<td>4%</td>
<td>2%</td>
<td>50</td>
</tr>
<tr>
<td>I received adequate assistance from the WILD Department and/or CNR in applying for and locating a job in my field.</td>
<td>14%</td>
<td>34%</td>
<td>36%</td>
<td>12%</td>
<td>4%</td>
<td>50</td>
</tr>
<tr>
<td>Professors heavily involved in research tend to neglect their teaching duties.</td>
<td>12%</td>
<td>20%</td>
<td>32%</td>
<td>32%</td>
<td>4%</td>
<td>50</td>
</tr>
</tbody>
</table>
Question 6 – Rate how successful you were in attaining the following learning objectives during your time at USU (see below for detailed descriptions of each learning objective). Numbers are the percentage that gave a particular rating for a given learning objective. Answers 0–2 are not shown because there were no responses for those choices. The scale went from 0—Not at all successful to 10— Completely successful. N=50.

<table>
<thead>
<tr>
<th>Learning Objectives — Short Descriptions</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Mean (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge of biology and ecology in relation to your major.</td>
<td>2%</td>
<td>0</td>
<td>0</td>
<td>4%</td>
<td>10%</td>
<td>34%</td>
<td>32%</td>
<td>18%</td>
<td>8.4 (50)</td>
</tr>
<tr>
<td>2. Competence in collecting and analyzing data.</td>
<td>0</td>
<td>2%</td>
<td>2%</td>
<td>12%</td>
<td>24%</td>
<td>22%</td>
<td>20%</td>
<td>18%</td>
<td>7.9 (50)</td>
</tr>
<tr>
<td>3. Understanding of the social context in which natural resource management is conducted.</td>
<td>0</td>
<td>2%</td>
<td>4%</td>
<td>4%</td>
<td>14%</td>
<td>30%</td>
<td>28%</td>
<td>18%</td>
<td>8.2 (50)</td>
</tr>
<tr>
<td>4. Ability to communicate.</td>
<td>0</td>
<td>2%</td>
<td>10%</td>
<td>8%</td>
<td>16%</td>
<td>18%</td>
<td>26%</td>
<td>20%</td>
<td>8.0 (50)</td>
</tr>
<tr>
<td>5. Understanding of and ability to apply what is learned in your major to manage, conserve, and restore natural resources.</td>
<td>0</td>
<td>2%</td>
<td>0</td>
<td>6%</td>
<td>16%</td>
<td>26%</td>
<td>34%</td>
<td>16%</td>
<td>8.3 (50)</td>
</tr>
</tbody>
</table>

**Learning Objective 1.** Functional knowledge of biology and ecology in relation to your major (Forestry, Rangeland Resources, Wildlife Science, Conservation and Restoration Ecology) – includes basic understanding of vegetation management in the context of soils, hydrology and watershed processes, and natural and anthropogenic disturbance; plant and animal taxonomy and identification; environmental context of molecular and organismal biology; population, community, ecosystem dynamics; and understanding of forest succession, stand dynamics, disturbances, and growth-growing stock relations.

**Learning Objective 2.** Competence in collecting and analyzing data related to conservation and restoration – includes ability to use field/lab techniques to measure and record data about organisms and their environments; to measure land areas and conduct spatial analysis using GIS and related tools; to design and implement inventories and monitor ecological systems; and to analyze data and use models to project future ecological conditions resulting from forest, rangeland, or wildlife management or anthropogenic disturbances.

**Learning Objective 3.** Understanding of the social context in which natural resource management is conducted – includes basic understanding of human behavior, economics, and culture and their impacts on natural resources; of human demands for natural resources and their effects on resource availability and quality; of natural resource policy and how it is developed; of how federal, state, and local laws and regulations govern natural resource management; and of the ecosystem services that wildlands provide to society.

**Learning Objective 4.** Ability to communicate – includes the ability to understand scientific and other documents in order to critically evaluate opposing viewpoints in conservation and restoration; to prepare and deliver effective oral presentations to professionals and stakeholders; and to write clearly for both technical and non-technical audiences.

**Learning Objective 5.** Understanding of and ability to apply what is learned in your major to manage, conserve, and restore natural resources — ability to research possible solutions to natural resource problems, then develop a management plan with specific objectives and constraints. Understanding of how natural resource management plans are carried out in practice.
Wildland Resources Undergraduate Exit Survey Summary, May 2018

This survey was emailed in December 2017 and May 2018 to all 52 graduating seniors, 40 of whom responded for a 77% response rate (13 in Fall 2017 and 27 in Spring 2018).

**Question 1** – What degree(s) did you or will you obtain from USU? Check all that apply. Of the 40 who responded, 30 (75%) graduated in WEM, 3 (7.5%) in FEM, 4 (10%) in CREC, and 3 (7.5%) in REM.

**Question 2** – What year did you (or will you) graduate? If more than one degree, check the most recent year. 13 respondents graduated in December 2017 and 27 in May 2018.

**Question 3** – Do you currently have a job, or a job pending your graduation? Check one. FT = full time, PT = part time, P = permanent, T = temporary, R = related to degree, Unrel = unrelated. WEM = Wildlife Ecology and Management, FEM = Forest Ecology and Management, REM = Rangeland Ecology and Management, CREC = Conservation and Restoration Ecology. \( N = 39 \).

**Question 4** – If you have a job to go to after graduating, who has hired you? Check one. 33 answered this question; 8 non-NR organization (1 self-employed, 1 office worker, 2 military, 1 landscape, 1 insurance company, 1 USU, 1 unspecified); 9 US Forest Service; 1 National Park Service; 3 UDWR; 5 university/college; 1 consulting firm; 1 state NR agency (National Guard); 5 said other NR agency (4 USFW, 1 unspecified).
**Question 5** – Select the choice that best describes your agreement about the following experiences at USU. Numbers are the percentage that gave a particular rating for a given experience. Bold indicates most selected rating, \( N = 38 \).

<table>
<thead>
<tr>
<th>Experience</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>My faculty advisor was generally helpful in guiding my progress through the program.</td>
<td>45%</td>
<td>26%</td>
<td>16%</td>
<td>3%</td>
<td>11%</td>
<td>38</td>
</tr>
<tr>
<td>The CNR Academic Advising Center was generally helpful in guiding my progress through the program.</td>
<td>58%</td>
<td>26%</td>
<td>11%</td>
<td>3%</td>
<td>3%</td>
<td>38</td>
</tr>
<tr>
<td>I feel that little or no student advisement is needed.</td>
<td>8%</td>
<td>11%</td>
<td>24%</td>
<td>34%</td>
<td>24%</td>
<td>38</td>
</tr>
<tr>
<td>There was too much repetition of course content in my classes.</td>
<td>0</td>
<td>26%</td>
<td>24%</td>
<td>42%</td>
<td>8%</td>
<td>38</td>
</tr>
<tr>
<td>I feel laboratories in courses are necessary to apply skills and knowledge learned in classrooms.</td>
<td>42%</td>
<td>47%</td>
<td>5%</td>
<td>5%</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>Course field trips and field exercises are important for professional development.</td>
<td>68%</td>
<td>24%</td>
<td>8%</td>
<td>0</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>The best teachers illustrate classroom principles with examples from their research.</td>
<td>24%</td>
<td>53%</td>
<td>18%</td>
<td>5%</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>I feel the WILD Department has a responsibility to help its students find employment.</td>
<td>24%</td>
<td>47%</td>
<td>26%</td>
<td>3%</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>The WILD Department did an adequate job of informing students about job prospects in my field.</td>
<td>18%</td>
<td>58%</td>
<td>11%</td>
<td>11%</td>
<td>3%</td>
<td>38</td>
</tr>
<tr>
<td>I received adequate assistance from the WILD Department and/or CNR in applying for and locating a job in my field.</td>
<td>18%</td>
<td>29%</td>
<td>32%</td>
<td>16%</td>
<td>5%</td>
<td>38</td>
</tr>
<tr>
<td>Professors heavily involved in research tend to neglect their teaching duties.</td>
<td>16%</td>
<td>24%</td>
<td>32%</td>
<td>26%</td>
<td>3%</td>
<td>38</td>
</tr>
</tbody>
</table>
Question 6 – Rate how successful you were in attaining the following learning objectives during your time at USU (see below for detailed descriptions of each learning objective). Numbers are the percentage that gave a particular rating for a given learning objective. Answers 0–4 are not shown because there were no responses for those choices. The scale went from 0–Not at all successful to 10–Completely successful. N=38.

<table>
<thead>
<tr>
<th>Learning Objectives – Short Descriptions</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Mean (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge of biology and ecology in relation to your major.</td>
<td>3%</td>
<td>11%</td>
<td>5%</td>
<td>32%</td>
<td>24%</td>
<td>26%</td>
<td>8.4 (38)</td>
</tr>
<tr>
<td>2. Competence in collecting and analyzing data.</td>
<td>13%</td>
<td>8%</td>
<td>29%</td>
<td>29%</td>
<td>5%</td>
<td>16%</td>
<td>7.5 (38)</td>
</tr>
<tr>
<td>3. Understanding of the social context in which natural resource management is conducted.</td>
<td>3%</td>
<td>5%</td>
<td>21%</td>
<td>29%</td>
<td>21%</td>
<td>21%</td>
<td>8.2 (38)</td>
</tr>
<tr>
<td>4. Ability to communicate.</td>
<td>3%</td>
<td>8%</td>
<td>24%</td>
<td>26%</td>
<td>21%</td>
<td>18%</td>
<td>8.1 (38)</td>
</tr>
<tr>
<td>5. Understanding of and ability to apply what is learned in your major to manage, conserve, and restore natural resources.</td>
<td>0%</td>
<td>5%</td>
<td>21%</td>
<td>21%</td>
<td>32%</td>
<td>21%</td>
<td>8.4 (38)</td>
</tr>
</tbody>
</table>

**Learning Objective 1.** Functional knowledge of biology and ecology in relation to your major (Forestry, Rangeland Resources, Wildlife Science, Conservation and Restoration Ecology) – includes basic understanding of vegetation management in the context of soils, hydrology and watershed processes, and natural and anthropogenic disturbance; plant and animal taxonomy and identification; environmental context of molecular and organismal biology; population, community, ecosystem dynamics; and understanding of forest succession, stand dynamics, disturbances, and growth-growing stock relations.

**Learning Objective 2.** Competence in collecting and analyzing data related to conservation and restoration – includes ability to use field/lab techniques to measure and record data about organisms and their environments; to measure land areas and conduct spatial analysis using GIS and related tools; to design and implement inventories and monitor ecological systems; and to analyze data and use models to project future ecological conditions resulting from forest, rangeland, or wildlife management or anthropogenic disturbances.

**Learning Objective 3.** Understanding of the social context in which natural resource management is conducted – includes basic understanding of human behavior, economics, and culture and their impacts on natural resources; of human demands for natural resources and their effects on resource availability and quality; of natural resource policy and how it is developed; of how federal, state, and local laws and regulations govern natural resource management; and of the ecosystem services that wildlands provide to society.

**Learning Objective 4.** Ability to communicate – includes the ability to understand scientific and other documents in order to critically evaluate opposing viewpoints in conservation and restoration; to prepare and deliver effective oral presentations to professionals and stakeholders; and to write clearly for both technical and non-technical audiences.

**Learning Objective 5.** Understanding of and ability to apply what is learned in your major to manage, conserve, and restore natural resources – ability to research possible solutions to natural resource problems, then develop a management plan with specific objectives and constraints. Understanding of how natural resource management plans are carried out in practice.
Wildland Resources Undergraduate Exit Survey Summary, May 2017
This survey was emailed in December 2016 and May 2017 to all 52 graduating seniors, 39 of whom responded for a 75% response rate (8 in Fall 2016 and 31 in Spring 2017).

**Question 1** – What degree(s) did you or will you obtain from USU? Check all that apply. Of the 39 who responded, 21 (54%) graduated in WEM, 8 (21%) in FEM, 6 (15%) in CREC, and 4 (10%) in REM.

**Question 2** – What year did you (or will you) graduate? If more than one degree, check the most recent year. 8 respondents graduated in December 2016 and 31 in May 2017.

**Question 3** – Do you currently have a job, or a job pending your graduation? Check one. FT = full time, PT = part time, P = permanent, T = temporary, R = related to degree, Unrel = unrelated. Part-time, permanent, related is not included because no one chose that answer. WEM = Wildlife Ecology and Management, FEM = Forest Ecology and Management, REM = Rangeland Ecology and Management, CREC = Conservation and Restoration Ecology. N = 39 (8 in Fall 2016 and 31 in Spring 2017).

**Question 4** – If you have a job to go to after graduating, who has hired you? Check one.
26 answered this question; 6 said other NR agency but did not specify which, 5 US Forest Service, 4 UDWR, 3 university/college, 2 each BLM and non-NR organization, 1 private ranch or other land, 1 UFF&SL.
Question 5 – Select the choice that best describes your agreement about the following experiences at USU. Numbers are the percentage that gave a particular rating for a given experience. Bold indicates most selected rating. \( N = 35 \) (7 in Fall 2016 and 28 in Spring 2017).

<table>
<thead>
<tr>
<th>Experience</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course field trips and field exercises are important for professional development.</td>
<td>69%</td>
<td>25%</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
<td>35</td>
</tr>
<tr>
<td>I feel laboratories in courses are necessary to apply skills and knowledge learned in classrooms.</td>
<td>49%</td>
<td>33%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>35</td>
</tr>
<tr>
<td>I feel that little or no student advisement is needed.</td>
<td>6%</td>
<td>14%</td>
<td>14%</td>
<td>49%</td>
<td>17%</td>
<td>35</td>
</tr>
<tr>
<td>I feel the WILD Department has a responsibility to help its students find employment.</td>
<td>14%</td>
<td>51%</td>
<td>29%</td>
<td>6%</td>
<td>0%</td>
<td>35</td>
</tr>
<tr>
<td>I received adequate assistance from the WILD Department and/or CNR in applying for and locating a job in my field.</td>
<td>20%</td>
<td>26%</td>
<td>37%</td>
<td>11%</td>
<td>6%</td>
<td>35</td>
</tr>
<tr>
<td>My faculty advisor was generally helpful in guiding my progress through the program.</td>
<td>31%</td>
<td>26%</td>
<td>23%</td>
<td>17%</td>
<td>3%</td>
<td>35</td>
</tr>
<tr>
<td>Professors heavily involved in research tend to neglect their teaching duties.</td>
<td>9%</td>
<td>6%</td>
<td>31%</td>
<td>40%</td>
<td>14%</td>
<td>35</td>
</tr>
<tr>
<td>The CNR Academic Advising Center was generally helpful in guiding my progress through the program.</td>
<td>57%</td>
<td>34%</td>
<td>6%</td>
<td>3%</td>
<td>0%</td>
<td>35</td>
</tr>
<tr>
<td>The WILD Department did an adequate job of informing students about job prospects in my field.</td>
<td>34%</td>
<td>43%</td>
<td>20%</td>
<td>3%</td>
<td>0%</td>
<td>35</td>
</tr>
<tr>
<td>The best teachers illustrate classroom principles with examples from their research.</td>
<td>54%</td>
<td>37%</td>
<td>6%</td>
<td>3%</td>
<td>0%</td>
<td>35</td>
</tr>
<tr>
<td>There was too much repetition of course content in my classes.</td>
<td>6%</td>
<td>20%</td>
<td>23%</td>
<td>45%</td>
<td>6%</td>
<td>35</td>
</tr>
</tbody>
</table>
Question 6 – Rate how successful you were in attaining the following learning objectives during your time at USU (see below for detailed descriptions of each learning objective). Numbers are the percentage that gave a particular rating for a given learning objective. Answers 0-4 are not shown because there were no responses for those choices. The scale went from 0—Not at all successful to 10—Completely successful. N = 35 (7 in Fall 2016 and 28 in Spring 2017).

<table>
<thead>
<tr>
<th>Learning Objectives – Short Descriptions</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Mean (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge of biology and ecology in relation to your major.</td>
<td>0%</td>
<td>3%</td>
<td>23%</td>
<td>20%</td>
<td>11%</td>
<td>43%</td>
<td>8.7 (35)</td>
</tr>
<tr>
<td>2. Competence in collecting and analyzing data.</td>
<td>0%</td>
<td>17%</td>
<td>17%</td>
<td>20%</td>
<td>32%</td>
<td>14%</td>
<td>8.1 (35)</td>
</tr>
<tr>
<td>3. Understanding of the social context in which natural resource management is conducted.</td>
<td>0%</td>
<td>0%</td>
<td>23%</td>
<td>23%</td>
<td>20%</td>
<td>34%</td>
<td>8.7 (35)</td>
</tr>
<tr>
<td>4. Ability to communicate.</td>
<td>3%</td>
<td>6%</td>
<td>23%</td>
<td>25%</td>
<td>20%</td>
<td>23%</td>
<td>8.2 (35)</td>
</tr>
<tr>
<td>5. Understanding of and ability to apply what is learned in your major to manage, conserve, and restore natural resources.</td>
<td>3%</td>
<td>3%</td>
<td>11%</td>
<td>29%</td>
<td>31%</td>
<td>23%</td>
<td>8.5 (35)</td>
</tr>
</tbody>
</table>

Learning Objective 1. Functional knowledge of biology and ecology in relation to your major (Forestry, Rangeland Resources, Wildlife Science, Conservation and Restoration Ecology) – includes basic understanding of vegetation management in the context of soils, hydrology and watershed processes, and natural and anthropogenic disturbance; plant and animal taxonomy and identification; environmental context of molecular and organismal biology; population, community, ecosystem dynamics; and understanding of forest succession, stand dynamics, disturbances, and growth-growing stock relations.

Learning Objective 2. Competence in collecting and analyzing data related to conservation and restoration – includes ability to use field/lab techniques to measure and record data about organisms and their environments; to measure land areas and conduct spatial analysis using GIS and related tools; to design and implement inventories and monitor ecological systems; and to analyze data and use models to project future ecological conditions resulting from forest, rangeland, or wildlife management or anthropogenic disturbances.

Learning Objective 3. Understanding of the social context in which natural resource management is conducted – includes basic understanding of human behavior, economics, and culture and their impacts on natural resources; of human demands for natural resources and their effects on resource availability and quality; of natural resource policy and how it is developed; of how federal, state, and local laws and regulations govern natural resource management; and of the ecosystem services that wildlands provide to society.

Learning Objective 4. Ability to communicate – includes the ability to understand scientific and other documents in order to critically evaluate opposing viewpoints in conservation and restoration; to prepare and deliver effective oral presentations to professionals and stakeholders; and to write clearly for both technical and non-technical audiences.

Learning Objective 5. Understanding of and ability to apply what is learned in your major to manage, conserve, and restore natural resources – ability to research possible solutions to natural resource problems, then develop a management plan with specific objectives and constraints. Understanding of how natural resource management plans are carried out in practice.
Appendix 2: FEMA and the OPM Requirements

*Return to Table of Contents*

U.S. Office of Personnel Management (OPM) Forestry Series 0460 series requirements and FEMA program elements *(from FEMA program website)*

**Educational Requirements for Forest Management Specialists**

*Updated 27Aug19*

The undergraduate program in Forest Ecology and Management at Utah State University is designed to provide students with the skills necessary for both professional employment in forest management and the pursuit of graduate studies in ecology and natural resources. A wide variety of subjects, including biophysical sciences, resource policy and economics, human-environment relationships, and resource assessment and planning, are integrated into a broad curriculum. The undergraduate program is accredited by the Society of American Foresters, and it meets federal Office of Personnel Management (OPM) requirements for the Forestry Series 0460.

<table>
<thead>
<tr>
<th>OPM Requirements (29Aug19)</th>
<th>USU Forest Ecology and Management Undergraduate Program Required Courses</th>
</tr>
</thead>
</table>
| **Degree Requirement:** Forestry; or a related subject-matter field that included a total of at least 30 semester hours in any combination of biological, physical, or mathematical sciences or engineering, of which at least 24 semester hours of course work were in forestry. | Biological, physical, or mathematical sciences:  
BIOI 1610: Biology I/BIOI 1615: Biology I Laboratory (4 sem. hrs.)  
BIOI 1620: Biology II (BLS)/BIOI 1625: Biology II Laboratory (4 sem. hrs.)  
MATH 1050: College Algebra (4 sem. hrs.)  
MATH 1100: Calculus Techniques (3 sem. hrs.)  
WATS 2220: General Ecology (3 sem. hrs.)  
CHEM 1110: General Chemistry I (4 sem. hrs.)  
STAT 2000: Statistical Methods (4 sem. hrs.)  
-OR- STAT 3000: Statistics for Scientists (3 sem. hrs.)  
WILD 3810: Plant and Animal Populations (3 sem. hrs.)  
**SUBTOTAL:** 28-29 sem. hrs.  

Forestry:  
WILD 3850: Vegetation and Habitat Management (3 sem. hrs.)  
WILD 3100: Introduction to Wildland Fire (3 sem. hrs.)  
WILD 5710: Forest Vegetation Disturbance Ecology and Management (3 sem. hrs.)  
WILD 3800: Wildland Plants and Ecosystems (4 sem. hrs.)  
WILD 3820: Forest Plants: Identification, Biology, and Function (3 sem. hrs.)  
WILD 5700: Forest Assessment and Management (3 sem. hrs.)  
WILD 4750: Monitoring and Assessment in Natural Resource and Environmental Management (4 sem. hrs.)  
WILD 5350: Wildland Soils (3 sem. hrs.)  
**SUBTOTAL:** 26 sem. hrs.  

**GRAND TOTAL:** 78-79 cr.
**OPM Requirements for FEMA, continued.**

<table>
<thead>
<tr>
<th>OPM Requirements (29Aug19)</th>
<th>USU Forest Ecology and Management Undergraduate Program Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The curriculum must have been sufficiently diversified to include courses in each of the</td>
<td>APEC 3012: Introduction to Natural Resource and Regional Economics (3 sem. hrs.)</td>
</tr>
<tr>
<td>following areas:</td>
<td>ENVS 3300: Fundamentals of Recreation Resources Management (3 sem. hrs.)</td>
</tr>
<tr>
<td>Management of Renewable Resources -- study of the science and art of managing renewable</td>
<td>ENVS 3010: Fundamentals of Natural Resource and Environmental Policy (3 sem. hrs.)</td>
</tr>
<tr>
<td>resources to attain desired results. Examples of creditable courses in this area include</td>
<td>ENVS 4000: Human Dimensions of Natural Resource Management (3 sem. hrs.)</td>
</tr>
<tr>
<td>silviculture, forest management operations, timber management, wildland fire science</td>
<td>WATS 3700: Fundamentals of Watershed Science (3 sem. hrs.)</td>
</tr>
<tr>
<td>or fire management, utilization of forest resources, forest regulation, recreational land</td>
<td>WILD 3850: Vegetation and Habitat Management (3 sem. hrs.)</td>
</tr>
<tr>
<td>management, and wildlife or range habitat management.</td>
<td>WILD 3100: Introduction to Wildland Fire (3 sem. hrs.)</td>
</tr>
<tr>
<td></td>
<td>WILD 5710: Forest Vegetation Disturbance Ecology and Management (3 sem. hrs.)</td>
</tr>
<tr>
<td></td>
<td>TOTAL: 24 sem. hrs.</td>
</tr>
<tr>
<td></td>
<td>WILD 2400: Wildland Resource Techniques (3 sem. hrs.)</td>
</tr>
<tr>
<td></td>
<td>WILD 5350: Wildland Soils (3 sem. hrs.)</td>
</tr>
<tr>
<td></td>
<td>WILD 3800: Wildland Plants and Ecosystems (4 sem. hrs.)</td>
</tr>
<tr>
<td></td>
<td>WILD 3820: Forest Plants: Identification, Biology, and Function (3 sem. hrs.)</td>
</tr>
<tr>
<td></td>
<td>TOTAL: 13 sem. hrs.</td>
</tr>
<tr>
<td>Forest Biology -- study of the classification, distribution, characteristics, and</td>
<td>WILD 1800: Introduction to Geographic Information Sciences (3 sem. hrs.)</td>
</tr>
<tr>
<td>identification of forest vegetation, and the interrelationships of living organisms to the</td>
<td>WILD 4750: Monitoring and Assessment in Natural Resource and Environmental Management (4 sem. hrs.)</td>
</tr>
<tr>
<td>forest environment. Examples of creditable courses in this area include dendrology, forest</td>
<td>WILD 5750: Applied Remote Sensing (3 sem. hrs.)</td>
</tr>
<tr>
<td>ecology, silvics, forest genetics, wood structure and properties, forest soils, forest</td>
<td>WILD 5700: Forest Assessment and Management (3 sem. hrs.)</td>
</tr>
<tr>
<td>entomology, and forest pathology.</td>
<td>TOTAL: 13 sem. hrs.</td>
</tr>
<tr>
<td>Forest Resource Measurements and Inventory -- sampling, inventory, measurement, and</td>
<td>WILD 1800: Introduction to Geographic Information Sciences (3 sem. hrs.)</td>
</tr>
<tr>
<td>analysis techniques as applied to a variety of forest resources. Examples of creditable</td>
<td>WILD 4750: Monitoring and Assessment in Natural Resource and Environmental Management (4 sem. hrs.)</td>
</tr>
<tr>
<td>courses include forest biometrics, forest mensuration, forest valuation, statistical</td>
<td>WILD 5750: Applied Remote Sensing (3 sem. hrs.)</td>
</tr>
<tr>
<td>analysis of forest resource data, renewable natural resources inventories and analysis,</td>
<td>WILD 5700: Forest Assessment and Management (3 sem. hrs.)</td>
</tr>
<tr>
<td>and photogrammetry or remote sensing.</td>
<td>TOTAL: 13 sem. hrs.</td>
</tr>
</tbody>
</table>
Appendix 3: Journal Subscriptions

Standard IV: Parent Institution Support
List of 115 subscriptions for journals pertaining to forest ecology and management

<table>
<thead>
<tr>
<th>Journal Title</th>
<th>ISSN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advances in Forestry Science</td>
<td></td>
</tr>
<tr>
<td>Agroforestry systems (0167-4366)</td>
<td></td>
</tr>
<tr>
<td>Allgemeine Forst- und Jagdzeitung (0002-5852)</td>
<td></td>
</tr>
<tr>
<td>American forests (0002-8541)</td>
<td></td>
</tr>
<tr>
<td>Annals of forest research (1844-8135)</td>
<td></td>
</tr>
<tr>
<td>Annals of Silvicultural Research</td>
<td></td>
</tr>
<tr>
<td>Arbor age (0279-0106)</td>
<td></td>
</tr>
<tr>
<td>Artvin Çoruh üniversitesi orman fakültesi dergisi</td>
<td></td>
</tr>
<tr>
<td>Australian forestry (0004-9158)</td>
<td></td>
</tr>
<tr>
<td>Bartin Orman Fakültesi dergisi</td>
<td></td>
</tr>
<tr>
<td>Biotropia (Bogor) (0215-6334)</td>
<td></td>
</tr>
<tr>
<td>Bucovina forestieră</td>
<td></td>
</tr>
<tr>
<td>Bulletin of the Transilvania University of Brașov. Series II, Forestry, wood industry, agricultural food engineering (2065-2135)</td>
<td></td>
</tr>
<tr>
<td>California forests (1536-4399)</td>
<td></td>
</tr>
<tr>
<td>Canadian forest industries (0318-4277)</td>
<td></td>
</tr>
<tr>
<td>Canadian journal of forest research (0045-5067)</td>
<td></td>
</tr>
<tr>
<td>CERNE</td>
<td></td>
</tr>
<tr>
<td>Forest@</td>
<td></td>
</tr>
<tr>
<td>Forestry &amp; British timber (0308-7638)</td>
<td></td>
</tr>
<tr>
<td>Forestry (London) (0015-752X)</td>
<td></td>
</tr>
<tr>
<td>Forestry chronicle (0015-7546)</td>
<td></td>
</tr>
<tr>
<td>Forests</td>
<td></td>
</tr>
<tr>
<td>Forstwissenschaftliches Centralblatt (0015-8003)</td>
<td></td>
</tr>
<tr>
<td>Frontiers of forestry in China (1673-3517)</td>
<td></td>
</tr>
<tr>
<td>Glasnik Sumarskog fakulteta - Univerzitet u Beogradu (1987)</td>
<td></td>
</tr>
<tr>
<td>Holz als Roh- und Werkstoff (0018-3768)</td>
<td></td>
</tr>
<tr>
<td>IForest (Viterbo)</td>
<td></td>
</tr>
<tr>
<td>Indonesian journal of forestry research (2355-7079)</td>
<td></td>
</tr>
<tr>
<td>International forestry review (1465-5489)</td>
<td></td>
</tr>
<tr>
<td>International journal of forest engineering (1494-2119)</td>
<td></td>
</tr>
<tr>
<td>International journal of forestry research</td>
<td></td>
</tr>
<tr>
<td>International journal of mathematical and computational forestry &amp; natural-resource sciences (2082-7581)</td>
<td></td>
</tr>
<tr>
<td>International journal of wildland fire (1049-8001)</td>
<td></td>
</tr>
<tr>
<td>International oaks (1941-2061)</td>
<td></td>
</tr>
<tr>
<td>Metsanduslikud uurimused (1406-9954)</td>
<td></td>
</tr>
<tr>
<td>New forests (0169-4286)</td>
<td></td>
</tr>
<tr>
<td>New Zealand forest industries magazine (1174-0248)</td>
<td></td>
</tr>
<tr>
<td>New Zealand journal of forestry science (0048-0134)</td>
<td></td>
</tr>
<tr>
<td>Northern journal of applied forestry (0742-6348)</td>
<td></td>
</tr>
<tr>
<td>Nova mehanizacija šumarstva</td>
<td></td>
</tr>
<tr>
<td>Open journal of forestry (2163-0429)</td>
<td></td>
</tr>
<tr>
<td>Pakistan journal of forestry (0030-9818)</td>
<td></td>
</tr>
<tr>
<td>Pesquisa Florestal Brasileira (1809-3647)</td>
<td></td>
</tr>
<tr>
<td>Quebracho : revista de ciencias forestales</td>
<td></td>
</tr>
<tr>
<td>Revista árvore (0100-6762)</td>
<td></td>
</tr>
<tr>
<td>Revista do Instituto Florestal (0103-2674)</td>
<td></td>
</tr>
<tr>
<td>Revista forestal latinoamericana</td>
<td></td>
</tr>
<tr>
<td>Revista forestal venezolana (0556-6606)</td>
<td></td>
</tr>
<tr>
<td>Scandinavian journal of forest research (2082-7581)</td>
<td></td>
</tr>
<tr>
<td>Sibirskij lesnoj žurnal (2311-1410)</td>
<td></td>
</tr>
<tr>
<td>Small-scale forest economics, management and policy</td>
<td></td>
</tr>
</tbody>
</table>
Ciência da madeira

Ciência florestal

Colombia forestal (0120-0739)

Croatian journal of forest engineering

European journal of forest research (1612-4669)

FAO forestry paper (0258-6150)

Fire management notes (0194-214X)

Fire management today (1554-8996)

Flamma (Sevilla)

Floresta e ambiente

Floresta (0015-3826)

Folia forestalia Polonica. Seria A. Leśnictwo (0071-6677)

Forest & conservation history (1046-7009)

Forest ecology and management (0378-1127)

Forest history (0015-7422)

Forest pathology = Journal de pathologie forestière = Zeitschrift für Forstpathologie (1437-4781)

Forest policy and economics (1389-9341)

Forest products journal (0015-7473)

Forest science and practice (2095-4034)

Forest science and technology (2158-0103)

Forest science (0015-749X)

Forest systems (2171-5068)

Investigación agraria. Sistemas y recursos forestales (1131-7965)

Irish forestry (0021-1192)

ISRN forestry

İstanbul Üniversitesi Orman Fakültesi Dergisi. Seri A (0535-8418)

Journal of biomechanical engineering (0148-0731)

Journal of forest engineering (0843-5243)

Journal of forest history (0094-5080)

Journal of forest research (1341-6979)

Journal of forest science (Praha) (1212-4834)

Journal of forestry research (1007-662X)

Journal of forestry (0022-1201)

Journal of sustainable forestry (1054-9811)

Journal of tropical forest science (0128-1283)

Jurnal Analisis Kebijakan Kehutanan (0216-0897)

Jurnal hutan tropis

Jurnal Ilmu Kehutanan (Fakultas Kehutanan Universitas Gadjah Mada) (0126-4451)

Jurnal Manajemen Hutan Tropika (2087-0469)


Jurnal perbenihan tanaman hutan

Lesná prace badawcze (1732-9442)

Lesnicky casopis (0323-1046)

Madera y bosques (1405-0471)

Small-scale forestry (1873-7617)

South-East European forestry (1847-6481)

Southern African forestry journal (1029-5925)

Southern forests (2070-2620)

Southern journal of applied forestry (0148-4419)

State of the world’s forests (1020-5705)

Tree genetics & genomes (1614-2942)

Tree physiology (0829-318X)

Trees (Berlin, West) (0931-1890)

Turkish journal of agriculture and forestry (1300-011X)

Unasylva (0041-6436)

Wallacea : jurnal penelitian kehutanan (2302-299X)

Western journal of applied forestry (0885-6095)

Wildfire (Fairfield, Wash.) (1073-5658)

Wood & wood products (0043-7662)

Wood based panels international (0144-7238)

Wood technology (1067-1064)

World of wood (1068-7300)

Acta silvatica & lignaria

Hungarica (1786-691X)

Southern Hemisphere forestry journal (1991-931X)
Appendix 4: Professional course instructor survey results

Standard V: Curriculum

Instructor ratings of FEMA curriculum courses relative to SAF proficiencies. Ratings conducted Fall 2019. Course contributes to competency (1) not at all, (2) a little, (3) somewhat, (4) quite a lot, and (5) very much; shaded = ratings 3-5.

