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Course Portfolio for NRES 311: Wildlife Ecology and Management

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COURSE PORTFOLIO
NRES 311 Wildlife Ecology and Management
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INTRODUCTION

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OBJECTIVES OF THE COURSE PORTFOLIO

I have three main goals from my portfolio: (1) continue to refine my course through the required documentation of connections between course goals and course activities, (2) documenting the efficacy of my teaching techniques, and (3) serving as a preliminary step to publishing some of the case studies I am using in my course.

First, refining my course. Prior to 2004, I had taught this course once at UNL (Spring 2003), during which I drew from four variations of the course that I have taught as at other colleges and universities. I am pleased with the course I developed, but want to continue to refine my activities and hone the experience for the students. The connection between course goals, teaching methods, and assessment methods is critical for me. My problem-based learning has solved some teaching problems that I had experienced in previous versions of this course, but it has also presented new problems to deal with. I am especially perplexed between the need to simultaneously cover certain content and allow time for digestion and processing by the students. As I

refine the course, I find myself cutting content in favor of giving students time to digest and really learn and apply material. At what point does the course become too lax in content? What assignments provide (1) student learning opportunities, and (2) a suitable showcase for assessment of student learning in a workable time period (both the student project's time period and my grading time period)?

Second, the results of my teaching. I am using problem-based learning with group learning experiences and assignments. The responsibility is on the individual to motivate themselves to read, contribute to groups, and participate in learning experiences. I use a group assignment as the assessment for one unit. Therefore, there is potential for students to 'slide by' on their group's efforts. Are all students in my course learning? How can I be sure of this? What does a grade mean in my course? Should I be happy or concerned if all students end up with A's and B's in my course?

Last, peer-review of teaching methods. Through this peer-review of my course, I am hoping to begin the process of publishing some of my problem cases and teaching methods. I am spending considerable time on my courses–it seems that it is quite a bit more time than might be required for simple promotion and tenure concerns (that's obviously not what is driving me!). Thus, it seems best to get the most out of the effort, in terms of professional recognition. I have schemes of publishing a text with problem cases for wildlife ecology courses or publishing manuscripts in teaching journals. I am hopeful that completing the portfolio will enhance those efforts.

DESCRIPTION OF THE COURSE

Course goals and objectives **LINK TO COURSE SYLLABUS**

Goals

I would like my course to:

1. Provide an opportunity for students to discuss current issues and research in wildlife and fisheries management.
2. Expose students to professionals in state and Federal wildlife management agencies.
3. Provide experience working in teams to solve reality-based problems.
4. Provide each student with ecological knowledge base from which to operate as an effective wildlife biologist.

Objectives

By the end of my course, students should be able to:

1. Express the impact of individual and societal values, or conservation ethic, in determining management policy.
2. Demonstrate knowledge of general ecological principles, such as succession, competition, and predation, as they affect fish and wildlife populations.
3. Effectively apply knowledge of the relationships of wildlife with various habitats.
4. Demonstrate an ability to apply general management principles to real problems in

forest, grassland, and wetland ecosystems.

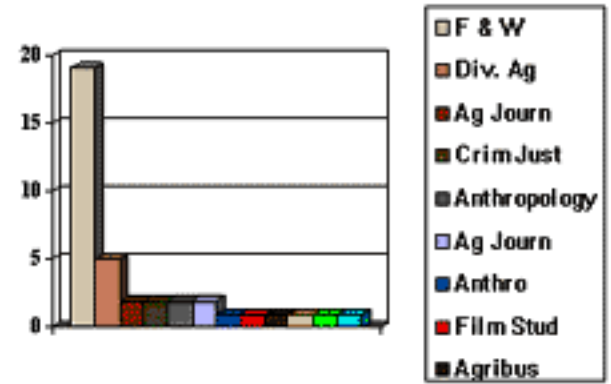
5. Demonstrate an ability to analyze wildlife population dynamics and structure, including the ability to evaluate the demographic and genetic structure of a population.
6. Develop a management plan for a threatened or endangered species, as well as an over-abundant species, with special attention to significant state and Federal legislation and regulations.
7. Integrate knowledge of ecological systems with management needs into a defendable position on a wildlife management decision.

The course

Audience

I usually have 35-40 students in the course. In 2004, I had 33 students. One student (the 34th) dropped during the first week; otherwise, retention was high.

Usually, half of my students are Fisheries and Wildlife majors, and half are non-majors. However, non-majors are often upper-level students in closely related disciplines, such as Animal Science, Ag Journalism, or Range Science (see figure below at left for complete list of majors in my course in 2004). Some of the F&W majors, and many of the non-majors have not taken Ecology (BIOS 220), which is the prerequisite for my course. The figure below, on the right, shows the total number of students in the course, the number of students who had taken BIOS 101 (General Biology), and the number of students who had taken BIOS 220 (Ecology).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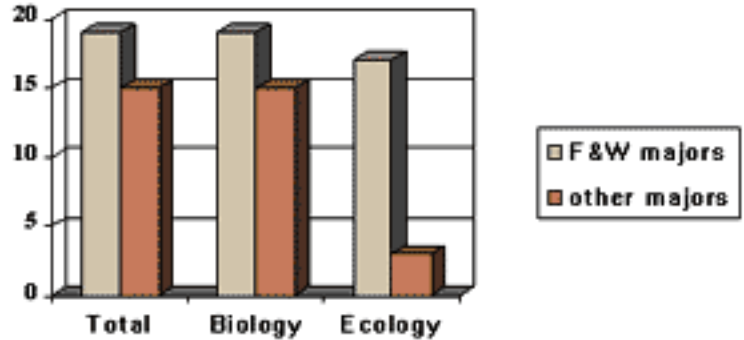
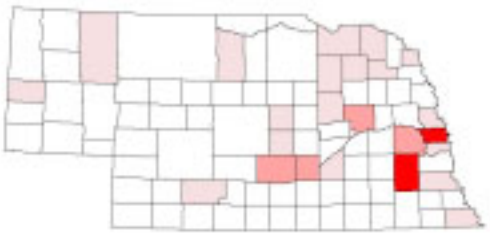

20
15
10
5
0
Total
Biology
Ecology
F&W majors
other majors

Fisheries and Wildlife students in my course are usually sophomores and juniors, and this is the first 'wildlife' course that most take in our department, after fulfilling soils, hydrology, biology, chemistry, and ecology foundation courses. As such, most students are extremely interested in the content of the course, even though it is required.

In 2004, 29 of my students were from Nebraska. California, Minnesota, Illinois, and Australia were the homes to the other 4 students. See figure at right:

Of the Nebraska students, the figure to the right shows the distribution of where they came from (dark red = 3 or more students, light red = 2 students, light pink = 1 student):



Course structure

The course was structured as a MWF 3-credit lecture course (50 minutes), with no lab. Class activities include guided discussions, group work, lectures, discussions of outside-the-text readings, computer labs, and a special field trip. LINK TO COURSE SCHEDULE

Teaching methods

I use problem-based learning methods to teach the course. I designed 5 units for the course, centered on the 7 objectives (see below). Each unit begins with an in-class reading of a fact-based, ill-structured, fictitious case problem. The students read the problem and work in groups to determine what they would need to do/know to solve the problem. Then, as a class, we list the most important learning issues that need to be dealt with as we proceed through the unit. These learning issues become the focus of the subsequent mini-lectures, group work, assignment(s), projects, and/or exams. LINK TO PBL INFORMATION PAGE

I have written problem cases that incorporate many local, Nebraska themes. Luckily, there are some great examples to use from Nebraska. I also incorporate some cases from other states. In the future, I would like to change one of these cases to an international theme.

