



	<u>Instructor</u>		<u>Course Details</u>
Name:	Carrie Havrilla, PhD	Term:	Spring 2022
Office:	NR 213	Meeting days:	T/Th
Phone:	(970) 491-6912	Meeting hours:	8:00 AM – 9:15 AM
E-Mail:	caroline.havrilla@ColoState.edu	Location:	Forestry 217
Office Hours:	T 9:15-10 AM	Course credits:	3 credits



Welcome

Welcome to **Rangeland Herbivore Ecology and Management (RS 452)**! The goal of this course is to provide students with the foundation necessary to explore rangeland herbivore-habitat interactions, complex linkages among large herbivores, plants, the environment, and people in rangelands, and to apply this knowledge to critique and develop adaptive grazing management strategies.

Course Structure

The structure of course content delivery will be a mix of lecture, instructor-led discussion, and student-led discussion. The first half of the course will focus mainly on rangeland herbivore ecology, plant ecology, and social dimensions of rangeland herbivore management. The latter part of the course will focus on applied grazing management to inform the development and critique of adaptive grazing management plans and strategies. There is no textbook for this course. To cover this broad scope of subject matter, students will explore linkages between large herbivores, the environment, and people and adaptive grazing management in a series of 10, one to two-week learning modules. Each module is composed of short lectures, readings, discussions, and assignments. Active participation and group discussions of relevant literature will be a cornerstone of this course. Students will demonstrate mastery of course content through group discussions, completion of case studies, and a final project.

Course Goals and Objectives

The goal of this course is to guide students through a study of a complex variety of factors that determine how large rangeland herbivores interact with their habitat and to help students explore how these interactions translate into challenges and opportunities for natural resource conservation and management. Upon successful completion of this course students will:

1. *Identify* and describe important linkages between animal performance and plant performance and the major factors that drive each.
2. *Examine* how interactions among rangeland herbivores, the environment (e.g., plants), and humans translate into challenges and opportunities for land management and conservation.

3. *Compare* characteristics and outcomes of traditional vs. adaptive livestock grazing management strategies.
4. *Use* scientific data to construct evidence-based arguments.
5. *Appraise* the extent to which management actions that influence plant and animal performance will meet management and conservation objectives.
6. *Design* a grazing management plan that achieves specific management goals and objectives.
7. *Conduct* a meta-analysis of existing data to explore an independent research topic.

Course Prerequisites

RS 300; LAND 220 or LIFE 220

CSU's Land Acknowledgment Statement

Colorado State University acknowledges, with respect, that the land we are on today is the traditional and ancestral homelands of the Arapaho, Cheyenne, and Ute Nations and peoples. This was also a site of trade, gathering, and healing for numerous other Native tribes. We recognize the Indigenous peoples as original stewards of this land and all the relatives within it. As these words of acknowledgment are spoken and heard, the ties Nations have to their traditional homelands are renewed and reaffirmed.

CSU is founded as a land-grant institution, and we accept that our mission must encompass access to education and inclusion. And, significantly, that our founding came at a dire cost to Native Nations and peoples whose land this University was built upon. This acknowledgment is the education and inclusion we must practice in recognizing our institutional history, responsibility, and commitment.

<https://landacknowledgment.colostate.edu>

This is an Inclusive Classroom

Inclusive teaching involves deliberately cultivating a learning environment where all students are treated equitably, have equitable access to learning, and feel valued and supported in their learning. Such teaching attends to social identities and seeks to change the ways systemic inequities shape dynamics in teaching-learning spaces, affect individuals' experiences of those spaces, and influence course and curriculum design.

– Adapted from <http://crlt.umich.edu/node/90467>

CSU's Principles of Community

- **Inclusion:** We create and nurture inclusive environments and welcome, value and affirm all members of our community, including their various identities, skills, ideas, talents and contributions.
- **Integrity:** We are accountable for our actions and will act ethically and honestly in all our interactions.
- **Respect:** We honor the inherent dignity of all people within an environment where we are committed to freedom of expression, critical discourse, and the advancement of knowledge.
- **Service:** We are responsible, individually and collectively, to give of our time, talents, and resources to promote the well-being of each other and the development of our local, regional, and global communities.
- **Social Justice:** We have the right to be treated and the responsibility to treat others with fairness and equity, the duty to challenge prejudice, and to uphold the laws, policies and procedures that promote justice in all respects.