<table>
<thead>
<tr>
<th>Instructor</th>
<th>WILD Commons Courses</th>
<th>FEMA-only Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kuhs</td>
<td>Bosworth</td>
</tr>
<tr>
<td></td>
<td>Belmont</td>
<td>Klain</td>
</tr>
<tr>
<td></td>
<td>LaMalfa/DefRose</td>
<td>Yocom</td>
</tr>
<tr>
<td></td>
<td>Adler</td>
<td>Miller</td>
</tr>
<tr>
<td></td>
<td>Rushing</td>
<td>Cappock</td>
</tr>
<tr>
<td></td>
<td>Lutz</td>
<td>Brothers</td>
</tr>
<tr>
<td></td>
<td>LaMalfa/DefRose</td>
<td>Kulmatiski</td>
</tr>
<tr>
<td></td>
<td>Veblen</td>
<td>DeRose</td>
</tr>
<tr>
<td></td>
<td>Yocom</td>
<td>Ramsey</td>
</tr>
<tr>
<td></td>
<td>Miller</td>
<td>Grossl</td>
</tr>
</tbody>
</table>

<p>| Ecology and Biology | WILD 2000 | WILD 1800 | WILD 2400 | WILD 3800 | WILD 3810 | WILD 3850 | WILD 4750 | APEC 3012 | ENVS 3010 | WILD 3100 | ENVS 3300 | ENVS 4000 | WATS 3700 | WILD 5350 | WILD 5700 | WILD 5710 | WILD 5750 | PSC 3000 | Total |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|--------|
| 1. Understanding of taxonomy and an ability to identify forest and other tree species, their distribution, and associated vegetation and wildlife | 1 | 1 | 2 | 3 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 28 |
| 2. Knowledge of soil properties and processes, hydrology, water quality, &amp; watershed functions | 1 | 1 | 1 | 4 | 1 | 1 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 4 | 5 | 2 | 2 | 1 | 5 | 38 |
| 3. 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 | 3 | 1 | 2 | 5 | 4 | 5 | 5 | 3 | 1 | 1 | 4 | 1 | 1 | 4 | 4 | 5 | 4 | 1 | 2 | 56 |</p>
<table>
<thead>
<tr>
<th>Ecology and Biology</th>
<th>Instructor</th>
<th>FEMA-only Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kuhns</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Belmont</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>LaMalfa/</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>DeRose</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Adler</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Rushing</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Lutz</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>LaMalfa/</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>DeRose</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Veiblen</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Bosworth</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Klain</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Yocom</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Miller</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Coppack</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Brothers</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Kulmatiski</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>DeRose</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Ramsey</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Grossl</td>
<td>FEMA-only Courses</td>
</tr>
<tr>
<td></td>
<td>Composite</td>
<td>FEMA-only Courses</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Ability to make ecosystem, forest, and stand assessments</td>
<td>39</td>
</tr>
<tr>
<td>5. Knowledge of tree physiology and the effects of climate, fire, pollutants, moisture, nutrients, genetics, insects and diseases on tree and forest health and productivity</td>
<td>34</td>
</tr>
<tr>
<td><strong>Measurement of forest resources</strong></td>
<td></td>
</tr>
<tr>
<td>1. Ability to identify and measure land areas and conduct spatial analyses</td>
<td>32</td>
</tr>
<tr>
<td>2. Ability to design and implement comprehensive inventories that meet specific objectives using appropriate sampling methods and units of measurement</td>
<td>32</td>
</tr>
<tr>
<td>3. Ability to analyze inventory data and project future forest, stand, and tree conditions</td>
<td>30</td>
</tr>
<tr>
<td>Instructor</td>
<td>WILD 2000</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Kuhns</td>
<td>1</td>
</tr>
<tr>
<td>Belmont</td>
<td></td>
</tr>
<tr>
<td>LaMalfa/DeRose</td>
<td></td>
</tr>
<tr>
<td>Adler</td>
<td></td>
</tr>
<tr>
<td>Rushing</td>
<td></td>
</tr>
<tr>
<td>Lutz</td>
<td></td>
</tr>
<tr>
<td>Vebien</td>
<td></td>
</tr>
<tr>
<td>Bosworth</td>
<td></td>
</tr>
<tr>
<td>Klein</td>
<td></td>
</tr>
<tr>
<td>Yocom</td>
<td></td>
</tr>
<tr>
<td>Miller</td>
<td></td>
</tr>
<tr>
<td>Coppock</td>
<td></td>
</tr>
<tr>
<td>Brothers</td>
<td></td>
</tr>
<tr>
<td>Kulmatiski</td>
<td></td>
</tr>
<tr>
<td>DeRose</td>
<td></td>
</tr>
<tr>
<td>Ramsey</td>
<td></td>
</tr>
<tr>
<td>Grossl</td>
<td></td>
</tr>
<tr>
<td>Composite</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Ability to develop, apply and understand the effects of silvicultural prescriptions appropriate to management objectives, including methods of establishing and influencing the composition, growth, and quality of forests

2. Ability to analyze the economic, environmental, and social consequences of forest resource management strategies and decisions

3. Ability to develop management plans with specific multiple objectives and constraints

4. Understanding of the valuation procedures, market, and non-market forces that avail humans the opportunities to enjoy non-consumptive products and services of forests
<table>
<thead>
<tr>
<th>Instructor</th>
<th>WILD Commons Courses</th>
<th>FEMA-only Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kuhs</td>
<td>FEMA only Courses</td>
</tr>
<tr>
<td></td>
<td>Belmont</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LaMalfa/DeRose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adler</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rushing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lutz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LaMalfa/DeRose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Veblen</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bosworth</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Klain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yocom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Miller</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coppock</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brothers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kulmatiski</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DeRose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ramsey</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grossl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Composite</td>
<td></td>
</tr>
</tbody>
</table>

### Management of Forest Resources

5. Understanding of the valuation procedures, market forces, processing systems, transportation and harvesting activities that translate human demands for timber-based and other consumable forest products into the availability of those products

|  | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 25 |

6. Understanding of the administration, ownership, and organization of forest management enterprises

|  | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 3 | 2 | 1 | 2 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 26 |

### Forest Resource Policy, Economics, and Administration

1. Understanding of forest policy and the processes by which it is developed

|  | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 4 | 2 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 29 |

2. Knowledge of how federal, state, and local laws and regulations govern the practice of forest resource management

<p>|  | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 3 | 2 | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 29 |</p>
<table>
<thead>
<tr>
<th>Instructor</th>
<th>Kuhns</th>
<th>Belmont</th>
<th>LaMalfa/DeRose</th>
<th>Adler</th>
<th>Rushing</th>
<th>Lutz</th>
<th>LaMalfa/DeRose</th>
<th>Veblen</th>
<th>Bossworth</th>
<th>Klein</th>
<th>Yocom</th>
<th>Miller</th>
<th>Coppock</th>
<th>Brothers</th>
<th>Kulmatiski</th>
<th>DeRose</th>
<th>Yocom</th>
<th>Ramsey</th>
<th>Grossl</th>
<th>Composite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Resource Policy, Economics, and Administration</td>
<td>WILD 2000</td>
<td>WILD 1800</td>
<td>WILD 2400</td>
<td>WILD 3800</td>
<td>WILD 3810</td>
<td>WILD 3820</td>
<td>WILD 3850</td>
<td>WILD 4750</td>
<td>APEC 3012</td>
<td>ENVS 3010</td>
<td>ENVS 3300</td>
<td>ENVS 4000</td>
<td>WATS 3700</td>
<td>WILD 5350</td>
<td>WILD 5700</td>
<td>WILD 5710</td>
<td>WILD 5750</td>
<td>PSC 3000</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>3. Understanding of professional ethics, including the SAF Code, and recognition of the responsibility to adhere to ethical standards in decision making on behalf of clients and the public</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Understanding of the technical, financial, human resources, and legal aspects of public and private enterprises</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5: Syllabi for Required Professional Courses in the USU FEMA Curriculum

Standard V: Curriculum

Table A5-1. Syllabi for required professional courses in the FEMA program. Syllabi for inclusion in a proposed menu of courses for Fall 2020 are also provided (see Standard V.5).

<table>
<thead>
<tr>
<th>REQUIRED COURSES</th>
<th>Instructor</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEC 3012</td>
<td>Introduction to Natural Resource and Regional Economics</td>
<td>R. Bosworth</td>
</tr>
<tr>
<td>ENVS 3010</td>
<td>Fundamentals of Natural Resource Policy</td>
<td>S. Klain</td>
</tr>
<tr>
<td>ENVS 3300</td>
<td>Fundamentals of Recreation Resources Management</td>
<td>Z. Miller</td>
</tr>
<tr>
<td>ENVS 4000</td>
<td>Human Dimensions of Natural Resource Management</td>
<td>L. Coppock</td>
</tr>
<tr>
<td>WATS 3700</td>
<td>Fundamentals of Watershed Science</td>
<td>S. Brothers</td>
</tr>
<tr>
<td>WILD 1800</td>
<td>Introduction to Geographic Information Systems</td>
<td>D. Ramsey</td>
</tr>
<tr>
<td>WILD 2000</td>
<td>Introduction to Wildland Resources</td>
<td>E. LaMalfa</td>
</tr>
<tr>
<td>WILD 2400</td>
<td>Wildland Resource Techniques</td>
<td>E. LaMalfa</td>
</tr>
<tr>
<td>WILD 3100</td>
<td>Introduction to Wildland Fire**</td>
<td>L. Yocom</td>
</tr>
<tr>
<td>WILD 3800</td>
<td>Wildland Ecosystems</td>
<td>P. Adler</td>
</tr>
<tr>
<td>WILD 3810</td>
<td>Plant &amp; Animal Populations</td>
<td>C. Rushing</td>
</tr>
<tr>
<td>WILD 3820</td>
<td>Forest Plants: Identification, Biology, and Function</td>
<td>J. Lutz</td>
</tr>
<tr>
<td>WILD 3850</td>
<td>Vegetation and Habitat Management</td>
<td>E. Lamalfa, J. DeRose</td>
</tr>
<tr>
<td>WILD 4750</td>
<td>Monitoring and Assessment in NR &amp; Environmental Mgt.</td>
<td>K. Veblen</td>
</tr>
<tr>
<td>WILD 5350</td>
<td>Wildland Soils*</td>
<td>A. Kulmatiski</td>
</tr>
<tr>
<td>WILD 5700</td>
<td>Forest Assessment and Management</td>
<td>J. DeRose</td>
</tr>
<tr>
<td>WILD 5710</td>
<td>Wildland Disturbance: Ecology and Management</td>
<td>L. Yocom</td>
</tr>
<tr>
<td>WILD 5750</td>
<td>Applied Remote Sensing</td>
<td>D. Ramsey</td>
</tr>
</tbody>
</table>

HIGHERLY RECOMMENDED ELECTIVES

| WILD 4950 | Scientific Communication for Natural Resource Professionals | K. Becker |
| WILD 4570 | Forest Ecology of the Sierra Nevada and White Mountains | J. Lutz |
| PSC 5130 | Soil Genesis, Morphology, and Classification | J. Boettinger |
| WILD 4700 | Ecological Foundations of Restoration | E. Schupp |
| BIOL 4400 | Plant Physiology | K. Mott |
| PSC 3500 | Structure and Function of Plants | J. Carman |
| WILD 4880 | Genetics in Conservation and Management | K. Mock |

GENERAL SCIENCE FOUNDATION COURSE CLOSELY RELATED TO THE MAJOR

| WATS 2220 | General Ecology | T. Atwood |
| PSC 3000 | Fundamentals of Soil Science | P. Grossl |

*Required through Spring 2020, part of restricted elective set beginning Fall 2020

**To be offered in AY 2020-2021
Table A5-2. Catalog course descriptions for required courses and highly recommended electives in the USU FEMA program (as of 5 November 2019)

<table>
<thead>
<tr>
<th>REQUIRED COURSES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APEC 3012</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>ENVS 3010</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>ENVS 3300</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>ENVS 4000</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>WATS 3700</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>WILD 1800</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>WILD 2000</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>WILD 2400</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Prerequisite/Restriction:</strong> MATH 1050 or higher (C- or better); BIOL 1610 and BIOL 1620 Enrollment is limited to QCNR majors Department authorization is required for all non-majors.</td>
</tr>
</tbody>
</table>
### Table A5-2, continued

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WILD 3100</td>
<td><strong>Introduction to Wildland Fire 3 cr.</strong></td>
<td></td>
<td>This course introduces students to science and management of wildland fire. Topics include combustion and fire behavior, fire ecology, and fire management and policy.</td>
</tr>
</tbody>
</table>
| WILD 3800   | **Wildland Ecosystems 4 cr.**                    |         | Autecology and identification of dominant plants in important terrestrial ecosystems of the Intermountain West, and the structure, function, and dynamics of those ecosystems as related to the environment. Enrollment limited to WILD Department majors.  
*Prerequisite/Restriction:* BIOL 1620 and WATS 2220 or BIOL 2220 Department authorization required for all nonmajors. |
| WILD 3810   | **Plant & Animal Populations 3 cr.**             |         | Basics of plant and animal population ecology, including population regulation, life histories, single and multi-species interactions, and metapopulations. Case studies will cover topics of both management and conservation concern.  
*Prerequisite/Restriction:* WATS 2220 or BIOL 2220; MATH 1100 or higher (C-grade or better); STAT 2000 or STAT 3000 (C-grade or better) |
| WILD 3820   | **Forest Plants: Identification, Biology, and Function 3 cr.** |         | This course explores the identification, biology, and function of forest plants of western North America with an emphasis on the woody plants of Utah’s forest ecosystems. Introduction to woody plant anatomy, forest communities, and indicator species.  
*Prerequisite/Restriction:* MATH 1050 or higher (C-grade or better) |
| WILD 3850   | **Vegetation and Habitat Management 3 cr.**       |         | Applying ecological principles and concepts to manipulate the composition, structure, and productivity of wildland vegetation for a range of objectives, including the creation and maintenance of wildlife habitat, using biological, chemical, and mechanical methods, as well as fire.  
*Prerequisite/Restriction:* WILD 3800 |
| WILD 4750   | **Monitoring and Assessment in NR & Environmental Mgt. 4 cr.** |         | Lectures, laboratory exercise, and field-based projects introduce students to the concepts, strategies, and analytical methods of natural resource and environmental monitoring and assessment.  
*Prerequisite/Restriction:* BIOL 2220 or WATS 2220, MATH 1100 or higher (C-grade or better), STAT 2000 or STAT 3000 (C-grade or better), WILD 2400, WILD 3810 (may be taken concurrently). |
| WILD 5350   | **Wildland Soils 3 cr.**                         |         | Application of basic principles of soil science to wildland ecosystems. Effects of disturbance and land use on wildland soil properties. Role of soils in natural resource management.  
*Prerequisite/Restriction:* CHEM 1110; PSC 3000, and one additional upper-division Soils course, or instructor permission. |
Table A5-2, continued

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
</table>
| WILD 5700   | Forest Assessment and Management (CI) | 3 cr. | Detailed analysis of forest stand structure and growth. Development of silvicultural prescriptions to meet specific objectives. Analysis of costs and benefits of alternative forest management strategies. Emphasizes forest management to achieve a broad range of objectives. 
**Prerequisite/Restriction:** WILD majors or students with instructor permission. |
| WILD 5710   | Wildland Disturbance: Ecology and Management | 3 cr. | Examines causes, effects, and management options for selected biotic and abiotic agents of disturbance in wildland ecosystems. |
| WILD 5750   | Applied Remote Sensing | 3 cr. | Covers the application of remote sensing to landcover mapping and resource monitoring at a quantitative level. Students instructed on the effects of atmosphere and surface interaction on the reflectance collected by electro-optical sensors, as well as on the proper use and interpretation of various calibration and classification algorithms. |
| WILD 4950   | Scientific Communication for Natural Resource Professionals | 2 cr. | Catalog course description not available yet. Communications intensive (CI) status anticipated, currently under consideration by USU Curriculum Committee. |
| WILD 4570   | Forest Ecology of the Sierra Nevada and White Mountains | 3 cr. | This field experience uses an ongoing research project at the Yosemite Forest Dynamics Plot as a vehicle for learning field methods, natural history, and ecological theory. Students learn the ecology of mixed-conifer forests of the Sierra Nevada and bristlecone pine. |
| PSC 5130    | Soil Genesis, Morphology, and Classification | 3 cr. | Morphology, development, and classification of soils. Lectures and weekly field exercises emphasize soil as a natural body of the landscape: its properties, distribution, behavior, and interpretations for diverse land uses. 
**Prerequisite/Restriction:** Understanding of fundamental soil science; PSC 3000 recommended. |
| WILD 4700   | Ecological Foundations of Restoration | 3 cr. | An advanced plant ecology course emphasizing topics especially relevant to successful establishment of plants in disturbed environments and restoration of functioning dynamic ecosystems. It covers basic ecological processes from the population the ecosystem level and applications to ecological restoration. 
**Prerequisite/Restriction:** BIOL 1610, BIOL 1620 and WATS 2220 or BIOL 2220. |
| BIOL 4400   | Plant Physiology (QI) | 4 cr. | Introduction to plant metabolism, water relations, and growth. 
**Prerequisite/Restriction:** BIOL 1620, BIOL 1625, MATH 1050 or higher, or AP Calculus AB score of 3 or higher. |
Table A5-2, continued *Return to Table of Contents*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSC 3500</td>
<td><em>Structure and Function of Plants 3 cr.</em></td>
<td>3</td>
<td>Introduction to principles of plant physiology and fundamentals of plant anatomy, emphasizing implications for management and utilization. <strong>Prerequisite/Restriction:</strong> Integrated Science or comparable breadth course, BIOL 1010 or BIOL 1610.</td>
</tr>
<tr>
<td>WILD 4880</td>
<td><em>Genetics in Conservation and Management 3 cr.</em></td>
<td>3</td>
<td>Introduces principles of modern genetics, with applications, examples, and assignments related to ecology and management issues. Emphasizes genetic marker systems, gene flow, genetic drift, and adaptation. <strong>Prerequisite/Restriction:</strong> CHEM 1110 or CHEM 1210; and BIOL 1610</td>
</tr>
<tr>
<td>GENERAL SCIENCE FOUNDATION COURSE CLOSELY RELATED TO THE MAJOR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WATS 2220</td>
<td><em>General Ecology 3 cr.</em></td>
<td>3</td>
<td>Study of the interrelationships among organisms, humans, and their environments, addressing where and how organisms live. Adaptation, population growth, species interactions, biodiversity, and ecosystem function are explored for a wide variety of organisms and ecosystems. <strong>Prerequisite/Restriction:</strong> BIOL 1610 and BIOL 1620, (BIOL 1620 can be taken concurrently).</td>
</tr>
<tr>
<td>PSC 3000</td>
<td><em>Fundamentals of Soil Science 4 cr.</em></td>
<td>4</td>
<td>Fundamentals of soil science, emphasizing physical, chemical, mineralogical, and biological properties of soils, and how these properties relate to plant growth and environmental quality. <strong>Prerequisite/Restriction:</strong> CHEM 1110 or higher; and MATH 1050 or higher or AP Calculus AB score of 3 or higher.</td>
</tr>
</tbody>
</table>
APEC 3012: Introduction to Natural Resource Economics

Instructor: Ryan Bosworth
Office: AGRS 218
Phone: 797-0594
E-mail: ryan.bosworth@usu.edu
Office hours: M/W 10-11 and by appointment (email me)

Required Text: Barry C. Field: Natural Resource Economics: An Introduction (2nd ed.)

Learning Outcomes
Upon completing the course, all participants will understand the basics of Natural Resource and Regional Economics. In particular, students will be able to:

- use basic microeconomic tools to analyze natural resource use
- understand the concepts of efficiency, externalities, and market failure in the context of natural resource use
- understand the basic principles of benefit cost analysis
- understand the tools that economists use to value natural resources

Course organization

- The first portion of the course will consist of building a basic understanding of economic principles in the context of environmental and natural resource management.
- The next section of the course will develop general principles and tools for analyzing problems in natural resource management.
- The remainder of the course will consider the application of these principles and tools to specific topics, such as water rights, land management, forest management, and mineral extraction.

Grade Basis:

- Quiz 1: 10%
- Midterm: 20%
- Quiz 2: 10%
- Final Exam: 20%
- Reading Assignments: 20%
- Group Project: 20%

Quizzes: There will be two quizzes. These will help prepare you for the big exams by showing the types of questions you can expect. The quizzes will be completed through canvas and you can use any materials you want.

Exams: (Midterm and Final): These exams will be proctored.

Readings Assignments: Throughout the class there will be assigned readings and assignments.

Group Project: We will discuss the details of the group project in class.
Policies:

- Make-up exams will not be offered. If you miss the Midterm for a validated emergency, I may allow you to place the weight of the exam on the Final exam. A make-up exam for the final will be offered only in the case of a validated emergency.
- Late work will be accepted for half credit.
- No incomplete grades will be given.
- Students with Disabilities: Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435)797-2444 voice, (435)797-0740 TTY, (435)797-2444 VP, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible.
- Honor Pledge: Students will be held accountable to the Honor Pledge which they have agreed to: “I pledge, on my honor, to conduct myself with the foremost level of academic integrity.” Please familiarize yourself with the University’s Student Code: http://www.usu.edu/studentservices/pdf/StudentCode.pdf. The Instructor of this course will take appropriate actions in response to academic dishonesty.

Course Outline (Tentative)

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Important Issues</td>
</tr>
<tr>
<td>2</td>
<td>Natural Resources and the Economy</td>
</tr>
<tr>
<td></td>
<td>Demand/Public Goods/Time Value of Money</td>
</tr>
<tr>
<td>4</td>
<td>Costs/Supply</td>
</tr>
<tr>
<td>5</td>
<td>Efficiency and Sustainability</td>
</tr>
<tr>
<td>6</td>
<td>Markets and Efficiency</td>
</tr>
<tr>
<td>7</td>
<td>Public Policy for Natural Resources</td>
</tr>
<tr>
<td>8</td>
<td>Principles of Analysis</td>
</tr>
<tr>
<td>9</td>
<td>Valuation of Natural Resources</td>
</tr>
<tr>
<td>10</td>
<td>Mineral Economics</td>
</tr>
<tr>
<td>11</td>
<td>Energy</td>
</tr>
<tr>
<td>12</td>
<td>Forest Economics</td>
</tr>
<tr>
<td>14</td>
<td>Land Economics</td>
</tr>
<tr>
<td>15</td>
<td>Water Resources</td>
</tr>
<tr>
<td>16</td>
<td>Economics of Agriculture</td>
</tr>
<tr>
<td>17</td>
<td>Economics of Outdoor Recreation</td>
</tr>
</tbody>
</table>
General Information and Introduction to the Course

Plant Physiology is a broad discipline comprised of many subdisciplines, several of which could easily be the subject of an entire course. Because this is an introductory course, and because it is the only physiology course many students will take, I feel that it is important to cover all of the major subdisciplines to some degree. It is therefore impossible to cover any one subject in great depth, and many important topics will be dealt with in only one lecture, or less. Also, this course is designed to serve students with a variety of interests and backgrounds, so specific applications of plant physiology, such as forestry, range science or agriculture, will not be covered. In most courses or textbooks on plant physiology, subjects such as photosynthesis, water relations, respiration, etc., are considered as discrete topics with the angiospermous plant in mind. The problem with this approach is that it does not give students a feeling for why plants do things the way they do.

In this course, we will approach topics of plant physiology in an evolutionary context, considering them in the order that they were solved as plants evolved from single cells to multicellular organisms. For example, we will not take a topic such as photosynthesis and discuss it as a unit based on how the process occurs in an angiosperm leaf. Rather, we will consider first reactions that occurred in the simplest, single-celled, green plants and the problems that confronted them in their aqueous environment. Later in the course we will discuss how terrestrial plants solved the problem of CO$_2$ fixation from the atmosphere. The message conveyed by studying plant physiology in this context is that plants are the way they are because they had to be that way. I believe this approach, rather than memorization of processes and pathways, leads to an understanding of concepts in plant physiology. You will find (I hope) that this course demands that you think and understand rather than simply memorize facts.

The textbook we will use this quarter is an example of the traditional approach, but it lends itself fairly well to the approach I have outlined. On the schedule of topics I have listed the pertinent section of the text for each topic that we will consider. However, it will be useful to look through the book for other information that relates to the topic.

There will be three exams in the lecture part of the course during the quarter, each worth 100 points. There will be a comprehensive final exam worth 200 points. The dates for the in-class exams are given in the lecture schedule. If you cannot attend class on one of these days, you should inform me as soon as possible. I may agree to allow you to take the exam on a different day, or I may for an unusual circumstance choose to assign a grade for that exam based on your final exam grade. If there are questions regarding the grading of an exam, they must be raised within one week of the date I distribute the graded exams. The laboratory portion of the course will be worth 150 points. 50 of these points will come from laboratory-based questions on the hourly exams in lecture (10 points on each 1-hour exam and 20 points on the Final). The remaining 100 points will be awarded based on laboratory writeups and quizzes; the exact distribution of points and grading policies will be discussed by your laboratory instructor.

There are 650 possible points in the course. I do not grade on a curve or any other geometric configuration. It is possible for everyone in the course to earn an A, and it is possible that no one will earn an A. I guarantee that anyone finishing with at least 90% of the 650 points will receive an A; 80% B, 70% C, 60% D. I may lower the levels, but I don’t guarantee it. I do guarantee that I won't raise them, however.

Attendance in the laboratory is mandatory, and absences will be counted against your grade. Attendance is not required for the lecture, but it is strongly recommended. You will find that it is difficult to do well in this course without attending lecture. I expect you to meet all course requirements and any other requirements I may announce in class, even a class from which you may be absent. You are responsible for all information covered in class, some of which may not be covered in the book.
ENVS 3010 Fundamentals of Natural Resource Policy 3 cr.

This syllabus is subject to change

Instructor: Christopher Lant  e-mail: chris.lant@usu.edu  Office Hours: NR 201B T Th 10:30-12:00
Lecture/Discussion: TTH 9:00 – 10:15  NR 105
Undergraduate Teaching Fellow: Rachael McCorkle; Case brief grader Elizabeth Cook

COURSE OBJECTIVES
1. To understand the principles of neoclassical, institutional, and ecological economics as they apply to natural resource and environmental policy.
2. To understand the legal basis of and political process for making natural resource and environmental policy.
3. To gain a better understanding of ongoing policy debates concerning energy, climate, and water resources.

GRADING
Attendance/Participation  10%
Cost-Benefit exercise  10%
Energy, Nitrogen, Water simulations  15%
Proposed Rule comment using www.regulations.gov  10%
Legal Briefs of five cases  25%
Midterm Exam  10%
Final Exam  20%
IDEA Course Evaluation  0%
Total 100%

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>83-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>73-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
</tr>
</tbody>
</table>

Readings on Canvas

Environmental and Resource Economics
Environmental Law
The Constitution of the United States
Statute: The National Environmental Policy Act
Supreme Court Cases:
Lucas v. South Carolina Coastal Council (1992)
Massachusetts v. EPA (2007)
California Superior Court Case
National Audubon Society v. Superior Court (1983) ("Mono Lake case") available at:

Simulations: Energy, Water, Nitrogen

Law Review articles:
http://www.heinonline.org/HOL/Page?collection=journals&handle=hein.journals/adminlj10&id=41#41

<table>
<thead>
<tr>
<th>Topic</th>
<th>Reading assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part I: Economic Foundations of Env Policy</td>
<td></td>
</tr>
<tr>
<td>1 Environmental Ideologies and Economics Schools</td>
<td></td>
</tr>
<tr>
<td>2 Valuing the Environment: Concepts</td>
<td>Costanza et al. 2014</td>
</tr>
<tr>
<td>3 Valuing the Environment: Methods</td>
<td>Kozak et al</td>
</tr>
<tr>
<td>4 Principles of Env. and Ecological Economics</td>
<td>Rockstrom et al. 2009</td>
</tr>
<tr>
<td>5 Property Rights and Externalities</td>
<td>Hardin, Dietz, Lant</td>
</tr>
<tr>
<td>Part II: The Legal Foundations of Env. Policy</td>
<td></td>
</tr>
<tr>
<td>6 The Constitution and Env./NR Policy</td>
<td>Constitution, Chevron, Lucas</td>
</tr>
<tr>
<td>7 The 2nd Constitution: APA and NEPA</td>
<td>Croley; NEPA statute</td>
</tr>
<tr>
<td>Part III: The Issue Areas</td>
<td></td>
</tr>
<tr>
<td>8 Energy and Climate (Energy sim)</td>
<td>Mass v. EPA,</td>
</tr>
<tr>
<td>9 Water (Water sim)</td>
<td>Mono Lake case</td>
</tr>
<tr>
<td>10 Water Quality and Watersheds (Nitrogen sim)</td>
<td>Adler, Corps v Hawkes</td>
</tr>
<tr>
<td>Course Review and Evaluation</td>
<td></td>
</tr>
</tbody>
</table>
Course policies

USE OF COMPUTERS, TABLETS, AND MOBILE PHONES
Turn off or silence phones during class. Computers and tablets may be used only for taking notes or activities directly relevant to lecture material during class. Students should respect the rights of others to learn and minimize the possibility of distraction from the use of electronic devices. If the use of electronics presents a distraction to others during class, the student will be asked to stop using the device. If issues persist, the student will be asked to leave the class.

ACADEMIC HONESTY
Students are expected to produce original work. Plagiarism or falsification of any kind will be subject to disciplinary action. Offences will be referred to Utah State University Admissions office. The USU policy for academic honesty can be found at: usu.edu/studentservices/studentcode/article6.cfm. Please review this document to understand the Utah State University policy on academic honesty. If you have questions or concerns about the policy, please contact your instructor or academic advisor.

PLAGIARISM
Plagiarism includes knowingly "representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, and denial or revocation of degrees.

STUDENTS WITH DISABILITIES
Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the Disability Resource Center (435 - 797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor.
Fundamentals of Recreation Resources Management
ENVS 3300
Fall 2016

Who Am I: Abby Kidd
PhD Candidate, Department of Environment & Society

Where Am I: NR 240

How to Contact Me: abigail.kidd@aggiemail.usu.edu

When to Find Me: Office Hours: Mondays from 3pm – 5pm
Wednesdays from 2pm – 4pm

Lecture/Discussion: 5:15pm – 7:45pm, BNR 314

What are we going to discuss in this course?
This course provides an introduction to the fundamental principles of wildland recreation resource management. This semester, together, we will answer the following questions:

- What is recreation, where do people recreate, and who uses recreation resources?
- How do we plan for recreation use and manage recreation use sustainably?
- How do we design and manage facilities for recreation use?

What are the learning objectives of this course?

- Learn the fundamental principles of outdoor recreation; especially related to social, ecological, and facility design.
- Learn how to apply the above principles and theories effectively to maintain visitor experience and resource protection priorities common to public lands.
- Develop specific skills, competencies, and perspectives essential for professional outdoor recreation providers and managers.

I want you to come away from this course and be able to think like a recreation resource manager!

What I will expect from you?

- Attend and participate in class – I expect you to attend every class (yes the lecture notes are online but that is not a substitute for attending lecture), I also understand that life happens. So if something serious and unavoidable comes up or you are ill and must miss a class please let me know as soon as possible. I want you to be able to think critically in this course about the concepts and topics that we discuss in class. Therefore, not only will I expect you to be in class but I will also expect you to think, ask questions, and participate in discussions. As such, I will also ask that all of you to be respectful of your classmates
opinions and viewpoints. Please remember that there is a distinct difference between arguing and
discussing a topic civilly and respectfully. I will not tolerate the former.

- **Read assignments before coming to class** – Productive class discussion will be dependent on you
  coming to class prepared by being self-motivated and reading the assignments beforehand.

- **Complete all assignments to the best of your ability and turn them in on-time** – This is an upper-level
course and I expect all formal written assignments to be clean, concise, well-organized, well-thought out,
and contain minimal errors. Good writing skills are important and valued in all work environments. I
expect all assignment to be turned in by the beginning of class on their due date.

**What can you expect from me?**

- **Attend and prepare for class** - You can expect me to be at every class, or arrange an appropriate
  substitute except under crazy circumstances or if I am ill. I will come to class prepared with lecture
  material, any assignment material, and I will facilitate discussions. I will answer all student questions to
  the best of my ability. I will ensure that material for class is posted on Canvas in an organized and timely
  fashion. I understand that this is not your only class and that you have a life outside of this course,
  therefore I will do my best to make the course load reasonable.

- **I will facilitate learning** – Do not hesitate to ask questions (either in class or outside of class). I will be
  in my office during office hours to help students in any way necessary. Please come to me if you are
  feeling confused about a topic, overwhelmed with class material, are concerned about your grade, have a
  question about an assignment, or just want more information about a topic. Also, do not hesitate to email
  me as well, I check my email frequently (although not as frequently in the evenings and on the weekends)
  and will respond to any question or concern in a timely manner.

- **Grading will be fair and completed in a timely fashion** – I will do my best to ensure that grades are
  assigned fairly. I will also try to make it as clear as possible why you receive the grade that you received.
  If you have any questions about an assignment or grades please come and talk to me. If you do not
  understand what is expected of you for an assignment; please ask!

**Course Procedures**

- Attendance is required.
- Please do not use your cell phone or similar electronic devices during class. Web surfing or other activities
  unrelated to the course on your laptop are not acceptable. **Multiple scientific studies have shown that the
  use of electronic devices in the classroom has a negative impact on learning.**
- It’s OK to be human. Unforeseen circumstances will arise during the semester for you and for your
  instructor. I will communicate with you in advance as best as possible and expect that you will please do
  the same.