Currently, the 5 problem cases are:

1. Nebraska's Ornate Box Turtle trade

   This problem case is a short problem case, which helps to get the students introduced to problem-based learning. We begin the semester with a 'survival' exercise, which demonstrates the value of working

together as a group to solve a problem. The box turtle case case introduces the students to the Public Trust Doctrine, which allows a discussion of the history of wildlife management and law relating to wildlife. We also discuss individual and group land ethics, and determine how they affect decisions regarding management of wildlife and habitat on public and private lands. The problem case addresses Course Objective #1. LINK TO BOX TURTLE CASE

2. Moose and wolf interactions in Alaska

   This problem case is the longest case of the year, and covers the most material. I use the controversial relationship between moose and wolves in Alaska to discuss ecological relationships that are important to wildlife, such as competition (including the effects of competition from genetically modified organisms) and predation. We also discuss harvest of animals and population dynamics (births, deaths, and movement), as well as genetic structure of populations. The case includes 2 discussions and a population dynamics computer lab. This problem case addresses Course Objectives #2 and #3. The case concludes with an exam, which covers the first two problem cases (Ornate box turtle and Moose/wolves). LINK TO MOOSE AND WOLF CASE

3. Sandhill Crane management and harvest in Nebraska

   This problem case covers the entire second unit of the course, and the case ends with a group position paper, in which the groups decide whether Nebraskans should be able to harvest sandhill cranes. Topics covered by this problem case include threatened and endangered species management, harvest management, and hunting ethics. The students meet a Nebraska Game and Parks Commission biologist (Dr. Scott Taylor) during a guest lecture on harvest management (Course Goal #2). This problem case addresses Objectives #3, #6, and #7. It also addresses Course Goal #3 (reality based group problem solving). LINK TO SANDHILL CRANE PROBLEM CASE

4. A tale of two National Wildlife Refuges: Piedmont NWR (Georgia) and DeSoto NWR (Nebraska/Iowa)

   This problem case covers the topics of animal damage management (too many animals), forest management, and grassland management. It includes 2 discussions and an in-class exercise on landscape-level habitat management. The case focuses on two National Wildlife Refuges, to demonstrate the type of management done on these public land areas, and I contrast that with other areas, such as National Forests. The problem case addresses Course Objective #3 and #4. The case culminates in an exam. LINK TO NWR CASE

5. Pheasant management in Nebraska

   This problem case introduces students to the interactions between wildlife and food, cover, and soils. The students work in groups to provide each other with information on the 2002 Farm Bill, and I use the Farm Bill as a means of discussing landscape changes in habitat. This case problem is

a short case problem, which addresses Course Objectives #1, #2, and #3. The case ends with an exam during finals week. This case is one of the more popular cases, as many students are interested in hunting and have direct observations on pheasant population changes during their lifetime. LINK TO PHEASANT CASE

We use a textbook by Bolen and Robinson, titled "Wildlife Ecology and Management." This text is the best available, but does not provide a perfect fit for the class in some of the more quantitative topics, such as conservation genetics and wildlife population dynamics. During each problem unit, there are assigned readings from the text, and I supplement that material during class with lecture material.

Assignments

Reading discussion papers: In addition to the textbook readings, each unit contains at least one special reading that is not in their text. In fact, there is one special discussion paper during most weeks of the course. The students are asked to read the material, and then respond to 1-2 questions. For example, when we read Aldo Leopold's Land Ethic, the students are asked to find a current news article that expresses a land ethic (or lack thereof) of the subject of the news article. In class, students first discuss the questions and the reading in small groups. I facilitate these discussions by moving among the groups. I then bring the groups back together and we write down general discussion points or conclusions that groups drew as they contemplated the readings. The students hand in their written discussion papers, which promote readings before class and an initial critique of the article. I feel strongly about the value of these discussions. In fact, I purposely chose the room for the course to enable movement of chairs into small discussion groups. In 2005, I will be changing the structure of the course to further facilitate better group discussion (see "planned changes" section).

Exams: Three (3) of the 4 units conclude with an exam. The exams are a combination of multiple-choice, fill-in-the-blank, matching, and short essay/problem solving questions. I hand out a review sheet prior to the exam, and students study the review sheets quite well, which I feel facilitates their learning process. The exams concentrate on assessing the learning issues that the class developed. LINK TO REVIEW SHEET FOR EXAM #1 .

Harvest management group position paper: For the second unit, the class breaks into groups of 4-5 students. Instead of an exam, the groups prepare a position paper in which they decide whether sandhill cranes should be harvested in Nebraska. The paper requires them to learn about the biology, behavior, and migratory patterns of Sandhills cranes, as well as harvest regulations in surrounding states (Nebraska is the only state in the central flyway that does not harvest cranes). I provide some resources as a kick-start for their research, and the class goes on a field trip to the Rowe Sanctuary near Gibbon, NE to observe

the migration of the cranes and learn from the biologists at the Sanctuary. LINK TO HARVEST MANAGEMENT PAPER RUBRIC .

Grading model

Based on assessment readings for the Peer Review of Teaching group meetings, I developed a new grading model, so 2004 was the experimental year for this model.

I have 2 basic types of graded material—exams and homework/in-class assignments. Exams have scores between 0 and 100. My homework/in-class assignments had scores between 0 and 10 in previous years. I usually had the exams worth 60% of their grade, and the other assignments worth 40% of their grade. Most students would score 8-10 points (out of 10) on these small assignments, which had the effect of inflating their final grades. Last year, I was troubled as all students received A's or B's, including some students that I did not feel did well enough to receive grades of that magnitude.

My new grading system is a definitional model. I defined what it meant to receive an "A." In my case, students must have an average on their 4 exams (including the group project as one exam score) of >=90%. A "B" was an average of 80-89%. Etc. Then, I graded their smaller assignments as essentially pass/fail. If an assignment was not turned in, the student received a "0". If the student turned the assignment in, but it was not complete in some way, the student received a "5", which was simply a categorical score, meaning they did not satisfactorily finish the assignment. Students receiving a "5" had the option to resubmit the assignment within 1 week; if the necessary improvements were made, they would then receive a "10". A "10" indicated a "pass". To receive an A, in addition to having an exam average over 90%, the student had to have 85% of their pass/fail assignments as 10's. They also could only have 1 "0" on these assignments.

My reasoning for this grading model was that "A" students should be able to perform well on exams, but they should also be very involved in class on a daily basis (no 0's on pass/fail assignments). Class participation is a very high priority for the way I teach my course. Also, "A" students should be able to constantly perform well on these smaller assignments (85% of the assignments had to be 10's, or passes). So, a student who does well on exams, but rarely comes to class should not get an "A". And, a student who always comes to class, but does not do well on exams should not get an "A". LINK TO GRADING MODEL

THE COUSE AND THE BROADER CURRICULUM

NRES 311 Wildlife Ecology and Management is an applied ecology course–BIOS 220 Ecology is the prerequisite. NRES 311 is a required course for Fisheries and Wildlife students, and precedes NRES 350 Wildlife Management Techniques in the Fisheries and Wildlife major's curriculum. I also teach NRES 350, which is a much more quantitative course, dealing with management and research processes.

My course could be seen as a transition between the Ecology and the Wildlife Management Techniques course. Ecology is a broad course, covering interrelationships between/among all taxa of plants and animals and the like. Management Techniques, on the other hand, is a very applied course, teaching capture and marking techniques for wildlife (vertebrate, non-domestic animals), analysis of wildlife survey data, and similar topics–a "how to" course. Wildlife Ecology and Management fits between the two courses as an applied ecology course–determining how ecological principles apply to wildlife populations and management decisions.

My course also prepares students for other upper-level courses in our Fisheries and Wildlife curriculum. For example, Biology of Wildlife Populations is a course that many students take, usually in their senior year. My introduction to demographics of wildlife populations, disease dynamics, and life history traits is critical to students taking Biology of Wildlife Populations. Wildlife Damage Management is another upper-level course that students take after Wildlife Ecology and Management. I cover a basic introduction to wildlife damage, which provides an opportunity for students to become intrigued by this area of wildlife management.

Last, students taking my course have a large degree of variance in their life history background with regard to wildlife and fish species. Some students may have taken zoology and vertebrate zoology. Others may have gotten in to one of their additional animal resources courses, such as ornithology, ichthyology, herpetology, and mammalogy. But, most students have not gotten this far in their training. Therefore, I teach Wildlife Ecology and Management from an introductory level with regard to these subjects. For example, when we discuss food needs of wildlife, I introduce them to the need for and structure of a 'cecum' in birds, not assuming that they have seen this in another course.

ANALYSIS OF STUDENT LEARNING

FOCAL ASSIGNMENTS FOR THIS PORTFOLIO:

1. Exams (3)
2. Group project (sandhill crane harvest report)
3. Reading response papers/in-class assignments (15)

I. EXAMS

General evidence of learning

	EXAM #1	REPORT #2	EXAM #3	EXAM #4	AVERAGE
Average	81.5	89.0	84.7	84.4	84.7
Low score	58.5	82.0	52.5	43.8	65.6
High score	96.5	95.0	98.0	99.0	94.5
SD (score)	10.9	4.3	10.3	12.2	7.2

Examples of student work:

Exam 1:

consisted of 10 multiple choice questions, 6 fill-in-the-blank questions, 6 true/false questions, a mathematical problem, 2 short answer questions, and a take-home essay that required library research.

