NR 562: Ecosystem Services in a Changing World
Fall Semester 2016, 3 credits
Conservation Leadership Through Learning
Colorado State University

Date and Time: Tuesdays from 2 – 4:30 PM
Location: Forestry 217

Instructor: Kelly W. Jones
Office Hours: Tuesdays 12:30pm -1:30pm or by appointment
Office: Forestry 238
Email: Kelly.Jones@colostate.edu

COURSE OVERVIEW
The field of ecosystem services presents a major new organizing framework for conservation and natural resources management that is being applied in diverse places globally. Ecosystem services are the conditions and processes through which natural and managed ecosystems, and their constituent species, sustain and fulfill human life. These services range from the provision of food and clean drinking water to climate regulation and flood mitigation to recreational activities and spiritual fulfillment, and much more. While these services from nature underpin our lives, most have been undervalued historically in land use, economic, and policy decisions. In extreme cases, the value of ecosystem services is only recognized after they are lost. In this class, we will examine the linked ecological, economic, and institutional challenges towards better characterizing the contribution of ecosystem services to human well-being, as well as the development of policies and institutions for integrating ecosystem services into decision-making. We will critically examine how these ideas are being put into practice through pioneering efforts in the public, private, and nonprofit sectors.

COURSE PREREQUISITES: Admission to the Conservation Leadership specialization in HDNR.

COURSE OBJECTIVES:

• Develop depth of knowledge about the theoretical underpinnings of the field of ecosystem services by linking concepts from ecology, geography, economics, and social science (and other pertinent areas).
• Examine monetary and non-monetary methods for “valuing” nature and critically assess their assumptions and utility.
• Identify and use methodologies and tools to integrate ecosystem services into decision-making in the public, private, and nonprofit sectors.
• Critically examine policy efforts to design effective payment for ecosystem services programs and other institutional approaches for restoring and protecting ecosystem services.
• Identify key research-action areas and new frontiers of research-action in the field of ecosystem services.
• Empower students to integrate ecosystem services into decision-making in leadership
positions across the public, private, and nonprofit sectors.

- Strengthen student’s written and oral communication skills for engaging policymakers, communities, the general public, and other audiences.

**Course Materials:** Class readings, assignments, lecture slides, syllabus, and other materials will be available electronically through CANVAS.

**Course Assignments and Grading**

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<thead>
<tr>
<th></th>
<th>Title</th>
<th># of Points</th>
<th>DUE Date</th>
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<tbody>
<tr>
<td>1</td>
<td>Mapping handout (individual or pairs)</td>
<td>100</td>
<td>Sept. 13</td>
</tr>
<tr>
<td>2</td>
<td>Valuation handout (group)</td>
<td>100</td>
<td>Oct. 4</td>
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<td>3</td>
<td>Synergy week #2 assignment (CAP)</td>
<td>100</td>
<td>Oct. 14</td>
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<td>4</td>
<td>Design a PES program (group)</td>
<td>150</td>
<td>Nov. 4</td>
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<td>5</td>
<td>Grant proposal on ecosystem services &amp; presentation (individual or pairs)</td>
<td>150</td>
<td>Nov. 29 &amp; Dec. 2</td>
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**TOTAL POINTS** 600

**Letter grades** will be assigned as follows:

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<tr>
<th>Letter Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
<td>98-100% (and at instructor discretion)</td>
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<tr>
<td>A</td>
<td>94-97%</td>
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<td>A-</td>
<td>90-93%</td>
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<td>B+</td>
<td>88-89%</td>
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<td>C+</td>
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<td>65-69%</td>
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**Course Schedule**

**NOTE on readings:** “Required Readings” are ones that everyone should read prior to coming to class. For those who wish to read more on a given topic, I’ve also listed “Enrichment Readings” to read at your leisure. For the most part, focus on big picture concepts, and pay attention to linkages with other courses.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics (Tentative)</th>
<th>Readings &amp; Assignments (Tentative)</th>
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<tbody>
<tr>
<td>Week 1:</td>
<td>Orientation</td>
<td>To be completed by date listed</td>
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<tr>
<td>Aug. 23</td>
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<td>No Class</td>
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**Week 2: Aug. 30**