This class follows an IVC (Internet Video Conferencing) format, with students participating in multiple locations
throughout the state. While you will all be able to see me, students may not be able to see all of their classmates
and I may or may not be able to see all receiving students at the same time. This presents a particular difficulty in
asking and answering questions during class. I will do my best to pause and provide ample opportunity for students
to ask questions. If you have a question, please say your name and site before asking your question. This will help
me as well as your classmates. Please follow the same procedure when answering questions. Speak clearly and with
sufficient volume so that students at other locations can hear your questions and responses. Finally, please do not
engage in conversations unrelated to class material while class is in session. The University policy on Classroom Incivility can be accessed at the following link: http://www.usu.edu/policies/pdf/Classroom-Incivility.pdf

How will I gauge your level of learning?

My job is to facilitate the learning of a particular topic. In our educational system, we gauge how well I’ve done my job and how well you’ve put forth effort to learn the material with letter grades and GPAs. Therefore, you will complete several assignments that will be assessed as part of your overall grade for this course. More importantly however, these assignments will help me and you understand the learning process in this course. I strive to make these assignments as useful and interesting as possible and am opened to suggestions regarding course assignments.

For this course, I have assigned the following points to your required activities (Totaling 500 Points):

Readings:
There is no required text for this class. All readings will be available on the course Canvas page. Readings will be posted a minimum of one week prior to the class date for which they are assigned. I expect you to do the readings BEFORE class.

Graded Work:

3-2-1 Quizzes (5 x 5pts = 25 points)
The purpose of these quizzes is to motivate you to complete the assigned readings. Report 3 things you learned from the reading; list 2 questions you have for clarification or discussion; and provide 1 statement of feedback. Quizzes will be completed on Canvas and are due by 10:00pm the day prior to the class meeting for which the reading is assigned. In other words, these are due Sunday night by 10:00pm.

Photo Elicitation Exercise (25 points, Due Sept. 16)
What does outdoor recreation mean to you? Share a photograph and narrative that you feel addresses an important issue or concept in outdoor recreation/recreation resources management. More details will be provided on Canvas.

Site Visit Exercise (50 points, Due Oct. 24)
How can we study outdoor recreation without actually getting outside? Visit a local recreation site and prepare a one page reflection paper. More details will be provided on Canvas.

Issue Analysis & Webpage Design (100 points, Due Nov. 28)
You will be presented with a number of current issues in recreation resource management and pick a topic that interests you. Your task will be to research both sides of the issue and then using what we have learned in class and your own research you will make management recommendations. Instead of summarizing this information in a final term paper, you will make a website analyzing the issue. You will work in groups of 2 or 3. Part of this assignment will be to examine and critique the websites of your peers. Do not worry if you have not designed a website before, I will assist you in the process and we will cover some of the basics in class. More details will be provided on Canvas.

Exams (Two Midterms for 50 points each + One Final for 100 points = 200 points)
These will measure your overall understanding of ideas and principles presented in the course. The first two exams will be a mixture of short essay, multiple choice, and short answer questions administered during our regular class meeting. One week before each exam, I will post a study guide describing what will be on the exam. Questions will cover both lecture materials and readings, including readings not discussed in class.
The final exam will be a take-home, practical exercise requiring you to apply the principles, techniques, and tools that you have learned throughout the semester. Make-up exams will not be scheduled except in cases of verified emergency or when your absence is directly due to other university activities. In the latter case, please inform me well in advance of the scheduled exam date.

**Writing and Grammar:**

Written work and communication is expected to be concise, well organized, and contain minimal errors (please proof-read and use spell check!). Grammar and professionalism will be criteria for grading on all assigned written material (including. For writing resources and assistance, visit the USU Writing Center:

[http://writing.usu.edu/](http://writing.usu.edu/)

**Academic integrity (Bottom line: Don’t cheat)**

I understand that school is stressful and that you are trying to balance many aspects of your life at one time. The internet and technology makes it so easy and so tempting to claim someone else’s work as your own. Don’t give in to the temptation; it will not benefit you in the long run. I would rather you come and talk to me and turn in an assignment late than cheat on an assignment. **If I discover that you have plagiarized all or part of an assignment you will fail the entire course.**

What is considered academic dishonesty in this course are the following:

- *Submitting substantially the same work* for an assignment in this class as you turned in for credit in another class;
- Representing, by paraphrase or direct quotation, the published or unpublished work of *another person as one’s own* without giving full acknowledgment (including phrases lifted from websites, and materials prepared by anyone who sells term papers.)

Using work copied or paraphrased from a publication or website is plagiarism unless the copied work is in quotations and the source is clearly cited. Direct quotations should be used infrequently (typically <1% of a paper); citations should acknowledge the source of an idea or fact, but the writing should be your own. If you need more information about what constitutes a violation of academic integrity under the university Honor Code, or you’d like to read the university’s policy on this issue, go to [http://www.usu.edu/policies/pdf/Acad-Integrity.pdf](http://www.usu.edu/policies/pdf/Acad-Integrity.pdf).

**Accommodation for disabilities**

This university helps disabled students participate fully in its programs, activities and services. If you have a disability that has been documented by USU’s Disability Resource Center, you can work with the Center and with me to ensure that you get whatever assistance that you need.
## Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings and Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 29</td>
<td>Introductions, Course Organization</td>
<td><em>Jensen and Guthrie (2005) Chapter 1</em></td>
</tr>
<tr>
<td></td>
<td>Outdoor Recreation: Historical and Contemporary Perspectives</td>
<td><em>Meine &amp; Knight (1999) The Essential Leopold - Chapter 3: Outdoor Recreation</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Introductory Quiz</strong></td>
</tr>
<tr>
<td>Sept. 5</td>
<td><strong>No Class – Labor Day Holiday</strong></td>
<td><strong>Photo Elicitation Exercise Due by Sept. 16</strong></td>
</tr>
<tr>
<td>Sept. 12</td>
<td>Social Trends Influencing Outdoor Recreation</td>
<td><em>McLean &amp; Hurd (2014) Kraus’ Recreation and Leisure in Modern Society – Chapter 13: Future Perspectives</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3-2-1 Quiz #1</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Guest Lecture: Dr. Jordan Smith</strong></td>
<td><strong>Exam #1 Study Guide</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Guest Lecture: Dr. Paul Jakus</strong></td>
<td><strong>Exam #1 Study Guide</strong></td>
</tr>
<tr>
<td>Sept. 26</td>
<td>Introduction to Recreation &amp; Interactions with Natural Resources</td>
<td><em>Leung &amp; Marion (2000) Recreation Impacts &amp; Management in Wilderness</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Siber (2014) The Heist: How Visitors Stole a National Monument</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Exam #1</strong></td>
</tr>
<tr>
<td>Oct. 3</td>
<td>Review Exam #1</td>
<td><em>Hughes (2015) 6,000 Visible Stars Light Up America’s ‘dark sky’ Parks, USA Today</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Newman et al. (2009) From Landscapes to Soundscapes: Introduction</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3-2-1 Quiz #2</strong></td>
</tr>
<tr>
<td>Oct. 10</td>
<td>Recreation Interactions: Vegetative Management, Rangeland Resources, and Other Natural Resources Uses</td>
<td>No Reading or Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Stack et al. (2011) Reducing Visitor Noise Levels at Muir Woods National Monument Using Experimental Management</em></td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Reading</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National Park</td>
</tr>
<tr>
<td></td>
<td></td>
<td>McCool et al. (2007) An Assessment of Frameworks Useful for Public Land Recreation Planning (pp. 43 – 91)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site Visit Exercise Due</td>
</tr>
<tr>
<td></td>
<td>Guest Lecture: Dr. Jordan Smith</td>
<td>Introduction</td>
</tr>
<tr>
<td>Nov. 7</td>
<td>Review Exam #2</td>
<td>Bell (2008) Design for Outdoor Recreation</td>
</tr>
<tr>
<td></td>
<td>Recreation Facility Design, Pt I</td>
<td>Chapter 2: Design Concepts for Outdoor Recreation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 12: Design for Overnight Visitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chapter 14: Comprehensive Site Design</td>
</tr>
<tr>
<td>Nov. 21</td>
<td>Introduction to Recreation Policy &amp; Planning</td>
<td>No Reading or Quiz</td>
</tr>
<tr>
<td>Nov. 28</td>
<td>Case Studies in Recreation Resource Management Pt. I</td>
<td>Issues Analysis Website Completed</td>
</tr>
<tr>
<td>Dec. 5</td>
<td>Case Studies in Recreation Resource Management, Pt. II</td>
<td>Peer Review of Websites Due</td>
</tr>
<tr>
<td>Dec. 12</td>
<td></td>
<td>Final Exam Due</td>
</tr>
</tbody>
</table>
EnvS 4000:

Human Dimensions of Natural Resource Management (HD-NRM)

Syllabus for Fall 2016

Course Ref. No. 41979; 3 credit hours

MEETING TIME AND PLACE: Tuesdays and Thursdays, 10:30-11:45, NR 105

INSTRUCTOR: **Dr. Layne Coppock.** Professor, Dept. of Environment and Society (EnvS). Office: NR 140. Office Phone: (435) 797-1262. Email: Layne.Coppock@usu.edu. Office Hours: By appointment.

GRADUATE TEACHING ASSISTANT (TA): **Ms. Gwendwr Meredith.** Email: gwendwr@aggiemail.usu.edu. Office hours: To be announced. Office: NR 229.

COURSE DESCRIPTION: This course introduces students to concepts and approaches that underlie or describe how people interact concerning natural resource management in the western United States. Major topics include: (1) Diagnosing and managing stakeholders; (2) how people’s attitudes towards natural resources are shaped; (3) the organizational cultures of different management agencies; (4) principles of teamwork and leadership in problem-solving; (5) how resource tenure systems affect stewardship; (6) constraints affecting the adoption and diffusion of technology and management innovations; and (7) collaborative learning for conflict management. Best practices for hosting public meetings and collecting information from people, as well as effective modes for public communication, outreach, education, and regulation, will also be addressed.

The general course format will be based on lectures, but in-class activities will be frequent. Activities will prominently include discussions in a break-out group format that highlight materials from readings and oral presentations. Guest speakers will bring real-world perspectives to the course as well.
KEY LEARNING OBJECTIVES:
The key learning objectives for this course include:

1. Learning fundamental principles, generalizations, and theories;
2. Developing professional skill sets, competencies, and points of view;
3. Learning to apply concepts and methods to improve thinking and problem solving; and
4. Gaining factual knowledge concerning terminology, methods, etc.

READINGS:
There are no books required for this course. Rather, a series of papers and reports are posted on Canvas and organized by specific class periods.

CANVAS:
Nearly all course-related information will be posted at our Canvas website. Each class period corresponds to a module in Canvas. If you have questions about Canvas, please see the instructor or the TA. Sometimes email will be used in addition to Canvas to communicate with students.

GRADING:
Total possible points will be about 580. Letter grades will be roughly based on the traditional point scale (A, A-, B+, B…etc.) but grades may be curved at the end of the course depending on student performance. The final curve may be down or it may be up. Grades are assigned based on how people’s cumulative point totals clump together at the end. Points will be approximately distributed as: (1) Pop quizzes, group discussions, attendance, and short homework assignments (about 200 points or 34% of the total); (2) two mid-term exams (about 220 points overall or 38% of the total); and (3) a cumulative final exam (about 160 points or 28% of the total).

Attendance and class participation are very important. Those who regularly attend class and actively contribute to discussions may be rewarded with a “significant bump” in their final letter grade. Those who regularly miss class may be penalized in their final grade. This is not an online course; regular failure to attend class is rude behavior. An indicator of poor attendance is missing
too many quizzes or discussion sessions, and this can bring on a further grade penalty. Attendance will be taken on a regular basis and points may be given to reward those in attendance and penalize those who are absent.

There may be opportunities to gain extra credit, but it depends on what situations occur during the semester. For example, if a notable speaker is giving a seminar on campus that relates to our course material, some extra-credit points to attend and report on that seminar could be offered—but this would be announced in advance.

How does a student position him or herself for a “good grade” in this course? (1) Keep up with the readings and study guides; (2) attend help sessions before the exams; and (3) attend class and participate! All exams, quizzes, and group discussions will all be held in this classroom. Other student-assessment details—including the style of exams—will be reviewed later.

Absences can only be excused in the case of illness, personal emergencies, or time conflicts arising from official university commitments. Written documentation will typically be required to justify excused absences. Students need to communicate with the instructor with respect to any planned absences, especially if they are extended or otherwise unusual.

Opportunities to make-up work or testing events that have been missed as a result of excused absences will be determined on a case-by-case basis. Missed work that results from unexcused absences cannot be made up.

DISABILITY RESOURCE CENTER (DRC): USU is required by law to help disabled students participate fully in all programs, activities, and services. If you have a disability, documented by the DRC, that requires note-takers, interpreters for the deaf, extended testing time, etc., let the instructor know as soon as possible. The DRC may also help provide course material in alternative formats like large print, Braille, and diskette. See the DRC web site http://www.usu.edu/drc/
COUNSELING: USU offers an excellent counseling center (TSC 306) on campus for individuals, groups, and couples. Services include consultations, crisis appointments, and therapy animals are on site. All services are confidential and most are free of charge. See the USU web site http://www.usu.edu/counseling/

STUDENT ETHICS: The Quinney College of Natural Resources follows the USU Student Code regarding academic integrity. Please see Article VI of the USU Student Code for details at http://www.usu.edu/studentconduct Students caught cheating on quizzes or exams or plagiarizing the work of others will receive an F for their efforts.

Students are expected to behave in a respectful manner towards their peers and instructors to encourage an open and positive learning experience for all. Cell phones, iPods, etc., need to be shut off when the class period gets underway. Use of laptops, iPads, etc., is only allowed if a student is taking notes from our lectures or researching information in the context of a class discussion.

Let’s Have a Great Semester!
WATS/BIOL 2220 - General Ecology

Spring 2020 • Tuesday & Thursday 10:30-11:45 am • Widtsoe 007

Instructor: Dr. Trisha Atwood
NR 134
Office hours: Mon & Wed 10-11 am or by appointment
1-435-797-5729
trisha.atwood@usu.edu

Graduate teaching assistant:
Marshall Wolf
Office hours: TBA

Website: CANVAS

Course Objectives
Ecology is the study of relationships between organisms and their environment. These relationships can be understood by investigating the factors that influence the abundance and distributions of organisms. Because these factors range in scale from characteristics of individuals to global processes, ecology is necessarily interdisciplinary. Throughout this course, you will learn the principles and application of ecological theory. You will also learn how the major ecological theories have developed and the evidence that supports them. This will provide you with an understanding of the scientific process and scientific analysis. By the end of this course, you should be able to describe basic ecological concepts and how they were developed, relate these concepts to observations in nature, and be able to interpret data in light of these concepts to draw conclusions about ecological processes.

<table>
<thead>
<tr>
<th>General Ecology Objectives</th>
<th>IDEA Student Rating of Instruction Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learn the principles and application of ecological theory</td>
<td>✓ Gaining factual knowledge (terminology, classifications, methods, trends) ✓ Learning fundamental principles, generalizations, or theories</td>
</tr>
<tr>
<td>Understand how the major ecological theories have developed and the evidence that supports them</td>
<td>✓ Gaining factual knowledge (terminology, classifications, methods, trends) ✓ Learning fundamental principles, generalizations, or theories</td>
</tr>
<tr>
<td>Understand the scientific process and scientific analysis</td>
<td>✓ Learning fundamental principles, generalizations, or theories ✓ Learn to apply course material (to improve thinking, problem solving, and decisions)</td>
</tr>
<tr>
<td>Be able to related basic ecological concepts to observations in nature</td>
<td>✓ Learning fundamental principles, generalizations, or theories ✓ Learn to apply course material (to improve thinking, problem solving, and decisions)</td>
</tr>
<tr>
<td>Be able to interpret data in light</td>
<td>✓ Learning fundamental principles, generalizations, or theories</td>
</tr>
</tbody>
</table>
of ecological theory and draw
conclusions about ecological
processes | theories
| ✓ Learn to apply course material (to improve thinking,
problem solving, and decisions)

Materials

Reading
Although the text book for this class, *Ecology in Action* by Fred Singer, is not mandatory I
HIGHLY RECOMMEND that you purchase it and read the chapters as we go along. This is a
great book filled with great real life stories about ecologists and ecology, and the stories
will help drive home difficult concepts and provide addition examples of things I present in
lectures.

*i>clickers*
I will make extensive use of in-class assessment activities. You can use an i>clicker ($45 at
USU bookstore) or your own laptop or smartphone with a subscription (price depends on
length of subscription). **Register your device with your student ID by January 15.** There
is a link to i>clicker registration on CANVAS. If you are using a laptop or smartphone,
please register when you download the app (app.reef-education.com).

ASSESSMENT
You will have the opportunity to demonstrate and reinforce your understanding of
ecological principals with a variety of assessment activities throughout the semester.

Exams [240 points possible (60% of grade)]
There will be four exams. All four exams are worth 60 points each. Make-up exams will
only be given in the most extenuating of unexpected circumstances, and will not likely be
the same format as the in-class exam.

In ecology, many concepts build upon others. Every exam is therefore comprehensive in
this sense. The primary focus of each exam, however, will be centered on material covered
since the last exam. **The final exam is cumulative.** It will focus on the last couple of
chapters not covered in other exams, as well as all other chapters presented earlier in the
year.

Exam questions are designed to measure your progress toward meeting the class
objectives and will reflect material presented in lectures, movies, and problem sets. Exams
will be multiple choice, short answer, true/false, and/or fill-in-the-blank. **You are
required to bring a calculator to every exam (needs to be capable of doing log and
natural log).** The use of notes, books, electronic mobile devices and all other materials are
prohibited during the exams.
**In-class problem sets [80 points possible (20% of grade)]**
There will be a total of four problem sets, worth 20 points each. One of the most important objectives of this class is that you learn to think like an ecologist. This means learning to design experiments to test hypotheses, interpret the results of those experiments, and synthesize these results with other ecological concepts. These problem sets can be done individually or in small groups (some of the exercises will require you to have a partner). You have the option of either turning in one assignment per person or one assignment per group. If you turn in a group assignment all names must be on the assignment when it is turned in, the addition of a group member after the assignment is turned in or graded will not be accepted!

Problem Set Due Dates:
- Problem Set 1: Life History Tables- Due Feb 6
- Problem Set 2: Mark Recapture- Due Feb 13
- Problem Set 3: Functional Responses- Due March 19
- Problem Set 4: Food webs- Due March 26

**Understanding the literature quizzes [40 points possible (10% of grade)]**
You will be given two, peer reviewed science papers for each unit (total 8 papers, worth 5 pts each). These papers will be uploaded on Canvas for you to download and read. These papers will cover some of the founding works in the field of ecology and many are authored by USU researchers. You will need to read these papers carefully and complete an online quiz for each paper. The quizzes will be posted on Canvas and must be completed using Canvas. Quizzes must be completed by 10:30 am (beginning of class) on the due date or sooner to receive credit.

Reading Quizzes Due Dates:
- Unit 1: January 28
- Unit 2: February 20
- Unit 3: March 31
- Unit 4: April 16

**Movie Quizzes [20 pts possible (5% of grade)]**
Occasionally we will watch a movie in class to help drive home important concepts. While watching the movie you will be given a quiz to complete and turn in before the end of class. Movies and movie quizzes cannot be made-up. Material covered in the movies is fair game for the exams.

**Participation [20 pts possible (5% of grade)]**
*In-class clicker questions and surveys* [up to 20 points possible, this is worth 1 test grade!]
I will make extensive use of in-class activities to assess and reinforce your understanding of the readings and lecture material. This will give you the opportunity to reflect on what you have read before class, the notes you have taken in class, and to discuss these concepts with your peers. Most of these activities will be graded based on participation alone, but some may be graded for content. There will be no make-ups for i-clicker points. You must be present in lecture to earn these points.
Extra credit (max of 5% of grade)
Occasionally I may offer extra credit for attending scientific seminars or for completing online surveys for the University (e.g., IDEAS survey or Freshmen survey). These opportunities will be announced in class.

Final grades
Your final grade will be determined based on the percent of total possible points earned out of the total points possible (400 total) throughout the semester. This percentage will translate to a letter grade based on the scale below. This is the guaranteed scale, but I may adjust this scale in your favor.

<table>
<thead>
<tr>
<th>Percent</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93-100</td>
<td>A</td>
</tr>
<tr>
<td>90-92</td>
<td>A-</td>
</tr>
<tr>
<td>87-89</td>
<td>B+</td>
</tr>
<tr>
<td>83-86</td>
<td>B</td>
</tr>
<tr>
<td>80-82</td>
<td>B-</td>
</tr>
<tr>
<td>77-79</td>
<td>C+</td>
</tr>
<tr>
<td>73-76</td>
<td>C</td>
</tr>
<tr>
<td>70-72</td>
<td>C-</td>
</tr>
<tr>
<td>67-69</td>
<td>D+</td>
</tr>
<tr>
<td>63-66</td>
<td>D</td>
</tr>
<tr>
<td>60-62</td>
<td>D-</td>
</tr>
<tr>
<td>less than 60</td>
<td>F</td>
</tr>
</tbody>
</table>

Classroom Conduct

Attendance
You are adults and responsible for establishing your own priorities. I do not take attendance in lecture, but it is in your very best interest to come to class on a regular basis. The material presented in lecture will expand upon that covered in the reading or which can be garnered from lecture notes. In addition, extra credit is based on in-class activities, which cannot be made up.

Mobile electronic devices
The use of mobile electronic devices is very distracting to those around you. I would prefer if you did not use these in class at all. If you prefer to take notes on your laptop, please mute the sound and sit on the west side of the lecture hall so that those who wish to remove themselves from this distraction can sit on the east side of the lecture hall.

ADA Compliance
Students with Americans with Disabilities Act (ADA)-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435)797-2444. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print, digital, or audio) are available with advance notice.
Academic Integrity
Cheating, falsification of information and plagiarism constitute academic dishonesty and will not be tolerated. It is your responsibility to review and adhere to USU's Academic Integrity Standard [http://www.usu.edu/studentservices/studentcode/article6.cfm](http://www.usu.edu/studentservices/studentcode/article6.cfm). Any student found in violation of this standard will be reported to the Vice President of Student Services and will not receive credit for assignments on which infractions occur.

The instructor, Trisha Atwood reserves the right to alter this syllabus at any time. Schedule

**Important Note:** This schedule is subject to change. Check CANVAS regularly for updates.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, activities, and deadlines</th>
<th>Assigned reading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1 – Physiological Ecology and Ecology of Individuals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Jan 7</td>
<td>Introduction – What is Ecology/Physical Environment</td>
<td>Ch. 1 &amp; Ch. 2</td>
</tr>
<tr>
<td></td>
<td>Jan 9</td>
<td>The Physical Environment</td>
<td>Ch. 2</td>
</tr>
<tr>
<td>2</td>
<td>Jan 14</td>
<td>[You should have your &gt;Clicker registered] Evolution and Adaptation/Acquiring nutrients and energy</td>
<td>Ch. 3 &amp; Ch. 4</td>
</tr>
<tr>
<td></td>
<td>Jan 16</td>
<td>Acquiring nutrients and energy/ Temperature and Water Relations</td>
<td>Ch. 3 &amp; Ch. 5</td>
</tr>
<tr>
<td>3</td>
<td>Jan 21</td>
<td>Complete temperature relations</td>
<td>Ch. 4</td>
</tr>
<tr>
<td></td>
<td>Jan 23</td>
<td>Graphing and test review</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>4</td>
<td>Jan 28</td>
<td>Exam 1 Reading quizzes for Unit 1 due</td>
<td>Ch. 1-5</td>
</tr>
<tr>
<td></td>
<td>Jan 30</td>
<td>Life History and Evolution Problem set 1 handout: Life History Table</td>
<td>Ch. 8</td>
</tr>
<tr>
<td><strong>Unit 2 – Populations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Feb 4</td>
<td>Movie Quiz: Rise of Animals: Triumph of the Vertebrates</td>
<td>Movie (Ch. 11 life tables)</td>
</tr>
<tr>
<td></td>
<td>Feb 6</td>
<td>Problem set 2 handout: Mark recapture lab Problem set 1 due</td>
<td>Other</td>
</tr>
<tr>
<td>6</td>
<td>Feb 11</td>
<td>Distribution and Dispersal</td>
<td>Ch. 9</td>
</tr>
<tr>
<td></td>
<td>Feb 13</td>
<td>Population abundance and growth Problem set 2 due</td>
<td>Ch. 10, 11</td>
</tr>
<tr>
<td>7</td>
<td>Feb 18</td>
<td>Test review</td>
<td>Ch. 8, 9, 10, 11</td>
</tr>
<tr>
<td></td>
<td>Feb 20</td>
<td>Exam 2 Reading quizzes for Unit 2 due</td>
<td>Ch. 8, 9, 10, 11</td>
</tr>
<tr>
<td><strong>Unit 3 – Community Ecology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Feb 25</td>
<td>Competition</td>
<td>Ch. 13</td>
</tr>
<tr>
<td></td>
<td>Feb 27</td>
<td>Movie quiz: Animal interactions</td>
<td>Other</td>
</tr>
<tr>
<td>9</td>
<td>March 3</td>
<td>SPRING BREAK-NO CLASS!</td>
<td></td>
</tr>
<tr>
<td></td>
<td>March 5</td>
<td>SPRING BREAK-NO CLASS!</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>March 10</td>
<td>Predation</td>
<td>Ch. 14</td>
</tr>
<tr>
<td></td>
<td>March 12</td>
<td>Problem set 3 handout: Functional Response lab</td>
<td>Other</td>
</tr>
<tr>
<td>11</td>
<td>March 17</td>
<td>Complex interactions &amp; Food webs</td>
<td>CH. 16</td>
</tr>
<tr>
<td></td>
<td>March 19</td>
<td>Problem set 4 handout: Food web lab Problem set 3 due</td>
<td>Other</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
<td>Chapter(s)</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>March 24</td>
<td>Biological Diversity and Stability</td>
<td>Ch. 17</td>
<td></td>
</tr>
<tr>
<td>March 26</td>
<td>Test review</td>
<td>Ch. 13-17</td>
<td></td>
</tr>
<tr>
<td>March 31</td>
<td>Exam 3</td>
<td>Ch. 13-17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reading quizzes for Unit 3 due</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unit 4 – Ecosystems, Landscapes and Global Change**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Chapter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2</td>
<td>Chasing ice</td>
<td>other</td>
</tr>
<tr>
<td>April 7</td>
<td>Ecosystem structure and energy flow</td>
<td>Ch. 19</td>
</tr>
<tr>
<td>April 9</td>
<td>Nutrient cycles</td>
<td>Ch. 20</td>
</tr>
<tr>
<td>April 14</td>
<td>Global change</td>
<td>other</td>
</tr>
<tr>
<td>April 16</td>
<td>Reading quizzes for Unit 4 due</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Catch up day or Study day</td>
<td></td>
</tr>
<tr>
<td>April 21</td>
<td>Test review</td>
<td></td>
</tr>
<tr>
<td>April 23</td>
<td>No class-Interim day</td>
<td></td>
</tr>
<tr>
<td>April 30</td>
<td>Final Exam (cumulative): 9:30-11:20 am</td>
<td>All chapters</td>
</tr>
</tbody>
</table>
WATS 3700: Fundamentals of Watershed Science
(Spring 2019)

Instructor: Dr. Soren Brothers
Office: BNR 269
Email: soren.brothers@usu.edu
Office hours: Wednesday, 2 – 4 PM or by appointment

Teaching Assistant: Lindsay Capito
Office: JQL 222
Email: marleymom24@gmail.com
Office hours: By appointment

Lectures: Monday, Wednesday, Friday 11:30 AM – 12:20 PM
VSB 130

Course Objectives:
In order to understand the nature of our lakes, rivers, and reservoirs, we must first examine the watersheds which have created them. Watershed science encompasses an exciting, dynamic interaction between landscape geology, physics, chemistry, and biology. Understanding how these forces interact is an important first step towards managing our aquatic resources.

This course will introduce students to the fundamental components that comprise a watershed. We will examine the interplay between these components, with a particular focus on linking aquatic ecology to watershed characteristics. Finally, we will briefly examine the socio-political dimensions which come to play in this field, as watershed boundaries rarely align with political ones, potentially leading to conflict.

As good writing skills are essential to the success of an academic, this course is also designed to be a communications-intensive course. This means that a substantial portion of each student’s time will be spent on writing assignments, and a close collaboration with writing fellows and Science Writing Center tutors will be established to improve academic writing skills through practice.

Primary Learning Outcomes:
- Identify the broad landscape features which comprise the backbone of a watershed.
- Understand the relationships between climate and watershed processes.
- Classify various predominant lake-types around the world, and link these back to watershed-level concepts.
- Identify anthropogenic changes to watersheds, and how these have influenced rivers and lakes within the watershed.
- Understand the relationships between aquatic ecology and watershed processes
- Effectively communicate your understanding using clear, concise writing, with correct grammar and appropriate use of citations.
Assignments and Grading:
#1- Homework Assignments 15%
#2- Communication Assignments 30%
#3- Midterm Exam 15%
#3- Video Project 20%
#4- Final Exam 20%

Homework Assignments:
Throughout the semester a number of assignments (formative and summative assessments) will be assigned to familiarize you with some of the basic principles and methods used in watershed science. “Questions for Thought” (QFT) homework will be assigned for units focusing on aquatic ecology. For each QFT assignment, two questions must be chosen by the student (from the list provided at the end of each Dodds textbook chapter), and 2 to 4 sentences must be written and submitted as answers to each of the chosen questions. Many of these assignments will undergo peer review grading, and online submissions (via canvas) will be automatically and anonymously assigned to peers. Part of your assignment grade will relate to the quality of your peer review. Unless exercises are designated as group projects, students must submit their individual effort.

Communication Assignments:
As this is a communication intensive course, a major component of the final grade will come from the communication assignments. You will be asked to submit one short writing assignment (1-2 pages, double spaced), one medium-length (3-4 page, double spaced) writing assignment, and a policy brief. The short writing assignment (5% of total grade) will be a practice in writing an executive summary of a peer-reviewed journal article for a specific audience (academic/specialist, family members, etc.), and will be graded to focus heavily on grammar and appropriate writing style. The medium-length writing assignment (10% of total grade) will have students summarize and discuss two contradictory scholarly articles on a specific relevant topic, and will be graded more rigorously on content as well as a greater focus on appropriate citations and grammar. For the policy brief (15% of total grade), students will be required to identify a watershed which is being faced with an issue (dam construction, invasive species, eutrophication, etc.), and write up a 2-3 page, highly accessible/readable report, addressed to a responsible government management agency, summarizing the main problems and identifying a solution.

Midterm and Final Exams:
Thirty-five percent of the course grade will rest on the midterm (15%) and final (20%) exams. These exams will be designed to test your knowledge and understanding of the reading materials provided to date. If you are an ESL student, please contact me to make arrangements for use of foreign language dictionaries and translators. You must have prior permission to use such a device.

Video Project:
Students will be assigned to groups of four, and will create an original 10-15 minute video. There will be some flexibility in the video topic and style; possible options could
be a debate-show format, investigative report, or online science education video. Although there is flexibility in format and topic, each student of the group will be required to present/speak at least 3-4 minutes within the video, and all group members will receive the same grade for each video. You will be expected to follow a set of guidelines regarding content and format that will be provided to you. The goal of this assignment is to combine the various aspects of the course into a cohesive case study examining one particular watershed of the student’s choice. The educational video should introduce the public to the important characteristics of the given watershed (whether geological and/or ecological), the impacts that human populations have had (or may in the future have) upon it, and recommendations for future management.

**Writing Fellows Program:**

To help students improve their writing skills, this class will participate in the Writing Fellows (WF) Program. For the first two (short and medium) written communication assignments, you will submit a good *first draft* that will be evaluated by the WF, *two weeks* prior to the assignment due date (as per deadlines indicated on the schedule below, and as a printed-out hard copy unless organized otherwise with the WF). You will then meet in a conference with the WF to discuss possible improvements of your paper and suggestions for revision; you will submit the *original* draft (hard copy with WF’s comments) and the *final* version (online via Canvas) of your paper to the instructor for grading. Final papers will not be accepted without the first draft and WF comments. There are thus two due dates for each paper: first draft to the WF and first draft + final version to the instructor. Please note time and place of your conference and honor your appointment. Students that fail to show up for their appointments with the WF will be marked down. Both first and final drafts must be submitted at the beginning of class on the specified date.

The four Writing Fellows for our class are:

*Frank De Jong*
Franklindejong3@gmail.com
(760) 855-4350

**Heather Reid**
heather.k.reid@gmail.com
(801) 232-5113

**Christyna Gardner**
christynagardner@yahoo.com
(276) 521-3297

**Vanessa Snow**
vansnow98@gmail.com
(435) 630-9871

*Science Writing Center:*
In addition to the Writing Fellows (WF) Program, all class members will be required to meet for at least one one-on-one 30-minute session with a Science Writing Center tutor (https://writing.usu.edu/programs/sci-writing). These tutors will be able to assist students in polishing up assignments or reports prior to being handed in, or can offer additional advice on a returned writing assignment. For communication assignments (short or medium) which have received a grade below 60%, an additional 5% credit may be earned by discussing the writing assignment with the tutor.

Required Materials:
This course will incorporate readings from the primary literature, an open, online course (Water: Science and Society) developed by a previous instructor of this course in collaboration with faculty from Penn State (accessed online at https://www.e-education.psu.edu/earth111/), and one book: Freshwater Ecology, a general textbook introducing students to the science of inland waters (e-book link: https://libcat.lib.usu.edu/record=b3494608-S2). This textbook is additionally available through the Merrill-Cazier Library.


I will also be using Canvas to share assignments, readings, student grades, and any additional announcements. For the required video assignment, groups will be organized to ensure that at least one group member has access to a device for recording video and audio. For students or groups without access to video-editing software, free online software, such as Lightworks (https://www.lwks.com/) is available for the preparation of their videos.

Canvas:

We will use Canvas regularly for sharing announcements, accessing readings, accessing and submitting assignments, and checking your grades. The messaging system in Canvas is inflexible and clunky, so do not use it to contact me. Email either the instructor or teaching assistant directly if you have questions or concerns.