<https://diversity.colostate.edu/resources/principles-of-community/>

COMMUNITY GUIDELINES FOR THIS COURSE:

Students are expected to demonstrate respect for all members of the class. It is critical that this be a safe space for everybody. It is my intention to create a learning environment that is safe and welcoming to students from diverse backgrounds and identities. If this is not happening, please help hold me accountable.

A few general guidelines to keep in mind:

1. Be kind.
2. Respect difference.
3. Take responsibility for your learning.
4. Support others.

NAMES AND PRONOUNS:

If your name appears differently in official course records or if your name/pronouns change at some point in the semester, please let me know.

THIS IS AN INCLUSIVE CLASSROOM:

Inclusive teaching involves deliberately cultivating a learning environment where all students are treated equitably, have equitable access to learning, and feel valued and supported in their learning. Such teaching attends to social identities and seeks to change the ways systemic inequities shape dynamics in teaching-learning spaces, affect individuals' experiences of those spaces, and influence course and curriculum design.

– Adapted from <http://crlt.umich.edu/node/90467>

ACCOMODATIONS AND SUPPORT:

It is important that all students find this class welcoming and manageable. If you need disability-related accommodations in this class or have medical information you wish to share with us please do not hesitate to let us know. You are welcome to share this information privately during office hours or via email. If you need assistance assessing any needs you have related to your ability status, please contact the Student Disability Center, 491-6385. Beyond disabilities, please be in communication with me if you have other life events that are having an impact on your ability to stay up to date on course material. Together we can figure out a plan for just about anything... but I can't implement accommodations or support if you wait too long to share with me.

IMPORTANT OBSERVANCES:

I realize that the university schedule is not designed around everyone's most important days. If you have religious or cultural observances that coincide with this class, if your little sister has her first science fair, or you have an interview for a dream job, please talk with me in advance so we can discuss how you can make up the missed time. The only non-negotiable date is the final exam period.

POLICY ON CHILDREN IN CLASS:

If we want women and non-binary students to stay in academia, then we must find ways to academically mitigate the disproportionate amount of labor placed on them as caregivers in families. Currently, CSU does not have a formal policy on children in the classroom so what follows is a reflection of my own beliefs and commitments to my students.

Please note that I use a non-traditional definition of "parenting" that extends beyond biology and/or state sanctioned legal qualifications. Therefore, the following policy applies to anyone, regardless of gender, who has a primary responsibility for the daily care of a child. In some instances this may mean your siblings, the children of your siblings, cousins, grandchildren, the children of your close friends, etc.

1. All exclusively breastfeeding babies are welcome in class as often as is necessary to support the nursing relationship. I never want students to feel like they have to choose between feeding their baby and continuing their education. You and your nursing baby are welcome in class anytime.
2. I ask that all students work with me to create a welcoming environment that is respectful of all forms of identity, including parenting status.
3. In all cases where babies and children come to class, I ask that caregivers sit close to the door so that if your little one needs special attention and is disrupting learning for others, you may step outside until their need has been met. Non-parents in the class, please reserve seats near the door for your parenting classmates.
4. Finally, I understand that often the largest barrier to completing your coursework as a caregiver is the mental and physical exhaustion many parents feel in the evening. The struggles of balancing school, childcare and often another job can feel insurmountable so it is my hope that you will feel comfortable disclosing your student-parent status to me. This is the first step in my being able to accommodate any needs that arise. While I maintain the same high expectations for all student in my classes regardless of parenting status, I am happy to problem solve with you in a way that makes you feel supported as you strive for school-parenting balance.

(Adapted from Dr. Melissa Cheyney)

Required Texts and Materials

There is no required textbook for this course. All reading materials will be made available on Canvas. See schedule for reading timeline.

Library & Research Help

The CSU Libraries Help Desk provides basic research and technical assistance either in person at Morgan Library or by phone at 970-491-1841. Virtual assistance is also available via the Libraries' Ask Us chat and email services (<http://lib.colostate.edu/help/ask-us>). Jocelyn Boice is the librarian supporting the Forest and Rangeland Stewardship Department and this course. Contact her for in-depth assistance at: jocelyn.boice@colostate.edu.