- Course overview
- Introduction to Ecosystem Services

**REQUIRED Readings:**
- Bouma & Van Beukering (2015) Chapter 1: Ecosystem services: from concept to practice
- Mace (2014) “Whose conservation?” Science

**Enrichment Readings:**
- WRI Definitions of Ecosystem Services

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**Week 3: Sept. 6**

- ES Core Concepts: Ecology & Geography

**REQUIRED Readings:**

**Enrichment Readings:**
- Ruhl et al. (2007) Intro, Ch. 1, and Ch. 2. *Law and Policy of Ecosystem Services*

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**Week 4: Sept. 13**

- ES Core Concepts: Economics

**REQUIRED Readings:**

**Enrichment Readings:**

**Assignment Due: Mapping Handout**
| Week 5: Sept. 20 | Economic Value & Valuation Methods for Ecosystem Services | REQUIRED Readings:  
• MEA Chapter 6: Value and valuation approaches, pages 127-139  
• Cleveland et al. (2006) “Economic value of the pest control service provided by Brazilian free-tailed bats in south-central Texas.” *Frontiers in Ecology and the Environment*  

Enrichment Readings:  
• Radiolab “How do you put a price tag on nature?” (Available online): http://www.radiolab.org/story/what-dollar-value-nature/  
• Planet Money Podcast “Tallying up the pelican bill” (Available online): http://www.npr.org/sections/money/2010/07/30/12880374/the-friday-podcast-tallying-up-the-pelican-bill  
• The Ecosystem Valuation Website: http://www.ecosystemvaluation.org/uses.htm |
| Week 6: Sept. 27 | Synergistic Week #1 | No Class |
| Week 7: Oct. 4 | Social Value & Non-Monetary Valuation Methods for Ecosystem Services | REQUIRED Readings:  
• Berbes-Blazquez (2012) “A participatory assessment of ecosystem services and human wellbeing in rural Costa Rica using photo-voice” *Env Management*  
• (Skim) Non-monetary techniques for the valuation of ecosystem services: http://www.openness-project.eu/sites/default/files/SP-Non-monetary-valuation.pdf |
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<th>Week 8: Oct. 11</th>
<th>Enrichment Readings:</th>
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<td></td>
<td>Kenter et al. (2015) “What are shared and social values of ecosystems?” <em>Ecological Economics</em></td>
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<td>Bieling (2014) “Ecosystem services as revealed through short stories from residents of the Swaibian Alb (Germany).” <em>Ecosystem Services</em></td>
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<td>Bunse et al. (2015) “What can deliberative approaches bring to the monetary valuation of ecosystem services? A literature review.” <em>Ecosystem Services</em></td>
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<td><strong>Assignment Due: Valuation Handout</strong></td>
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<td>Week 9: Oct. 18</td>
<td>REQUIRED Readings:</td>
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<td>Enrichment Readings:</td>
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<td>TED Talk: Rob Harmon (9 min.) “How the market can keep streams flowing”: <a href="http://www.ted.com/talks/rob_harmon_how_the_market_can_keep_streams_flowi">http://www.ted.com/talks/rob_harmon_how_the_market_can_keep_streams_flowi</a> ng.html</td>
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<td>Week 10: Oct. 25</td>
<td>REQUIRED Readings:</td>
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<td>Schomers (2013) “Payments for ecosystem services: a review and comparison of developing and industrialized countries.” <em>Ecosystem Services</em></td>
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### Enrichment Readings:
- Guerra (2016) “Assessing preconditions for implementing a payment for environmental services initiative in Cotriguacu (Mato Gross, Brazil).” *Ecosystem Services*
- Bennett et al. (2014) “Utility engagement with payments for watershed services in the United States” *Ecosystem Services*
- Raes et al (2016) “Towards market- or command-based governance? The evolution of payments for environmental service schemes in Andean and Mesoamerican countries.” *Ecosystem Services*