Course Policies:

- Cell phones must be silent or turned off during class.
- All assignments are due at the beginning of class on the given due date.
- Arrangements for make-up exam will only be made as an emergency measure for justifiable reasons. A doctor’s note is required to reschedule a missed midterm exam.
- Late homework assignments receive an automatic grade of zero. Late reports will have a grading penalty of 10% per day late for up to four days.

Departmental and University Policies:

*Academic Freedom:*
Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility.

**Students with Disabilities:**
Accommodations are collaborative efforts between students, faculty and the Disability Resource Center (DRC). Students with accommodations approved through DRC are responsible for contacting me prior to or during the first week of the semester to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DRC should contact DRC immediately at 797-2444.

**Academic Dishonesty:**
All assignments and exams are to be completed individually, unless otherwise stated by the instructor. This course follows the University rules on civility and honesty. These can be found at http://www.usu.edu/policies/PDF/Acad-Integrity.pdf. The penalty for cheating, falsification, or plagiarism in this class will be assessed on a case-by-case basis, but by default will be a zero grade for the assignment/exam. In addition, the offense will be reported to the Office of Student Conduct for inclusion in the student’s permanent record. A useful guide for understanding and avoiding plagiarism, and required reading for all students prior to the commencement of this course, is available online here (http://ocw.usu.edu/English/introduction-to-writing-academic-prose/plagiarism.html). All online submissions to Canvas will be automatically screened for plagiarism by Turnitin (comparing writing samples to all other student papers, the internet database, and journals, periodicals, and publications). Students will not be notified of identified plagiarism in a writing sample until the assignment has been marked.

**Important Dates:**

**Friday, January 25th:** Short writing assignment due (beginning of class)
**Friday, February 22nd:** Medium-length writing assignment due (beginning of class)
**Friday, March 1st:** Midterm exam
**Tuesday, March 26th:** USU Spring Runoff Conference
**Monday, April 1st:** Video assignment due (by beginning of class)
**Friday, April 12th:** Policy brief due
**Monday, April 29th:** Final Exam

WSS: Water, Science and Society online course modules: https://www.e-education.psu.edu/earth111/
FE: Freshwater Ecology
FA: Formative Assessment
SA: Summative Assessment
QFT: Questions for Thought
WA: Writing Assignment
<table>
<thead>
<tr>
<th>Month</th>
<th>Dates</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>7, 9, 11</td>
<td>Introduction to watersheds and the global distribution of water</td>
<td>WSS Module 1</td>
<td>Wed: WSS M1: FA 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fri: WA#1 (WF)</td>
</tr>
<tr>
<td></td>
<td>14, 16, 18</td>
<td>Tying it together: geology and climate</td>
<td>WSS Module 2</td>
<td>Fri: WSS M2: SA</td>
</tr>
<tr>
<td></td>
<td>23, 25</td>
<td>Climate effects on watersheds</td>
<td>WSS Module 4,</td>
<td>Wed: WSS M4: FA 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fri: WA#1 due</td>
</tr>
<tr>
<td></td>
<td>28, 30, 1</td>
<td>Water on the move: rivers</td>
<td>FE Ch 6, WSS Module 3</td>
<td>Wed: FE: QFT Ch 6</td>
</tr>
<tr>
<td></td>
<td>4, 6, 8</td>
<td>Lakes: types and distribution</td>
<td>FE Ch 7</td>
<td>Wed: FE: QFT Ch 7</td>
</tr>
<tr>
<td></td>
<td>11, 13, 15</td>
<td>Impoundments: When a river becomes a lake</td>
<td>WSS Module 5</td>
<td>Wed: WSS M5: SA (dam debate)</td>
</tr>
<tr>
<td></td>
<td>20, 22</td>
<td>Wetlands and groundwater</td>
<td>WSS Module 6, FE Ch 4, 5</td>
<td>Wed: FE: QFT Ch 5</td>
</tr>
<tr>
<td></td>
<td>25, 27, 1</td>
<td>Midterm review and exam #1</td>
<td></td>
<td>Fri: WSS M6.2: SA</td>
</tr>
<tr>
<td>March</td>
<td></td>
<td></td>
<td></td>
<td>WA#2 due</td>
</tr>
<tr>
<td></td>
<td>4, 6, 8</td>
<td>The good, the bad, and the algae</td>
<td>FE Ch 18</td>
<td>Wed: FE: QFT Ch 18</td>
</tr>
<tr>
<td></td>
<td>11, 13, 15</td>
<td>SPRING BREAK</td>
<td></td>
<td>Fri: News stories (algal blooms)</td>
</tr>
<tr>
<td></td>
<td>18, 20, 22</td>
<td>Ecology of inland waters: Zooplankton to Fish</td>
<td>FE Ch 21, 24</td>
<td>Wed: FE: QFT Ch 21</td>
</tr>
<tr>
<td></td>
<td>25, 27, 29</td>
<td>Watershed biogeochemistry: Linking terrestrial and aquatic biomes.</td>
<td>FE Ch 13</td>
<td>Wed: FE: QFT Ch 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td></td>
<td>Water quality</td>
<td>WSS Module 7</td>
<td>Mon: VA due Fri:</td>
</tr>
<tr>
<td>---------</td>
<td>-----</td>
<td>--------------------------------</td>
<td>----------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td></td>
<td>1, 3, 5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 8, 10, 12 |     | Watershed management and restoration | WSS Module 10 | Wed: WSS M7: FA2
Fri: Policy Brief due |
| 15, 17, 19 |     | Watersheds in society and policy | WSS Module 8.2, Module 9 | Fri: WSS M1: SA (Water journal) |
| 22      |     | Final exam + review            |                            | Study!                    |
WILD 1800 Introduction to Geographic Information systems 3 cr.

WILD/GEOG 1800

Introduction to Geographic Information Science

Spring Semester, 2019
Lecture: MW 8:30am-9:20am (NR105)
Labs: T 2:00pm-4:00pm; WF 1:30pm-3:20pm (LSB225A)

Instructors:
Dr. R. Douglas Ramsey
Email: doug.ramsey@usu.edu
Office: 355a Natural Resources
Office Phone: 797-3783
Office Hrs: 9:30-11am MWF, or by Appt.

Shannon Belmont
Email: shannonw.belmont@gmail.com
Office: 138 Natural Resources
Office Phone: Use Email
Office Hrs: By Appointment

Undergraduate Teaching Assistant: Dylan Anderson

COURSE DESCRIPTION
Geographic Information Systems (or GIS) refers to the technology used to capture, manage, analyze, and display geographically referenced information. Geographically referenced information is simply information about where something is and what is there. GIS technology is increasingly used in a wide range of fields. Some examples include environmental modeling, facilities management, social and demographic change analyses, urban planning, homeland security, economic development, site suitability analyses, marketing, transport routing, and web design.

Geographic Information Science (or GIScience) is the science behind the technology. GIScience studies the underlying theory and building blocks of GIS. GIScientists work to improve knowledge about GIS, its applications, and to address fundamental questions that GIS raises for society.

This course will introduce the fundamental concepts of geographic information systems and science, including geographic data, mapping, geospatial analysis, and geospatial technologies. The course involves both lectures and hands-on lab activities using ESRI ArcGIS, the most widely used commercial GIS software package.

While students will gain a working knowledge of ArcGIS, the focus of the course is on analytical concepts that are fundamental in any GIS environment. After the successful completion of the course, students should:

1. Understand basic concepts and terminology of geographic data, spatial analysis, geospatial technologies, and cartography
2. Develop skills in the operation of GIS software
3. Be able to formulate a research question and implement analytical steps to answer the question using GIS
4. Know how to find and use resources, including sources of geospatial data, to answer questions and solve problems
PREREQUISITES AND EXPECTATIONS
There are no prerequisites for this course, but you should be familiar with the Windows operating system and be able to perform basic tasks such as copying files and folders, editing documents, navigating websites, and using search engines and online mapping tools (such as Google Maps).

As with any university-level course, an understanding of basic mathematics and statistics is required. You will be expected to write professionally with proper spelling and grammar. All secondary sources must be properly cited and referenced.

COURSE MATERIALS:

USB DRIVE OR EXTERNAL DISK:
A USB drive or external hard disk is required. The lab computers do not save your personal profile or assignments. Once you log out, your profile and data are deleted from the server. **It is important that you keep all of your work on a USB dongle or external hard disk.** Alternatives to an external drive include cloud-based options such as Box or Drop Box, etc. It is **critical** that you back up your data often. Nothing is more painful (or educational) than having all of your data eaten by the digital dog right before you turn it in. It will happen!

CANVAS:
We will use Canvas ([usu.instructure.com](http://usu.instructure.com)) for announcements, submitting assignments, online discussions, and grade reporting. It is your responsibility to use the Canvas system. Questions about Canvas can be directed to the USU IT service desk ([it.usu.edu](http://it.usu.edu), servicedesk@usu.edu, 435-797-4357).

EMAIL:
The best way to contact Doug or Shannon is via e-mail. We will try to respond to e-mails on the same day and within no more than two working days (we hope). Shannon is very good at monitoring her Canvas email. Doug, not so much. Please use my actual email address ([doug.ramsay@usu.edu](mailto:doug.ramsay@usu.edu)) whenever possible.

SOFTWARE
We will use the latest version of ArcGIS, which is available on all computers in the LSB lab as well as on the third floor of the Quinney Library. Student licenses are also available to install on personal computers through the USU site license web site. Contact Shannon Belmont for an authorization code.

COURSE STRUCTURE:
The class is a standard Lecture/Lab class with lectures twice a week (MW) starting on the third week and one lab (3 sections). Friday lectures beginning on the third week will be used to assist students to complete assignments and to answer questions. Doug will be available in his office during this time. The lectures will focus on theory, application, and case studies. Participation during lectures is essential to your learning in this course. Learning is about asking questions......... SO ASK!!!

READINGS
Readings will be assigned for most lectures. It is your responsibility to complete the readings listed on the course schedule before coming to class. *(Notice that I have a reading assignment for the first day of class..... See, you’re already behind)*
There will be four quizzes (~1 per month) delivered through Canvas. Quizzes may cover material from previous lectures, labs, and reading assignments and may also cover materials yet to be presented in class. Quizzes will be open-book, notes, web, etc., but you are expected to do your own work. Do not provide answers to your classmates - Let them suffer.

EXAMS
There will be two exams: Both exams will be delivered through Canvas. A mid-term exam will be available between Monday, Feb. 27th and Wednesday, March 3rd. The Final Exam will be available through Canvas during the finals week starting on May 1st, at 7:30am and will terminate on May 5th at 9:20am (the end of our scheduled final exam time). Exams will cover material from lectures, readings, and labs. The same book, notes, web usage rules used for the quizzes apply to the exams. The final will not be comprehensive.

GRADING SCALE

<table>
<thead>
<tr>
<th>Grade</th>
<th>A</th>
<th>A−</th>
<th>B+</th>
<th>B</th>
<th>B−</th>
<th>C+</th>
<th>C</th>
<th>C−</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>93-100</td>
<td>90-92</td>
<td>87-89</td>
<td>83-86</td>
<td>80-82</td>
<td>77-79</td>
<td>73-76</td>
<td>70-72</td>
<td>60-69</td>
<td>&lt; 60</td>
</tr>
</tbody>
</table>

RUBRIC
Students will be responsible for the following work:

<table>
<thead>
<tr>
<th>Percent of grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab assignments (12 total)</td>
</tr>
<tr>
<td>Participation</td>
</tr>
<tr>
<td>Quizzes</td>
</tr>
<tr>
<td>Mid-term exam</td>
</tr>
<tr>
<td>Final exam</td>
</tr>
<tr>
<td>Total:</td>
</tr>
</tbody>
</table>

LABS
The lab is intended to provide hands-on experience working with GIS software. This is the fun part of the class. Not nearly as boring as the lectures.

Shannon is responsible for the labs. She has organized an excellent set of exercises and a few introductory videos. Doug will assist and help with questions during lab times. Labs will start with a brief introduction, including an overview of the learning objectives, materials, and expected deliverables.

Students will have the remainder of the lab to work individually or in groups. For most labs, students will be required to work outside of lab period to complete the assignment. If you are working in a group, and we encourage you to do so, please do not turn in a copy of your partners work (or visa versa). Make your work personal to you. It’s hard to figure out if you are working with someone or just copying their work (that’s bad, BTW).

LAB ATTENDANCE
The lab portion of this course is critical. You cannot learn GIS by only attending the lecture (and not just because the lectures can be boring). However, lab attendance is not mandatory. If you feel that you can complete lab assignments without coming to lab, then that’s fine. You are, however, encouraged to attend lab. You may attend a different lab section on occasion when your schedule for any given week keeps you from attending your designated lab time or if you need some extra help completing an assignment. Be aware, however, that our labs are full and continually attending a different lab from the one that you registered for will make the labs
crowded (and the other students will glare at you.) Also, if you want to install the software onto your laptop, then you should bring your laptop to lab so that you can work more efficiently. This will also reduce the competition for the lab workstations (and other students will be in awe that you can do this on your laptop).

LAB ASSIGNMENTS
There are 12 lab assignments. Lab assignments have been written with the intent of exposing you to the fundamental tools of ArcGIS, teaching you to think and solve problems spatially, and to be resourceful when troubleshooting problems.

Assignment types will vary depending on the week and subject matter being covered; however, assignments will generally require some independent research and additional time in the lab. Lab assignments and deliverables are to be written in your own words.

Lab assignments will be available through Canvas. Due dates depend on your individual lab section. As a general rule, each assignment will be due the following week before the start of lab. The lab schedule is aggressive and unrelenting (Shannon is the hard-nose here, so don’t blame Doug). Lab exercises will not always be finished within the lab period. Late assignments will be penalized according to the late work policy for the course (below). However, it is better to turn labs in late rather than not turn them in at all. If you are having issues meeting deadlines, please talk to us.

Each lab exercise builds on knowledge and skills acquired in previous assignments. Assignments get progressively more complex and instructions become less detailed throughout the semester. You cannot afford to get behind.

Students will generally submit lab exercises in digital form through Canvas (unless specified). Individual feedback will be provided through Canvas; student submissions will be marked up and individual comments provided on the grading rubric associated with each exercise. The feedback provided is designed in part to help the student improve their cartography and presentation style, which is a critical component of effectively presenting GIS results.

Lab assignments will be graded not only on providing the “correct” answers (those are important), but also on your ability to clearly and professionally express information through text and graphics.

LAB GRADING
Grading rubrics for each lab can be found under the individual assignment page on Canvas. Specific grading criteria are listed with the associated points each criterion is worth. If you merely do what is asked of you on each assignment, you will meet expectations and can expect to get a B. To get an A, your submissions will need to be exceptional. More information and details about grading will be available in lab.

LAB HARDWARE AND SOFTWARE
A personal computer is not required for this course. Aside from the LSB lab, the Quinney computer labs are available for student use (hours available at: http://qcnr.usu.edu/quinney/computerlab_hours). Computers with ArcGIS are also available for USU students at the open-access computer lab in the College of Engineering (http://bit.ly/1Z1QJDJ).

ArcGIS is available through the campus site license web site for students wishing to use their own computer; system requirements can be found at: http://arcg.is/1wRy0RD. Note that ArcGIS
is only compatible with the Windows operating system. If you have a Mac, you will need to
install Boot Camp or a virtual Windows machine such as Parallels or VMware. Contact Shannon
Belmont for an authorization code to download of the ArcDesktop software.

CLASS POLICIES

ATTENDANCE AND PARTICIPATION:
Attending each lecture and lab session is necessary to achieve a satisfactory grade in this course.
If you miss class, do not e-mail the instructors to ask what you missed. It is your responsibility to
obtain materials or notes from other students and Canvas.

LATE WORK AND MAKE-UP EXAMS
It is your responsibility to turn in all work on time. Grades for assignments will be reduced by 10
percent for each day late. No late work will be accepted more than 2 weeks after the due date.
No make-up exams or quizzes will be offered unless prearranged with the instructor or as a result
of a documented emergency.

USE OF COMPUTERS, TABLETS, AND MOBILE PHONES
Turn off or silence phones during class. Computers and tablets may be used only for taking notes
or activities directly relevant to lecture material during class (i.e. no Facebook, Twitter, Netflix,
etc.). Students should respect the rights of others to learn and minimize the possibility of
distraction from the use of electronic devices. If the use of electronics presents a distraction to
others during class, the student will be asked to stop using the device. If issues persist, the
student will be asked to leave the class.

ACADEMIC HONESTY
Students are expected to produce original work. Plagiarism or falsification of any kind will be
subject to disciplinary action. Offences will be referred to Utah State University Admissions
office. The USU policy for academic honesty can be found at: http://bit.ly/22Hmm9M under the
“Student Conduct” tab. Please review this document to understand the Utah State University
policy on academic honesty. If you have questions or concerns about the policy, please contact
your instructor or academic advisor.

PLAGIARISM
Plagiarism includes knowingly “representing, by paraphrase or direct quotation, the published or
unpublished work of another person as one’s own in any academic exercise or activity without
full and clear acknowledgment. It also includes the unacknowledged used of materials prepared
by another person or agency engaged in the selling of term papers or other academic materials.”
The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment,
probation, suspension, expulsion, withholding of transcripts, and denial or revocation of degrees.

STUDENTS WITH DISABILITIES
Reasonable accommodation will be provided for all persons with disabilities in order to ensure
equal participation within the program. If a student has a disability that will require some
accommodation by the instructor, the student must contact the Disability Resource Center (435-
797-2444), preferably during the first week of the course. Any request for special consideration
relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and
approved by the instructor.
Lecture Outline:
This is a general outline. Dates may change depending on our collective progress through the materials. The readings include hyperlinks to materials on the web.

<table>
<thead>
<tr>
<th>Date</th>
<th>Lectures</th>
<th>Readings</th>
<th>Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07,09,11</td>
<td>How do you spell &quot;GIS&quot;??? (Introduction)</td>
<td>• Wikipedia - Introduction and History of Development</td>
<td>Intro to ArcGIS</td>
</tr>
<tr>
<td>14,16,18,</td>
<td>The nature of spatial data, data formats, and relational databases</td>
<td>• Raster Data</td>
<td>Spatial Data Types</td>
</tr>
<tr>
<td>21, 23</td>
<td></td>
<td>• Vector Data</td>
<td>Coordinate Systems</td>
</tr>
<tr>
<td>25,28,30</td>
<td>Map projections and coordinate systems</td>
<td>• Relational Databases</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Projections</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>February</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04,06</td>
<td>Data collection and input</td>
<td>• Data Input</td>
<td>Creating Data</td>
</tr>
<tr>
<td>11,13</td>
<td>Data Management – Geodatabases, Data quality</td>
<td>• Geodatabase</td>
<td>Vector Analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• GeoDB Architecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• GeoDB Tour</td>
<td></td>
</tr>
<tr>
<td>18,20</td>
<td>Cartography</td>
<td></td>
<td>Free Style GIS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25,27</td>
<td>Midterm Exam Joining and relating data, Spatial queries, Geoprocessing of vector and raster data</td>
<td>• Joining and Relating Tables</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04,06</td>
<td>Spatial analysis</td>
<td>• Geoprocessing</td>
<td>Raster Surfaces - Craters on Mars</td>
</tr>
<tr>
<td>11,13</td>
<td>Spring Break</td>
<td></td>
<td>Spring Break</td>
</tr>
<tr>
<td>89,20</td>
<td>Remote sensing &amp; terrain analysis</td>
<td></td>
<td>Combining Raster &amp; Vector Analysis</td>
</tr>
<tr>
<td>25,27</td>
<td>Spatial statistics</td>
<td>• Spatial Statistics</td>
<td>GPS data collection</td>
</tr>
<tr>
<td>April</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01,03</td>
<td>Spatial statistics (cont’d) and GIS programming</td>
<td>• Model Builder</td>
<td>Fix This Map! (Cartography challenge)</td>
</tr>
<tr>
<td>08,10</td>
<td>Advanced geovisualization</td>
<td>• Python</td>
<td></td>
</tr>
<tr>
<td>15,17</td>
<td>GIS &amp; society, GIS management and policy</td>
<td>• Geovisualization</td>
<td>Final Project</td>
</tr>
<tr>
<td>22</td>
<td>The future of geographic information science</td>
<td></td>
<td>Final Project due</td>
</tr>
<tr>
<td>May</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-01</td>
<td>Finals Week</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Tuesday is Monday, Red = holiday
**WILD 2000 – Fall 2019**

Instructor: Dr. Eric LaMalfa  
Office: BNR 163  
Phone: NA  
Email: [Canvas inbox](#)

**Office hrs. Monday 1:00 – 3:00 PM (BNR 163)**

**Course Fee**

You paid an $11.50 fee for this course that covers a portion of the cost of field trip, transportation and supplies.

**Course Description**

The primary purpose of this course is to prepare you to make informed decisions about your major and career. While we will address many issues that relate to natural resources, THIS IS NOT A CONTENT COURSE. Rather it is an orientation / advising course.

Specifically, the course will: (1) involve you in the Quinney College of Natural Resources (QCNR) and Department of Wildland Resources (WILD); (2) introduce you to the disciplines/majors of the QCNR; (3) get you enthused about and committed to your major and profession; (4) introduce you to some local, regional, national, and global natural resource science/management issues; (5) introduce you to some practicing professionals and their jobs; and (6) assist you in networking with fellow students, QCNR faculty, and staff.
Required Textbooks and Resources

Text Book (Required): *A Sand County Almanac* by Aldo Leopold

Computer: Please bring a computer or tablet to all classes. Computers can be checked out from Student Services

IDEA Objectives

1. Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
2. Developing skill in expressing myself orally or in writing
3. Learning how to find and use resources for answering questions or solving problems

Course Objectives

In this course, you will:

1. Learn about majors and careers in Natural Resources.
2. Develop an understanding of major requirements, the importance of prerequisites and course sequences, and having a plan that will lead to graduation.
3. Meet, associate with, and learn from upper division students through participation in student organization activities.
4. Develop an understanding of the types of careers and work done by graduates of QCNR and develop an understanding of how your interests relate to issues dealt with by the QCNR.
5. Develop an understanding of the broader social context and purpose of work in natural resources.
6. Develop friendships that will make your college experience and career more enjoyable and productive.
7. Improve communication skills and writing ability.
8. Develop a resume.

Evaluation Methods and Criteria

There are 1000 possible points for this course. To meet the outcomes for this class, students are expected to take part in many different PROFESSIONAL activities. Some will be organized as part of the class, and others will be organized outside of the class. When known, seminars, field, and TWS Student Chapter activities will be announced by the instructor. However, students are encouraged to bring information about these activities and announce them in class.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meet with your Academic Advisor and submit report</td>
<td>80*</td>
</tr>
<tr>
<td>Meet with your Faculty Advisor and submit report</td>
<td>80*</td>
</tr>
<tr>
<td>Complete resume and job application assignment</td>
<td>80*</td>
</tr>
<tr>
<td>Participate in ENVS fieldtrip</td>
<td>100</td>
</tr>
<tr>
<td>Participate in WATS fieldtrip</td>
<td>100</td>
</tr>
<tr>
<td>Participate in WILD fieldtrip</td>
<td>100</td>
</tr>
<tr>
<td>Participate in a student organization activity and submit report</td>
<td>80*</td>
</tr>
<tr>
<td>Participate in a student organization activity and submit report</td>
<td>80*</td>
</tr>
<tr>
<td>React to Reading Assignment 1 in a short written report</td>
<td>100</td>
</tr>
<tr>
<td>React to Reading Assignment 2 in a short written report</td>
<td>100</td>
</tr>
<tr>
<td>React to Reading Assignment 3 in a short written report</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL POINTS</strong></td>
<td><strong>1000</strong></td>
</tr>
</tbody>
</table>

* required assignment (incomplete results in an "F" grade for the course.)
Grade Scheme

The following grading standards will be used in this class:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100% to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0% to 90.0%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0% to 87.0%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0% to 83.0%</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0% to 80.0%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0% to 77.0%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0% to 73.0%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0% to 70.0%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0% to 67.0%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0% to 60.0%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60.0% to 0.0%</td>
</tr>
</tbody>
</table>

Course Schedule/Outline

Week 1 – August 26
- Introduction to this course
- Introduction to QCNR (Quinney College of Natural Resources)
- Extracurricular USU
- Seasonal jobs

Week 2 – September 2 Labor day NO CLASS!
- Reading Assignment 1 due

Week 3 – September 9
- WILD Field Trip
- Reading Assignment 2 due

Week 4 – September 16
- College advisors panel
- Major advisors panel
- Reading Assignment 3 due

Week 5 – September 23
- WATS Field Trip

Week 6 – September 30
- ENVS Field Trip
Week 7 – October 7
- Major advisors panel (continued)
- Create a resume

Week 8 – October 14th
- Review job applications in your field
- Job application assignment due

Don’t forget your Faculty Advisor Meeting Assignment and Academic Advisor Meeting Assignment are due by the end of the semester (3 PM, Sunday, December 8th). However, you need to send me an email confirming you have scheduled a meeting with both your Faculty Advisor and Academic Advisor by the last day of our class (3 PM, Monday, October 7th). Both of your first and second Student Organization Assignment are also due by the end of the semester (3 PM, Friday, December 13th).

Reading Assignments - Sand County Almanac

READINGS: Our textbook is *A Sand County Almanac*, written by Aldo Leopold in the 1940s. Leopold is considered to be the “father” of both the practice of wildlife management and the wilderness movement. The book has had millions of copies printed and has been translated into at least nine languages. It has informed and changed the environmental movement and natural resource management and stimulated a widespread interest in ecology as a science. Yet, it is written in a way that requires no advanced courses to understand. It is the perfect book for WILD 2000.

There are three required readings in *A Sand County Almanac*, which are listed below. A report is required for each reading.

**Reading 1** – “Forward” through the chapter on “July”

**Reading 2** – “August” through “December”

**Reading 3** – “The Land Ethic” through “Conservation Esthetic”

Besides introducing you to Aldo Leopold, the purpose of this exercise is to help you translate your life experiences into your philosophy about natural resources. Your philosophy will have a lot to do with how you approach and enjoy natural resource management. It is hoped that each reading will trigger a memory of some event that has happened in your life. Your assignment is to write a report on the memory of yours that the reading caused you to think about.

- Identify the specific writing of Leopold that triggered your memory (chapter, pages, etc.).
- Describe the experience (Where did it happen? Who did it happen with?). Go into some detail about the place. What did it look like, feel like, smell like? Describe how the people you were with (parents, grandparents, siblings, spouse, friends, Scout troop, and/or teachers) that made the experience such a special memory.

Describe how the experience affected your interest in natural resources. Reports should be no more than 1 page in length, double-spaced, in 12 pt Times New Roman font. Each report = 100 points.
Other Assignments

Meet with your Academic Advisor and submit report

- Your Academic Advisor is someone you need to know. They will know more about the rules and regulations of USU than anyone else and can help you figure out how to successfully work towards graduation. If you are a student in QCNR, your Academic Advisor is Shelly Kotynek (NR 120). You can set up a meeting with her by following this link. If you are in a major outside of QCNR, you will have a different Academic Advisor. If you don’t know who this is, go to your Department’s office and ask.
- You will submit a 300-word report on Canvas describing your interactions with your Academic Advisor. What did you discuss? What did you learn? What remaining questions do you have?

Meet with your Faculty Advisor and submit report

- Your Faculty Advisor is a faculty member on campus. They are your best source of information about careers. If you are in QCNR, you have an assigned faculty advisor. His or her name will be listed on your DegreeWorks, a degree auditing report that can show you how to progress towards your degree. If you are not familiar with Degree Works, follow this link for instructions on how to use it. If you are not in QCNR, you may or may not have an assigned Faculty Advisor. It is a College or Department option. If you do, their name will be on Degree Works. If you do not, then pick a professor in your major and interview them. Pick someone that have or have had a class with.
- You will submit a 300-word report on Canvas describing your interactions with your Faculty Advisor. What did you discuss? What did you learn? What remaining questions do you have?

Complete resume and job application

- We’ll spend time in class reviewing common job search sites and discussing best practices for resume creation.
- You will need to submit a resume and cover letter on Canvas.

Participate in three class field trips (ENVS, WATS, WILD)

- It is important that you attend each of the three field trips planned during this course. These field trips will take place during regularly scheduled class time.
- For each trip, you will need to submit a brief written statement about the trip and what you learned.

Participate in two extracurricular activities

- Many of the best parts of undergrad happen outside of the classroom. By connecting with the many student organizations on campus you can meet students with common interests, engage in professional development, and expand your network on campus. You may participate in any student organization activities of interest to you, but for professional development, you are encouraged to become involved with the organization associated with your major.
- The student organizations associated with the QCNR majors are the Fisheries Society (usuafs@gmail.com), Forestry Club (forestry@agglemail.usu.edu), Range Club (usrurangeclub@gmail.com), Student Organization for Society and Natural Resources (utahstate.sosnr@gmail.com), and Wildlife Society (usuwildlife@gmail.com). In addition, you may want to become involved with the QCNR Student Council.
- For each activity, you will submit a short written description of the activity and what you learned.

Late Work

One day late -20% of final grade. Two days late -40% of final grade. Three days late, zero for final grade. No exceptions, other than excused absences specified in university policy.
Nonattendance Policy

Students May Be Dropped For Nonattendance

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. *(This does not remove responsibility from the student to drop courses which he or she does not plan to attend.)* This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar’s Office through their preferred e-mail account (see 2018-2019 General Catalog).

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General Information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: [http://www.usu.edu/riskmgmt/](http://www.usu.edu/riskmgmt/)

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at [libguides.usu.edu/rc](http://libguides.usu.edu/rc).

Classroom Civility

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read [Student Code Article V Section V-3](http://www.usu.edu/policies/student/2018-2019.html) for more information.

University Policies & Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. [Faculty Code Policy #403](http://www.usu.edu/policies/faculty/2018-2019.html) further defines academic freedom and professional responsibilities.

Academic Integrity – “The Honor System”

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:
"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."
A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

**Academic Dishonesty**

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating**: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually;"
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor, or engaging in any form of research fraud.

- **Falsification**: altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism**: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to ARTICLE VI. University Regulations Regarding Academic Integrity

**Sexual Harassment/Title IX**

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU’s Office of Equity for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305), and has designated the Office of Equity Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

**Withdrawal Policy and "I" Grade Policy**

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances but not due to poor performance or to retain financial aid. The term ‘extenuating circumstances’ includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.
 Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: https://studentaffairs.usu.edu, (435) 797-1712, studentservices@usu.edu, TSC 220
- Student Legal Services: https://ususa.usu.edu/student-association/student-advocacy/legal-services, (435) 797-2912, TSC 326
- Access and Diversity: http://accesscenter.usu.edu, (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: http://accesscenter.usu.edu/multiculture, (435) 797-1728, TSC 315
- LGBTQA Programs: http://accesscenter.usu.edu/lgbtqa, (435) 797-1728, TSC 3145
- Provost's Office Diversity Resources: https://www.usu.edu/provost/diversity, (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University: https://studentconduct.usu.edu/studentcode

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII.

Full details for USU Academic Policies and Procedures can be found at:

- Student Conduct
- Student Code
- Academic Integrity
- USU Selected Academic Policies and Procedures
- USU Academic Policies and Procedures
- Academic Freedom and Professional Responsibility Policy

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with other notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.
WILD 2400 - Wildland Resource Techniques

Fall 2019 (3 credits)

Lecture ESLC 046 Tuesday 9-10:15am, Lab LSB 225 Thursday 9am-1:30pm

Instructor

Eric M. Lamolla, Ph.D.

Department of Wildland Resources (WILD)

Office hours: BNR 163: Monday 1-3pm

*Please contact me through the canvas inbox.

TAs and UTFs office hours and contact info

- Alex Howe (TA) - office hours: NR 235, Wednesday 10-12
- Tatum Del Bosco (TA) - office hours: NR 321, Tuesday 11-1pm
- Steven Handtke (UTF)
- Nicholas Mero (UTF)

Office hours: BNR 163, Monday 1-3pm or by appointment (or talk to me after class Tuesdays).

Prerequisite/Restriction

MATH 1050 or higher (C- or better); BIOL 1610 and BIOL 1620. Enrollment is limited to QCNR majors. College of Natural Resources Departmental authorization is required for non-majors.

Course Fee

Each student will be charged $32 to cover the cost of field equipment and transportation.

Field Trips

There are five field trips for this class. They will occur on the weeks of September 5th, 12th, 19th, and 26th, 23rd, and October 31st (scary!).

“We will leave early (8am on September 26th) to travel to the TW Daniel “school forest”.

165
# Course Schedule

One 75-minute lecture/lab period (Tuesday 9:00 am-10:15 am) and one 4-hr lecture/lab/field trip period (Thursday 9:00 am-1:00 pm) each week.