Student 1: 96.5% (A). The student received 76.5 of 80 points on the in-class portion of the exam. Answers were correct, calculations on life table problem were correct, most details on short essay questions were provided. One small detail on each short essay was not complete. On the take-home essay, the student used jargon that I was looking for, including the words "density dependent". The student also referred to functional and numerical responses, which are both required to regulate prey populations. The student also summarized and provided data from 2 peer-reviewed literature sources. LINK TO STUDENT 1 EXAM 1

Student 2: 62% (D). The student received 47 of 80 points on the in-class portion of the exam. Approximately half of the answers were incorrect, calculations on the life table problem were incorrect, and the student could not relate how the Public Trust Doctrine applied to a short answer question (the PTD was a major focus of the first unit, showing a lack of achieving this learning objective). On a second short-answer question, the student was able to describe the information contained on the graphs, but was not able to relate WHY the information was important. On the take-home exam, the student used Wyoming Wildlife and an Alaska Fish and Game web site for 'peer-reviewed' references. These references were not helpful to the student. The student confused the concepts of population regulation with population limitation—a key concept in this unit. The literature cited section of the paper was very incomplete. The 15 points they received were probably very generous, looking back on the exam. LINK TO

STUDENT 2 EXAM 1

Exam 3:

consisted of 17 multiple choice questions, 10 true/false questions, and 2 short answer questions.

Student 1: 97% (A). The student missed only 1 of the 27 initial questions. On the short-answer questions, the student provided factual information, and answered the entire suite of sub-questions on each question. LINK TO STUDENT 1 EXAM 3

Student 2: 52% (F). The student missed 10 of the 27 initial questions. On the first short-answer question, the student's answer was not factual. The answer was vague with regard to the purpose of the National Wildlife Refuge system. On the second short-answer question, the student did not define "natural good" and "natural evil" as requested. The student also did not describe the hunters' actions by using the term "human skills" as requested. Both answers showed a lack of understanding of the learning objectives associated with each question. LINK TO STUDENT 2 EXAM 3

Exam 4:

consisted of 16 multiple choice questions, 4 matching questions, 5 true/false questions, 1 short answer question, and a take-home essay question that required library research.

Student 1: 96.5% (A). The student received 76.5 of the 80 in-class points. On the short-answer question, the student provided a very complete answer that answered each of the sub-questions, including a general description of the research shown in the data table, an accounting of why higher fat content matters to mourning doves, and what impacts low (or high) fat content would have to a population of doves. The student found two relevant peer-reviewed articles for the take-home portion of the exam, and the answer was complete. The student adequately summarized the results from both research article, as well as summarizing and introducing the topic in the essay. LINK TO STUDENT 1 EXAM 4

Student 2: The student received 45.75 of the 80 points in the in-class portion of the exam. On the short answer question, the student made several assumptions that were not merited. For example, they assumed that because the sample size of doves was larger in Hancock County, this meant the population was larger in Hancock County, was well. The student did not relate what role fat played for mourning doves (energy), and the answer was not as detailed as was needed. In several places, the student did not answer "why". On the take-home exam, the student's answer only covered half the page and was quite vague. I was not convinced the student had actually read the references they found in any depth.

The student's references were good, but the summary of each was very lacking. LINK TO STUDENT 2 EXAM 4

Comparison of students: Fisheries and Wildlife majors vs. non-majors

	EXAM #1	EXAM #3	EXAM #4	AVERAGE*
F&W major (n = 19):				
Average	79.6	85.0	85.5	85.0
SD (score)	11.4	10.0	12.2	8.3
Non-majors (n = 14):				
Average	84.0	84.2	82.8	85.0
SD (score)	9.7	10.6	12.1	8.0

*includes scores from Sandhill Crane group paper (Exam #2).

Comparison of students: students with Ecology prereq vs. those without

	EXAM #1	EXAM #3	EXAM #4	AVERAGE*
With prereq (n = 19):				
Average	85.0	88.3	90.5	88.0
SD (score)	9.9	8.6	4.9	4.4
W/out prereq (n = 14):				
Average	76.7	79.8	76.1	80.2
SD (score)	10.4	10.4	14.1	7.8

*includes scores from Sandhill Crane group paper (Exam #2).

This year, 14 non-majors took the class. Ten (10) these students did not have the prerequisite for the course, NRES 220 Ecology. In addition, 4 Fisheries and Wildlife majors did not have the prerequisite, or they had flunked the course (Ecology) during the previous semester. The "Nroll" computer did not keep these students from enrolling in my course. So I decided to let them take the course while I conducted an experiment to see whether the prerequisite mattered to their success in the course.

As you can see in the above tables, Fisheries and Wildlife majors and non-majors actually were dead-even in their final average exam score (85%). However, students that did not take (or pass) Ecology, the prerequisite, did considerably worse than students who had passed Ecology (B- and B+, respectively). On the three in-class exams, students without the ecology prereq averaged a C, while students that had taken ecology had a very high B+ or A- on the in-class exams.

Student diversity in the course also manifested itself in terms of student interest and activity. I found the F&W majors and other students that had taken ecology to be much more interested in the course, and active in group discussions. For example, on the final day of the course, we completed course assessments. Twenty-nine students were

in class, that day. All 19 F&W majors were in class, and only 10 of 14 non-majors were in class. This pattern was representative of attendance during the semester.

II. GROUP PROJECT

General evidence of learning

See above in the exams section for a comparison of exams with the group project. The average score on the group project was 89%, about half a grade higher than the other exams. I graded the group projects very critically, and I was very happy, overall, with the products the groups produced. I provided the groups with several work days (no lectures in class), and I think they made fairly good use of those days. I feel that the group project is a good assignment to address several of the course's learning objectives.

Examples of student work:

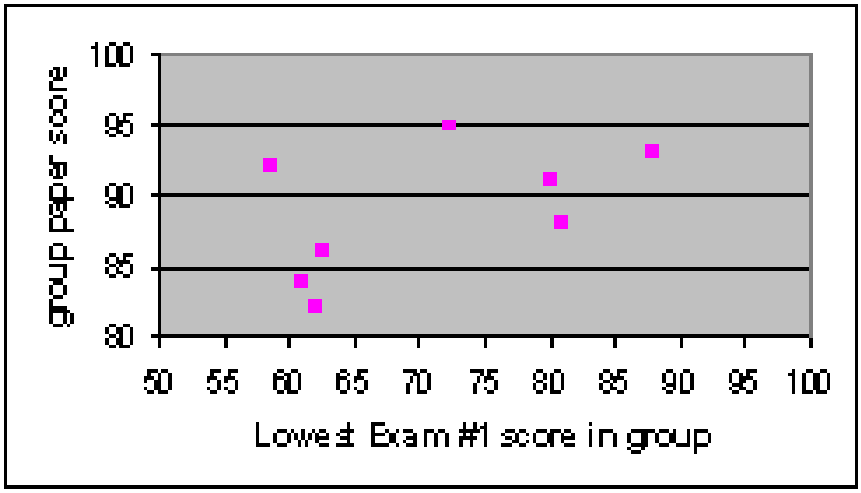
Group 1: 95% (A). The group's paper included each of the four required sections (background, current status, recommendation on harvest decision, and regulation recommendations). Two of the sections were extremely well-written, was good, and the fourth section was fair/good. Of the 8 learning issues the class developed, the group addressed 7. The group also properly cited their references, they had approximately 50% of their references from peer-reviewed journals, as required, although this could have been higher. They used literature to support their decision, there were minor mistakes in judgement/logic, and the report was well-written, typed, and error-free. LINK TO GROUP 1 REPORT 2

Group 2: 82% (A). The group's paper included each of the four required sections (background, current status, recommendation on harvest decision, and regulation recommendations). The quality of these sections were not high—two of the sections were good and two were OK/fair. Of the 8 learning issues there were 4 that were not adequately addressed, which was probably the largest loss of points on the final score. The group also properly cited their references, but many points in the text were missing citations. Fewer than the required 50% of their references came from peer-reviewed journals. The group use literature to support some of their decisions, but not all. There were some minor and major mistakes in judgement/logic, and the report was well-written, typed, and error-free (grammatically). LINK TO GROUP 2 REPORT 2

Bias of group composition

Do groups with lower average exam scores also receive lower scores on their group project? Why?

My analysis of exam #1 shows that the minimum exam score in a group has a strong correlation ($R^2 = 0.51$) with how the group scores on their report. That is, the lower the minimum Exam #1 score among the group's members, the lower the group scores on their group report. Exam #1 is a review of many ecological principles, and thus separates out the non-ecology students from the ecology students.