Important Dates to Remember

- Last Day to Add/Drop Classes Without an Instructor Override: Sun, January 23, 2022
- Registration Closes: Wed, February 2, 2022
- Withdrawal and Repeat/Delete Deadline: Mon, March 21, 2022
- Summer 2022 Registration begins: Tue, March 22, 2022 (check RamWeb for specific access date/time)
- Spring Recess: Sat, March 12 – Sun, March 20, 2022
- Fall 2022 Registration begins: Mon, April 4, 2022 (check RamWeb for specific access date and time)
- Last Day to Process a University Withdrawal: Fri, May 6, 2022
- Final Examinations: Mon-Fri, May 9-13, 2022

Useful websites with important dates to remember

<https://registrar.colostate.edu/registration-dates/>

<https://www.online.colostate.edu/faqs/important-dates.dot>

CSU COVID-19 Guidelines

Masks are required inside university buildings. You must also meet university vaccine or exemption requirements.

All students are expected and required to report to the COVID Reporter (<https://covid.colostate.edu/reporter/>) when:

- You suspect you have symptoms of COVID, regardless of whether or not you are vaccinated and even if your symptoms are mild
- You have tested positive for COVID through a non-CSU testing site, such as home test or test at a pharmacy
- You believe you may have been exposed to COVID go to the COVID Reporter and follow the guidance under "I believe I have been in close contact with someone who has COVID-19." This guidance will depend upon your individual circumstances

You will not be penalized in any way for reporting symptoms or concerns.

Do not ask me as your instructor to report for you. It is your responsibility to report through the COVID Reporter promptly.

As your instructor I may not ask you about vaccination status or if you have COVID but you may freely volunteer to send me information from a public health official if you have been asked to isolate or quarantine.

When you complete the COVID Reporter, the CSU Public Health office is notified. Once notified, that office will contact you and, depending upon each situation, will conduct contact tracing, initiate any necessary public health requirements and notify you if you need to take any steps.

If you do not have internet access to fill out the online COVID-19 Reporter, please call (970) 491-4600.

For the latest information about the University’s COVID resources and information, including FAQs about the spring semester, please visit the **CSU COVID-19 site** <https://covid.colostate.edu/>.

Course Schedule

Course structure for most weeks:

Tuesday (T) – Instructor-led introduction to new material (lectures, videos, activities, etc.) + Meta-analysis focus time

Thursday (Th) – Student-led group literature discussion

*** Note: weekly schedule is subject to change upon instructor’s discretion ***

MODULE 1: INTRODUCTION TO RANGELAND HERBIVORE ECOLOGY

Date	Day	Topic	Readings + More	Activities/Assignments	Due date
Jan 18	T	Course Welcome, Introduction, & Norms	<ul style="list-style-type: none"> RS 452 Syllabus RS 452 Discussion Lead Guidelines 	One Slide Introduction (Learning Journal 1)	1/19/22
Jan 20	Th	Personal Introductions + Introduction to Meta-analysis Paper Discussion 1 (Lead: Havrilla)	<ul style="list-style-type: none"> Harrison (2011): "Getting started with meta-analysis" 		

MODULE 2: THE BIG PICTURE: RANGELANDS, HERBIVORES & SOCIETY

Date	Day	Topic	Readings + More	Activities/Assignments	Due date
Jan 25	T	Course Welcome, Introduction, & Norms	<ul style="list-style-type: none"> Mukasonga (2018) [<i>Fiction</i>] 	<p style="text-align: center;">META-ANALYSIS: GUIDELINES</p>	
Jan 27	Th	Paper Discussion 2 Leads: TBD	<ul style="list-style-type: none"> Larocque (2014): "Revisiting distinctions between ranching and pastoralism: A matter of interspecies relations between livestock, people, and predators" 		

MODULE 3: THE HERBIVORE PERSPECTIVE

Date	Day	Topic	Readings + More	Activities/Assignments	Due date
Feb 1	T	Large herbivore classification, digestive anatomy, & physiology	<ul style="list-style-type: none"> • Fritz ad Loison (2008) • Bell (1971) • Ungulate taxonomy handout 	<p style="text-align: center;">META-ANALYSIS: TOPIC SELECTION</p>	2/6/22
Feb 3	Th	Paper Discussion 3 Leads: TBD	<ul style="list-style-type: none"> • Hofmann (1989): <i>"Evolutionary steps of ecophysiological adaptation and diversification of ruminants: a comparative view of their digestive system"</i> 		Learning Journal 3
Feb 8	T	Grazers vs. browsers habitat and nutritional needs; forage intake, quality, and selection	<ul style="list-style-type: none"> • Shipley (1999) • University of Idaho (2012) • CS and GR Characteristics Handout 	Learning Journal 4	2/13/22
Feb 10	Th	Paper Discussion 4 Leads: TBD	<ul style="list-style-type: none"> • Ripple & Beschta (2004): <i>"Wolves and the Ecology of Fear: Can Predation Risk Structure Ecosystems?"</i> 		