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Time</th>
<th>Activity (+field)</th>
<th>Lecturers</th>
<th>Topics</th>
<th>* Bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-Aug</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>LaMalfa</td>
<td>Introduction - Safety and logistics orientation, manifests, group assignments</td>
<td></td>
</tr>
<tr>
<td>29-Aug</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>LaMalfa</td>
<td>Navigation (GPS, Map &amp; Compass, Topography)</td>
<td>Logan Campus Walk</td>
</tr>
<tr>
<td>3-Sep</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>Frank How</td>
<td>Wildlife capture and handling                                          * Green Canyon</td>
<td></td>
</tr>
<tr>
<td>5-Sep</td>
<td>TH</td>
<td>8am-1pm</td>
<td>Lab</td>
<td>faculty and grad students</td>
<td>Wildlife capture and handling                                          * Green Canyon</td>
<td></td>
</tr>
<tr>
<td>10-Sep</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>LaMalfa</td>
<td>Monitoring for management vs research design</td>
<td></td>
</tr>
<tr>
<td>12-Sep</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>LaMalfa</td>
<td>Range Monitoring - species inventory, biomass, cover, density</td>
<td>UCC Campus Walk</td>
</tr>
<tr>
<td>17-Sep</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>DeRose</td>
<td>Why and how to measure trees and forests - background</td>
<td></td>
</tr>
<tr>
<td>19-Sep</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>DeRose</td>
<td>Tree measurements - fixed-area plots - general plot assessment</td>
<td>* Green Canyon</td>
</tr>
<tr>
<td>24-Sep</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>DeRose</td>
<td>Allometry - stand exam - sampling theory</td>
<td></td>
</tr>
<tr>
<td>26-Sep</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>DeRose</td>
<td>Common stand exam - fuels - understory vegetation - regeneration</td>
<td>* TWD forest</td>
</tr>
<tr>
<td>1-Oct</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>DeRose</td>
<td>How to crunch tree and stand data</td>
<td></td>
</tr>
<tr>
<td>3-Oct</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>DeRose</td>
<td>Tree data entry - stand calculations - graphing results</td>
<td>ESLC GIS lab</td>
</tr>
<tr>
<td>8-Oct</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>* Midterm</td>
<td>Tree data entry - stand calculations - graphing results</td>
<td></td>
</tr>
<tr>
<td>10-Oct</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>DeRose</td>
<td>Tree data entry - stand calculations - graphing results</td>
<td>ESLC GIS lab</td>
</tr>
<tr>
<td>15-Oct</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>Leandro</td>
<td>Bioacoustic and soundscape data collection and visualization</td>
<td></td>
</tr>
<tr>
<td>17-Oct</td>
<td>T</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>LaMalfa and TA's</td>
<td>data session 1</td>
<td>ESLC GIS lab</td>
</tr>
<tr>
<td>22-Oct</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>Del Bosco</td>
<td>Camera Traps and Dung Transsects</td>
<td>ESLC GIS lab</td>
</tr>
<tr>
<td>24-Oct</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>Del Bosco</td>
<td>Camera Traps and Dung Transsects</td>
<td></td>
</tr>
<tr>
<td>29-Oct</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>Tegt</td>
<td>Remote Delivery &amp; Chemical immobilization</td>
<td></td>
</tr>
<tr>
<td>31-Oct</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>Tegt</td>
<td>Remote Delivery &amp; Chemical immobilization</td>
<td>*USDA - Millville</td>
</tr>
<tr>
<td>5-Nov</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>LaMalfa</td>
<td>Fuel moisture, fire effects lecture (Stevens Point talk)</td>
<td></td>
</tr>
<tr>
<td>7-Nov</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>LaMalfa and TA's</td>
<td>data session 1</td>
<td>ESLC GIS lab</td>
</tr>
<tr>
<td>12-Nov</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>LaMalfa</td>
<td>Range Monitoring - biomas, cover, frequency, rare plants</td>
<td></td>
</tr>
<tr>
<td>14-Nov</td>
<td>T</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>LaMalfa and TA's</td>
<td>data session 2</td>
<td></td>
</tr>
<tr>
<td>19-Nov</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>Tegt</td>
<td>Automated Environmental data</td>
<td></td>
</tr>
<tr>
<td>21-Nov</td>
<td>T</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>Tegt</td>
<td>r data session 3</td>
<td></td>
</tr>
<tr>
<td>26-Nov</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>Torry Rogers</td>
<td>Genetic Methods</td>
<td></td>
</tr>
<tr>
<td>28-Nov</td>
<td>T</td>
<td>9am-1pm</td>
<td>Thanksgiving</td>
<td></td>
<td><strong>Final</strong></td>
<td></td>
</tr>
<tr>
<td>3-Dec</td>
<td>T</td>
<td>9-10:15am</td>
<td>Lecture</td>
<td>LaMalfa/shultz</td>
<td>Deer population exercise</td>
<td></td>
</tr>
<tr>
<td>5-Dec</td>
<td>TH</td>
<td>9am-1pm</td>
<td>Lab</td>
<td>LaMalfa</td>
<td>Deer population exercise</td>
<td>ESLC GIS lab</td>
</tr>
<tr>
<td>10-Dec</td>
<td>T</td>
<td>9-10:15am</td>
<td>Final Exam</td>
<td></td>
<td><strong>Final</strong></td>
<td></td>
</tr>
</tbody>
</table>
Course description

Introduction to research and management techniques is required coursework for all undergraduates pursuing degrees in Wildland Resources (wildlife, range, forest, and conservation). Students will learn fundamental field, laboratory, and data management techniques which facilitate inventory, assessment, and monitoring of natural resources. Successful completion of field exercises will prepare students for seasonal technician work related to ecological research and land management. Data management and computing skills acquired will prepare students for upper division coursework related to specific WILD degree programs.

Learning objectives for students

This course will prepare students for field technician work related to ecological research and land management. Students will experience hands on field navigation, various data collection methods, and data processing.

Course description

Introduction to research and management techniques is required coursework for all undergraduates pursuing degrees in Wildland Resources (wildlife, range, forest, and conservation). Students will learn fundamental field, laboratory, and data management techniques which facilitate inventory, assessment, and monitoring of natural resources. Successful completion of field exercises will prepare students for seasonal technician work related to ecological research and land management. Data management and computing skills acquired will prepare students for upper division coursework related to specific WILD degree programs.
Learning objectives for students

This course will prepare students for field technician work related to ecological research and land management. Students will experience hands on field navigation, various data collection methods, and data processing.

1) Gaining factual knowledge (terminology, classifications, methods, trends) in natural resource research and management.

2) Acquiring skills in working with others as a member of a team to complete work assignments. Students will work in small groups to address basic natural resource monitoring and management questions.

3) Develop specific skills and competencies required for managing and analyzing data related to wildlife, range, and forest resources. Students will learn to interpret data visualizations and acquire summary statistics using Excel spreadsheets and R.

Instructor and course evaluation

At the end of the semester, you will be asked to provide independent ratings of the course instruction by completing an online course IDEA course survey. You are strongly encouraged to share feedback that will improve the 2400 course during the term.

Course resources

We will heavily rely upon the Canvas learning management system throughout the course. You can log into Canvas at https://canvas.usu.edu. Enter your username, which is your A#, and strong password (the same one you use for Banner or Aggiemail). For a list of tutorials relating to Canvas, go to your Canvas page, select “support” and “Canvas orientation for students”. We will be using Canvas's quiz, assignment, and announcement tools. You should use the discussion tools to communicate and coordinate with your peers and group members.

Course activities

1. Assigned video tutorials – Each week, students will watch a short video tutorial in Canvas (5-30 minutes) prior to each scheduled field exercise to get familiar with each technique. Students are expected come to field trips prepared to use field equipment and collect real data.
2. Assigned Readings – Each week, students will complete the assigned reading before the corresponding lecture and quiz. This will also prepare students to ask questions and participate in group discussions.
3. Classroom Lectures – We will discuss how each method is used in research and management.
4. Guest lectures – Professional land managers, researchers, private consultants, and graduate students will present on the use of specific natural resource measurement techniques.
5. Computer Lab – Students will primarily use spreadsheets to enter, clean, store, share, and summarize field data. Students will be introduced to a variety of software programs and apps used in research and management (e.g. R, Excel, Google Drive, Forest Vegetation Simulator, etc.)
6. Group Assignments – Students will be assigned to groups during some field and computer lab exercises. Grading of group assignments will include an online peer-evaluation component.
7. **Online quizzes** – Each week, students will complete a short quiz in Canvas prior to field exercises. Quizzes will cover material in the assigned readings and/or assigned video tutorials.

8. **Field exercises** – Each week, students are expected to arrive ready for the field (personal field equipment). Participation in field exercises will be evaluated based on attendance and by peer-evaluations in Canvas.

9. **Class Discussions** – Assigned readings from peer-reviewed scientific journals, agency reports, or case studies will be included in some modules. In small groups, students will discuss potential advantages or weaknesses in the techniques used.

### Online Reading Materials

Links to all reading materials will be available on the Canvas page (see selected examples below).


### Supplemental instructional videos

Links to specific videos will be available on the Canvas page (see selected examples below).

[https://jornada.nmsu.edu/morit-assess/training/videos](https://jornada.nmsu.edu/morit-assess/training/videos)

[https://rangeveg.wordpress.com/](https://rangeveg.wordpress.com/)

### Software

All software will be available in the Quinney College of Natural Resources computer labs.

### Field Equipment

Wild 2400 is a field-based course. As such, we will be spending a considerable amount of time outdoors in all types of weather (sun, rain, sleet, and snow). The instructor will provide necessary field equipment and supplies related to each field exercise. Students are responsible for providing the following personal field equipment during outdoor field activities:

- All-weather clothing and accessories:
  - Hiking boots
  - Rain Jacket
  - Pack
  - Hat
  - Gloves
  - Sunscreen
  - Water bottle
Food/snack  
Digital camera or smart phone  
Field notebook and pen

Student Assessment

Grades will be based on field exercise participation, online quizzes, exams, individual assignments, and group assignments.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field exercise participation/ <strong>professionalism</strong></td>
<td>25% (9)</td>
</tr>
<tr>
<td>Online quizzes</td>
<td>25% (12)</td>
</tr>
<tr>
<td>Individual assignments</td>
<td>15% (10)</td>
</tr>
<tr>
<td>Group assignments</td>
<td>15% (4)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20% (1)</td>
</tr>
</tbody>
</table>

**Professionalism:** This part of your grade will be based on the instructor’s assessment of your active and thoughtful participation in the class, meeting deadlines, etiquette, etc. (behaviors you value in a colleague/employee). Points will be assigned based on class attendance and an end of semester peer evaluation.

Grading scale

- A: 100 to 93
- A-: 92 to 90
- B+: 88 to 87
- B: 86 to 83
- B-: 82 to 80
- C+: 79 to 77
- C: 76 to 73
- C-: 72 to 70
- D+: 69 to 67
- D: 66 to 60
- F: 59 and below

Course policy

Late assignments or late quiz submissions are accepted only for illness or family emergencies. Accommodations for academic scheduling conflicts will only be considered prior to the anticipated absence. We will spend a lot of time together working in small groups this semester. Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. Students are expected to participate, collaborate, look out for one another, and learn from each other.
Disability Resource Center

The DRC works with individuals, faculty, and staff to ensure that students with disabilities can fully participate in University programs, services, and activities. Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Contact the DRC at 435-797-2444 or visit http://www.usu.edu/drc/ for more details.

University policy (Student and Faculty Codes)

Academic freedom – Each individual has the right to teach, study, discuss, investigate, discover, create, and publish freely.

Academic Honesty/Integrity – Students have a responsibility to promote academic integrity at the University by not participating in or facilitating others’ participation in any act of academic dishonesty and by reporting all violations or suspected violations of the Academic Integrity Standard to their instructors.

Affirmative Action/Equal Opportunity – Utah State University prohibits discrimination and harassment based on: race, color, religion, sex (including pregnancy, childbirth, or pregnancy-related conditions), gender identity or expression, sexual orientation, national origin, age, disability, or status as a protected veteran.

Assumption of Risk – All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel.

Classroom Incivility – Disruptive classroom behavior will not be tolerated.

Conduct, Student Standards – All interactions with faculty members, staff members, and other students shall be conducted with courtesy, civility, decency, and a concern for personal dignity.
Course Description

This course provides an introduction to wildland fire. Fire plays a critical ecological role in forests, grasslands, and other systems, and it is also something land managers and societies grapple with in different ways around the world. In this course you will be introduced to the basics of fire, including the combustion process. We will learn about how terrain, weather, and fuels influence how fires start, spread, and go out. We will also cover an introduction to fire ecology, the relationship between fire and its environment. We will study fire management strategies, including fire suppression and prescribed burning. Finally, we will talk about fire management policy and current issues in fire science and management. Throughout the course, examples from both local systems and from around the globe will be used to illustrate concepts.

Fees

No fees are required for this course.

Course Objectives

By the end of this course, you will have:

1. Gained a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories) (IDEA Objective #1)
   - An understanding of the basic physical and chemical attributes of fire, including combustion
   - Knowledge of how terrain, weather, and fuels affect fire behavior

2. Developed specific skills, competencies, and points of view needed by professionals in the field most closely related to this course. (IDEA Objective #4)
   - Knowledge of fire’s different effects on various ecosystems
   - An understanding of techniques used to suppress, ignite, and manage fires
   - An understanding of the complexity of fire and fuel management in the wildland urban interface

3. Developed skills in expressing oneself orally or in writing (IDEA Objective #6)
   - Two writing assignments
   - Presentation to the class

Instructor

Dr. Larissa Yocom
Office: NR 236
Email: larissa.yocom@usu.edu
Phone: 435-797-4155
Office hours: MW 9:30 – 10:30 am or by appointment
Course Resources

There is no required textbook for this course. Required readings will be posted to Canvas.

Course Policies

Late work policy

All assignments are due on the designated dates. You may submit assignments up to 3 days past the due date, but you will lose 10% of the available points per day. If you have circumstances that prevent you from turning assignments in on time, please contact me.

Technology policy

Please help maintain an environment conducive for learning by not using cell phones or other technology for non-learning purposes in class. Maintaining a distraction-limited environment is important for learning, and trying to multitask negatively affects you and your classmates.

Statement on plagiarism and cheating:

Plagiarism and cheating will not be tolerated. Any instance will result in failure of the assignment and depending on the circumstances, failure in the course.

Course Work

Readings

The readings for the class are selected to give you important background information on each topic, and will complement the material covered in lectures. The readings are not optional, and material from the readings will be included on quizzes and the final exam.

Quizzes (15%)

Students will take weekly quizzes throughout the semester. Content from both the readings and lectures will appear on quizzes. There will be 15 quizzes, worth 5 points each (75 points). Quizzes are due by the end of the weekend (11:59 p.m. Sundays) and may not be taken late.

Class Participation (10%)

Students should actively and thoughtfully participate in class discussions and activities. This is an important way to help retain knowledge and develop perspectives on class topics.

Homework (15%)

There will be 5 homework assignments assigned during the semester, each worth 3% of the total grade for the class.
Fire Regime and Ecology Paper (15%)

Students will write a short paper on the fire regime and fire ecology of a particular ecosystem. Papers should include a description of the fire regime in a particular ecosystem, including information about typical fire type, size, patchiness, intensity, severity, frequency, and seasonality. The second section should be about fire effects on plants and animals. The final section should be about plant traits that are conducive to the persistence of those plants over time in the fire regime. Choices of ecosystems will be given, or students can pick an alternative ecosystem in consultation with the instructor.

Sustainability and Fire Paper (15%)

Students will write a short paper about how fire management is related to sustainability. This paper will be in the form of an op-ed, where each student will argue a point of view about fire policy or management, urge an action that we can take in support of sustainability, and use factual evidence to back up claims made.

Fire Case Study Presentation (15%)

Students will give a presentation on one noteworthy fire. Choices of noteworthy fires will be given, or students can pick an alternative fire in consultation with the instructor. Presentations should include background (e.g., location, size, weather conditions), fire ecology (e.g., vegetation type, severity, post-fire effects), management taken (e.g., people and equipment, incident command), noteworthy aspects of the fire, and what lessons were learned as a result of the fire. Photos and maps presented in PowerPoint are encouraged.

Final Exam (15%)

A comprehensive final exam will include material from the lectures, assigned readings, and student presentations. The exam will take place during the University-scheduled exam time.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100% to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0% to 90.0%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0% to 87.0%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0% to 83.0%</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0% to 80.0%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0% to 77.0%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0% to 73.0%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0% to 70.0%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0% to 67.0%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0% to 60.0%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 59.0% to 0.0%</td>
</tr>
</tbody>
</table>
Disability Statement

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.
This course is taught simultaneously at three USU campuses: the Logan Campus, Uintah Basin Campus, and USU Eastern Price Campus. The content and syllabus is the same for all campuses.

COURSE FORMAT: 4 credits; two 75-minute class periods (Tuesday 1:30-2:45 pm, Thursday 1:30-2:45 pm) and one 2 hour 45 minute lab (Tuesday 3:00-5:45 pm) each week. At the Logan Campus, all lectures and labs meeting in Library 421 then move to NR 217 for the lab. At the Uintah Basin Campus, class meets in Roosevelt in Room SC 177 and in Vernal in Room B110, and lab meets in Vernal in Room B 124. At the USU Eastern Price Campus, class meets in CIB 101.

INSTRUCTOR

LOGAN CAMPUS INSTRUCTORS:

Eric LaMalfa, Assistant Professor,
Wildland Resources Department,

Please e-mail me via the canvas inbox
Office hours: BNR 163, Mon. 1pm - 3pm or by appointment.

UINTAH BASIN CAMPUS INSTRUCTOR:

Lisa Boyd, 435-828-3604, mommyboyd@yahoo.com. Office hours by appointment.

USU EASTERN PRICE CAMPUS INSTRUCTOR:

Jacob Martin, Teaching Assistant, Wildland Resources Department, USU Eastern, Price, 435-770-4966 (best way to reach him). jacoblmartin92@gmail.com. Office hours by appointment.
COURSE DESCRIPTION

An introduction to the dominant plant species, disturbance regimes, and management challenges of the major ecosystems of western North America, with special focus on the Intermountain West. Approximately half of the course focuses on the autecology and identification of dominant woody, forb, grass, and grass-like species of these ecosystems, with identification based primarily on sight recognition of characteristic morphological features and limited use of plant keys. The other half of the course focuses on the interactions among abiotic factors, disturbances regimes, and native and non-native species that create biogeographic variation among ecosystems as well as challenges and opportunities for land managers.

FEES

COURSE FEE: The course fee of $30 per student covers the cost of transportation for three field trips as well as materials needed to maintain the mounted botanical specimens used in the lab.

COURSE OBJECTIVES

1. To gain an understanding of the present and future challenges facing managers of terrestrial ecosystems in western North America, primarily grazing, fire, biological invasions, and climate change.
2. To gain an understanding of the autecology, value, and uses of important forest and rangeland plants.
3. To develop the ability to identify important plants found on wildlands in the Intermountain West and other regions, and classify them according to accepted botanical nomenclature.

COURSE STRUCTURE

The course is divided into six sections: 1. Forests, 2. Cold deserts, 3. Wetland/riparian, 4. Central grasslands, 5. Hot desert ecosystems, and 6. Climate change. For each of the first 5 sections, you will learn 15-25 plant species (~84 species total for the semester). Each set of species will be introduced during selected Tuesday labs (see Course Schedule). Field trips will be used for studying live plants in their natural environments, while herbarium specimens will be used for species identification during regular lab periods. Autecology and community ecology will be presented and discussed during class periods.
FIELD TRIPS

We will take three field trips in the Cache Valley area (for students at the Logan Campus) and the Uintah Basin and Price areas (for students at the Uintah Basin Campus and the USU Eastern Price Campus) during the regularly scheduled Tuesday class and lab periods:

1. forest communities on 10 September
2. cold desert field trip on 24 September
3. riparian, wet meadow and wetland communities on 15 October

READING MATERIALS

The recommended text for the course is *North American Wildland Plants: A Field Guide, 2nd Edition* by J. Stubbendieck et al. (2011, University of Nebraska Press, Lincoln, NE). Information sheets will be available as electronic documents for those species that are not found in this textbook. If you want to better understand plant family characteristics, I highly recommend another book, *Botany in a Day: The Patterns Method of Plant Identification* by Thomas J. Elpel (2004, HOPS Press LLC, Silver Star, MT), which can be purchased at hopspress.com or amazon.com for $25.00.

LAB/FIELD EQUIPMENT

You are responsible for supplying your own magnifying lens for viewing minute plant features in labs and on field trips. You should purchase a 10X to 20X lens. Several magnifying lenses are available online at Amazon.com – they are sold as “Jeweler’s Loupes.” The USU Bookstore (Logan Campus) sells 10X lenses for $13.00 to $15.00. The bookstores at the Uintah Basin Campus and USU Eastern Campus can order lenses.

CANVAS

All course materials will be placed on the CANVAS site for this course. They include: 1) the course syllabus; 2) Lecture slides and “video lectures”, 3) readings, 4) a list of all 84 plant species organized by plant set; 5) information sheets for species not found in the textbook; 6) a summary of plant family and tribe characteristics; 7) derivations and meanings of scientific names for all 85 plant species; 8) images of all 85 plant species in the field and on herbarium mounts.
STUDENT ASSESSMENT:

1. Plant identification quizzes: You will be tested on the identification (ID) of plants that you have studied in lab. There will be 5 quizzes, each one covering the current module and the one previous, and a final, comprehensive quiz. Each ID quiz will have 20 plants (herbarium specimens), with the exception of the first quiz, which will have 14. You will be tested on your ability to identify each plant to family, genus and species. You may use your completed dichotomous plant keys on the quizzes (see lab activities below), but they will not be graded beforehand. You also have the option of drawing an illustrated glossary of plant morphological terms for your use on the quiz. Quizzes will be scored as follows:
   - 0.5 points for family
   - 0.5 points for genus
   - 0.5 points for species epithet
   - -0.1 points for incorrect capitalization
   - You will not receive points for incorrectly spelled scientific names

2. Midterm and final exams: The two midterms and one final exam will focus on questions that require you to integrate information about plant autecology and community and ecosystem ecology, rather than simple trivia questions. You will use class discussion time to write your own exam questions and practice answering them.

3. Study questions and in class activities: To give you an incentive to cover material assigned out of class and to participate during in-class activities, I will ask you to complete short online quizzes and submit answers to class discussion questions (group assignments graded only for completion). I will drop your four lowest scores, including incompletes.

4. Lab activities: You will complete a dichotomous key for each module and the comprehensive, final quiz by entering the names of plant families, genera and species into a prepared key. For the final module, you will write your own dichotomous key. You may use these keys on your quizzes but they will not be graded beforehand. You will not receive points for misspelled scientific names. Points will be deducted for incorrect capitalization and/or italicization.

5. Extra Credit: You may add up 5 points to your total lab grade. You may earn 1 point for attending one of the optional study sessions (organized by the TA and UFT), and 2 points for creating an illustrated glossary of 25 or more plant morphological terms by the end of the semester. These points can be added to your grade or used to make up missed field trips.
You may add up to 5 points to your midterm/final exam grade by finding and collecting a plant from our lab modules on USU campus. USU has incorporated many native species into their landscaping. If you find one of our 85 species growing in a campus garden, write a quick description of the location (Example: Garden northwest of Quad Cafe). For a grass, collect a flowering stem; for a woody plant or forb, collect/photograph a leaf and flower/fruit. For a conifer, collect/photograph a cone. Points will be awarded to the first person to find each plant, though you may earn points for finding the same species in a different location on campus.

LATE POLICY: If you miss a plant ID quiz or an exam, you cannot make it up. However, if you contact the TA at least a week ahead of time, you can schedule an alternate time. Study questions and in-class activities must be completed on time (but low scores will be dropped).

### GRADING

<table>
<thead>
<tr>
<th></th>
<th>% OF GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant ID quizzes</td>
<td>25</td>
</tr>
<tr>
<td>Exams (equally weighted)</td>
<td>52.5</td>
</tr>
<tr>
<td>Study questions &amp; in-class activities</td>
<td>5</td>
</tr>
<tr>
<td>Lab activities</td>
<td>17.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

### GRADE SCHEME

Grades at the end of the course will be assigned as:
<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100% to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93% to 90%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90% to 87%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87% to 83%</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83% to 60%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80% to 77%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77% to 73%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73% to 70%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70% to 67%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67% to 60%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 60% to 0%</td>
</tr>
</tbody>
</table>

**ADDITIONAL ITEMS**

- The schedule of topics, assignments, and all other details in this syllabus are subject to change with fair warning.
- ADA compliance: Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disability Resource Center in Room 101 of the University Inn, 797-2444 voice, 797-0740 TTY, or toll-free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.
- Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any “unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at 797-1266.
• Students whose religious activities conflict with the class schedule should contact me at the beginning of the semester to make alternative arrangements.

• Cheating and other forms of academic dishonesty are listed in The Code of Policies and Procedures for Students at Utah State University (revised September 2009), Article VI, Section 1. If you are found to be engaged in academic misconduct, at a minimum you will receive no credit for that exam or assignment. Repeat or serious offenders can expect more serious consequences.

COURSE SCHEDULE

(SEE SCHEDULE ON CANVAS HOME PAGE FOR LATEST UPDATES)
WILD 3810 PLANT AND ANIMAL POPULATION

Course Description

This course is designed to introduce and review the factors that regulate and cause change in plant and animal populations. The relevance of population dynamics to conservation, management, ecology, and evolution will be covered. We will examine single-species, multi-species, age-structured, size-structured, and spatial models of population dynamics, as well as life history strategies. In addition to ecological concepts, students will be introduced to mathematical techniques and computer software that will allow them to examine population dynamics on their own as they embark on their careers.

Prerequisites

WATS 2220 or BIOL 2220, MATH 110 or higher (C- grade or better); STAT 2000 or STAT 3000 (C- grade or better)

Logistics

Lecture: Monday and Wednesday 10:30-11:20 BNR 314
Lab: Monday 2:30-4:20 LSB 225
Credits: 3

Course Objectives

By the end of this course, you will be able to:

1. Understand general concepts of plant & animal population dynamics
2. Use mathematics and computer software to examine dynamics of plant and animal populations
3. Analyze data and use models to project future plant & animal population conditions resulting from management or anthropogenic disturbances
4. Critically evaluate data and graphs to make informed decisions about policy and management

Instructor

Dr. Clark Rushing
clark.rushing@usu.edu
Office: NR 145
Office hours: Monday and Wednesday 1:00-2:30

Teaching assistant

Lauren Ricci
lauren.e.ricci@gmail.com
Office: NR 233
Office hours: By appointment
Honors students

This class is offered as an Honors Class on a contract basis. Those students wishing to take this class for Honors should contact the instructor during the first week of class.

Course Requirements

Lectures

Lectures will cover basic concepts regarding the dynamics of plant and animal populations. Mastering these topics is critical to doing well in the course so lecture attendance will count towards a small portion of your grade (~0.2% of your final grade per lecture) as an incentive for attending.

Labs

Labs will consist primarily of computer-oriented sessions designed to help solidify the topics presented in lecture. All computer-based lab activities will use the free programming language R. In addition, we will run R using RStudio, a powerful integrated development environment (IDE) for R. Labs will meet in Quinney Library 306. You are welcome to use your own personal laptop computer (see below for instructions for installing R and RStudio if you plan to use your own computer). Much of the demonstration of how demography and population dynamics are monitored and assessed in the field will be covered in WILD 2400 and WILD 4750.

No previous experience with R is expected for this course. Lab activities, particularly those early in the semester, will be specifically designed to reinforce lecture topics as well as to introduce students to manipulating, analyzing, and visualizing data using R.

During lab, students will work through pre-written code with the help of instructors. These activities will involve analyzing and visualizing data to deepen understanding of concepts presented in lecture.

Homework assignments

Graded lab assignments will involve a combination of:

- Short-answer questions based on the results of lab activities;
- Changing/writing code to answer new questions not addressed in lab activities; and,
- Short essays that link lab results to applied management/conservation issues

Each assignment will consist of a R Markdown template (we’ll discuss what that means during the first lab) with questions and code. Portions of each assignment can be completed during lab. The remainder of the assignment will require students to take the results from their lab activities and complete assignments outside of class. Out-of-class work can either be completed on your own computer or by using the computer lab facilities in the Quinney Library. Please refer to the instructions for submitting homework assignments before submitting your assignment.

All lab assignments must be turned in by the beginning of lab the following week. Late assignments are docked 20% of the grade for each day late.

Quizzes

Each week, students will be given a 10-question electronic quiz consisting of multiple choice, fill-in-the-blank, matching, or TRUE/FALSE questions. Quizzes will be posted to Canvas and must be completed within one week of posting. Students may use lecture notes, textbooks, or the internet to answer questions but you must take the quiz yourself. Students may not work together on quizzes.

Quizzes that are not completed within one week will receive a grade of 0.
Exams

This course will have two mid-term exams (worth 10% of your grade each) and one final exam (worth 25% of your grade). All exams will be cumulative to some extent because the major topics in the course build off of each other so understanding the topics covered later in the semester requires understanding the topics covered earlier in the semester. However, exams 2 and 3 will tend to focus on material covered since the previous exam.

Course Resources

Lecture and lab materials

PDF copies of each lecture will be posted on Canvas prior to class. Students are encouraged to download/print lectures ahead of class to aid note-taking. Please note, however, that lecture slides will not contain all of the details that will be discussed during lecture. Therefore, reviewing the slides is not a substitute for attending class.

Lab materials will also be distributed through Canvas prior to each lab. These materials will consist of files containing data and code. These materials can be downloaded prior to or at the beginning of lab.

Textbooks

The primary text for this course is:


New and used copies can be bought or rented from here. If you find a cheap copy of the first edition, that is fine.

Additional readings will be assigned from:


PDF versions of all chapters are available for free here. Links to purchase hard copies ($17.50) can be found by clicking on the previous link.

Software

All lab computers will have R and RStudio installed on them so students are not required to install software on their own computers. However, students are free to use their own laptops during lab and having R and RStudio installed will make it easier to complete lab assignments outside of class. Any students wishing to use their own computers should have both R and RStudio installed and running prior to the first lab. Detailed instructions for installing both programs can be found here. If you plan to use your own computer, be sure to test that you have everything installed correctly by doing the following:

1) Launch RStudio

2) Put the cursor in the window labelled ‘Console’. Type the following code (without the apostrophes!) followed by enter or return: ‘x <- 2 * 4’. Next type ‘x’ followed by enter or return. You should see the value 8 print to screen. If yes, you’ve succeeded in installing R and RStudio.

If you encounter any problems with the previous steps, please contact me prior to the first lab.
# Evaluation Methods and Criteria

Your course grade will be based on the following:

- Lab assignments (10 total) - 400 points (40%)
- Quizzes (10 total) - 100 points (10%)
- Midterm exams (2 total) - 200 points (20%)
- Final exam - 250 points (25%)
- Lecture attendance - 50 points (5%)

# Grade Scheme

The following grading standards will be used in this class.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent Range</th>
<th>Point Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 % to 93.0%</td>
<td>930-100</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0 % to 90.0%</td>
<td>900-929</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0 % to 87.0%</td>
<td>870-899</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0 % to 83.0%</td>
<td>830-869</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0 % to 80.0%</td>
<td>800-829</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0 % to 77.0%</td>
<td>770-799</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0 % to 73.0%</td>
<td>730-769</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0 % to 70.0%</td>
<td>700-729</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0 % to 67.0%</td>
<td>670-699</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0 % to 60.0%</td>
<td>600-669</td>
</tr>
</tbody>
</table>
# Course Schedule/Outline

## Lecture schedule (subject to change)

<table>
<thead>
<tr>
<th>Week (dates)</th>
<th>M</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit 1: Dynamics of unstructured populations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (Jan. 7 &amp; 9)</td>
<td>Intro to WILD3810</td>
<td>Abundance</td>
</tr>
<tr>
<td>2 (Jan. 14 &amp; 16)</td>
<td>Density-independent growth</td>
<td>Density-dependent growth</td>
</tr>
<tr>
<td>3 (Jan. 21 &amp; 23)</td>
<td>MLK holiday - no class</td>
<td>Declining populations</td>
</tr>
<tr>
<td>4 (Jan. 28 &amp; 30)</td>
<td>Stochastic population dynamics</td>
<td>Dynamics of small populations</td>
</tr>
<tr>
<td>5 (Feb. 4 &amp; 6)</td>
<td>Guest lecture - Scientific writing</td>
<td>Exam 1</td>
</tr>
<tr>
<td><strong>Unit 2: Dynamics of structured populations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (Feb. 11 &amp; 13)</td>
<td>Review exam 1</td>
<td>Life tables</td>
</tr>
<tr>
<td>7 (Feb. 18 &amp; 20)</td>
<td>President’s Day - no class</td>
<td>Life-history diversity</td>
</tr>
<tr>
<td>8 (Feb. 25 &amp; 27)</td>
<td>Survival estimation</td>
<td>Age-structured dynamics</td>
</tr>
<tr>
<td>9 (Mar. 4 &amp; 6)</td>
<td>Matrix models</td>
<td>Buffer</td>
</tr>
<tr>
<td>10 (Mar. 11 &amp; 13)</td>
<td>Spring break - no class</td>
<td>Spring break - no class</td>
</tr>
<tr>
<td>11 (Mar. 18 &amp; 20)</td>
<td>Sensitivity and elasticity</td>
<td>Life history strategies</td>
</tr>
<tr>
<td>12 (Mar. 25 &amp; 27)</td>
<td>Exam 2</td>
<td>Review exam 2</td>
</tr>
<tr>
<td><strong>Unit 3: Spatial dynamics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 (Apr. 1 &amp; 3)</td>
<td>Metapopulation dynamics</td>
<td>Source-sink dynamics</td>
</tr>
<tr>
<td>14 (Apr. 8 &amp; 10)</td>
<td>Occupancy</td>
<td>Buffer</td>
</tr>
<tr>
<td><strong>Unit 4: Species interactions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 (Apr. 15 &amp; 17)</td>
<td>Competition</td>
<td>Predator-prey dynamics</td>
</tr>
<tr>
<td>16 (Apr. 22 &amp; 24)</td>
<td>Harvest dynamics</td>
<td>No class</td>
</tr>
</tbody>
</table>
**Lab schedule (subject to change)**

<table>
<thead>
<tr>
<th>Week (date)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Dynamics of unstructured populations</td>
<td></td>
</tr>
<tr>
<td>1 (Jan. 7)</td>
<td>No lab</td>
</tr>
<tr>
<td>2 (Jan. 14)</td>
<td>Intro to R/Abundance estimation</td>
</tr>
<tr>
<td>3 (Jan. 21)</td>
<td>MLK holiday - no lab</td>
</tr>
<tr>
<td>4 (Jan. 28)</td>
<td>Intro to R/Modeling population growth</td>
</tr>
<tr>
<td>5 (Feb. 4)</td>
<td>Population viability analysis</td>
</tr>
<tr>
<td>Unit 2: Dynamics of structured populations</td>
<td></td>
</tr>
<tr>
<td>6 (Feb. 11)</td>
<td>TBD</td>
</tr>
<tr>
<td>7 (Feb. 18)</td>
<td>President’s Day - no lab</td>
</tr>
<tr>
<td>8 (Feb. 25)</td>
<td>Life tables</td>
</tr>
<tr>
<td>9 (Mar. 4)</td>
<td>Survival estimation</td>
</tr>
<tr>
<td>10 (Mar. 11)</td>
<td>Spring break - no class</td>
</tr>
<tr>
<td>11 (Mar. 18)</td>
<td>Matrix population projections</td>
</tr>
<tr>
<td>12 (Mar. 25)</td>
<td>Elasticity analysis and comparison of life history strategies</td>
</tr>
<tr>
<td>Unit 3: Spatial dynamics</td>
<td></td>
</tr>
<tr>
<td>13 (Apr. 1)</td>
<td>Metapopulation dynamics</td>
</tr>
<tr>
<td>14 (Apr. 8)</td>
<td>Occupancy models</td>
</tr>
<tr>
<td>Unit 4: Species Interactions</td>
<td></td>
</tr>
<tr>
<td>15 (Apr. 15)</td>
<td>Compensatory predation</td>
</tr>
<tr>
<td>16 (Apr. 22)</td>
<td>Harvest dynamics</td>
</tr>
</tbody>
</table>

**Attendance and Excused Absences Policy**

If you have an anticipated absence, please notify me at least 1 day prior to the absence. It is your responsibility to make up for the materials missed in the event of a lecture or lab absence. Your attendance on specified exam dates is mandatory. Exams will be announced 1 week prior to the exam date in class. Make-up exams will be administered in only the most extreme circumstances. Excuses for absence due to illness, death in the family, or other unanticipated events will be handled on a case-by-case basis and must be documented.
Nonattendance Policy

Students May Be Dropped For Nonattendance

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. (This does not remove responsibility from the student to drop courses which he or she does not plan to attend.) This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar’s Office through their preferred e-mail account (see 2018-2019 General Catalog).