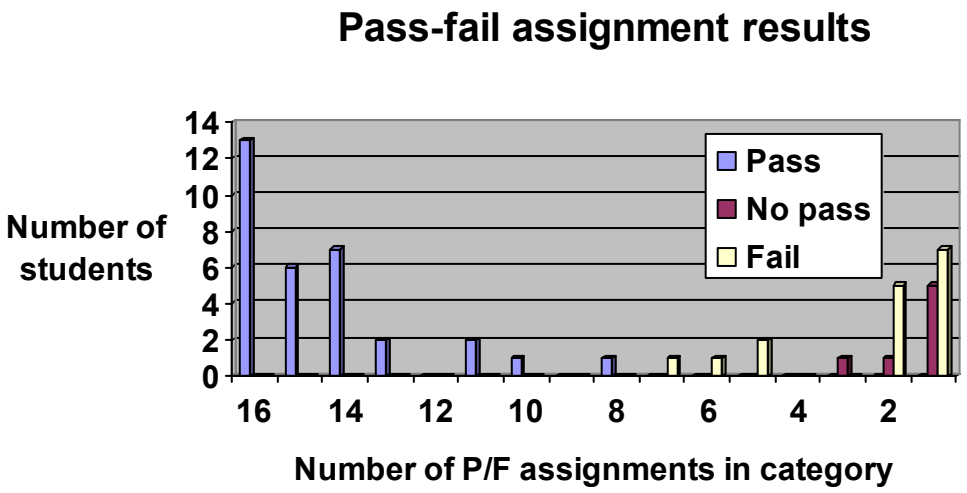
The results of this exercise are of interest to me, as I am concerned about the composition of the groups. I randomly selected group members this year, stratifying the groups with at least 2 F&W majors in each group. Most groups were composed of 2 F&W majors and 2 non-majors. Reflecting on the above result, I am considering two options for group formation next year. First, I might stratify the groups based on the first exam score, rather than by major. This would ensure a good mix of students in the groups. However, a second suggestion I have received is to use the first exam to ensure that all high-scoring students are together in groups, while low-scoring students are together in groups. The reasoning for the latter is that the lowest scoring students are going to 'drag down' the overall group score (see above graph), and they might try harder if they are not working in the shadow of higher scoring students. Similarly, high-scoring students will challenge each other, and should not be penalized by placing them in groups with low-scoring students.

As of this writing, I am leaning toward the 'mixed' groups, as I firmly believe that this exercise helps students learn to work with others (one of my course goals). Thus, the group dynamics are important, and I will try to enact structures to help facilitate those dynamics. However, this topic continues to be of interest to me, and I'm sure I will continue to wrestle with this choice in the future.

III. READING DISCUSSION PAPERS and IN-CLASS ASSIGNMENTS

General evidence of learning

Most students in the course did well on the 16 pass/fail assignments. For example, 13 students passed all 16 of the assignments during the semester, while 1 student passed only 8 assignments. Similarly, 7 students failed one assignment during the semester, while 1 student failed 7 assignments (the only way to fail an assignment was to not turn it in, or not be in class). Following are the summaries of how students performed on homework assignments (includes reading discussion papers and in-class assignments):



Examples of student work:

Focus assignment 1. Aldo Leopold's "Land Ethic" reading response: assignment consisted of reading the "Land Ethic," and then finding a current news item that showed the presence or lack of a land ethic in an individual or group (e.g., corporation). The writing assignment needed to draw out the connection of the news article to the "Land Ethic".

Student 1: Pass. The student found an interesting article about prairie restoration in Nebraska. The student cited 2 examples of how the article related to Leopold's writing, and nicely summarized these connections. It was obvious from reading the essay that the student had closely read Leopold's "Land Ethic" as well as the news article. LINK TO STUDENT 1 LAND ETHIC WRITING

Student 2: No Pass. The student found a current article about a young hunter killing a mountain lion. The student's essay was very passionate, but the student never tied the article to the "Land Ethic." It was not obvious from reading the student's essay that they had read the "Land Ethic." LINK TO STUDENT 2 LAND ETHIC WRITING

Focus assignment 2. Chris Helzer's "Tree planting in Nebraska" reading response: assignment consisted of reading the "Tree planting in Nebraska", which discusses the tension of Nebraska being the "Arbor State" and at the same time being a prairie state.

The author suggests that managers focus on regional levels of biodiversity, and the author suggests that prairie restoration is much more important than tree planting. The students were asked to pretend as if they had just received 80 acres of Nebraska farmland from a deceased relative—how would they manage that land for wildlife? Would they plant trees or restore grasslands? And, they were to relate their decision to Helzer's paper—noting whether they were in agreement or disagreement with Helzer.

Student 1: Pass. The student wrote a descriptive paragraph about their management plans. The essay concluded with several lines that linked their plans to Helzer's article. They noted what they had learned from the Helzer article. LINK TO STUDENT 1 TREE PLANTING WRITING

Student 2: No Pass. The student wrote a nice description of their management plans, and even included a map of their habitat plans. But, they did not contrast their ideas with Helzer's reading. In this case, the student was very much in disagreement with Helzer, but it was not obvious they had read the Helzer reading as they prepared their plans. LINK TO STUDENT 2 TREE PLANTING WRITING

SYNTHESIS OF ALL ASSIGNMENTS

General evidence of learning

Quantitative evidence.—The majority of my students received A's and B's as final grades, indicating a relatively high level of performance. Twenty-seven out of 33 students received at least a B- in the course.

On exams (including the group project as the 'exam' for the second unit), 26 of 33 students received at least a 80% average. Eight students received at least an A average on exams. Fourteen students received A's as final grades, so pass/fail assignments brought 6 students from a B+ to an A-. I remain ambiguous about the distribution of these grades. I enjoy watching students learn, so my philosophy would allow me to award all 33 students A's if they deserved them. I do not wish my grades to fit on a bell curve. However, I wonder if my exams are adequately measuring the learning objectives for the course. In the future, I will examine these exams to determine if I might be able to add more quantitative rigor and fewer multiple choice-type questions.

	A	B	C	D	F
AVERAGE EXAM SCORE	8	18	5	2	0
PASS/FAIL ASSIGNMENTS	23	6	2	2	0
FINAL GRADE	14	13	4	2	0

Qualitative evidence.—I asked my students to complete a course assessment at the end of the semester. 10 of the 29 students that completed the survey were not F&W majors, and had not taken Ecology—the prerequisite for my course. Of the 10, 7 did not think that taking Ecology would have been helpful in improving their learning in my course. Thus, even though the students were theoretically unprepared for my course (and my evaluation above shows that they were less successful than their peers who were prepared by taking Ecology), these students still felt that their learning experiences in my course were valid, positive experiences.

Problem-based learning (PBL) experiences: 28 of 29 students that completed the assessment felt that the problem cases I used enhanced their interest in the material. Twenty-seven (27) of the 29 students felt that the approach helped them learn more about the subject matter. Only 4 students related that they were, at some point, confused as to their responsibilities under this "new" learning system.

Comments:
"I learn better this way than being lectured at."
"It related the class to the real world…"
"Able to do personal research—not just copying lecture material."
"It introduced how 'real' biologists analyze wildlife issues."
"Made us think more critically rather than just sit, listen, memorize, and test."
"Having the information in front of you helps you understand it more clearly."
"It was a new way of learning—it was actually fun."
"Lectures were on what we wanted to know, which really helped."
"Didn't really understand how it would help grade."
"I would have learned as much otherwise [with lectures], but it wouldn't have seemed as applicable."

Readings and discussion experiences: 26 of the 29 students completing the assessment felt that the special readings enhanced their learning. 25 of the 29 students felt that the subsequent discussions in small groups enhanced their learning. Although most students still thought these activities were useful, my plans for next year include even more emphasis on these discussions—in an attempt to make them even more relevant and useful to the students.

Sandhill crane group learning experience: 14 of the 29 students related that they learned from this group project, as it forced them to do their own research on the subject matter. 7 more related that this project was enjoyable, because it was "much easier" than studying for an exam. The last 8 students related that they either felt negatively ("I would have learned more from lectures and an exam") or ambiguously ("group writing or exam are both OK") about the project.

Six students felt that they constantly had to keep their group focused, as other members were slacking. The other 23 students related that their groups were fairly evenly balanced in their efforts. Because the assessment was not related to a grading activity for this assignment, I was glad to see that 23 students were still favorable to the equality of workload and accomplishments among their group members.

PLANNED CHANGES

Course structure

I taught the course during 2004 as a MWF 50-minute lecture class. Because of the importance of the group work and discussion days, I am changing the structure of the course in 2005. I will still have 50-minute lecture periods on MW, but the Friday class period will be changed to 2 recitation sections on Wednesday, after the lecture period. So, the class will be split into 2 smaller groups for discussions. This will allow me to further interact with individuals in ways that I was not able to do this year. Although it is an extra hour of contact time for me, I think it will be well-worth the time in the end.