MODULE 4: THE PLANT PERSPECTIVE

Date	Day	Topic	Readings + More	Activities/Assignments	Due date
Feb 15	T	Plant chemistry, palatability, and defense	<ul style="list-style-type: none"> • Inderjit (2013) • Mortesen (2013) 	<p style="text-align: center;">META-ANALYSIS: OUTLINE DUE</p>	2/20/22
Feb 17	Th	Paper Discussion 5 Leads: TBD	<ul style="list-style-type: none"> • Provenza et al. (2003): <i>"Linking herbivore experience, varied diets, and plant biochemical diversity"</i> 		Learning Journal 5
Feb 22	T	Plant responses to herbivory	<ul style="list-style-type: none"> • Cougenhour (1985) 	Learning Journal 6	2/27/22
Feb 24	Th	Paper Discussion 6 Leads: TBD	<ul style="list-style-type: none"> • Diaz et al. (2007) <i>"Plant trait responses to grazing – a global synthesis"</i> 		

MODULE 5: SCIENCE WRITING AND META-ANALYSIS BOOTCAMP

Date	Day	Topic	Readings + More	Activities/Assignments	Due date
Mar 1	T	Writing in Science Paper Discussion 7 Lead: Havrilla	<ul style="list-style-type: none"> Valiela (2009) <ul style="list-style-type: none"> - "Chapter 5: Communication of Scientific Information: Writing" - "Chapter 6: Communicating Scientific Information: The Scientific Paper" 	Learning Journal 7	3/6/22
Mar 3	Th	Meta-analysis code	<ul style="list-style-type: none"> Viechtbauer et al. (2021) 		

MODULE 6: CHALLENGES OF RANGELAND HERBIVORE MANAGEMENT

Date	Day	Topic	Readings + More	Activities/Assignments	Due date
Mar 8	T	<i>Challenges balancing the needs of herbivores, ecosystems, & people in rangelands: impacts of livestock grazing on rangeland ecosystem functioning</i>	<ul style="list-style-type: none"> Hruska et al. (2017) 	<p style="text-align: center;">META-ANALYSIS ANOTATED REFERENCES</p>	3/11/22
Mar 10	Th	Paper Discussion 8 Leads: TBD	<ul style="list-style-type: none"> Lia and Kumar (2020): "A global meta-analysis of livestock impacts on soil properties" 		

MODULE 6: GRAZING/BROWSING MANAGEMENT PLANS

Date	Day	Topic	Readings + More	Activities	Due date
Mar 22	T	Grazing systems, stocking rates, & traditional livestock management	<ul style="list-style-type: none"> Allen et al. (2017) = (Ch. 11 in Briske 2017 book) CSU Stocking Rate Calculator 	Stocking Rate Mini Case Study	3/22/22
Mar 24	Th	Paper Discussion 9 Leads: TBD	<ul style="list-style-type: none"> Teague and Barnes (2017): "Grazing management that regenerates ecosystem function and grazingland livelihoods" 		

MODULE 7: ADAPTIVE GRAZING MANAGEMENT

Date	Day	Topic	Readings + More	Activities	Due date
Mar 29	T	<i>Ecological Dimensions of Adaptive Rangeland Herbivore Management</i>	<ul style="list-style-type: none"> Allen et al. (2017): Ch. 11 in Briske book 	Learning Journal 9	4/3/22
Mar 31	Th	Paper Discussion 10 Leads: TBD	<ul style="list-style-type: none"> Bailey et al. (2019): "Synthesis Paper: Targeted Livestock Grazing: Prescription for Healthy Rangelands" 		
Apr 5	T	<i>Social Dimensions of Adaptive Rangeland Herbivore Management: rancher decision-making, and local and indigenous knowledge systems</i> Guest speaker: TBD	<ul style="list-style-type: none"> Derner et al. (2021) 	META-ANALYSIS PAPER DRAFT DUE	4/8/22
Apr 7	Th	Paper Discussion 11 Leads: TBD	<ul style="list-style-type: none"> Roche et al. (2015): "On-ranch grazing strategies: context for the rotational grazing dilemma" 	Learning Journal 10	4/10/22