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: http://www.usu.edu/riskmgmt/

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at libguides.usu.edu/rc.

Classroom Civility.

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read Student Code Article V Section V-3 for more information.

University Policies & Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities.
Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution, and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined by the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating:** using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually.”
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor, or engaging in any form of research fraud.

- **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.

- **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: ARTICLE VI. University Regulations Regarding Academic Integrity

**Sexual Harassment/Title IX**

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU’s Affirmative Action/Equal Opportunity (AA/EO) Office for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305), and has designated the AA/EO Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.
Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:
- Division of Student Affairs: https://studentaffairs.usu.edu, (435) 797-1712, studentservices@usu.edu, TSC 220
- Student Legal Services: https://ususla.usu.edu/student-association/student-advocacy/legal-services, (435) 797-2912, TSC 326
- Access and Diversity: http://accesscenter.usu.edu, (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: http://accesscenter.usu.edu/multiculture, (435) 797-1728, TSC 315
- LGBTQA Programs: http://accesscenter.usu.edu/gbqta, (435) 797-1728, TSC 3145
- Provost's Office Diversity Resources: https://www.usu.edu/provost/diversity, (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University: https://studentconduct.usu.edu/studentcode

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII.

Full details for USU Academic Policies and Procedures can be found at:
- Student Conduct
- Student Code
- Academic Integrity
- USU Selected Academic Policies and Procedures
- USU Academic Policies and Procedures
- Academic Freedom and Professional Responsibility Policy

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.
WILD 3820
Forest Plants: Identification, Biology, and Function
Credits: 3
Instructor: Sara J. Germain

Course Objectives
After taking this course, students should be able to enter a forest ecosystem in western North America and identify the principal plant species. Students should have the vocabulary and techniques to differentiate among the plants covered in the course and understand aspects of their evolution, taxonomy, and ecological function.

1) Identification: The course covers approximately 132 species (generally 11 per week for each of the 12 weeks) that are either widespread throughout western North America or which are narrowly distributed, but either important or unique, as well as the plant characters that allow identification of these 132 species.
2) Taxonomy: The course covers the plant families and phylogeny of the 132 plant species.
3) Function: The course introduces woody plant physiology and adaptations to forest conditions.
4) Indicators: The course provides an introduction to indicator species or groups of species that will allow students to identify various moisture and nutrient conditions.

The course involves a considerable amount of memorization. The overarching goal is to prepare students for resource management careers in the West. Although the class does not specifically cover plant species found outside the West, the plant families represented serve as a good background for work or research anywhere in the northern temperate regions of the world.

Course Fee
The course fee of $28 covers lab materials and supplies (principally preparation of specimens).

Recommended Text

Web Site: http://website-wild3820.s3-amazon-web-2.amazonaws.com/
The website, fully open access, hosts the written course materials (other than the "Woody Plants of Utah" text) and the detailed topics to be covered in lecture and lab. Prior to each class, the lectures will be updated for the current year and the PDF of the PowerPoint will be posted (on the 'Schedule' tab of the website). If the files on the website have the suffix of the current year, the files have been updated (usually by the Saturday before class). Prior to that time the lecture from the previous year is posted for your information. Prior to each lab session, PDF files for the lab PowerPoint and a key will be posted.

Assignment Details
Each week students are expected to read the section on the assigned plants in the book ("Woody Plants of Utah") and read the detailed webpages for those species from the course website.
Evaluation
Performance is evaluated with quizzes, written assignments, a midterm concept review, a lab final exam on plant identification (during the last lab session, in "dead week"), and a concepts and terminology exam during finals week. Quizzes and exams are closed-book.

The course has 100 total points. The point distribution is:

1) Biweekly quizzes (6) – 4 points each, 24 points total
2) Written assignments (4) – 1 point each, 4 points total
3) Lab journal (12) – 1 point per lab, 12 points total
4) Plant walk – 1 point
5) Midterm review – 9 points
6) Lab final (plant identification) – 30 points
7) Final exam (concepts and terminology) – 20 points

Your overall numerical score for the course is the sum of those components. Your grade for the class will be no lower than the following conversion: A, 93-100; A-, 90-92; B+, 87-89; B, 84-86; B-, 80-83; C+, 77-79; C, 74-76; C-, 70-73; D, 64-69; F, <63. However, your final grade will likely be higher than a straight conversion (i.e., the class is 'curved'). In 2014, final course grades were 7 points higher than the straight conversion, in 2015, final course grades were 10 points higher, and in 2016 final course grades were 7 points higher than a straight conversion. Because the class is curved, the straight conversion underestimates your likely final evaluation (and therefore I do not provide 'snapshots' of grades during the semester).

Replacement / Extra Credit
When students have pre-approved reasons for missing labs, lab journals can be turned in promptly for full credit; if labs are missed without pre-approval, lab journals can be turned in promptly for 50% credit. Lab journals more than six days late will receive no credit. When students have pre-approved reasons for missing lab quizzes, an appointment must be made to complete an alternate quiz. You must contact me prior to the start time of the lab / quiz you will be missing to get pre-approval. Pre-approved reasons include: scheduled travel, family or medical emergencies, and unavoidable occupational requirements.

No extra credit is offered. However, participation in weekly UTF study and chat sessions can reduce the need for extra credit by ensuring you are prepared for quizzes and exams.

Attendance
I expect students to attend all lectures and the full lab section. Attendance will be assessed at the end of each lab period when lab journals are submitted.

Technology
Laptop / iPad use for anything but taking class notes (Facebook, email, other course work, etc.) is not permitted. If you violate this requirement, you will be asked to turn off the laptop / iPad. If the problem continues, you will not be able to bring the laptop / iPad to class, and may be asked to leave class prematurely. Cell phone use of any kind (calls, texts, email, social media, etc.) is not permitted during class time; if you need to use your phone for any reason, please leave the room to avoid disrupting other students.
Students with Disabilities

The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center, at least two weeks before the start of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format—larger print, audio, diskette, or Braille."

Plagiarism

"Plagiarism includes knowingly representing by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials” (Student Code page 10). I expect that all the work you do in this class will be your own.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topic</th>
<th>Lab Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Week 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>August 26</td>
<td>Introduction, Forest Biogeography</td>
<td>Pinaceae Systematics (Big) Key</td>
</tr>
<tr>
<td><strong>Week 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>September 2</td>
<td>Labor Day - no class</td>
<td></td>
</tr>
<tr>
<td><strong>Week 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>September 9</td>
<td>Forest Development</td>
<td>Non-pine Conifers (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quiz #1 (2016, 2017, 2018) Writing Assignment #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(due Sept. 13, see Canvas)</td>
</tr>
<tr>
<td><strong>Week 4</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>September 16</td>
<td>Fire and Fire Adaptation</td>
<td>The Colorado Plateau (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing Assignment #1 rewrite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(due Sept. 20, see Canvas)</td>
</tr>
<tr>
<td><strong>Week 5</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>September 23</td>
<td>Compound Disturbances: Beetles and Fire</td>
<td>California Forests I (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plant Morphology Handout Antiosperm Phylogeny Poster (Hilger 2014)</td>
<td>Writing Assignment #2 rewrite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(due Sept. 27, see Canvas)</td>
</tr>
<tr>
<td><strong>Week 6</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>September 30</td>
<td>Climate and Climate Adaption I</td>
<td>California Forests II (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing Assignment #2 rewrite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(due Oct. 4, see Canvas)</td>
</tr>
<tr>
<td><strong>Week 7</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>October 7</td>
<td>Climate and Climate Adaptions II</td>
<td>Pacific Northwest Forests I (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(due Oct. 21 in class)</td>
</tr>
<tr>
<td><strong>Week 8</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>October 14</td>
<td>Elevation and the Water Balance</td>
<td>Pacific Northwest Forests II (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Plant Walk (Guide, Student Exercise)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Midterm Review Q &amp; A (due Oct. 21 in class)</td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Additional Information</td>
</tr>
<tr>
<td>----------</td>
<td>------------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>Week 9</td>
<td>October 21</td>
<td>Biotic Interactions I</td>
<td>Pacific Northwest Forests III (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing Assignment #3 (due Oct. 25, see Canvas)</td>
</tr>
<tr>
<td>Week 10</td>
<td>October 28</td>
<td>Biotic Interactions II</td>
<td>The Widely Distributed (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing Assignment #3 rewrite (due Nov. 1, see Canvas)</td>
</tr>
<tr>
<td>Week 11</td>
<td>November 4</td>
<td>Forest Change</td>
<td>Forest Change Plants (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing Assignment #4 (due Nov. 8, see Canvas)</td>
</tr>
<tr>
<td>Week 12</td>
<td>November 11</td>
<td>Diversity, Rarity, and Community</td>
<td>More Widespread, Moist Habitats (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Writing Assignment #4 rewrite (due Nov. 15, see Canvas)</td>
</tr>
<tr>
<td>Week 13</td>
<td>November 18</td>
<td>Course concepts review</td>
<td>More Widespread, Drier Habitats (Big) Key</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quiz #6 (2016, 2017, 2018)</td>
</tr>
<tr>
<td>Week 14</td>
<td>November 25</td>
<td>Review of Difficult Taxa</td>
<td>Review of Difficult Taxa Plant review</td>
</tr>
<tr>
<td>Week 15</td>
<td>December 2</td>
<td>Lab Final Exam (2018)</td>
<td>Comprehensive Plant ID Final</td>
</tr>
<tr>
<td>Finals Week</td>
<td>December 11</td>
<td>12:30 to 14:20; Written Knowledge Exam USU Finals (2016, 2017, 2018)</td>
<td></td>
</tr>
</tbody>
</table>
WILD 3850 (Spring 2019)
Vegetation and Habitat Management
Tuesday-Thursday, 3:00-4:15 pm; 3 Credits

Eric LaMalfa
CANVAS inbox (preferred contact)
Eric.lamalfa@aggiemail.usu.edu

Fee Busby
fee.busby@usu.edu

Catalogue Description:
Applying ecological principles and concepts to manipulate the composition, structure, and productivity of wildland vegetation for a range of objectives, including the creation and maintenance of wildlife habitat, using a variety of methods, including biological, chemical, mechanical, and fire. (3cr).

Course Background:
It is expected that students already have a solid background in ecology and are familiar with, for example, succession and relative tolerance, and have had an introduction to regeneration ecology and the nature of plant communities. We will build on this background to develop an understanding of vegetation management practices as they relate to: ecological and biological principles, natural resources management strategies, and socioeconomic and environmental constraints. The basic objectives of vegetation management, both in general terms or as they relate to a specific project, must be explicitly understood in terms of desired species composition and structure. We will use specific examples to make this clear, and will focus on implementation of these objectives, using a variety of tools and practices. The relevance of the course will be reinforced by examples and case studies relating to a diversity of natural resource situations, (e.g., restoration, wildlife habitat management, and management of invasive plants).

Learning Objectives:
1) Ability to apply ecological concepts and principles to manipulate the composition, structure, and productivity of wildland vegetation for a range of objectives, including the creation and maintenance of wildlife habitat, using biological, mechanical, chemical, pyric, and revegetation methods.

2) Ability to analyze economic, environmental, and social consequences of vegetation management strategies and decisions.

3) Develop/improve technical writing skills that are critical for natural resource professionals.

Format: Lectures TR 3:00-4:15 BNR 278
The first half of the semester will focus on vegetation and habitat management in forest ecosystems; the second half will focus on vegetation and habitat management in range ecosystems.
Grading:
Grading will be based on: Percentages will be based on:
90% or better A Midterm exams 50%
80-89% B Assignments 50%
70-79% C
60-69% D
59% or less F

Readings and Assignments:
Half of your grade (50 points) will be derived from the Forestry portion of the course and the remaining half of your grade (50 points) will be derived from the Rangeland portion of the course.

All course materials (syllabus, readings, review questions, etc.) are on CANVAS (https://usu.instructure.com/courses/361447). Powerpoints used during class will be posted to CANVAS immediately after each class.

During the forestry portion of the course, there will be four short writing assignments. Each will be in the same format, i.e., a 1.5-2 page background report on a particular aspect of a native plant species. Feedback on each report should facilitate improvement in both style and efficiency. These assignments have two purposes: provide practice in clear and concise organization of technical material; and, by focusing on a plant species and wildlife species of your choice, help you to put lecture and reading content into context (i.e., apply the material in a meaningful way). To summarize, during the forest portion of the course there will be a mid-term exam (Mar 3) (25% of the total course grade) and the reports (25% of the total course grade).

- 10% will be deducted from the grade for each day an assignment is late.

During the rangeland portion of the course you will have four assignments: (1) select an Ecological Site of interest; (2) set a management objective of how you would like to use your site; and (3) to meet your management objective, address how prescribed burning, mechanical treatments, chemical treatments and/or grazing management might be used on your site. Assignments 1-2 are worth 6 points each and assignment 3 is worth 18 points, for a total of 30 points or 3/5ths of the grade for the Rangeland portion of the class. The mid-term for the rangeland management part of the course will be a practical problem exercise using the knowledge gained from the previous exercises and material presented in class. The final project is work 20 points (2/5th of Rangeland grade).

Accommodations for disabilities:
Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disabilities Resource Center (DRC) in Room 101 of the University Inn, 797-2444 voice, 797-
0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

**Academic integrity:**
Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all USU students. Infractions (cheating, falsification, and plagiarism) and their associated penalties are described in the USU Academic Policies and Procedures Manual ([www.usu.edu/policies](http://www.usu.edu/policies)).

**How can I succeed in this class?**
It is as easy as 1, 2, 3: 1) show up 2) pay attention (don’t check email during class) and 3) do the assignments. Materials covered in this course cannot be memorized from a textbook. The material in this course has been collated from a wide variety of sources by your professors. It is your job to extract all the information you can from them and make sure that it makes sense TO YOU. Ask questions in class and ask questions during office hours or in the hallways. The more you put in, the more you will get out.

**Course Schedule and Reading Assignments:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Jan 8</td>
<td>Course introduction/Forest vegetation dynamics</td>
<td></td>
</tr>
<tr>
<td>3) Jan 15</td>
<td>Forest vegetation dynamics, cont. (Introduction due)</td>
<td></td>
</tr>
<tr>
<td>4) Jan 17</td>
<td>Forest disturbances</td>
<td>Long et al. (2004)</td>
</tr>
<tr>
<td>5) Jan 22</td>
<td>Stand dynamics (Fire effects assessment due)</td>
<td>Long &amp; Shaw (2005)</td>
</tr>
<tr>
<td>7) Jan 29</td>
<td>Disturbance-based management (Forestry - Habitat value due)</td>
<td>Long and Smith (2000)</td>
</tr>
<tr>
<td>8) Jan 31</td>
<td>Disturbance -based management</td>
<td>Agee and Skinner (2005)</td>
</tr>
<tr>
<td>9) Feb 5</td>
<td>Manipulation - Reproduction treatments (Forestry - wildlife species habitat due)</td>
<td>Gallo (2016)</td>
</tr>
<tr>
<td>10) Feb 7</td>
<td>Manipulation - Stand treatments</td>
<td>Hayes et al. (1997)</td>
</tr>
<tr>
<td>11) Feb 12</td>
<td>Seed collection and handling</td>
<td>Johnson et al. (2004)</td>
</tr>
<tr>
<td>12) Feb 19</td>
<td>Summary &amp; review (Forestry – seed collection and handling due)</td>
<td>IDEA course survey - extra credit due</td>
</tr>
<tr>
<td>13) Feb 21</td>
<td>Summary &amp; review</td>
<td></td>
</tr>
<tr>
<td>14) Feb 25</td>
<td>Summary &amp; review</td>
<td></td>
</tr>
<tr>
<td>14) Feb 28</td>
<td>Forest midterm (Habitat assessment due)</td>
<td></td>
</tr>
</tbody>
</table>
**Rangeland Vegetation Section**

1) Mar 5  Course Introduction and Range fundamentals and history  Monsen (2004b)
2) Mar 7  Ecological sites and state and transition models  Briske et al. (2005)
3) Mar 11-15  SPRING BREAK
4) Mar 19  Principles of rangeland vegetation  Chambers (2014); Stevens (2004a)
   (Ecological site description assignment due)
5) Mar 21  Site suitability (climate, soil, topography, and biotic condition)
6) Mar 26  Grazing management  Briske et al. (2008); Kothmann (2009)
7) Mar 28  Grazing Management  (Management objective assignment due)
8) Apr 2  Controlling plant competition: (1) fire / prescribed burning  Monsen (2004a); Monsen (2004c); Whisenant (2004)
9) Apr 4  Controlling plant competition: (2) mechanical treatments  Stevens and Monson (2004a)
10) Apr 9  Controlling plant competition: (3) chemical treatments  Vallentine (2004)
11) Apr 11  Controlling plant competition: (4) Biological control treatments  (Recommended prescribed burning, mechanical treatments, chemical, and/or grazing management treatments assignment due)
12) Apr 16  Seeding desired plants  (Rangeland mid-term assigned)
14) Apr 18  Planning – Putting it all together  (First draft of Rangeland mid-term due)
   (15) Swanson (1994)
Apr 30  All work completed

**READINGS (PDFs can be found on Canvas)**

**Forest Vegetation – Habitat Management Section**


Range Vegetation -- Habitat Management Section


Syllabus

WILD 4700, Ecological Foundations of Restoration
Spring 2018

Instructor: Gene Schupp
Office: BNR 373
Phone: 797-2475
e-mail: eugene.schupp@usu.edu

Class: TR, 12:00-1:15+, BNR 314

Office Hours: MWF, 10:30-11:30; TR, 11:00-11:50 (except for occasional emergency absences)

If you cannot come at this time, make an appointment after class, by phone, or by e-mail. Please note that my e-mail is for notifying me in emergencies and for making appointments, not as a substitute for office visits.

Format:
Two 75-min+ “lectures” per week. Although most of these will indeed be primarily me talking, some periods will be devoted to other activities such as working on the group project, giving student presentations, etc. However, the “lectures” will be different from the typical lecture. I will post on Canvas pdfs of very detailed notes covering each topic in advance and expect them to be read and thought about in advance. Then in class I will go over those notes with a PowerPoint. Instead of taking non-stop notes you will be paying attention, thinking, questioning, discussing, and adding additional thoughts to your handouts. So in a sense, the “lecture” is a review/clarification of the notes – repetition helps – and an opportunity for us to talk in more detail about things that are less clear or more interesting. Hopefully we will have good dialogue.

Educational Objectives:
This course is the Capstone Course for the Conservation and Restoration Ecology degree. Thus, it will be integrative and will be partially used to assess your entire educational experience, mostly through a group project that constitutes the Capstone Experience and requires integrating information from this class with knowledge you have obtained throughout your education – both in classroom settings and real-world hands-on experiences.

The specific content presented in this course is designed to build on basic natural science knowledge developed in courses such as Biology I and II (Biol 1610 and 1620), General Ecology (NR/Biol 2220), and Fundamentals of Soil Science (PSC 3000); and to complement the more applied knowledge obtained in courses such as Vegetation and Habitat Management (WILD 3850). Specific objectives are:

1) To develop an advanced understanding of principles of basic plant ecology and evolution especially relevant to the restoration of healthy and functioning natural ecosystems, with an emphasis on issues related to the establishment, survival, growth, and reproduction of plants.

2) To develop an ability to integrate information across levels of ecological organization (e.g., links between ecosystem function and plant establishment) and across temporal and spatial scales (e.g., effects of short-term climatic changes on long-lived species).
3) To gain an understanding of how ecological information can improve restoration decisions and explain restoration failures.

**IDEA Center Evaluation Objectives:**

- 22. Learning fundamental principles, generalizations, or theories **Essential**
- 23. Learning to apply course material (to improve thinking, problem solving, and decisions) **Important**
- 25. Acquiring skills in working with others as a member of a team **Important**

**Readings:**

There is no textbook for this class. However, I will assign required readings and suggest additional useful readings – journal articles, book chapters, etc. – throughout the course. These readings either will be available to download electronically from the library or they will be placed on the course Canvas page. Remember, if you are off campus connect to the vpn to get access to journals through the library.

**Required Electronic Resource:**

Go to [http://www.ser.org/page/SERDocuments](http://www.ser.org/page/SERDocuments), the publications listing on the web site of the “Society for Ecological Restoration.” There are many valuable resources here but two in particular will be important for us. Print or save them, read them, and keep them in mind throughout the course. They are compact but are relevant to a lot of what we will talk about in class:

1) “The SER International Primer on Ecological Restoration” (15 pp). Scroll down through the publications to find it.

2) “International Standards for the Practice of Ecological Restoration.” Near the top. Published in December 2016, this combines some information from a number of SER’s previous publications, including the Primer.

**Important Electronic Resources To Be Aware Of:**

“Clewell, A., J. Rieger, and J. Munro. December 2005. Society for Ecological Restoration International: Guidelines for Developing and Managing Ecological Restoration Projects, 2nd Edition.” Also from SER’s website. Although we will not directly cover developing and managing restoration projects in class, this is useful information and likely will be very relevant to your group project.


Or hard copies can be ordered from the Rocky Mountain Research Station site.


NRCS Idaho-Utah Plant Materials Technical Notes: There is quite a range of fact sheets here covering all kinds of topics, some of which is very relevant.

http://www.nrcresearchportal.org/nrcresearchportal/glance/technical/?cid=nrcresearchportal/glance/technical/technotes

Great Basin Consortium: The consortium is a “network of networks” linking six groups of managers and researchers dealing with management of Great Basin landscapes. All groups can easily be accessed from this site and this gives access to a lot of information, some directly relevant to this class, some relevant to your future if you expect to remain in land management in the Intermountain Region. See:

http://greatbasinresearch.com/consortium/index.html

Sage Grouse Initiative: Especially consider the “Great Basin Fact Sheet Series” at http://www.sagegrouseinitiative.com/category/great-basin-factsheet-series/

Sagebrush Steppe Treatment Evaluation Project (SageSTEP): The web site of our research consortium is also a place to look for information.

http://www.sagestep.org/


Student Evaluation:
There will be no exams in this class. Assessment of your performance will be based exclusively or nearly so on an individual student presentation and two group presentation. There might be one or more opportunistic short writing assignments, but that depends on how the semester goes and what interesting opportunities arise (for example, a relevant seminar).

Each student will be responsible for one individual PowerPoint presentation (20 minutes each) during the semester. Details and a schedule will be provided later, but presentations will be based on a scientific paper on a restoration ecology topic from the peer-reviewed literature selected by you and approved by me. This is a chance to explore more thoroughly a topic of interest to you.

Final group presentations will be based on an analysis of a restoration scenario and will be by PowerPoint. These will be presented at the end of the semester by the entire group to the entire class. I will assign groups and the specific scenario to be assessed fairly early in the semester. This is a project that should be worked on throughout the semester, although I imagine much of the work will be later in the course after more material has been covered. However, to insure that groups are organizing their
project and working on it groups will give “progress report” presentations about half way through the semester. Keep in mind that in this project you will be drawing on all of your formal and informal education, not just material from this class. Consequently, the presentation is expected to incorporate information ranging across ecology, natural resources management, soils, economics, policy, and more.

**Grading:**

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final presentation</td>
<td>150</td>
</tr>
<tr>
<td>Progress report presentation</td>
<td>50</td>
</tr>
<tr>
<td>Individual presentation</td>
<td>40</td>
</tr>
<tr>
<td>Any writing assignments</td>
<td>30 each</td>
</tr>
</tbody>
</table>

Grading will be based on a 90-100% = A, 80-89% = B, etc. scale. Depending on scores, these cutoffs may be shifted slightly up or down, but not by much.

**Student Progress on Departmental Learning Objectives:**
Performance in this course will contribute to the evaluation of your individual progress on the following departmental learning objectives:

**Primary Objective:** C5. Understanding of and ability to apply what is learned in the major to conserve and restore natural resources – ability to research possible solutions to natural resource problems, then develop a conservation or restoration management plan with specific objectives and constraints. **60% weight.**

**Secondary Objective:** C4. Ability to communicate – includes the ability to understand scientific and other documents in order to critically evaluate opposing viewpoints in conservation and restoration; to prepare and deliver effective oral presentations to professionals and stakeholders; and to write clearly for both technical and non-technical audiences. **30% weight.**

**Tertiary Objective:** C3. Understanding of the social context in which conservation and restoration are conducted – includes basic understanding of human behavior, economics, and culture and their impacts on natural resources; of human demands for natural resources and their effects on resource availability and quality; of natural resource policy and how it is developed; of how federal, state, and local laws and regulations govern natural resource management; and of the ecosystem services that wildlands provide to society. **10% weight.**

**Academic (Dis)honesty:**
This course will have zero tolerance of cheating and plagiarism. Read and believe the statement on “Academic Honesty/Integrity” (http://catalog.usu.edu/content.php?catoid=12&navoid=3140&hl=academic+dishonesty&returnto=search). If you have any question about what constitutes academic dishonesty, or what the consequences of dishonesty may be, see Article V, Section V-3, and Article VI of the USU Student Code (https://studentconduct.usu.edu/studentcode/). In brief, academic dishonesty is not only grounds for failing the course, but potentially for being expelled from the University.
Students with Disabilities:
If you have any disability that requires accommodation, such as the use of a reader, scribe, interpreter, alternatives to print media (e.g., Braille, large print, or audio format), or extra time for exams, the University and I are more than happy to accommodate you to the fullest extent possible. You must, however, document your disability and needs at the Disability Resource Center in University Inn 101 and talk to me as soon as possible.
WILD 4570 Forest Ecology of the Sierra Nevada and White Mountains 3 cr.

WILD 4570
Forest Ecology of the Sierra Nevada and White Mountains
Credits: 3
Instructor: James A. Lutz

Course Objectives
After taking this course, students should be able to enter a forest ecosystem and analyze its present state, make inferences about its past, and speculate about its future. The class goal is to provide students with the skills to interpret and contribute to the management of forests in the western United States. The class develops a set of field skills necessary to examine forest systems, and provides an introduction to many of the forest types of the West in a comparative context.

Students learn measuring techniques for forest research, how to plan and execute forest surveys working in teams, to accurately use traditional (compass, diameter tape, quadrats) and modern (Total Stations, lasers, GPS) equipment, an appreciation for measurement accuracy, and to document work and observations in a field notebook. Students learn to identify all woody species in the Sierra Nevada lower mixed conifer forests, and principal species from the montane and sub-alpine species of the Sierra Nevada and the White Mountains in a comparative context. Students learn to identify important factors associated with tree mortality (pathogens, insects, suppression, mechanical factors, and animal damage) as well as diagnose synergistic and contingent mortality scenarios. The overarching class goal is to provide students with the skills to interpret and contribute to the management of forests in the western United States.

Schedule
Pre-trip orientation and safety meeting: late April (3 hours)
Friday/Saturday: Deliver gear to NR 113
Sunday: Depart NR parking lot at 6:30 am. Arrive Hodgdon Meadows campground. Set up camp.
Tuesday: Agents of mortality
Wednesday: Beetle gallery identification
Thursday: Pathogenic fungi
Friday: Spatial processes
Saturday: Data collection considerations
Sunday: Fire ecology of Pinus ponderosa forests and Yosemite Valley
Monday: Day off, hiking in Yosemite National Park
Tuesday: Introduction to fuel and the collection of fuels data
Wednesday: Mortality and ingrowth
Thursday: Mortality and ingrowth
Friday: Mortality and ingrowth
Saturday: Mortality and ingrowth
Sunday: Abies magnifica forest; Pinus jeffreyi woodland. Camp at Tuolumne Meadows
Monday: Wilderness navigation. Pinus contorta forest. At Tuolumne Meadows
Tuesday: Pinus albicaulis forest. At Tuolumne Meadows
Thursday: Drive back to Logan

**Assigned Reading**


Lutz, J. A., A. J. Larson, M. E. Swanson, and J. A. Freund. 2012. Ecological importance of large-diameter trees in a temperate mixed-conifer forest. *PLoS ONE* 7(5): e36131. This study and the on-line appendices are a comprehensive background to the ecological processes active in the Yosemite Forest Dynamics Plot. All the authors will be at the plot during the class.


Lutz, J. A., J. W. van Wagendonk, A. E. Thode, J. D. Miller, and J. F. Franklin. 2009. Climate, lightning ignitions, and fire severity in Yosemite National Park, California, USA. *International Journal of Wildland Fire* 18(7): 765-774. This paper explores some of the climatological factors that help shape the fire season. Based on these data, what should we expect from the fire season this year?

Scholl, A. E., and A. H. Taylor. 2010. Fire regimes, forest change, and self-organization in an old-growth mixed-conifer forest, Yosemite National Park, USA. *Ecological Applications* 20(2): 362-380. This research was performed not too far from the YFDP, so its conclusions are quite relevant.


**Background Reading**

Eng, R.C. (editor). Navigation. Chapter 5 in Mountaineering: The Freedom of the Hills. 2010. The Mountaineers Books, Seattle. In this class we will learn how to use a mirror compass to collect field data and also to navigate in the wilderness. "Freedom" is by far the best reference book for outdoor adventuring in the high places of the world. I recommend you buy a copy and read it cover to cover. "For the modern alpine traveler, navigation is the key to wandering at will through valleys and meadows, up cliffs and over glaciers, earning the rights of a citizen in a magical land, a mountaineer with the freedom of the hills."

**Grading**
Students must participate in each day of the field activities and turn in all of the assignments to receive a grade. I will assess your understanding of field techniques and Sierra Nevada species in the field. You will document your learning and observations in a field notebook. Each component of your evaluations will earn up to the maximum number of points stated – your overall numerical score for the course is the sum of those components. Your grade for the class will be no lower than the following conversion.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>84-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-83</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>74-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-73</td>
</tr>
<tr>
<td>D</td>
<td>64-69</td>
</tr>
<tr>
<td>F</td>
<td>&lt;63</td>
</tr>
</tbody>
</table>
Components: Field notebook – 25, Reflection pieces – 25, Species identification – 20, Field techniques – 20, Pre-trip reading quiz – 10. The field notebook and reflection pieces are due one week after our return to Logan.

Course Fee
The course fee (approximately $500) covers transportation, camping fees, and most food expenses (food on the road is not included).

Students with Disabilities
The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center, at least two weeks before the start of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format—larger print, audio, diskette, or Braille."

Plagiarism
"Plagiarism includes knowingly representing by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials" (Student Code page 10). I expect that all the work you do in this class will be your own.

Field Details
Details about equipment lists and logistics are posted on the course web site.
WILD 4750 Monitoring and Assessment in Natural Resources and Environmental Management 4 cr.

WILD 4750, Fall 2019 (4 credits)
Monitoring and Assessment in Natural Resource and Environmental Management

Lecture: Tues, Thurs 9:00 am – 10:15 am, LIB 411
Laboratory: Tues 10:30 am – 1:15 pm, LIB 411 and LSB 225A

Instructor:
Dr. David Stoner
BNR 363
david.stoner@usu.edu
Office hours: Thursdays 12:30 -1:30 PM or by appointment

Teaching Assistant:
Robert Bidner
bidner1rjj@gmail.com
Office hours: W: 2:00-4:00 PM in the NR atrium, or by appointment

Class fees: Course fee of $40 covers costs associated with class field trips and labs including transportation, supplies and equipment.

Course Web Page: All course material including announcements, syllabus, lecture materials, assignments, and labs will be posted on Canvas (https://canvas.usu.edu).

Course Description: This class is designed to train natural resource students in developing and implementing programs for the inventory, monitoring, and assessment (IMA) of wildland ecosystems. The class will cover all phases of the monitoring process, from generating hypotheses and study design, to data collection and analysis, to interpretation and reporting of results. Basic IMA techniques will be introduced, and there will be an emphasis on data analysis and interpretation.