Grading model

As noted above, I instituted a new grading model this year. On pass/fail assignments, students received either a "10"--meaning they "passed", a "5"—meaning they could resubmit it to correct problems in it, or a "0"—meaning they did not turn the assignment in. I found this system to work fairly well, but I did not feel that it gave credit to students who spent considerable time on assignments, rather than doing the bare minimum to pass the assignment. Therefore, I am considering a change in 2005, in which the grades would be "exceptional pass", "pass", "resubmit", and "fail." The four categories would allow me to reward students that deserved A's in the course. As the table in a section above notes, 23 of 33 students were classified in the "A" category on pass/fail assignments—meaning they had only 1 "0", and over 85% of their assignments were 10's. Next year, I would suggest the following grading criteria for the pass/fail assignments:

GRADE	REQUIREMENT
A	Over 85% of assignments are 3's (exceptional pass), and only one 0 (fail)
B	Over 85% of assignments are at least 2's (pass)
C	Over 75% of assignments are at least 2's (pass)
D	Over 60% of assignments are at least 2's (pass)
F	Less than 60% of assignments are at least 2's (pass)

SUMMARY AND OVERALL ASSESSMENT OF PORTFOLIO PROCESS

As a part of this review process, I made the following improvements to the course:

1. Before the semester started, I completely re-designed the course so that it directly addressed my objectives. I took several lectures, 1 guest lecture, and some small activities out of the course, and replaced them with lectures, discussions, and activities that directly were tied to course objectives. I feel much better about the focus of the course.
2. I monitored the interactions and success patterns of my small groups. My surveys showed that the students reported that they learned from small group discussions, and that the majority of the students felt the group project was an important learning experience.
3. I continued to implement problem-based learning in the course. The redesign of the course (#1) was also intended to fully express the problem-based learning model in the course. In the survey, students reported that they enjoyed and valued this method of learning. This portfolio is the first form of publishing the case studies that I have created over the past 2 years for this course.
4. I determined the value of the prerequisite (Ecology) for the course. My evaluation shows clearly that the course is critical to student success in my course.
5. The collection of student assignments allowed me to focus on my grading rubrics. I believe this improved 'teaching/student relations', as students reported feeling as if they understood what was expected of them. The peer review process forced me to clarify the expectations so that I could provide examples of how students met (or failed to meet) these expectations.

Tentative Course Syllabus

Wildlife Ecology and Management

Spring 2004

University of Nebraska, Lincoln

School of Natural Resources

NRES 311

Instructor

Larkin Powell, Assistant Professor

Office: 204E NRH

Phone: 402.472.6825

Email: lpowell3@unl.edu

Course homepage:
http://snrs.unl.edu/powell/teaching/nres311/nres311.htm

Course Schedule

Reading List

Case Studies

Wildlife Management Links

Current News Links

Course description

Wildlife ecology, conservation biology, population biology, and enhancement of wildlife populations through management. Emphasis on both game and nongame species, as well as management options that include human/wildlife interactions, habitat, and wildlife populations.

This course uses a problem-based learning format.

NRES 311 is designated for natural resources and biological sciences majors.

Location

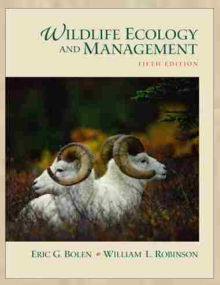
Lecture: MWF 10:00-10:50

149 L W Chase Hall, East Campus

Textbook

Wildlife Ecology and Management, 5th edition, 2003

by E. G. Bolen and W. L. Robinson



Grading

I use a definitional grading system in this course--a mix of pass/no-pass assignments, and material graded on a 0-100 scale. The intent is to determine if you have completed the learning objectives for the course.

For my grading model, click here.

(Explanation of final grades in a PBL course)

Course objectives

By the end of this course, students should be able to:

1. Express the impact of individual and societal values, or conservation ethic, in determining management policy.

2. Demonstrate knowledge of general ecological principles, such as succession, competition, and predation, as they affect fish and wildlife populations.

3. Effectively apply knowledge of the relationships of wildlife with various habitats.

4. Demonstrate an ability to apply general management principles to real problems in forest, grassland, and wetland ecosystems.

5. Demonstrate an ability to analyze wildlife population dynamics and structure, including the ability to evaluate the demographic and genetic structure of a population.

6. Develop a management plan for a threatened or endangered species, as well as an over-abundant species, with special attention to significant state and Federal legislation and regulations.

7. Integrate knowledge of ecological systems with management needs into a defendable position on a wildlife management decision.

This course will:

1. Provide an opportunity for students to discuss current issues and research in wildlife and fisheries management.

2. Expose students to professionals in state and Federal wildlife management agencies.

3. Provide experience working in teams to solve reality-based problems.

4. Provide each student with ecological knowledge base from which to operate as an effective wildlife biologist.

Course Schedule

Wildlife Ecology and Management

Spring 2004

University of Nebraska, Lincoln

School of Natural Resource Sciences

NRES 311

Course Syllabus

Reading List

Case Studies

DATE	TOPIC	READINGS or OTHER ASSIGNMENTS B&R = Bolen and Robinson (2003) text
Jan. 12	Introduction Survival group exercise	
14	**Nebraska's Box Turtle trade problem case**	Problem case introductory materials (in class)
16	--History of wildlife management and wildlife law	B&R: Ch. 1, Ch. 2
19	Martin Luther King HOLIDAY	NO CLASS
21	--DISCUSSION: Societal values, conservation ethics --Box turtle case wrap up, directed writing, discussion, reports?	Reading Summary and News Summary due in class Leopold 1949 (Land Ethic)

23	**Moose and wolf problem case** INTERACTING POPULATIONS --Case study introduction	Problem case introductory materials (in class) Group discussions
26	--Intraspecific competition	B&R: pp. 48-52 (Ch. 5, sect 5.1-5.2)
28	--Interspecific competition	
30	DISCUSSION: Introduction of genetically modified species/competition	Reading Summary due in class Article: transgenic salmon (available on Blackboard)
Feb. 2	WILDLIFE POPULATIONS --Population dynamics, viability analyses	B&R: pp. 52-66, 68-69 (Ch. 5, sect 5.3-5.11)
4	--Stella computer population modeling *Animal Science computer lab* (A222-A223) Download data	
6	--Predation	B&R: pp. 149-198 (Ch. 9, sect. 9.1-9.2)
9	--Wildlife disease	B&R: Ch. 8
11	POPULATION GENETICS --Wildlife population genetics: structure and management	Problem case introductory materials (in class) B&R: pp. 466-476 (Ch. 21, sect 21.1-21.3)
13	--Conservation genetics: small populations	B&R: pp. 476-495 (Ch. 21, sect 21.4-21.11)
16	--Genetics exercise (endangered species) DISCUSSION: Conservation genetics	Con bio exercise Reading Summary due in class Articles: Cheetah conservation genetics
18	**EXAM #1**	
20	**Sandhill Crane problem case** --Case introduction	Problem case introductory materials (in class)
23	T&E SPECIES MANAGEMENT --Endangered Species Act and management options: translocation, captive breeding, habitat acquisition	B&R: Ch. 19 News article: stocking dead salmon
25	DISCUSSION: Endangered Species Act	Reading Summary due in class Pulliam and Babbit 1997, Miller et al. 2002
27	GROUP WORK DAY Details on group project, divide responsibilities	
Mar. 1	--Managing migratory species	B&R: pp. 81-91 (Ch. 6, sect. 6.10-6.12))
3	HARVEST --Harvest as a management tool --15 minutes of group time	B&R: Ch. 10