MODULE 8: DECOLONIZING RANGELAND HERBIVORE MANAGEMENT

Date	Day	Topic	Readings + More	Activities	Due date
Apr 12	T	Indigenous knowledge systems and reintroduction of the American Bison Guest speaker: TBD	<ul style="list-style-type: none"> Rosas et al. (2008) 	Learning Journal 11	4/17/21
Apr 14	Th	Paper Discussion 12 Leads: TBD	<ul style="list-style-type: none"> Clark et al. (2018): "Impacts of reintroduced bison on first nations people in Yukon, Canada: finding common ground through participatory research and social learning" 		

MODULE 9: RANGELAND RESTORATION & HERBIVORES

Date	Day	Topic	Readings + More	Activities	Due date
Apr 19	T	Rangeland restoration and herbivores + Restoration Case Study Day 1	<ul style="list-style-type: none"> Marty (2005) Croel & Kneitel (2011) 	Restoration Case Study (Groups)	4/21/22
Apr 21	Th	Restoration Case Study Day 2			

MODULE 10: THE FUTURE OF RANGELAND HERBIVORES

Date	Day	Topic	Readings + More	Activities	Due date
Apr 26	T	Global change, restoration, sustainability, and the future of large herbivores and livestock	<ul style="list-style-type: none"> Ripple et al. (2013): <i>Collapse of the world's largest herbivores</i> TEDx Talk: Cows, carbon, and climate change 	Learning Journal 13	5/1/22

MODULE 11: FINAL PROJECT PRESENTATIONS

Date	Day	Topic	Readings + More	Activities	Due date
Apr 28	Th	FINAL PROJECT PRESENTATIONS - Group 1 -		META_ANALYSIS FINAL PAPER DUE	5/5/22 by 5pm
May 3	T	FINAL PROJET PRESENACTIONS - Group 2 -			
May 5	Th	FINAL PROJET PRESENACTIONS - Group 3-			

Basis for Final Grade

Item	Points	%
Discussion Participation (1 point per)	10	10
Discussion Lead	5	5
Learning Journals	10	10
Stocking Rate Mini Case Study (Mod 6)	4	4
Restoration Case Study (Mod 9)	6	6
Meta-Analysis Outline	5	5
Meta-Analysis Annotated References	15	15
Meta-Analysis Draft Term Paper	5	5
Meta-Analysis Oral Presentation	15	15
Meta-Analysis FINAL Term Paper	25	25
Total	100	100

Grades will be assigned using chromatic variants based on the percentage of total points earned, as follows: $\geq 90\%$ A, 80-89.5% B, 70-79.5% C, 60-69.5% D, $< 60\%$ F. Students should not assume that a curve will be applied to the course grading, but if one is applied, it will be a minor adjustment to the student's benefit.

* See below for description of course work and expectations.

Course work and expectations

Readings: Student are encouraged to complete all readings by the assigned date. Readings will inform the lectures, discussions, case studies, and course project - and they're interesting!

Discussion Participation (10 points) | "Showing up" for class (in person or remotely) shows respect to your classmates and instructor and is likely to be highly correlated with your grade. Active participation in group discussions will be noted. We're all here to learn and explore a cool topic – let's get the most out of it by supporting each other and contributing to rich class discussions. As with work or meetings, I expect that you will let me know when you cannot make it. **While participation in this class is key, please do not attend class in person if you are ill.** Email me and we'll figure something out. You will never be penalized in my class for abiding by university COVID-19 safety guidelines that protect other members of the class.

Discussion Lead (5 points) | In groups of 2-3, students will lead a discussion on a scientific journal article for a single class period. Additional details on expectations for this are offered in the RS452_Discussion_Lead_Guidelines.pdf document provided in the course materials. There will be a 50-minute live discussion during the normal class time. Discussion leads should stimulate conversation during that time (a post or two per day) or until the instructor determines the discussion is closed. Successful discussion leads will include a brief PowerPoint presentation to orient the class the discussion paper. Students who are not leading will be expected to contribute at least two substantive contributions during that time.

Learning Journals (10 points) | A learning journal is an ongoing collection of writing for the purpose of learning (rather than the purpose of demonstrating learning). Students will complete weekly learning journals on Canvas. Each journal entry will be worth 1 point (i.e., 1% of term course grade). There will be 13 Learning Journal opportunities throughout the semester, and only the student's best 10 will count towards their final grade. Journal topics will relate to the week's learning module topic and/or readings.

Stocking Rate Mini Case Study (4 points) | In Module 6, students will complete a mini case study in groups to practice grazing management livestock stocking rate calculations.