<table>
<thead>
<tr>
<th>Course objective</th>
<th>IDEA Center learning objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding major concepts in study design, data collection, and data analysis</td>
<td>Learning fundamental principles, generalizations or theories</td>
</tr>
</tbody>
</table>
| Developing abilities to apply basic resource management monitoring tools and methods, including study design and data analysis | 1) Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course
2) Learning to apply course material (to improve thinking, problem solving, and decisions) |

Pre-requisites: BIOL/WATS 2220; MATH 1100 or higher (C- grade or better); STAT 2000 or 3000 (C- grade or better); WILD 2400. Pre- or Co-requisite: WILD 3810


Laboratory and Field Trips: Lab time will consist of lectures, computer-oriented instruction, and field trips. You must be on time and properly prepared for each lab, including having completed assigned readings. Unless specified otherwise, lab assignments are due by 9 AM on
the Thursday following lab. On lab days we will meet in LIB 411 before moving to LSB 225A for computer lab sessions, unless instructed otherwise. For outdoor labs, you will need to bring the required materials and equipment, including appropriate clothing, food, and water. Field trips will take place unless severe weather is actually occurring. There are two all-day field trips, one on Saturday, Sept. 7 and one on Saturday, Sept. 21. These field trips are mandatory.

Grading: Final grades will be based on:

A) Two exams (25% * 2 = 50%)
B) Term paper (monitoring proposal) (25%)
C) Lab and lecture exercises* (25%)

* You may drop your lowest grade in this category.

Grades will be assigned as:

| A = 93-100% | B- = 80-82.9% | D+ = 67-69.9% |
| A- = 90-92.9% | C+ = 77-79.9% | D = 63-66.9% |
| B+ = 87-89.9 | C = 73-76.9% | D- = 60-62.9% |
| B = 83-86.9% | C- = 70-72.9% | F = <60% |

The official USU policy is, “For work in graded courses, A shall denote exceptional performance, B above average performance, C satisfactory performance, D poor performance, and F failing performance.”
(http://catalog.usu.edu/content.php?catoid=8&navoid=1650#GPA_Hours_and_Quality_Points).

Late assignments: For each school day an assignment is late, the grade will be reduced by 10%.

Attendance: Unexcused laboratory absences will result in a zero for that lab assignment. Excuses for absence due to illness, family emergencies, or other unanticipated events will be handled on an individual basis.

NOTE: Make-up exams will not be given except under EXTRAORDINARY CIRCUMSTANCES.

Cell phones and laptops: Please turn off your phones while in class. If you are bringing a laptop for note-taking, please refrain from checking email or using social media during the class period.

Accommodation: The Americans with Disabilities Act states: “Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille.”

Ethics: All students are expected to perform in accordance with implicit and explicit honor codes of the College of Natural Resources and Utah State University. Cheating and plagiarism will not be tolerated, and students caught violating the honor code will be subject to CNR/USU disciplinary procedures. Plagiarism includes knowingly "representing, by paraphrase or direct
quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." In accordance with USU’s policy “the penalties for plagiarism are severe and include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling” To learn more about USU’s “Academic Integrity” and plagiarism policies: [http://catalog.usu.edu/content.php?catoid=8&navoid=1572](http://catalog.usu.edu/content.php?catoid=8&navoid=1572).

**Classroom environment:** Discriminatory behavior related to a person’s age, sex, gender identity, sexual orientation, race, ethnicity, national origin, creed, religion, or disability is unacceptable and will not be tolerated. Proper behavior for students prominently includes refraining from actions that disrupt class. To learn more about USU's Student Code, see [http://catalog.usu.edu/content.php?catoid=8&navoid=1572](http://catalog.usu.edu/content.php?catoid=8&navoid=1572).

**Sexual Harassment:** Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EOO Office at 797-1266.

---

**Tentative Schedule**

(Schedule is provided for students’ convenience and may be changed at instructor’s discretion. Reading assignments can be viewed in Canvas under “Syllabus” or “Assignments”)

---
<table>
<thead>
<tr>
<th>WK</th>
<th>DAY</th>
<th>CLASS</th>
<th>DATE</th>
<th>TOPIC</th>
<th>READING ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tues</td>
<td>Lect 1</td>
<td>27-Aug</td>
<td>Course overview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tues</td>
<td>Lab 1</td>
<td>27-Aug</td>
<td>Review GPS, Orienteering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 2</td>
<td>29-Aug</td>
<td>What is IMA and why is it done?</td>
<td>RD: Veblen et al. 2014 &amp; Elzinga, Ch. 1</td>
</tr>
<tr>
<td>2</td>
<td>Tues</td>
<td>Lect 3</td>
<td>3-Sep</td>
<td>The monitoring process</td>
<td>RD: Elzinga, Ch. 2 &amp; 14; and samp. proposal</td>
</tr>
<tr>
<td></td>
<td>Tues</td>
<td>Lab 2</td>
<td>3-Sep</td>
<td>Descriptive statistics, pivot tables, R basics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 4</td>
<td>5-Sep</td>
<td>Conceptual models &amp; setting goals</td>
<td>RD: Elzinga, p. 280 &quot;Eco. Models&quot;; samp. proposal</td>
</tr>
<tr>
<td></td>
<td>Sat.</td>
<td>Field trip</td>
<td>7-Sep</td>
<td>Hardware Ranch field trip</td>
<td>RD: Elzinga, ch. 12, 1st of half of chapter</td>
</tr>
<tr>
<td>3</td>
<td>Tues</td>
<td>Lect 5</td>
<td>10-Sep</td>
<td>Field trip recap</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tues</td>
<td>Lab 3</td>
<td>10-Sep</td>
<td>Field trip data entry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 6</td>
<td>12-Sep</td>
<td>Sampling design</td>
<td>RD: ch. 7 (pp. 76-95); review field exercise</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 7</td>
<td>17-Sep</td>
<td>Sampling design</td>
<td>RD: Elzinga, ch. 11</td>
</tr>
<tr>
<td>4</td>
<td>Tues</td>
<td>Lab 4</td>
<td>17-Sep</td>
<td>prep for field trip; protocols, materials</td>
<td>RD: Elzinga, ch. 5 (164-167)</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 8</td>
<td>19-Sep</td>
<td>Hypothesis testing, t-tests</td>
<td>RD: p. 154-156, 164-167 and review 76-95</td>
</tr>
<tr>
<td></td>
<td>Sat.</td>
<td>Field trip</td>
<td>21-Sep</td>
<td>Ted Daniels field trip</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tues</td>
<td>Lect 9</td>
<td>24-Sep</td>
<td>Field trip recap</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tues</td>
<td>Lab 5</td>
<td>24-Sep</td>
<td>Field trip data entry/Hypothesis test, t-tests</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 10</td>
<td>26-Sep</td>
<td>Vegetation / habitat sampling</td>
<td>RD: Elzinga, ch. 12, ~ 2nd half of chapter</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 11</td>
<td>1-Oct</td>
<td>ANOVA</td>
<td>RD: Elzinga, p. 167-169</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 12</td>
<td>3-Oct</td>
<td>Veg / habitat cont'</td>
<td>Review Ch. 12</td>
</tr>
<tr>
<td>6</td>
<td>Thurs</td>
<td>Lect 13</td>
<td>8-Oct</td>
<td>ANOVA II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 7</td>
<td>8-Oct</td>
<td>ANOVA II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 14</td>
<td>10-Oct</td>
<td>Mid-term 1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Thurs</td>
<td>Lect 15</td>
<td>15-Oct</td>
<td>Forest review</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 8</td>
<td>15-Oct</td>
<td>Forest analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 16</td>
<td>17-Oct</td>
<td>Intro to wildlife sampling; mark-recapture</td>
<td>RD: Elzinga, ch.13, pp. 233-236 (mark-recapture)</td>
</tr>
<tr>
<td>8</td>
<td>Thurs</td>
<td>Lect 17</td>
<td>22-Oct</td>
<td>Distance sampling</td>
<td>RD: Elzinga, ch.13 (distance); &quot;distance_TWS&quot;</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 9</td>
<td>22-Oct</td>
<td>Distance Lab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 18</td>
<td>24-Oct</td>
<td>GUEST SPEAKER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 10</td>
<td>29-Oct</td>
<td>Correlation and regression</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 20</td>
<td>31-Oct</td>
<td>GUEST SPEAKER</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Thurs</td>
<td>Lect 21</td>
<td>5-Nov</td>
<td>ANCOVA and multiple linear regression</td>
<td>RD: &quot;multiple linear regression'</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 11</td>
<td>5-Nov</td>
<td>ANCOVA and multiple linear regression</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 22</td>
<td>7-Nov</td>
<td>GUEST SPEAKER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 12</td>
<td>12-Nov</td>
<td>Monitoring resources</td>
<td>landscape toolbox, IRIT 2018</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 24</td>
<td>14-Nov</td>
<td>Mid-term 2</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Thurs</td>
<td>Lect 25</td>
<td>19-Nov</td>
<td>Chi square and logistic regression</td>
<td>RD: Elzinga, ch. 9: 169-172</td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 13</td>
<td>19-Nov</td>
<td>Chi Square lab</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 26</td>
<td>21-Nov</td>
<td>GUEST SPEAKER</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Thurs</td>
<td>Lect 27</td>
<td>26-Nov</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Thurs</td>
<td>Lab 14</td>
<td>26-Nov</td>
<td>Monitoring proposals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 28</td>
<td>28-Nov</td>
<td>THANKSGIVING - NO CLASS</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Thurs</td>
<td>Lect 28</td>
<td>3-Dec</td>
<td>Employment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 15</td>
<td>3-Dec</td>
<td>Writing workshop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 30</td>
<td>5-Dec</td>
<td>Wrap-up: Final Papers Due / Presentations</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Thurs</td>
<td>Lect 29</td>
<td>10-Dec</td>
<td>NO CLASS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lab 15</td>
<td>10-Dec</td>
<td>NO CLASS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thurs</td>
<td>Lect 30</td>
<td>12-Dec</td>
<td>Final Exam (9:30-11:20 AM)</td>
<td></td>
</tr>
</tbody>
</table>
WILD 4880 Genetics in Conservation and Management 3 cr.

Course Description

Principles of modern genetics, with applications, examples, and assignments related to ecology and management issues in plant and animal species. Emphasis will be on molecular marker systems and how they can be used in investigations of gene flow patterns among populations, population dynamics, adaptation, captive breeding programs, definition of evolutionarily significant units, and other management applications. 3 cr. hrs.

Prerequisite/Restriction: CHEM 1110 or CHEM 1210; and BIOL 1610.

Semester(s) Traditionally Offered: Spring

Course Objectives

By the end of this course, you will have:

- Gained an understanding of basic genet concepts at the molecular, individual, population, and species levels.
- Gained an understanding of how genetic information can be used to inform ecological questions and management decisions.
- Improved your ability to read, interpret, and critique scientific studies and management reports based on genetic information.

Learning Objectives

Students succeeding in the course will learn:

- How molecular variation is related to phenotypic variation in plants and animals.
- The mechanism and consequences of natural selection on phenotypes and genotypes.
- How genetic diversity is generated, maintained, lost, and subdivided over time in natural populations.
- The basic mechanisms of inbreeding depression and outbreeding depression.
- How to assess whether a population is in Hardy-Weinberg equilibrium, using codominant molecular data, and how this information can be useful in management scenarios.
- The molecular basis and practical applications underlying common molecular marker systems.
- How phylogenetic trees and dendrograms are constructed and interpreted using molecular data.
- How genetic structure is assessed in natural populations.
- How genetic tools can be applied to elucidate specific features of natural population (e.g. gene flow, migration rates, parentage, effective population sizes, bottlenecks, range expansions, neutral diversity).
- How to read and critique scientific papers addressing management issues using genetic data.
- The difference between neutral and adaptive variation in natural populations, how each is assessed, and how data on both can be used jointly.
- The basics of several emerging approaches and applications in genetics, including PCR, DNA sequencing, qPCR, eDNA, and metabarcoding.

Instructor

Karen Mock, Professor

NR 338

Office hours: by appointment
Course Resources

No textbook is required. Required and optional readings will be provided during the class. You will need MS Powerpoint, MS Word, MS Excel (or Open Office versions) and a pdf reader on your computer to view and download files. It is your responsibility to get this software (or an Open Office version) on your own computer or locate a USU computer equipped with this software that you can use for this course. Additional free software will be required for homework exercises during the course and you must be able to upload this software.

Evaluation of Student Performance

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (best 8 of 9)</td>
<td>100</td>
</tr>
<tr>
<td>Participation (a subjective score)</td>
<td>25</td>
</tr>
<tr>
<td>Homework (4 @ 50 pts. each)</td>
<td>200</td>
</tr>
<tr>
<td>Exams (6 @ 100 pts. each)</td>
<td>600</td>
</tr>
<tr>
<td>Total Points</td>
<td>925 pts.</td>
</tr>
</tbody>
</table>

Grading Standards

The following grading standards will be used in this class:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 % to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0 % to 90.0%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0 % to 87.0%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0 % to 83.0%</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0 % to 80.0%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0 % to 77.0%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0 % to 73.0%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0 % to 70.0%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0 % to 67.0%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0 % to 60.0%</td>
</tr>
<tr>
<td>F</td>
<td>≤ 59.0 % to 0.0%</td>
</tr>
</tbody>
</table>

Course Schedule/Outline

See "Modules" section in Canvas course. These will be updated as required during the semester.
Make-up Policy for Exams

Makeup exams will only be provided in the event of well-documented incapacitating illness, family bereavement, or other extreme events. Arrangements will be made on a case-by-case basis at the discretion of the instructor. Alternate exam times prior to the regularly scheduled exams (due to an officially excused absence for a reason other than those above) must be arranged with the instructor at least a week in advance.

Late Work Policy

All assignments are due on the designated dates. You may submit assignments up to 3 days past the due date, but you will lose 10% of the available points per day. If you have circumstances that prevent you from turning assignments in on time, please contact me.

Nonattendance Policy

Students May Be Dropped For Nonattendance

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. (This does not remove responsibility from the student to drop courses which he or she does not plan to attend.) This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar's Office through their preferred e-mail account (see 2018-2019 General Catalog).

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: http://www.usu.edu/riskmgmt/

Classroom Civility.

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read Student Code Article V Section V-3 for more information.
University Policies & Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating**: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually.”
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor, or engaging in any form of research fraud.

- **Falsification**: altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism**: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: ARTICLE VI. University Regulations Regarding Academic Integrity
Sexual Harassment/Title IX

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU’s Office of Equity for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305), and has designated the Office of Equity Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term ‘extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: https://studentaffairs.usu.edu, (435) 797-1712, studentservices@usu.edu, TSC 220
- Access and Diversity: http://accesscenter.usu.edu, (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: http://accesscenter.usu.edu/multiculture, (435) 797-1728, TSC 315
- LGBTQ+ Programs: http://accesscenter.usu.edu/lgbtqa, (435) 797-1728, TSC 3145
- Provost’s Office Diversity Resources: https://www.usu.edu/provost/diversity, (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University: https://studentconduct.usu.edu/studentcode

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII.
WILD 4950 Scientific Communication for Natural Resource Professionals

Spring 2019 Syllabus
2 credits, W/F 1:00–2:15, Location TBD

Instructors:

Kendall Becker  
Science Writing Center Assistant Director  
ESCL 044B  
kendall.becker@usu.edu  
(206) 552-5340

Andrew Felton, PhD  
QLIB 202  
andrew.felton@usu.edu  
(612) 251-8554

Office hours: Please email Kendall and Andrew to ask questions or set up meetings at any time.
Prerequisites: ENGL 2010  
Pre- or co-requisite: WILD 3800 Wildland Plants and Ecosystems

Course Description: Effective communication is a critical skill for natural resource professionals, who frequently interface with scientists, other professionals, policymakers, and the public. The purpose of this course is to enhance the scientific literacy skills of natural resource professionals by teaching: 1) how to efficiently read scientific articles, 2) how to reverse outline different genres of scientific writing and oral presentations to learn how to construct them, 3) how to synthesize research and new ideas, and 4) how to present that information effectively in written and oral form to different audiences.

Course activities center around two common types of scientific discourse, a literature synthesis written for scientific readership and a project proposal. The purpose of the literature synthesis is to practice the skill of gathering and synthesizing scientific content. The purpose of the project proposal is to creatively design a way to advance science, improve management, or inform the public. The literature synthesis and the project proposal will be broken down into a series of formal and informal assignments that target how to read primary literature; how to decide on a focus for the final product; how to create an annotated bibliography; and how to outline, draft, and revise. Both written and oral presentation activities will involve multiple drafts with opportunities to incorporate instructor and peer feedback.

Attendance and Excused Absences Policy: You are responsible for emailing Kendall and Andrew in advance of any absences and arranging appropriate makeup activities.
IDEA Learning Objectives: The three essential objectives as articulated in the IDEA evaluation system are: (i) “Developing skills in expressing oneself orally or in writing,” (ii) “Learning how to find, evaluate, and use resources to explore a topic in depth,” and (iii) “Developing creative capacities.” Please approach us at any time during the semester to let us know if we are not 100% effective in achieving these outcomes for you, so we can adjust our methods.

Assessments of Student Learning: We will assess student learning using formative and summative assessments:

Formative assessments
- Reflections (8 total; ~1,000 words total): Seven minutes of focused writing in response to a specific prompt; these assignments will be opportunities for students to brainstorm topic ideas, reflect on communication concepts learned in class, and analyze their individual creative process. Instructors will read and comment on the content of these exercises. (Outcomes i and iii)
- Summary of a scientific journal article (200 words): This will be the culmination of students completing a series of steps to become familiar with how to read a scientific paper. Instructors will give feedback on content and style. (Outcomes i, ii, and iii)
- Annotated bibliographies (2 total; 5 articles each (WILD 4950) or 10 articles each (WILD 6900); ~1000 words total): Instructors will give feedback on content, in relation to students’ topics for the literature synthesis and proposal project. (Outcomes i and ii)
- Sessions at the Science Writing Center (2 total): Students will complete 25-minute, one-on-one sessions with a tutor to work on the literature synthesis and proposal project. (Outcomes i, ii, and iii)
- First submission of the literature synthesis (1,000 words): Instructors will give feedback on content and style. (Outcomes i, ii, and iii)
- Proposal project idea (50 words): Students will describe their proposal idea and its importance in a paragraph. Instructors will give feedback on content. (Outcomes i, ii, and iii)
- First submission of the written proposal project (1,000 words): Instructors will give feedback on content and style. (Outcomes i, ii, and iii)
- Second submission of the written proposal project to a peer for feedback (300 words): Instructors will evaluate students on the content and style of their feedback. (Outcomes i and iii)
- 5-minute oral presentation on a grammar topic of their choice: This will help students become independent at solving the grammar questions they encounter in their own writing. Instructors will give feedback on content and style. (Outcomes i, ii, and iii)
- 8-minute video of oral presentation on proposal project: Students will specify their audience (e.g., professional/scientific audience or public/policymaker audience). Instructors will give feedback on content and style. (Outcomes i, ii, and iii)

Summative assessments
- Final literature synthesis. Evaluated by instructors. (Outcomes i, ii, and iii)
- Final written proposal project. Evaluated by instructors. (Outcomes i, ii, and iii)
- Final oral presentation of proposal project. Evaluated by instructors and peers. (Outcomes i, ii, and iii)
Students will write 4,550 words during this course. Students will receive feedback on their written work and on a video of their oral presentation. They will have opportunities to revise their written work and their oral presentation based on this feedback. Written work represents 50% of the grade. Oral presentations represent 30% of the grade. Undergraduate students will base each written project on a minimum of 5 peer-reviewed articles. Graduate students will base each written project on a minimum of 10 peer-reviewed articles.

Grading:

<table>
<thead>
<tr>
<th>Written communication</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Homework assignments</td>
<td>10%</td>
</tr>
<tr>
<td>· Project 1: Scientific Literature Synthesis</td>
<td>20%</td>
</tr>
<tr>
<td>· Project 2: Project Proposal</td>
<td>20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oral communication</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Short oral presentation</td>
<td>5%</td>
</tr>
<tr>
<td>· Oral presentation video</td>
<td>10%</td>
</tr>
<tr>
<td>· Final oral presentation</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participation</th>
<th>20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>· Involvement in class</td>
<td>10%</td>
</tr>
<tr>
<td>· Meetings with instructors</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92.9</td>
</tr>
<tr>
<td>B+</td>
<td>87-89.9</td>
</tr>
<tr>
<td>B</td>
<td>83-86.9</td>
</tr>
<tr>
<td>B-</td>
<td>80-82.9</td>
</tr>
<tr>
<td>C+</td>
<td>77-79.9</td>
</tr>
<tr>
<td>C</td>
<td>73-76.9</td>
</tr>
<tr>
<td>C-</td>
<td>70-72.9</td>
</tr>
<tr>
<td>D+</td>
<td>67-69.9</td>
</tr>
<tr>
<td>D</td>
<td>60-66.9</td>
</tr>
<tr>
<td>F</td>
<td>59.9 and below</td>
</tr>
</tbody>
</table>

Library Services: All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at libguides.usu.edu/rc.

Classroom Civility: Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such
behavior may be subject to disciplinary action. Read Student Code Article V Section V-3 for more information.

**Academic Freedom and Professional Responsibilities:** Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities.

**Academic Integrity** – “The Honor System”: Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: **"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."**

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

**Academic Dishonesty** - The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating:** using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually;”
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.

- **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.
• **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: [ARTICLE VI. University Regulations Regarding Academic Integrity](#)

**Sexual Harassment/Title IX:** Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and [USU Policy 339](#) address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU’s [Office of Equity](#) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment ([USU Policy 305](#)), and has designated the Office of Equity Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

**Withdrawal Policy and "I" Grade Policy:** Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term ‘extenuating’ circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

**Students with Disabilities:** USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the [Disability Resource Center (DRC)](http://accesscenter.usu.edu) as early in the semester as possible (University Inn # 101, (435) 797-2444, [drc@usu.edu](mailto:drc@usu.edu)). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

**Diversity Statement:** Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: [https://studentaffairs.usu.edu](https://studentaffairs.usu.edu), (435) 797-1712, [studentservices@usu.edu](mailto:studentservices@usu.edu), TSC 220
- Student Legal Services: [https://ususa.usu.edu/student-association/student-advocacy/legal-services](https://ususa.usu.edu/student-association/student-advocacy/legal-services), (435) 797-2912, TSC 326,
- Access and Diversity: [http://accesscenter.usu.edu](http://accesscenter.usu.edu), (435) 797-1728, [access@usu.edu](mailto:access@usu.edu); TSC 315
• Multicultural Programs: http://accesscenter.usu.edu/multiculture, (435) 797-1728, TSC 315
• LGBTQA Programs: http://accesscenter.usu.edu/lgbtqa, (435) 797-1728, TSC 3145
• Provost’s Office Diversity Resources: https://www.usu.edu/provost/diversity, (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University: https://studentconduct.usu.edu/studentcode

Grievance Process: Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII.
Full details for USU Academic Policies and Procedures can be found at:

• Student Conduct
• Student Code
• Academic Integrity
• USU Selected Academic Policies and Procedures
• USU Academic Policies and Procedures
• Academic Freedom and Professional Responsibility Policy

Emergency Procedures: In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.

Nonattendance Policy: If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. (This does not remove responsibility from the student to drop courses which he or she does not plan to attend.) This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar's Office through their preferred e-mail account (see 2018–2019 General Catalog).
Return to Table of Contents

WILD 5350 Wildland Soils 3 cr.

- **Syllabus:** WILD and PSC 5350/6350 Wildland Soils

**Location:** Natural Resources Building 217  
**Time:** Spring 2018; Mondays and Wednesdays 2:30 – 4:00pm  
**Instructor:** Dr. Andrew Kulmatiski, andrew.kulmatiski@usu.edu, NR 224, 881-5496  
**Office hours:** Wednesdays 4:00-5:00 pm and by appointment.  
**Teaching Assistant:** None  
**Course website:** Look up course on Canvas: https://usu.instructure.com/courses/484517  
**Course fee:** $49 to cover lab consumables

**COURSE OBJECTIVES:** To gain a working understanding of plant-soil interactions. By the end of the course you will be able to visit a new site and know what measurements will be needed to understand how water and nutrients move through the soil, how this effects plant growth, and how different management approaches are likely to affect the soils and plants of that system. This course will give you the tools to answer such questions as how much will fertilizer increase plant growth / how will anthropogenic nitrogen deposition affect plant growth and composition? Are my plants water stressed? Is my site fixing carbon? Are soil organisms increasing or decreasing diversity or productivity at my site? How will climate change affect water and nutrient cycling at my site?

**COURSE DESCRIPTION/FORMAT:** 3 credits. Two, 1.5 hour, class/laboryatory meetings each Monday and Wednesday. This course is designed to be about half reading and lecture and half hands-on exercises. The typical class day will require that the student reads a chapter or paper from the primary literature. Classes will begin with a short, easy quiz on the reading for the day, continue with a 20-40 minute lecture and finish with a roughly one-hour exercise or set of exercises. Examples of exercises include measuring soil texture, processing soil N data, developing soil characteristic curves, observing soil organisms, and modding water flow through the soil using the Hydrus 1D computer model. Some of the material, for example on redox chemistry and atmospheric physics will be difficult, but the course is designed to ensure that you become comfortable with the material during class.

There will be two midterms and one cumulative final. One week before each test I will post a rough list of potential exam questions. These questions may be modified slightly for the exams, but all exam questions will be derived from the study list- if you can answer all the questions on the study list you will get an A on the tests. We will have an open format review session in every class before an exam. By ‘open format’ I mean that I will come to class and help with any questions you may have from the study list. The quizzes are designed to be a simple ‘litmus’ test for whether or not you did the reading before class. The exercises should largely be completed in class and the exams will have no surprises, so if you come to class prepared, you should do very well in the course.

**PREREQUISITES:** Students are expected to have a working knowledge of introductory chemistry. We will be discussing the chemical composition of minerals, mineral weathering, redox chemistry and nutrient cycling.

**STUDENT ASSESSMENT:**

1) **Daily Quizzes.** At the beginning of class each day there will be a short quiz on the day’s reading or material from the previous class. Each quiz will be worth 10 points = 200 points.

2) **Exercises:** These will largely be completed in-class = 220 points.

3) **Midterms 1 and 2:** 200 points each = 400 points

4) **Cumulative final:** 400 points

**Total points:** 1220
**Grade Distribution***:

\[
\begin{array}{ll}
1135-1220 (93\%+) & 939-975 (77-79.9\%) \text{ C+} \\
1098-1134 (90-92.9\%) & 891-938 (73-76.9\%) \text{ C} \\
1061-1097 (87-89.9\%) & 854-890 (70-72.9\%) \text{ C-} \\
1013-1060 (83-86.9\%) & 732-853 (60-69.9\%) \text{ D} \\
976-1012 (80-82.9\%) & <732 (<59.9\%) \text{ F}
\end{array}
\]

**TEACHING ASSISTANTS:**
There is no teaching assistant for this course.

**READING MATERIALS:**
The required textbook for the class is ‘Ecology and Management of Forest Soils: Fourth Edition’ by Dan Binkley and Richard F. Fisher (ISBN 978-0-470-97947-1 or -4). We will be reading the whole book. A few articles from the primary literature will also be assigned and loaded onto the class CANVAS page.

**CANVAS:**
Lecture materials (lecture notes, data, models, etc.) will be on canvas immediately before class.

**ABSENTEEISM POLICY:**
Attending class is your responsibility. Much of the course grade is derived from in-class activities. If you miss a quiz, you must present a valid excuse (e.g. doctor’s statement, jury selection, field trip in another course, etc.) before you can make it up. If you know you will be absent, please contact the instructor beforehand to see if your excuse is acceptable, and to make arrangements for a makeup quiz.

**ACCOMMODATIONS FOR DISABILITIES:**
Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disabilities Resource Center (DRC) in Room 101 of the University Inn, 797-2444 voice, 797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

**ACADEMIC INTEGRITY:**
Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all USU students. Infractions (cheating, falsification, and plagiarism) and their associated
WILD 5700(CI) Forest Assessment and Management (3 cr.)
Spring 2019

Julia Burton, Assistant Professor  
BNR 213  
Julia.burton@usu.edu

Description
Detailed analysis of forest stand structure and growth. Development of silvicultural prescriptions to meet specific objectives. Analysis of costs and benefits of alternative management strategies. Emphasizes forest management to achieve a broad range of management objectives.

Background and Objectives
You will apply a range of skills and tools in a hands-on approach to learning. By the end of the course you will be able to conduct an assessment that will support sound stand management decisions. You will:

a) Set objectives and specify evaluation criteria
b) Measure, describe and interpret forest vegetation inventories
c) Develop, test and display likely effects of alternative silvicultural treatments
d) Prepare written and oral reports for stand level project

Schedule: Tuesday and Thursday 9:00-10:15 AM in BNR 112B

Grading:
A. Grading will be based on:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%+</td>
<td>A</td>
</tr>
<tr>
<td>80-89%</td>
<td>B</td>
</tr>
<tr>
<td>70-79%</td>
<td>C</td>
</tr>
<tr>
<td>60-69%</td>
<td>D</td>
</tr>
<tr>
<td>59% or less</td>
<td>F</td>
</tr>
</tbody>
</table>

B. Percentages will be based on:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionalism</td>
<td>5%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Assignments</td>
<td>40%</td>
</tr>
<tr>
<td>Final project</td>
<td>40%</td>
</tr>
<tr>
<td>Writing fellow</td>
<td>5%</td>
</tr>
</tbody>
</table>

The “professionalism” component of your grade will be based on my assessment of your preparation and participation, teamwork, meeting of deadlines, etc. (in other words, those behaviors that you value in a colleague and employee). There will be no exams – you will be evaluated on the quality of your work.

Reading:
There will be required readings from scientific journals, texts, agency publications, etc. I expect you to come to class prepared – this includes having read assigned material. There will be in-class quizzes based on assigned readings and recorded lectures.

Written and oral reports:
There will be a series of weekly assignments. For most of these you will prepare a brief technical report. Constructive feedback on these reports will allow you to improve succeeding assignments. Reporting requirements for the final project will be a written report and oral presentation. In the written report you will communicate the results of your technical forest stand assessment. Following constructive feedback
on the initial draft of your report you will revise and resubmit. You will also give an oral presentation of your stand assessment.

**Accommodations for disabilities:**

Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disabilities Resource Center (DRC) in Room 101 of the University Inn, 797-2444 voice, 797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.

**Academic integrity:**

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all USU students. Infractions (cheating, falsification, and plagiarism) and their associated penalties are described in the USU Academic Policies and Procedures Manual (www.usu.edu/policies).

If you have any questions about what constitutes plagiarism, CHECK WITH ME!

**Class schedule (subject to change):**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Quiz</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Basic forest measurements, Rotations</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Habitat types; site quality; site index</td>
<td>Module 1 readings</td>
</tr>
<tr>
<td>15</td>
<td>Managerial finance</td>
<td>Density management 1-3</td>
</tr>
<tr>
<td>17</td>
<td>Managerial finance</td>
<td>Density management 4-6</td>
</tr>
<tr>
<td>22</td>
<td>Density management</td>
<td>Density management 7-8</td>
</tr>
<tr>
<td>24</td>
<td>Introduction to FVS/SVS</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Density management &amp; FVS/SVS</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Density management &amp; FVS/SVS</td>
<td></td>
</tr>
<tr>
<td>February</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Density management &amp; FVS/SVS</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Density management &amp; FVS/SVS</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Stand structure and fire behavior</td>
<td>Module 5 recorded lecture quiz</td>
</tr>
<tr>
<td>14</td>
<td>FVS Fire</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Uneven-aged silviculture</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Uneven-aged silviculture</td>
<td>Module 6 readings</td>
</tr>
<tr>
<td></td>
<td>Topic</td>
<td>Quiz</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>26</td>
<td>FVS Uneven-aged silviculture</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>FVS Uneven-aged silviculture</td>
<td></td>
</tr>
<tr>
<td>March</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Goals, objectives and evaluation criteria</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Project consultations, no class</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td><strong>Spring break</strong></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td><strong>Spring break</strong></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Reproduction methods/silvicultural systems</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Reproduction methods/silvicultural systems</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>FVS Shelterwood</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Insects and disease</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FVS: Insects and disease</td>
<td>Insects and disease videos</td>
</tr>
<tr>
<td>4</td>
<td>Building resilience</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Specialist's report consultation</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Specialist's report consultation</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Specialist's report consultation</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Specialist's report consultation</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Presentations and report due</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Finals week</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Finals week</td>
<td></td>
</tr>
</tbody>
</table>
Course description: Examines causes, effects, and management options for selected biotic and abiotic agents of disturbance in wildland ecosystems. 3 credits. [From course catalog.]

Class times: M, W 8:30 – 9:20 NR 217
Th 2:00 – 5:00 QL 222

Instructor: Dr. Larissa Yocom, with contributions from Dr. Barbara Bentz
Office: NR 236
Email: larissa.yocom@usu.edu
Phone: 435-797-4155
Office hours: MW 9:30 – 10:30 am or by appointment

Prerequisites: Prior coursework in ecology

Text: There is no required textbook for this course. Required readings will be posted to Canvas.

Course Fee: The course fee is used for transportation to field trips.

COURSE DESCRIPTION

Disturbances such as wildfire, insect outbreaks, wind, landslides, and drought are important processes that shape ecosystems in both subtle and dramatic ways. This course will focus primarily on wildfire, but will also cover other key disturbances that impact the western U.S. and ecosystems worldwide. Course topics will include disturbance mechanisms, immediate and lagged effects on ecosystems, variability in disturbance regimes over time and space, and vegetation responses and succession. The course will also cover management actions designed to build resilience to disturbance, respond to disturbance, and mimic disturbance. The course includes a weekly 3-hour lab; this time will be used to go on field trips for much of the semester.