5	--guest lecture: Scott Taylor, NGPC, upland game harvest management	
8	DISCUSSION: Effects of over-harvest on populations of blue-fin tuna --role play/directed writing	Reading Summary due in class Underwood 2001, Unit 11, pp. 345-382 (handout)
10	NO CLASS -- work on group projects (*Dr. Powell available in classroom*)	
12	NO CLASS -- work on group projects (*Dr. Powell available in classroom*)	
15	SPRING BREAK	
17	SPRING BREAK	
19	SPRING BREAK	
22	DISCUSSION: Ethics of hunting --role play	Reading Summary due in class NPR audio story on ethical hunting Gilbert 2000, Vitali 1990
24	NO LECTURE--MANDATORY FIELD TRIP *Sandhill Crane Trip to Platte River, Crane biology lecture at Audubon Rowe Sanctuary (Gibbon, NE)* *Will leave at noon, get back at 9:30 p.m.* *Bring supper with you!* ***PHOTO PAGE FROM TRIP HERE***	
26	**DeSoto National Wildlife Refuge deer management problem case** --Case introduction --NWR system (history, mission, success) **EXAM #2**--in form of group report--due in class	Problem case introductory materials (in class) B&R: Ch. 16
29	WILDLIFE DAMAGE MANAGEMENT --too many animals (deer, geese) --exotic species	B&R: pp. 389-395 (Ch. 17, sect. 17.7), and Ch. 18
31	--animal/human conflicts (coyotes, prairie dogs) --guard animals	B&R: pp. 169-177 (Ch. 9, sect. 9.3)
Apr. 2	DISCUSSION: wildlife damage management	Reading Summary due in class Ben-Ari 1998, Wilgoren 2002 OR Underwood, Unit 2, p. 26 (deer damage management)--handout
5	GRASSLAND MANAGEMENT --Introduction, fire	B&R: Ch. 14
7	GRASSLAND MANAGEMENT --Grazing	B&R: Ch. 14

9	FOREST MANAGEMENT --forest loss, management approaches	B&R: Ch. 15
12	FOREST MANAGEMENT --fragmentation, corridors/class exercise	B&R: Ch. 15
14	-DISCUSSION: forests or grass for Nebraska? Directed discussion and writing: Helzer 1997	
16	**EXAM #3**	
19	**Pheasant management problem case** --Case introduction	Problem case introductory materials (in class)
21	HABITAT NEEDS --cover requirements	B&R: Ch. 7(7.4-7.5)
23	--food requirements	B&R: Ch. 7(7.1-7.3)
26	--soil, water requirements	B&R: Ch. 11, 12
28	ECONOMIC POLICY --Farm Bill legislation impacts on wildlife	B&R: Ch. 20, Ch. 22 Farm Bill and Wildlife handout
30	evaluations course wrap-up, post-course assessment writing	
3-7	**FINAL EXAM WEEK (Exam #4)**	10-12 a.m., Thursday, May 6th

Problem-based learning: an active learning method

What is Problem-based learning?

This course will be presented using a Problem-based Learning (PBL) format. PBL is a teaching method developed for applied learning in the medical field, and it consists of problem cases based on real issues. These problem cases, or case studies, will guide your learning of concepts and principles. One goal of PBL is to encourage the development of critical thinking skills--my goal is for you to feel as though you experienced real-life situations that you may soon encounter in your careers. Problem cases have been developed from real-life situations, and we will use actual data whenever possible. In some cases, I have made editorial alterations of reality to better scale problems to our course time-frame and protect privacy of individuals, agencies, or organizations.

PBL is different than the case studies that many of you may have used before in other courses. In the past, you may have been given case studies at the end of a chapter to emphasize the material you have just covered. In PBL, you are given the case study *before* any learning takes place. Indeed, the problem is designed to lead you to identify certain concepts and principles that you must learn to arrive at a solution. The idea is for you to see a real-world problem, so that what you learn seems more than relevant to you! In this course, you should never have to ask, "Why are we learning this?!"

So, what will a typical class session or unit involve?

The semester will be broken into several units, or case studies, which follow directly from our course objectives (a case study for each objective). During each unit, the typical format will be:

1. Presentation of the problem case (known facts) to teams of 4-6 students.

2. In-class discussion of the problem and the information needed to address it. During this stage, we will formulate working hypotheses about our problem.

3. In-class identification of learning issues (things you don't understand, such as general concepts, principles, or knowledge that will be required to solve the problem).

4. Actual inquiry--involving out-of-class and in-class study of learning objectives. Will

include self-study, such as reading, data analysis, and research. Also will include mini-lectures and team- and class-discussions.

5. Preparation of Learning Issue Summaries (each team member will be responsible for one or more Learning Issues). Teams will review summaries.

6. Presentation of problem solution and justification (class discussion). In some cases, you will write an individual report, based on your team's analysis.

OK, that all sounds interesting, but what am I responsible for?

As students, you will have substantial responsibility for learning under this format. I will usually serve as a facilitator, rather than a 'sage on the stage'. Although the course will not have a lecture format, you will not be required to find ALL information on your own. Dependant upon the learning objectives that we define, I will serve as a source of information through mini-lectures, suggested readings, and sources of data. This style of learning has been demonstrated to enhance long-term retention of information and promote critical thinking, which you should find useful in your career.

This sounds really different!

This course format is new to me and most of you. I began my teaching career using the lecture teaching method, I was lectured to during most of my education, and most of you are probably used to being lectured to in your courses. Your biggest adjustment will be to spend time on the course regularly, rather than taking notes and studying in a single burst of effort before the exam! I want this course to be useful to you, and I encourage you to contact me if (when) you have questions or are uncertain about your responsibilities.

As an instructor, I have spent considerable time in preparation of the case studies and other course materials, as well as familiarizing myself with the method of instruction. UNL's Teaching and Learning Center (especially Michael Anderson) has served as a valuable source of information on PBL, and Dr. Mark Ryan from the University of Missouri (Columbia) has graciously granted permission to use some case studies he developed for similar courses at U of M. I sincerely believe that the PBL teaching method has great potential to create active learners with skills to be successful in a career in wildlife management and conservation.

--Material above based on suggestions and documents from M. Anderson and M. Ryan.

Some references about problem-based learning

Duch, B. J., S. E. Groh, and D. E. Allen. 2001. The power of problem-based learning: a practical "how to" for teaching undergraduate courses in any discipline. Stylus Publishing, Sterling, Virginia.

Ryan, M. R., and H. Campa, III. 2000. Application of learner-based teaching innovations to enhance education in wildlife conservation. Wildlife Society Bulletin 28: 168-179.

Wilkerson, L., and W. H. Gijselaers. 1996. Bringing problem-based learning to higher education: theory and practice. Jossey-Bass, Inc. San Francisco, California.

Internet links

A problem-based learning case about problem-based learning

Sample problem-based learning cases, University of Delaware

University of Delaware's PBL site

PBL at Maricopa Community College

PBL info from San Diego State University

CASE STUDIES or PROBLEMS

Collecting ornate box turtles in Nebraska

A Wildlife Management problem case prepared by

Larkin A. Powell, School of Natural Resources, University of Nebraska

Note: This case is designed as an applied problem in wildlife management. The characters quoted in the introductory 'story' are fictitious. However, their statements and scientific information are based on facts. Students are referred to various sources of data; therefore this problem case should not be cited as an informational source on ornate box turtle biology or their management.

STAGE 1: The problem

John Livingston sat at the family table, eating supper with his wife and their 15-year-old daughter, Susan. He squinted through his bifocals at the Peterson's Guide to Colleges and Universities that Susan was paging through. College was still 3 years away, but Susan was already starting to get advertisements in the mail because of her interest in wildlife management.

John and his family were ranchers in Cherry County, Nebraska. Cattle ranching paid the bills, and John was beginning to be worried about paying for Susan's college tuition. A couple years of drought had not helped financial matters.

Susan was not the only one in the Livingston family who was interested in wildlife. The entire family enjoyed watching nesting birds and pronghorn in their pastures on the 14,500 acre ranch. They had also developed an interest in other creatures found on their ranch--ornate box turtles. They seemed to be everywhere.

Susan had picked the first one up 10 years ago, and they still had "Marge" in a large tank in the living room. John picked up another for a city friend's little boy. Somehow, it had snowballed, and John now picked up box turtles for a person in Kansas City who sold them to pet stores. The turtles sold for $60 in the store, and John received $20 per turtle. He usually averaged about 100 per year, and the money he made helped pay for Christmas presents or family vacations. It wasn't a lot, but $2000 sure helped balance the books some years.

John picked up the local newspaper, and noticed a small headline on the back page:

Game and Parks Puts End to Reptile Trade (from Lincoln Journal-Star, 16 January 2002)

The lucrative trade in Nebraska's scaled and shelled critters has come to an end.

During their meeting Tuesday in Lincoln, the Nebraska Game and Parks Commission voted 5-2 to ban commercial exploitation of the state's 62 species of reptiles and amphibians.

The regulation outlaws the capture and sale of tens of thousands of ornate box turtles, ringneck snakes, northern prairie lizards and other creatures. It also ends a profitable business for a declining number of dealers who sold the animals online to pet stores or out-of-state dealers.

The new regulation delighted Angelika Byorth of Lincoln, the president of the Turtle Conservation Project, who has lobbied for laws protecting Nebraska's reptiles and amphibians for years.

"This is finally bringing an end to rolling the boulder up the mountain," she said.

During a public hearing Tuesday morning, seven people testified in support of protecting reptiles and amphibians from the pet trade. Former Gov. Frank Morrison was among them.