Restoration Case Study (6 points) | In Module 9, students will complete a week-long case study in groups on grazing management, restoration, and stakeholder decision-making.

The Course Project (Meta-Analysis) | The semester-long project in RS 452 is a meta-analysis (Harrison, 2011; Hedges et al., 1999). Meta-analysis techniques have grown considerably in recent decades and offer a unique quantitative tool to synthesize the results of independent experiments to assess overall results across studies (Schmidt and Hunter, 2014). Meta-analyses are like traditional review-style studies in that they synthesize trends across existing studies but employ distinct statistical methods to assess quantitative trends in existing data (Hedges et al. 1999). Meta-analysis goes beyond simply *describing* the state of the topic, and instead, it may provide an opportunity for students to leverage their efforts and yield an original scientific discovery that may contribute significantly to the body of scientific knowledge.

The meta-analysis project for RS 452 will involve written and oral components. The topic is open, and it must center on some aspect of rangeland herbivore ecology and management – including, for example, rangeland herbivore impacts on the environment, effectiveness of grazing systems and herbivore management strategies, etc. The best case is often when the meta-analysis follows your career interests (undergraduates) and/or thesis/dissertation research (graduate students). The meta-analysis must include at least 6 separate studies. All written documents should have 1" margins, size 11 to 12 font, in Times New Roman or size 10 font in Arial.

Data analysis will be conducted in R with basic meta-analysis code co-developed with the instructor.

The Outline (5 points) | The outline consists of 1) your working meta-analysis project title, 2) your hypotheses* and/or** question(s)/objectives, 3) a list of three potential journal articles (with complete references), and 4) expected results. Not to exceed one page.

*Hypotheses must include a null hypothesis and an appropriate number of alternative hypotheses.

**For most studies, a hypothesis is essential. In rare circumstances, it is possible that a hypothesis is not appropriate. If you feel this is the case for your project, consult with the instructor.

The Annotated References (15 points) | Annotated references consist of the literature citation in bold followed by a one paragraph (each no longer than one page) description in your own words of the major problem(s)/hypotheses addressed, study design and approach/methods, key results, important conclusions, and the implications and/or value of the study for your meta-analysis. You will submit five annotated references for five individual studies that will be included in your meta-analysis.

The Draft Term Paper (5 points) | Draft papers should be no more than 8 pages double-spaced, not including the abstract, references, and any supporting tables and figures.

The Oral Presentation (15 points) | Students will present the findings of their meta-analysis via a 15-minute oral presentation at the end of the semester. PowerPoint slides or similar visual presentation of key project components (see below) are *highly* encouraged. All students who are not actively presenting their project will be asked to peer-review their classmates' presentations. Peer-review will be worth one discussion participation point.

The Final Term Paper (25 points) | Final papers should be no more than 8 pages double-spaced, not including the abstract, references, and any supporting tables and figures. In Module 5, you will read from the book, *Doing Science: Design, Analysis, and Communication of Scientific Research* by Ivan Valiela. Specifically, you will read:

Chapter 5: Communication of Scientific Information: Writing

Chapter 6: Communicating Scientific Information: The Scientific Paper

These two chapters provide the foundational guide for the design, construction, and editing of your meta-analysis paper.

The elements of the written (and oral) component of your meta-analysis must include:

1. Title
2. Abstract

3. Introduction
4. Hypotheses* (and/or Objectives/Questions)
5. Approach/Methods
6. Results (Text/Body)
7. Discussion/Conclusions
8. Figures/Tables and Figure/Table Legends
9. References

Abstract

- No more than 250 words.

Introduction

- Several paragraphs, supported by literature
- Include a statement of objectives/questions/hypotheses here

Approach/Methods

- Include a detailed accounting of what data sets you used
- Key words used in search
- Explanation for any exclusion of certain data
- Justification for statistical approaches used and how assumptions of each statistical analysis were met

Results

- Results are an elegant verbal narrative of findings that refer to figures and tables *parenthetically*.

Discussion/Conclusions

- Key take-home messages

References

- Include all cited references *and* those used in the meta-analysis of data
- References formatted after *Proceedings of the National Academy of Sciences*
- Mendeley is a free software for reference management

Figures and Tables

- Presented at the end of the text along with legends
- If presenting a figure, remember each axis must include an axis label (e.g., "greenhouse gas emissions" and units (e.g., "gCO₂-eq"))
- Table legends (explanation) are placed directly above the table
- Figure legends (explanation) are placed directly below the figure

Delivery of assignments

All meta-analysis components should be uploaded electronically as a .pdf to Canvas by their due dates outlined in the course schedule above.