### Week 11: Nov. 1
- In class: Introduction to grant writing workshop (continues on Friday, Nov. 4)

**Assignment Due:** Design a PES program (due Nov 4)

### Week 12: Nov. 8
- Measuring Success of Ecosystem Services Projects

**REQUIRED Readings:**

**Enrichment Readings:**
- Naeem et al (2015) “Get the science right when paying for nature’s services.” *Science*

### Week 13: Nov. 15
- Synergistic Week #3

**No Class**
| Week 14: Nov. 22 | • Thanksgiving Break | No Class |
| Week 15: Nov. 29 | • Final Presentations | Assignment Due: Final grant proposals (Friday) & presentations (in class) |
| Week 16: Dec. 6 | • Reflection on Ecosystem Services Concept  
• Course Assessment | REQUIRED Readings:  

Optional Readings – a bunch of them… read what you can to prompt your thoughts for a final reflective discussion, but knowing that the end of the semester is a busy period.  
• Luck et al. (2012) Ethical considerations in on-ground applications of the ecosystem services concept. BioScience  
• Kinzig et al. (2011) Paying for ecosystem services: promise or peril? Science  
• Redford and Adams (2009) Payments for ecosystem services and the challenge of saving nature. Conservation Biology  
• Armstrong et al. (2007) Ecosystem-service science and the way forward for conservation. Conservation Biology |

**Course Policies**
**Academic Integrity:** As required by the CSU Faculty Council – “This course will adhere to the CSU Academic Integrity Policy as found in the General Catalog (http://www.catalog.colostate.edu/FrontPDF/1.6POLICIES1112f.pdf) and the Student Conduct Code (http://www.conflictresolution.colostate.edu/conduct-code). At a minimum, violations will result in a grading penalty in this course and a report to the Office of Conflict Resolution and Student Conduct Services.”

**Requests for Assignment Extensions:** In fairness to your fellow classmates, extensions on due dates for assignments will not be granted except in cases where extenuating circumstances arise. If this is the case, please let me know at the earliest possible opportunity to request an extension. In the absence of being granted an extension, the policy below applies for late submissions.

**Policy on Late Assignments:** Late assignments (those not turned in at the specified date and time) will be penalized one letter grade per calendar day (including weekends). After five calendar days have passed, the assignment will receive a grade of zero.

**Availability of Student Accommodations:** If you have university-approved circumstances, please contact me after the first class so that we can make a plan for accommodations to ensure a productive semester together.

**Additional Information Sources** – for those wishing to dive further into this field, consider these suggestions as a good start but certainly not comprehensive as this field continues to expand rapidly.

**Books**

**Websites**
- Ecosystem Marketplace: http://www.ecosystemmarketplace.com
- Mercados Ambientales: http://mercadosambientales.com (in Spanish!)
- Forest Carbon Portal: http://www.forestcarbonportal.com
- Watershed Connect: http://watershedconnect.org
- SpeciesBanking.Com: http://www.speciesbanking.com
- Ecosystem Marketplace Community Portal: http://community.ecosystemmarketplace.com
- Ecosystem Commons: http://ecosystemcommons.org
- Natural Capital Project: http://naturalcapitalproject.org
- The Ecosystem Services Partnership: http://www.fsd.nl/esp/
• IPBES: http://www.ipbes.net
• World Bank, Wealth Accounting and the Valuation of Ecosystem Services (WAVES): http://www.wavespartnership.org/waves/
• World Resources Institute, Mainstreaming Ecosystem Services Initiative (MESI): http://www.wri.org/project/mainstreaming-ecosystem-services
• Gund Institute for Ecological Economics: http://www.uvm.edu/giae/
• Betty and Gordon Moore seminar series on ecosystem services: http://www.moore.org/ecosystemservicesseminar.html
• Ecosystem services podcast tutorial: http://www.keckfutures.org/conferences/ecosystem-services_podcast_home.html
• The Economics of Ecosystems and Biodiversity (TEEB): http://www.teeweb.org
• TEEB lecture series: http://environment.yale.edu/TEEB
• A community on ecosystem services (ACES): http://www.conference.ifas.ufl.edu/aces/index.html
• National ecosystem services partnership: http://nicholasinstitute.duke.edu/initiatives/national-ecosystem-services-partnership