"There's no more important thing that we as humans have than the preservation of environment for the enjoyment of the public as well as those who will follow us on this spaceship we call planet Earth," said the 96-year-old turtle supporter.

Lee Simmons, director of Henry Doorly Zoo in Omaha, said many species of turtles, snakes and lizards can't reproduce quickly enough to withstand the pressure applied by commercial collectors and dealers. He urged the commission to adopt the commercial ban.

The issue dates back to 1993, when the Nebraska Legislature passed the so-called "Turtle Bill" to protect native turtles from commercial trade.

The law gave the commission authority to set regulations. Starting in 1994, it required reptile and amphibian dealers to obtain a free permit. Without hard evidence that commercial trade hurt populations, commissioners chose not to prohibit the practice.

Since then, the agency has studied box turtles and found them to be vulnerable to heavy collecting.

Also, Nebraska has become a target for out-of-state collectors, said Mace Hack, a wildlife biologist in charge of research analysis for the commission. Wyoming and South Dakota are the only two surrounding states with less-restrictive regulations on the trade.

As species become more rare in surrounding states, Nebraska may become even more attractive to nonresident dealers, Hack said.

"It's a concern that we could lose these species from some regions in the state quite quickly," he said.

Last year, 10 dealers obtained permits in Nebraska. Eight of those accounted for 97 percent of the trade.

John Rossenbach of Ainsworth is one such dealer who said the regulation would end a sideline business that helped support his ranching operation.

"There's a lot of children who can't have dogs and cats for pets," said Rossenbach, the only

person to speak against the regulation.

There were some notable exceptions to the ban.

Dealers can continue to sell leopard frogs and tiger salamanders for bait. In addition, children or hobbyists can keep a limited number of designated reptiles and amphibians as pets. Finally, legitimate scientists can apply for permits to collect the creatures for research purposes.

Reptile Rules:

What's off limits to commercial dealers?

All 62 native Nebraska reptiles and amphibians, except those commonly used as fishing bait.

What's fishing bait?

Two species of leopard frogs and tiger salamanders.

Can a kid still pick up a turtle or snake and keep it as a pet?

Yes, depending upon the species. Three of the most popular pet species - ornate box turtles, western painted turtles and milk snakes -still can be kept as pets, but they can't be sold or exported. The agency also has set limits on the number of creatures people can have in their possession.

For more information on the new regulations, call the commission at 471-0641.

Red-faced, John jumped from his chair. "They can't do that!" he shouted. "I own this land! I own every box turtle that's on my land."

John wasn't finished. "Curse them," he muttered. "Coming onto my land, and telling me what to do with what I find on my own property. That's Government for you! What will it matter if they're a few less turtles out there? They are a resource that is meant to be used--just like sharp-tailed grouse!"

John spun around to his wife. "Call Fred at the law office in town," he directed. "I want to get his opinion on this."

As John went out the door to check on the calves, Susan turned to her mother. "I was hoping Dad wouldn't see that article," she groaned. "I've always wished he wouldn't pick those turtles up--it's just not right. I read last month that over 5000 ornate box turtles are collected from Nebraska each year. Supposedly, the Nebraska Sandhills are the last stronghold for the species."

END OF STAGE ONE

Link to Stage Two--more details

LEARNING ISSUES: What do you need to learn to determine what Fred (the attorney) should advise John? Regardless of the new law, Susan seems to feel that her father's collecting is "not right". What considerations would you take into account to decide whether you agree with her?

LEARNING ISSUE REPORT: your assignment

The collection of ornate box turtles is only one of many current events in Nebraska (or the world) that deal with ethical concerns of wildlife conservation. Your assignment is to read Leopold's "Land Ethic". Then, find a news article from the past 3 years that you feel has a common theme with an issue raised in Leopold's "Land Ethic."

Write a 1-page thought piece on how your news article reflects a concern or lack of concern for Leopold's Land Ethic. You do not need to summarize the news article or Land Ethic. Provide evidence of a link between the two.

The summary is due in class on the day that we discuss Leopold's "Land Ethic." Provide a copy of the news article with your writing.

Links to resources for this case problem:

Stage Two--more details and internet links

Potential learning issues for this problem

Teaching blueprint for this case

CASE STUDIES or PROBLEMS

Moose and wolf population dynamics in Alaska

A Wildlife Management problem case prepared by

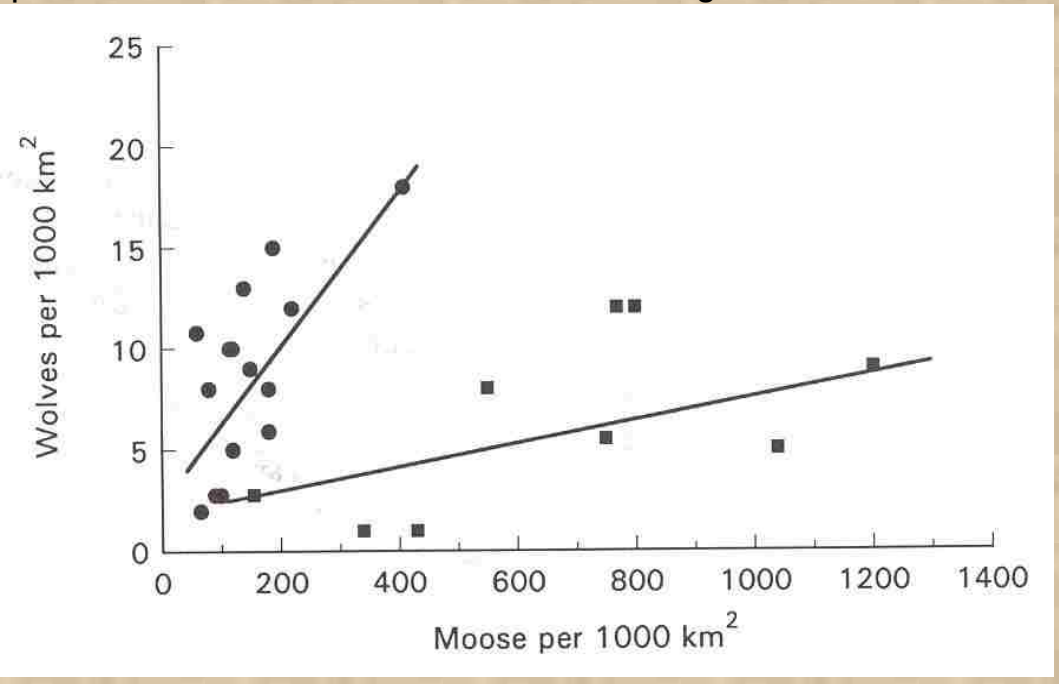
Larkin A. Powell, School of Natural Resources, University of Nebraska

Note: This case is designed as an applied problem in wildlife management. The characters quoted in the introductory 'story' are fictitious. However, their statements and scientific information are based on facts. Students are referred to various sources of data; therefore this problem case should not be cited as an informational source on wolves, moose, or population dynamics. The figure below is after Gasaway et al. 1992 (Wildlife Monographs 120), and was reprinted in Caughley and Sinclair 1994 (Wildlife Ecology and Management).

STAGE 1: The problem

Anne Archer sat at her desk. A tingle ran up her spine as she looked out her window over the Tongass National Forest in southeast Alaska. As an intern, this was her dream-come-true. A summer job in Alaska, working with moose and wolves. Growing up in Aurora, Nebraska, she had never seen a wolf. Or a moose for that matter. It could be quite a summer!

On her desk was a data graph that her new boss, Dr. Al Novara, had given her to look at.



"Take a look at this before this morning's meeting," Al had grunted on his way to the coffee machine. The meeting was going to be her first chance to meet the entire staff that she would be working with.

The graph looked straightforward. Anne noticed two sets of points. One set--the *squares*--represented populations of moose in areas where wolves were culled. The other set--the *circles*--were data from areas where very little predator control was carried out. Both sets of points showed a similar trend--there were more wolves as the moose population grew.

"Looks like the wolves are regulated by the moose--their food supply," thought Anne.

She also noticed that moose populations were usually higher in areas where wolf control was practiced.

"Or, perhaps moose are regulated by their predators?" Anne asked herself. "Which is it?"

Anne realized the importance of the answer to the question. Agency officials had recently suggested that Alaska step up the culling of wolves in an effort to change the downward population trends of moose in the state. Moose were prized by hunters, who paid big bucks to come from out-of-state to find a trophy bull. Officials had also suggested a reduction in hunting permits, as well. So, moose management was now "priority one."