Course Policies

Late Work Policy

Students are expected to complete all assignments according to the instructions and deadlines provided with those assignments and in this syllabus. No late work will be accepted unless arrangements have specifically been made with the instructor.

Extra Credit Policy

Extra credit questions may appear on the exams. Aside from that, no extra credit is available.

Grades of "Incomplete"

Per university policy, an instructor may assign temporary grade of Incomplete to a student who demonstrates that he or she could not complete the requirements of the course due to circumstances beyond the student's control

and not reasonably foreseeable. A student must be passing a course at the time that an Incomplete is requested unless the instructor determines that there are extenuating circumstances to assign an Incomplete to a student who is not passing the course. When an instructor assigns an Incomplete, he or she shall specify in writing using the Department Incomplete Grade Form the requirements the student shall fulfill to complete the course as well as the reasons for granting an Incomplete when the student is not passing the course. The instructor shall retain a copy of this statement in his or her grade records and provide copies to the student and the department head or his or her designee. (Section I.6 of the *Academic Faculty and Administrative Professional Manual*). For more information: <https://registrar.colostate.edu/incomplete-grades/>

Disability Access

Colorado State University is committed to providing reasonable accommodations for all persons with disabilities. Students with disabilities who need accommodations must first contact the Student Disability Center before requesting accommodations from the professor. The Student Disability Center (SDC; <https://disabilitycenter.colostate.edu/>) is located in room 121 of The Institute for Learning and Teaching (TILT) building. Their phone is (970) 491-6385 (V/TDD). Students who need accommodations in this course must contact the professor at the beginning of the semester to discuss needed accommodations.

Attendance Policy

This is an active learning and participation-heavy class. Your active participation in class shows your respect to your classmates and instructor and is likely to be highly correlated with your grade. As with work or meetings, I expect that you will let me know when you cannot make it.

Students who will miss class due to participation in University-sanctioned extracurricular/co-curricular activities must inform their instructors prior to the anticipated absence and take the initiative to make up missed work in a timely fashion. Instructors must make reasonable efforts to enable students to make up work which must be accomplished under the instructor's supervision (e.g., examinations, laboratories). In the event of a conflict in regard to this policy, individuals may appeal using established University procedures.

For the purposes of this regulation, University-sanctioned activities include competitions, events and professional meetings in which students are officially representing the institution. Appropriate sanctioned activities include:

- a. Intercollegiate athletics;
- b. Collegiate club sports and competitions;
- c. Conferences and workshops recognized by the University not related to academics;
- d. Commitments on behalf of the University (ASCSU, band, etc.); and
- e. Professional activities recognized by the University related to academics.
- f. Department heads or their designated representatives must approve sanctioned professional and departmental activities. Other sanctioned activities must be approved by the appropriate program director on record with the Division of Student Affairs offices or the Department of Athletics.

Religious Accommodation

Participation in official University activities, e.g., an out-of-town athletic event, or special religious observances may provide a legitimate reason for an excused absence. The student is responsible for discussing this with the instructor at the beginning of the semester.

Final Exam Policy

Final examination week is part of the regular semester. Student attendance shall be consistent with University policy. If a student has three or more final examinations (not classes) scheduled for the same day or if conflicts of examination times occur, the student may negotiate a time change with the instructors involved. If the parties involved cannot find a mutually agreeable time, the Registrar's Office indicates which courses must be changed.

Note: The Registrar's Office must be notified at least one week prior to Final Examination Week to allow instructors time to make appropriate accommodations. It is the student's responsibility to initiate negotiations.

<http://www.registrar.colostate.edu/final-exams>

Professionalism Policy

I fully understand that online learning in the COVID-19 era is challenging. That being said, please do your best to treat each online/remote class meeting with the professionalism that you would an in-person course. Please arrive on time for all class meetings. Please silence mobile phones and other devices during online class meeting times. Please be attentive and respectful to other students and respect differences of opinions and backgrounds. When

emailing me, please include your full name, CSU ID, and the course number in your email. Click [here](#) for a quick link to professionalism and maximizing the effectiveness of emails to your instructor.

Academic Integrity

The Department of Forest and Rangeland Stewardship takes academic integrity seriously. At minimum, academic integrity means that no one will use another's work as their own. You can find an overview and CSU's definition of plagiarism on the CSU Writing Center website found here:

<https://writing.colostate.edu/guides/page.cfm?pageid=311&guideid=17>.