STUDENT LEARNING EXPECTATIONS

IDEA Objective # 2: Learning fundamental principles, generalizations, or theories.
   1. Mechanisms and effects of disturbance, ecosystem responses, succession
   2. Management as it relates to disturbance
IDEA Objective #8: Developing skills in expressing oneself orally or in writing.
   1. Proposal on selected course topic
   2. Presentation of the proposal
   3. Written exams
   4. Participation in discussion and other activities

IDEA Objective #9. Learning how to find and use resources for answering questions or solving problems.
   1. Research into topic of choice
   2. Evaluation of quality of sources
   3. Development of skills in pulling out key information from sources

COURSE WORK

Readings
The readings for the class have been selected to give you important background information on each topic, and will complement the material covered in lectures and on field trips. The readings are not optional.

Quizzes (15%)
Students will take quizzes on the reading material each class day throughout the course. These quizzes must be completed prior to the beginning of the class. The purpose of these quizzes is to motivate you to do the reading so that you are prepared for class.

Exams (15% each)
Students will take two exams (15% each) during the semester. These will be open-book essay-style exams, each covering material from approximately half of the semester.

Research Proposal (30%)
Students will write a research proposal, in groups, on the topic of their choice. This will be an in-depth, semester-long project with multiple due dates and multiple opportunities to earn points throughout the semester. The proposal project is described in a separate document.

Proposal Presentation (10%)
At the end of the semester, students will give presentations on their proposals. More details will be given in a separate document.

Participation (10%)
Students are expected to participate in class. Participation has three parts: attendance, being an active participant in class, and turning in field trip or lab products.

   Attendance: If you cannot attend class or a field trip for some reason, please notify me ahead of time. If you miss class or a field trip, you will still be responsible for knowing the material covered.
Participation: Your participation grade will include a subjective assessment based on my perception of the quality and quantity of your participation throughout the semester (asking questions, participating in discussions and other activities, making comments and answering questions). Research has shown that students learn more and develop critical thinking skills when they participate in discussion, which is why participation is included as a course requirement.

Field trip or lab outputs: Field trips and labs will consist of field activities, labs, data analysis, and computer models. There will be products from some of these labs that you will be required to turn in, and these will make up part of your participation grade.

Required meetings (5%)
Each student is required to make two 5-minute visits to my office during the semester. If the visit lasts longer than 5 minutes, that’s fine. I’d like the chance to learn a little bit more about you and check in with you about the course and the proposal writing. The first visit must take place during the first 4 weeks of class, and the second visit must take place during the last 8 weeks of class. You are welcome to come by during office hours, just stop by, or make an appointment. Of course, you’re welcome to come by more than twice if you need to or want to.

In summary, points are earned as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15%</td>
</tr>
<tr>
<td>Proposal</td>
<td>30%</td>
</tr>
<tr>
<td>Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Required Meetings</td>
<td>5%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Late work policy
All assignments are due on the designated dates. You may submit assignments up to 3 days past the due date, but you will lose 10% of the available points per day. If you have circumstances that prevent you from turning assignments in on time, please contact me.

Grades are given as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93.0% to 100%</td>
</tr>
<tr>
<td>A-</td>
<td>90.0% to &lt; 93.0%</td>
</tr>
<tr>
<td>B+</td>
<td>87.0% to &lt; 90.0%</td>
</tr>
<tr>
<td>B</td>
<td>83.0% to &lt; 87.0%</td>
</tr>
<tr>
<td>B-</td>
<td>80.0% to &lt; 83.0%</td>
</tr>
<tr>
<td>C+</td>
<td>77.0% to &lt; 80.0%</td>
</tr>
<tr>
<td>C</td>
<td>73.0% to &lt; 77.0%</td>
</tr>
<tr>
<td>C-</td>
<td>70.0% to &lt; 73.0%</td>
</tr>
<tr>
<td>D+</td>
<td>67.0% to &lt; 70.0%</td>
</tr>
<tr>
<td>D</td>
<td>60.0% to &lt; 67.0%</td>
</tr>
<tr>
<td>F</td>
<td>0.0% to &lt; 60.0%</td>
</tr>
</tbody>
</table>

Statement on plagiarism and cheating:
Plagiarism and cheating will not be tolerated. Any instance will result in failure of the assignment and depending on the circumstances, failure in the course.
Disability Statement
USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Class topic</th>
<th>Lab / field trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 27</td>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 29</td>
<td>History of thought on disturbance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aug 30</td>
<td>Human disturbance field trip</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sept 3</td>
<td>No class: Labor Day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 5</td>
<td>Disturbance geography, regimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 6</td>
<td>Tree-coring field trip</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sept 10</td>
<td>Succession</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 12</td>
<td>Developing a proposal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 13</td>
<td>Wildfire risk field trip</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sept 17</td>
<td>Plant adaptations to disturbance</td>
<td>Plant adaptations field trip</td>
</tr>
<tr>
<td></td>
<td>Sept 19</td>
<td>Plants: organisms to communities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 20</td>
<td>Ecosystem processes &amp; disturbance</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Sept 24</td>
<td>Animals and disturbance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sept 26</td>
<td>Dr. Rogers: aspen &amp; lichens</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Oct 1</td>
<td>Wildfire</td>
<td>Behave lab: QL 304</td>
</tr>
<tr>
<td></td>
<td>Oct 3</td>
<td>Floods and droughts</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 4</td>
<td>Recreation in Green Canyon</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Oct 8</td>
<td>Wind, snow and ice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 10</td>
<td>Large animal disturbance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 11</td>
<td>Dr. Bentz: Insect disturbances</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Oct 15</td>
<td>Dr. Bentz: Insects &amp; pathogens</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 17</td>
<td>Dr. Bentz: Insect disturbances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 18</td>
<td>Dr. Bentz: Insect field trip</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 20</td>
<td>Dr. DeRose: Disturbance interactions</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Oct 22</td>
<td>Dr. Bentz: Invasive species</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 24</td>
<td>Earth moving: erosion &amp; landslides</td>
<td>Wetlands/invasives field trip</td>
</tr>
<tr>
<td></td>
<td>Oct 25</td>
<td>Dr. Bentz: Invasive species</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Oct 29</td>
<td>Roads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Oct 31</td>
<td>Climate change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov 1</td>
<td>Dr. Bentz: Insect lab</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Nov 5</td>
<td>Carbon</td>
<td>Core sanding and Ecol Seminar</td>
</tr>
<tr>
<td></td>
<td>Nov 7</td>
<td>Non-forest disturbance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov 8</td>
<td>Evaluation and time to work</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Nov 12</td>
<td>Dr. DeRose: Disturbance interactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nov 14</td>
<td>Management: resilience to disturbance</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Nov 19</td>
<td>Management: response to disturbance</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Nov 21</td>
<td>No class: Thanksgiving holiday</td>
<td></td>
</tr>
</tbody>
</table>

237
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 22</td>
<td>No lab - Thanksgiving holiday</td>
</tr>
<tr>
<td>Nov 26</td>
<td>Management: mimicking disturbance</td>
</tr>
<tr>
<td>Nov 28</td>
<td>Dr. Bentz: Insect management</td>
</tr>
<tr>
<td>Nov 29</td>
<td>Avalanche field trip</td>
</tr>
<tr>
<td>Dec 1</td>
<td></td>
</tr>
<tr>
<td>Dec 3</td>
<td>Sociology and economics of disturbance</td>
</tr>
<tr>
<td>Dec 5</td>
<td>International perspective on disturbance</td>
</tr>
<tr>
<td>Dec 6</td>
<td>Student presentations</td>
</tr>
</tbody>
</table>
WILD 5750/6750 - APPLIED REMOTE SENSING  
Fall Semester, 2017  
9:30am - 10:20am MW (Lecture - NR105), 1:30-2:50 W (Lab – Q306/304)  
9:30am – 10:20am F (Extended Office/Lab)  

R. Douglas Ramsey - Instructor - 355a Natural Resources  
Office Phone - 797-3783; Office Hours - 10:30 - 12:00 MWF, or by Appt.  

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug./Sep 28, 30</td>
<td>Introduction to Digital Image Processing</td>
</tr>
<tr>
<td></td>
<td>The Remote Sensing Process</td>
</tr>
<tr>
<td></td>
<td>Remote Sensing Data Acquisition, Sensors</td>
</tr>
<tr>
<td>Sep. 6, 8</td>
<td>Image Processing Systems, Scientific Visualization, Black and White vs. Color vs. Multispectral</td>
</tr>
<tr>
<td>Sep. 11, 13</td>
<td>Color-Space Transforms, Data Fusion</td>
</tr>
<tr>
<td></td>
<td>Image Statistics: Descriptive, Univariate, Multivariate</td>
</tr>
<tr>
<td>Sep. 18, 20</td>
<td>Image Geometric Correction, Linear and polynomial transforms</td>
</tr>
<tr>
<td>Sep 25, 27</td>
<td>Image Preprocessing, Image Enhancement, Image Reduction, Transects, Contrast Enhancements, Band Ratioing, Spatial Filters, PCA, NDVI, Texture</td>
</tr>
<tr>
<td>Oct. 2, 4</td>
<td>Image Radiometric Corrections, Sensor Detector Error, Environmental Attenuation</td>
</tr>
<tr>
<td>Oct. 9, 11</td>
<td>Image Transforms</td>
</tr>
<tr>
<td>Oct. 16, 18</td>
<td>Spectral Indices – Vegetation, Soils, etc.</td>
</tr>
<tr>
<td>Oct. 23, 25</td>
<td>Image Classification</td>
</tr>
<tr>
<td>Oct./Nov. 30, 1</td>
<td>Supervised Classification, Unsupervised Classification,</td>
</tr>
<tr>
<td>Nov. 6, 8, 13, 15</td>
<td>Fuzzy Classification, Ancillary Data, Accuracy Assessment</td>
</tr>
<tr>
<td>Nov. 20, 27, 29</td>
<td>Spectral Change Detection, Thematic Change Detection</td>
</tr>
<tr>
<td>Dec. 4, 6</td>
<td>GIS Linkages and Wrap-up.</td>
</tr>
</tbody>
</table>

**Fall Semester 2017 Important Dates:**  
August 28...............Classes Begin  
September 4.............Holiday (Labor Day)  
October 20..............Fall Break (Friday Schedule on Thursday)  
November 22 - 24...........Holiday (Thanksgiving)  
December 8..............Last Day of Class
APPLIED REMOTE SENSING
WILD 5750/6750

GRADING POLICY

Grading will be based on class and lab assignments:

Weekly lab assignments will be given during the lab period and are due the following week unless I say otherwise. These assignments are worth 50 points. Grading will be for completeness, accuracy, and neatness.

In-class assignments will be given intermittently throughout the semester. The timing of these assignments will be somewhat random and will be worth 10 points each. These are due by the next class period unless I say otherwise.

Quizzes will be given intermittently throughout the semester. These will be open book. Each quiz is worth 25 points.

A final project will be due on the last regular day of class. The topic of your project will be of your own choosing but must be cleared with me. This project is worth 200 points.

Each class or lab assignment will be turned in electronically (e-mail) on/or before class or lab on the due date. Late lab assignments will be assessed a 5-point fee for every day they are late. In class assignments will loose 1 point per day they are late. The final project will not be accepted late.

I will grade your assignments based on content, accuracy, clarity of writing, organization, and neatness.

COURSE MATERIALS:

USB DRIVE OR EXTERNAL DISK:
A USB drive or external hard disk is required. The Quinney labs no longer save your personal profile to the server. You will need to back up your work every day. There are cloud type options as well (Box, Drop Box) for backing up your work, and you can always email your work to yourself. But back it up, you must. Nothing is more painful (or educational) than having all of your data lost right before you turn it in.

CANVAS:
We will use Canvas for announcements, submitting assignments, and grade reporting. It is your responsibility to use the Canvas system. Questions about Canvas can be directed to the USU IT service desk (it.usu.edu, servicedesk@usu.edu, 435-797-4357).

EMAIL:
The best way to contact Doug is via e-mail. I will try to respond to e-mails on the same day and within no more than two working days (I hope).

SOFTWARE
We will use ArcGIS, which is available on all computers on the third floor of the Quinney Library. Student licenses are also available to install on personal computers through the USU site license web site. Contact Doug for an authorization code. We will
also use R (R Project for Statistical Computing), and optionally the Python programming language.

CLASS POLICIES

ATTENDANCE AND PARTICIPATION:
Attending each lecture and lab session is necessary to achieve a satisfactory grade in this course. If you miss class, it is your responsibility to obtain materials or notes from other students or Canvas.

LATE WORK AND MAKE-UP EXAMS
It is your responsibility to turn in all work on time. Grades for assignments will be reduced by 10 percent for each day late. No make-up exams or quizzes will be offered unless prearranged with the instructor or as a result of a documented emergency.

USE OF COMPUTERS, TABLETS, AND MOBILE PHONES
Turn off or silence phones during class. Computers and tablets may be used only for taking notes or activities directly relevant to lecture material during class (i.e. no Facebook, Twitter, Hulu, etc.). Students should respect the rights of others to learn and minimize the possibility of distraction from the use of electronic devices. If the use of electronics presents a distraction to others during class, the student will be asked to stop using the device. If issues persist, the student will be asked to leave the class.

ACADEMIC HONESTY
Students are expected to produce original work. Plagiarism or falsification of any kind will be subject to disciplinary action. Offences will be referred to Utah State University Admissions office. The USU policy for academic honesty can be found at: http://catalog.usu.edu/content.php?catoid=12&navoid=3140. Please review this document to understand the Utah State University policy on academic honesty. If you have questions or concerns about the policy, please contact your instructor or academic advisor.

PLAGIARISM
Plagiarism includes knowingly “representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged used of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.” The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, and denial or revocation of degrees.

STUDENTS WITH DISABILITIES
Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will require some accommodation by the instructor, the student must contact the Disability Resource Center (435- 797-2444), preferably during the first week of the course. Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor.
Final Project Report Standards  
Applied Remote Sensing  
WILD 5750/6750

The final project for this class will be delivered on the last day of class in Microsoft Word or PDF format. The final paper will be a minimum of 15 pages (including title page, references, tables, and figures.) All tables and figures will be numbered, captioned and placed within the text immediately after the first reference in the text (no more than a page after.) Figures can be of any type (color and/or B/W) but must be legible and represent the information in a manner consistent with the text description.

1. Title Page
   a. Title of paper, authorship, class, and date

2. Abstract
   a. Brief, ~250 word synopsis of your work. Abstracts are located at the beginning of the document, but written last.

3. Introduction
   a. Sets the stage for the work, and provides a statement of objectives and/or hypothesis

4. Literature Review
   a. A review of the pertinent literature that supports your work. Basically a linkage and interpretation of available literature written in your words – Can be combined with the Introduction.

5. Study Area
   a. A factual description of the biophysical and geographic setting of your study site.

6. Methods
   a. This section describes the methods and processes that you used to collect and interpret your data and the assumptions that you made relative to data collection and analysis. This section does not include basic descriptions of software commands (i.e. I don’t want to know which buttons you pushed on the computer)

7. Results
   a. A factual representation of the quantitative and/or qualitative results from your analysis. Do not interpret the results just report them.

8. Conclusion/Discussion

9. References
   a. Citations of published or available manuscripts, web pages, etc., supporting your hypothesis, assumptions, methodology, and conclusions. These articles are cited using the following standard:
Citation Rules:
Primary author last name, first initials, First initials and last name of secondary authors. Date.
   Paper or book title. Journal, proceedings, or book publisher that contained the work.
   Volume(Issue):page numbers or number of pages (book).

Sample Journal Article:
Deckert, C., and P.V. Bolstad. 1996. Forest canopy, terrain, and distance effects on global
positioning system point accuracy. *Photogrammetric Engineering and Remote Sensing*,

Sample Book:

Graphics:
Graphics can be taken from the screen (screen-grab) or by exporting imagery and graphics to a
standard image format like JPG's, TIF's, GIF's, PNG, etc. Imagery like the one on the left should be
stored as either a JPG, PNG, or a TIF. Line graphics like the one on the right should never be stored
with JPG image format. Store these as TIF of GIF images. Line graphics or images with superimposed
lines are notorious for losing resolution when they are resized to fit a space on the page. Make sure
when you capture these type of graphics, they are the size that you want to display. Do not attempt to
resize them.
PSC 3000 (Fundamentals of Soil Science) | Fall 2019

CONTACT INFORMATION

Instructor
Paul Grossl
797-0411
paul.grossl@usu.edu

Contact by e-mail. Will reply within 24 hours.

Course Description:
An introduction to soil as a natural resource. Chemical, physical, and biological properties and processes related to soil formation and management will be presented.

The goal of this course is that you know the physical, biological, mineralogical, and chemical properties that are responsible for making soil a precious natural resource.

Topic Outline:
Unit 1: What is Soil? Soil Horizons
Unit 2: Soil Texture & Structure, Parent Materials, Soil Formation and Weathering
Unit 3: Soil Orders
Unit 4: Soil Minerals & Charge
Unit 5: Soil Pores and Density Relationships
Unit 6: Soil Water
Unit 7: Soil Solid-Water Interactions
Unit 8: Soil Fertility and Plant Nutrition
Unit 9: Soil Organisms
Unit 10: Soil Carbon and Nitrogen/Soil Health

LEARNING RESOURCES

Textbook & Reading Materials
All materials needed for the course (readings, videos, handouts) will be provided on CANVAS. No textbook is required.

LEARNING ACTIVITIES

There will be 10 lab quizzes during the semester. You will be required to watch the lab videos and complete the quiz for each lab.
GRADES

A total of 500 points are possible for the course - 300 points from three lecture exams* (exams posted on CANVAS); 100 from ten CANVAS quizzes, and 100 for lab quizzes (10 points each lab).

Four 100-point exams will be given (Three regular 100 point exams and a 100 point comprehensive final exam). You may drop your lowest grade on one of the four exams, or elect not to take one of the exams (including the final) and have this serve as the dropped grade.

Exams and quizzes will be multiple choice. There is no time limit and you will be allowed two attempts for each exam and quiz. Only the highest score of your two attempts will be recorded.

COURSE POLICIES

Canvas Notification Preferences

Please make sure your Canvas notification preferences are set so that you will receive course announcements ASAP or Daily (click the appropriate link to set your preference).

UNIVERSITY POLICIES & PROCEDURES

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students. The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code. Acts of academic dishonesty include but are not limited to:

- Cheating: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done individually;
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
- Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
- Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
- Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor, or engaging in any form of research fraud.
- **Falsification**: altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism**: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

**Sexual Harassment**

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EOE Office at (435) 797-1266.

**Withdrawal Policy and "I" Grade Policy**

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

**Students with Disabilities**

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC). Please contact the DRC prior to or as early in the semester as possible. Alternate formats for course content are available with advanced notice.

Contacting the Disability Resource Center (DRC):
- On Campus: Room 101 of the University Inn
- Phone: 435-797-2444
- Website: [http://www.usu.edu/drc/](http://www.usu.edu/drc/)

Disability related resources for current students:
- DRC Student Handbook
- Deaf and Hard of Hearing Student Handbook
- Disability Related Scholarships
- Campus Resources
- Documentation Guidelines
- Online Resources for Students with Disabilities
Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Student Services: http://www.usu.edu/studentservices/, 435.797.1712, studentservices@usu.edu, TSC 220
- Student Advocates: http://www.usu.edu/ususa/legal/, 435.797.2912, TSC 340,
- Access and Diversity: http://www.usu.edu/accesscenter/, 435.797.1728, mailto:access@usu.edu; TSC 315
- Multicultural Programs: http://www.usu.edu/accesscenter/multiculture/, 435.797.1728, TSC 315
- LGBTQ Programs: http://www.usu.edu/accesscenter/lgbtqa/, 435-797-GAYS, TSC 314
- Provost’s Office Diversity Resources: http://www.usu.edu/provost/faculty/diversity/, (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University:
http://www.usu.edu/studentservices/studentcode/

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII. Grievances.

Full details for USU Academic Policies and Procedures can be found at:

- Student Conduct
- Student Code
- Academic Integrity
- USU Selected Academic Policies and Procedures
- USU Academic Policies and Procedures
- Academic Freedom and Professional Responsibility Policy

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.
PLSC 3500 – Structure & Function of Plants  
Syllabus – Spring Semester 2019

**Goal:** to relate the structure, development and physiology of horticultural and agronomic plants to their environment, cultivation and use. Seed, root, stem, leaf and flower organization will be studied in terms of plant appearance and function. Fundamentals of plant physiology and plant anatomy will be studied along with implications for growth, cultivation and environmental sustainability. Topics will be presented through discussions, reading assignments and related hands-on lab experiences.

**Instructor**

**John G. Carman.** Professor, Plant Genetics, Plants, Soils and Climate Department, AGRS 232. Email or call for an appointment: john.carman@usu.edu, 435 512-4913

**Lecture**  
T: 10:30-11:45, Eccles Science Learning Center (ESLC) 053

**Laboratory**  
TH: 10:30-11:45 or 12:00-1:15, Agricultural Sciences (AGRS) 102

**TAs:** Tara Roche (1st and 2nd labs)

**Required texts and supplemental materials**


MacAdam JW. Laboratory Manual (shelved in bookstore under ‘Carman, John’)

See CANVAS for supplemental course materials

**Lab safety:** Wearing of safety glasses and gloves is required during labs. Lab kits and all other lab supplies will be provided.

**Grading:** Lectures and labs parallel the text. There will be three non-comprehensive exams. Each will cover lecture and lab material. The two midterms will be administered by the USU testing center. The final exam will be in our classroom. There will be two reading assignments (journal articles) that will require you to provide short answers to questions concerning the articles. Students are expected to come to class having read the chapter pertaining to that day’s lecture (see lecture schedule). There will be a quiz at the end of each lecture on key concepts from the reading assignment and the lecture. Each student’s two lowest quiz scores will be dropped. Lab exercises are turned in at the end of each lab. These involve answering questions, drawing structures accurately, and correctly labeling your drawings.

<table>
<thead>
<tr>
<th>Course content</th>
<th>Grade (pts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two midterms (150 pt ea.)</td>
<td>300</td>
</tr>
<tr>
<td>Final</td>
<td>150</td>
</tr>
<tr>
<td>Two article reviews (50 pt ea.)</td>
<td>100</td>
</tr>
<tr>
<td>Lecture quizzes</td>
<td>200</td>
</tr>
<tr>
<td>12 lab exercises</td>
<td>250</td>
</tr>
</tbody>
</table>
Attendance: Students are expected to attend lectures and labs; missed labs cannot be made up. Should you have an extenuating circumstance, please notify me prior to your absence.

Course Fee: The $20 fee covers the acquisition and production of lab materials for the course.

Other policies

- Only registered students may attend. Children are not permitted in lectures or labs
- Reasonable accommodation will be provided for persons with disabilities (contact USU Disability Resource Center if applicable, 797-2444)
- Students are required to complete all course work by the end of the semester. Only under extenuating circumstances may an incomplete be offered (see USU grading policy)

IDEA learning objectives

1. Gaining factual knowledge (IDEA Objective 1)
2. Learning fundamental principles (IDEA Objective 2)
3. Developing specific skills (IDEA Objective 4)

Lecture, Lab, Readings and Exam Schedule

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Date</th>
<th>Chapters and labs covered by exams</th>
<th>Lab</th>
<th>Date</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/8</td>
<td>1 The Plant Cell</td>
<td>1</td>
<td>1/10</td>
<td>Seed structure</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>2 Plant Meristems &amp; Tissues</td>
<td>2</td>
<td>17</td>
<td>Seedling structure</td>
</tr>
<tr>
<td>3</td>
<td>22</td>
<td>4 Plant Stems</td>
<td>3</td>
<td>24</td>
<td>Herbaceous Stem Anatomy</td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>7 Plant Nutrition</td>
<td>4</td>
<td>31</td>
<td>Root and Nodule Anatomy</td>
</tr>
<tr>
<td>2/1</td>
<td>Assignment #1 (email by 5:00 P.M.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exam 1

Lectures 1-4; Labs 1-4
2/4-8 Exam 1 (Testing center)

Exam 2

Lectures 5-9; Labs 5-8
3/18-22 Exam 2 (Testing center)

10      | 26   | 11 Respiration                     | 9   | 28   | Extreme environment leaves |

29 Assignment #2 (email by 5:00 P.M.)

11      | 4/2  | 12 Environment and Development    | 10  | 4/4  | Vegetative repro. organs |
12      | 9    | 13 Hormonal Regulation of Development | 11  | 11   | Secondary plant products |
13      | 16   | 14 Secondary Plant Products       | 12  | 18   | Flower & fruit structure |
14      | 23   | 6 Reproduction in Flowering Plants |     |      |         |

Exam 3

Lectures 10-14; Labs 9-12
4/30 In classroom (9:30 – 11:20)
Course Description

Morphology, development, and classification of soils. Lectures and weekly field exercises emphasize soil as a natural body of the landscape: its properties, distribution, behavior, and interpretations for diverse land uses.

Prerequisite/Restriction: Understanding of fundamental soil science; PSC 3000 recommended.

4 Credits

Time and Location

Lecture: MWF 8:30-9:20 am, AGRS 141
Lab: W 2:30-5:20 pm, AGRS 107 (Begins September 4)

Fees

$50 (for transportation to/from field sites, rental of backhoe for excavation of field sites, purchase of supplies and equipment, color copies)

Course Objectives

By the end of this course, you will be able to:

1. Identify the environmental factors (climate, organisms, parent material, relief, time) that influence soil development in a landscape context.
2. Apply concepts of physical, chemical, and biological processes to explain soil formation and behavior.
3. Describe soil morphology and landscape features in the field according to National Cooperative Soil Survey standards.
4. Interpret key soil properties that influence vegetation communities, suitability for land use, ecosystem services, etc.
5. Classify soils using Soil Taxonomy and infer soil properties from the taxonomic name.
6. Access and use soil survey information available on the web, understanding its potential and limitation.

Instructors and Contact Info

Dr. Janis L. Boettiger, Professor, AGRS 339, 435-797-4026, Janis.Boettiger@usu.edu

Office Hours: MWF 9:30-16:00 am, or make an appointment via email or through Canvas

Ryan Hodges, PhD student, AGRS 302A-C, ryanfe140.0@gmail.com

Office Hours: TR 12:00-1:00 pm, or make an appointment via email or through Canvas

John R. Lawley, Researcher, 435-757-8117, John.Lawley@usu.edu

Plants, Soils, and Climate Department Office

AGRS 344, Phone: 435-797-2233, FAX: 435-797-3375
Course Resources

Required Books:

  
  Buy hard copy with plastic binder and pages at USU Campus store for $19.95 new, and/or download pdf online at:
  


  Download pdf of the above two books online at:
  
  http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/taxonomy/?cid=nrcs142p2_053580

Supplementary Books:


  Available as an Ebook from USU Merrill-Cazier Library:
  

Course Requirements

Each student will:

1. Read/view all assignments posted in Canvas
2. Attend lecture regularly
3. Participate in all labs
   - For most of the labs, we describe and interpret soils and landscapes.
   - Students will form teams to describe and interpret soil and landscape features, and discuss soil formation and behavior.
   - Required Lab Equipment: Soil knife (dulled hunting-style knife works well); clipboard and paper or notebook; pencils/pens
   - Recommended: 10X hand lens, field boots, jacket, long pants, hat, sun block, insect repellent, other as desired by individual.
   - Lab assignments typically require complete soil data sheet and written reports summarizing and interpreting data collected during field laboratories. Students may work together in their team to compile data, discuss interpretations, etc.
4. Complete all quizzes in Canvas
5. Submit all assignments in Canvas
6. Take all exams
Evaluation Methods and Criteria

PSC 5130 Grading:

10% - Quizzes in Canvas
20% - Midterm Exam (In-class written exam - Wednesday, October 16, 8:30-9:20 a.m., AGRS 141)
40% - Laboratory Reports (Indoor Lab, Field Labs, Soil Survey Assignment)
5% - Soil Catena Report (Cumulative report on field labs)
20% - Final Exam (Monday, December 9, 7:30-9:20 a.m., AGRS 141)
5% - Participation in lab, lecture, and grad student presentations

PSC 6130 Grading:

9% - Quizzes in Canvas
19% - Midterm Exam (Canvas Quiz + In-class written exam - Wednesday, October 17, 8:30-9:20 a.m., AGRS 141)
39% - Laboratory Reports (Indoor Lab, Field Labs, Soil Survey Assignment)
5% - Soil Catena Report (Cumulative report on field labs)
19% - Final Exam (Monday, December 9, 7:30-9:20 a.m., AGRS 141)
5% - Participation in lab, lecture, and grad student presentations
4% - Presentation

Graduate-Level Credit (PSC 6130): A 15-minute oral presentation that addresses some aspect of soil genesis, morphology, and classification in the context of your thesis or dissertation research topic is required (review of literature, additional field study proposal, etc.). Proposed topics and outlines submitted via Canvas by Monday, November 4. Presentations will occur during lab on December 4 in AGRS 107.
Grade Scheme

The following grading standards will be used in this class:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 % to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0 % to 90.0%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0 % to 87.0%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0 % to 83.0%</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0 % to 80.0%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0 % to 77.0%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0 % to 73.0%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0 % to 70.0%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0 % to 67.0%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0 % to 60.0%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 59.0 % to 0.0%</td>
</tr>
</tbody>
</table>

Course Schedule/Outline

Modules

1. Introduction to Soil Genesis, Classification, and Morphology (Week 1)
2. Soil Morphology (Week 2)
3. Soil Horizon Nomenclature (Week 3)
4. Introduction to Soil Classification - Soil Taxonomy (Week 4)
5. Soil Genesis (Weeks 5-7)
   - Midterm Exam - Wednesday, October 16, 8:30-9:20 am, AGRS 141
6. Soil Survey and Soil Interpretations (Week 8)
7. More Soil Classification (Week 9)
8. Advanced Soil Genesis, Morphology, Classification, and Interpretation (Weeks 10-15)
   - Final Exam - Monday, December 9, 7:30-9:20 am, AGRS 141
Lab Topics and Schedule

August 28: NO LAB (Week 1)

September 4: Indoor Lab. Develop skills in describing soil morphology; view rocks, minerals, soil profiles.

September 11: Field Laboratory - Describing soil morphology and site characteristics.

September 19: Field Laboratory - Describing soil morphology and site characteristics, naming horizons

September 25: Field Laboratory - Describing soil morphology and site characteristics, compare and contrast soils under different forest vegetation.

October 2: Field Laboratory - Describing soil morphology and site characteristics, intro to discussing soil forming processes.

October 9: Field Laboratory - Describing soil morphology and site characteristics, more soil forming processes; intro to soil classification.

October 15: Field Laboratory - Describing soil morphology, site characteristics; soil forming processes; soil classification.

October 23: Field Laboratory - Describing soil morphology, site characteristics; soil forming processes; soil classification.

October 30: Field Laboratory - Describing soil morphology and site characteristics, soil forming processes, soil classification. Discussion of multiple working hypotheses.

November 6: Field Laboratory - Describing soil morphology and site characteristics, soil forming processes, soil classification. Discussion of landscape evolution and erosion.

November 13: Make-up any labs canceled because of inclement weather. Work on Cumulative Lab Report.

November 20: Work on Cumulative Lab Report

November 27: NO LAB (Thanksgiving Break)

December 4: Graduate Student Presentations – All students attend.

Schedule Notes

- No lab: Wednesday, August 28 (First week of semester)
- No classes at USU: Monday, September 4 (Labor Day)
- First lab: Wednesday, September 4
- Midterm Exam – in lecture, Wednesday, October 16, 8:30-9:20 a.m., AGRS 141
- No classes: Friday, October 18 (Fall Break)
- Soil Survey Assignment due Monday, October 28
- Graduate Student Presentation (PSC 6130) topic and outline due Monday, November 4
- Cumulative Lab Report due Monday, November 25
- No classes at USU: Wednesday through Friday, November 27-29 (Thanksgiving Break)
- ALL students attend Graduate Student Presentations in Lab, Wednesday, December 4
- Last day of classes: Friday, December 6
- Final Exam, Monday, December 9, 7:30-9:20 am, AGRS 141

Attendance, Excused Absences, Late Assignments

Attendance in lecture is expected

Participation in lab is required

Some absences may be excused (e.g., academic or athletic events, health issues, etc.). Notify instructor as soon as possible.
Nonattendance Policy

Students May Be Dropped For Nonattendance

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. (This does not remove responsibility from the student to drop courses which he or she does not plan to attend.) This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar’s Office through their preferred e-mail account (see 2018-2019 General Catalog).

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: http://www.usu.edu/riskmgmt/

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at libguides.usu.edu/rc.

Classroom Civility.

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read Student Code Article V Section V.3 for more information.

University Policies & Procedures

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:
"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

**Academic Dishonesty**

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating**: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually;”
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor, or engaging in any form of research fraud.

- **Falsification**: altering or fabricating any information or citation in an academic exercise or activity.

- **Plagiarism**: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: [ARTICLE VI. University Regulations Regarding Academic Integrity](#)

**Sexual Harassment/Title IX**

Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and [USU Policy 339](#) address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU’s [Office of Equity](#) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment ([USU Policy 305](#)), and has designated the Office of Equity Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

**Withdrawal Policy and "I" Grade Policy**

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term ‘extenuating’ circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.
Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: https://studentaffairs.usu.edu, (435) 797-1712, studentservices@usu.edu, TSC 220
- Student Legal Services: https://ususa.usu.edu/student-association/student-advocacy/legal-services, (435) 797-2912, TSC 326
- Access and Diversity: http://accesscenter.usu.edu, (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: http://accesscenter.usu.edu/multiculture, (435) 797-1728, TSC 315
- LGBTQ Programs: http://accesscenter.usu.edu/lgbtqa, (435) 797-1728, TSC 3145
- Provost’s Office Diversity Resources: https://www.usu.edu/provost/diversity, (435) 797-6176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University: https://studentconduct.usu.edu/studentcode

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII.

Full details for USU Academic Policies and Procedures can be found at:

- Student Conduct
- Student Code
- Academic Integrity
- USU Selected Academic Policies and Procedures
- USU Academic Policies and Procedures
- Academic Freedom and Professional Responsibility Policy

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.