If you plagiarize in your work you could lose credit for the plagiarized work, fail the assignment, or fail the course. Each instance of plagiarism, classroom cheating, and other types of academic dishonesty will be addressed according to the principles published in the CSU General Catalog (under "Academic Integrity/Misconduct"):

<http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/>

This course will adhere to the CSU Academic Integrity [Policies and Guiding Principles](#) as found in the General Catalog and the [Student Conduct Code](#).

Academic integrity lies at the core of our common goal: to create an intellectually honest and rigorous community. Because academic integrity, and the personal and social integrity of which academic integrity is an integral part, is so central to our mission as students, teachers, scholars, and citizens, I will ask that you affirm the CSU Honor Pledge as part of completing your work in this course.

Further information about Academic Integrity is available at CSU's Practicing Academic Integrity:

<https://tilt.colostate.edu/Integrity/StudentResources>

Title IX Information

CSU's Student Sexual Harassment and Violence policy, following national guidance from the Office of Civil Rights, requires that faculty follow CSU policy as a "mandatory reporter" of any personal disclosure of sexual harassment, abuse, and/or violence related experiences or incidents shared with the faculty member in person, via email, and/or in classroom papers or homework exercises. These disclosures include but are not limited to reports of personal relational abuse, relational/domestic violence, and stalking. While faculty are often able to help students locate appropriate channels of assistance on campus (e.g., see the CSU Health Network link below), disclosure by the student to the faculty member requires that the faculty member inform appropriate CSU channels to help ensure that the student's safety and welfare is being addressed, even if the student requests that the disclosure not be shared.

For counseling support and assistance, please see the CSU Health Network, which includes a variety of counseling services that can be accessed at: <http://www.health.colostate.edu/>. And, the Sexual Assault Victim Assistance Team is a confidential resource for students that does not have a reporting requirement and that can be of great help to students who have experienced sexual assault. Some helpful websites:

<https://safety.colostate.edu/sexual-assault-information/>

<https://wgac.colostate.edu/support/sexual-assault/>

Non-Discrimination Statement

Colorado State University does not discriminate on the basis of race, age, creed, color, religion, national origin or ancestry, sex, gender, disability, veteran status, genetic information, sexual orientation, gender identity or expression, or pregnancy. The University complies with the Civil Rights Act of 1964, as amended, related Executive Orders 11246 and 11375, Title IX of the Education Amendments Act of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, Section 402 of the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, the Age Discrimination in Employment Act of 1967, as amended, The Pregnancy Discrimination Act of 1978, Americans with Disabilities Act of 1990, the Civil Rights Act of 1991, the ADA Amendments Act of 2008, the Genetic Information Nondiscrimination Act of 2008, and all civil rights laws of the State of Colorado. Accordingly, equal opportunity of employment and admission shall be extended to all persons. The University shall promote equal opportunity and treatment in employment through a positive and continuing affirmative action program for ethnic minorities, women, persons with disabilities, and veterans. The Office of Equal Opportunity is located in 101 Student Services. Source: <http://oeo.colostate.edu/non-discrimination-statement>

Literature Cited in Syllabus

- Hampton, S., Jones, M., Wasser, L., Schildhauer, M., Supp, S., Brun, J., Hernandez, R.R., Boettinger, C., Collins, S.L., Gross, L., Fernández, D., Budden, A.E., White, E., Teal, T., Labou, S., Aukema, J., 2017. Skills and Knowledge for Data-Intensive Environmental Research. *Bioscience* In Press.
- Hampton, S.E., Strasser, C.A., Tewksbury, J.J., Gram, W.K., Budden, A.E., Batcheller, A.L., Duke, C.S., Porter, J.H., 2013. Big data and the future of ecology. *Front. Ecol. Environ.* 11, 156–162. doi:10.1890/120103
- Harrison, F., 2011. Getting started with meta-analysis. *Methods Ecol. Evol.* 2, 1–10. doi:10.1111/j.2041-210X.2010.00056.x
- Hedges, L. V., Gurevitch, J., Curtis, P.S., 1999. The Meta-Analysis of Response Ratios in Experimental Ecology. *Ecology* 80, 1150–1156. doi:10.1890/0012-9658(1999)080[1150:TMAORR]2.0.CO;2
- Schmidt, F.L., Hunter, J.E., 2014. *Methods in Meta-Analysis: Correcting Error and Bias in Research Findings*. Sage Publications.