Were wolves causing the downward trend in moose? Or, were wolves taking the blame as the scapegoat--a product of human fear of predators?

Al poked his head in the door and interrupted Anne's thoughts. "Better get to the meeting now--we are always short one chair," he blurted out. "So, if you want a seat, you'd better beat Tom Tierney to the conference room. Tom's the intern working with Sarah Rafmussen!" Anne wondered how many cups of coffee one person could suck down before 9:00 a.m.

But, Al's plan worked. Tom was standing, and Anne was seated as the meeting started. Tom glared at Anne, with a look that told her it would be a race to the conference room every Thursday for staff meeting.

"OK, troops, we're here to assess last summer's data collection," stated Al, taking charge of the meeting. "We've seen the data from last summer's surveys--we counted wolves and moose at 24 study sites--all indicated by a dot on the graph you have. We've got two brilliant, young interns with us--perhaps they'd like to tell us what they see in the data?"

Tom poked his hand up. Amused, Anne decided to let him take a stab at an answer.

"It seems pretty obvious to me that we've got a classic predator-prey relationship going on here," Tom said. "In this relationship, the predators keep the prey numbers in check--we've got less moose in areas with normal populations of wolves. But, the prey also affect how large the predator populations can grow--we've got more wolves in areas with higher numbers of moose."

Satisfied, Tom leaned back against the wall.

"But," asked Anne, "have you given us all the information on this population? I'm really wondering if any regulation is going on here. The data seems really correlative to me--it sure looks like a good story, but I don't think this graph tells the whole story."

"Go on, Anne," encouraged Sarah, suddenly wondering if she had picked the right intern to work with. Tom's face reddened.

"Well, for example, what do you know about the population dynamics of the moose--do they exhibit different demographic rates when wolf populations are removed? Like, what happens to moose calf survival when you cull wolves? Does it increase, as you might expect?"

"And, are the moose birth or mortality rates density dependent? Perhaps we're seeing intraspecific competition playing a role in their dynamics--they might be regulating themselves!"

"Or," Anne continued with hesitation, "perhaps your study design is responsible for this pattern. Is it possible that the carrying capacity for moose in the landscape where you're culling wolves is naturally lower? I haven't seen any of the study sites, but I'd sure want to be sure it wasn't a coincidence that the high-cull and low-cull areas seem to have different moose populations."

Al leaned forward with a smile. "You've both got some good ideas," he said. "We do actually have some data that we've collected on demographic rates. And, it does seem to indicate there is some population regulation going on for both moose and wolf populations. Perhaps one of the things you might do for us this summer is put the data together in a stochastic simulation model to predict what would happen to moose populations if we stopped culling wolves everywhere. We're getting a lot of pressure to end the culling, but we're worried about losing our moose."

Tom poked his hand in the air, again. He couldn't leave the meeting without trying once more. "Anne mentioned interspecific competition," he said. "But, what about intraspecific competition?"

Sarah smiled. "You're right, too, Tom. Perhaps this model that you and Anne will put together will not be so simple after all. I think you can see how complex moose population dynamics are, and you've only been here one day!"

END OF STAGE ONE

Link to Stage Two--more details

LEARNING ISSUES: ***What regulates moose populations in Alaska?*** What information do you need to learn to answer this question? What issues do Anne and her co-workers bring up that need to be addressed? Can you think of other possible factors that might play a role in moose population dynamics?

LEARNING ISSUE REPORT: your assignment is to determine the answer to the above question--are moose populations in Alaska regulated by wolves? Use the resources listed in Stage Two to help. Although completed before the exam, this question will serve as a take-home essay on Exam #1.

You will have a limit of 1-1.5 pages (approximately 2-3 paragraphs) in which to answer the question, citing two (2) peer-reviewed sources (journal article or book) that you feel show what is responsible for regulation of moose populations. You may use internet sites for background information (and you may cite them as well), but you must have 2 peer-reviewed research articles as the backbone of your argument.

You may work together in groups to conduct library research, but the writing of the essay MUST be your own! See the University policy on cheating in the Student Handbook for penalties associated with not doing your own work on this assignment.

Due: February 13, 2004.

Grading criteria: This will be graded from 0-20 points (approximately 1/5th of the exam grade). To obtain the following number of points, your essay must include the following characteristics:

18-20	Properly cite 2 sources following style in Stage Two. Use literature to support either position (wolves do or do not regulate moose populations). Show evidence that you understand results of published manuscripts. 1-2 errors in grammar or spelling; essay is typed.
14-17	Properly cite 2 sources following style in Stage Two. Connection between literature and your position is not complete. Limited evidence that you understand results of published manuscripts. 3-4 errors in grammar or spelling; essay is typed.
10-13	Sources improperly cited. Little connection between literature and your position. Limited evidence that you understand results of published manuscripts. Many errors in grammar or spelling; essay is typed.
0-9	Did not complete assignment. Essay is not typed. Failure to show any connection between literature and your position. Failure to show that you understand results of published manuscripts. Evidence that your writing is not your own.

Links to resources for this case problem:

Stage Two--more details and internet links

Potential learning issues for this problem

Teaching blueprint for this case

CASE STUDIES or PROBLEMS

Sandhill crane harvest in Nebraska?

A Wildlife Management problem case prepared by

Larkin A. Powell, School of Natural Resources, University of Nebraska

Note: This case is designed as an applied problem in wildlife management. The characters quoted in the introductory 'story' are fictitious. However, their statements and scientific information are based on facts. Students are referred to various sources of data; therefore this problem case should not be cited as an informational source on Sandhill cranes.

STAGE 1: The problem

September 15, 2002

It was perhaps fortuitous, a little serendipitous, and a tad bizarre that they should end up at the same table in Mabel's Rib Shack in downtown Minot, North Dakota. But, when Bill Johnson and Jim Marshall placed their order, the only two seats left in the Rib Shack were at a table next to a rather large man with a walrus mustache wearing a US Geological Survey cap.

After receiving permission to sit down, Jim asked, "So, you study rocks?"

"No," replied Jack Coffee. "I'm with the Biological Resources Discipline--BRD--a part of USGS. I study Sandhill cranes."

"Yer kiddin'!" replied Bill. "Me and Jim were just out huntin' this morning. Got us a nice Sandhill, too. Been out for 3 days--those suckers are smart! Hard to kill, but fun to watch crash down to earth when you finally do get one...like a B52 bomber!"

As the conversation continued, Bill and Jim discovered that Jack used radio telemetry to study the movements of Sandhill cranes during migration. He was following the cranes southward as they soared towards their wintering grounds.

Bill and Jim were from Fremont, Nebraska. Since Nebraska was the only state in the Central Flyway that did not allow harvest of cranes, Bill and Jim made an annual migration

of their own to North Dakota to have first crack at the birds as they came south out of Canada.

"You've got a rough assignment studying these birds in a remote place like Minot," commented Jim. "I have a buddy that works at Valentine National Wildlife Refuge in Nebraska--he manages grasslands and is charge of their pronghorn herd. He doesn't put in the travel like you do."

"Migratory species will do that to you," grinned Jack, still bemused at his luck at finding two crane hunters. Crane hunters were few and far between, and most people didn't even know you could hunt Sandhill cranes. "But, it's an important task to monitor migratory species. They have some unique needs, and every step of their migration is important to their success."

As they waited for their lunches, Bill noted that there seemed to be more Sandhill cranes than he remembered seeing during previous hunting seasons. Jack nodded, but added, "Did you know that some Sandhill cranes are on the Endangered Species list?"

Bill and Jim's jaws dropped. "I don't understand," interjected Jim. "How can we hunt cranes if they're an endangered species?"

"Well, not all Sandhill cranes are endangered," Jack replied. "But, one subspecies--the Mississippi Sandhill crane was one of the first animals to be listed after the ESA passed in 1973."

"How can a subspecies be on the list? That makes no sense!" stated Bill. "Our government has to be nuts--is the entire species is doing OK, then why list a 'subspecies'? I'll bet that was a Democrat that thought that one up...kind of like a pork barrel budget item--I'll bet some Democrat from Mississippi passed that bill to put a Sandhill crane on the endangered species list!"

It was one of those times that Jack decided not to go any further down that topic--he didn't know if Bill and Jim understood the distinction of 'subspecies, and he really didn't want to explain that animals weren't listed on the by legislative bills. Luckily, the ribs arrived, which ended that conversation. But, as they began to hammer away at their juicy ribs, Bill and Jim began to prod Jack about the lack of a crane hunting season in Nebraska.

"I don't understand it for a moment," Bill stated. "There are over 500,000 of the birds. How could a few ornery cusses like us put a dent in the population? And, besides, you'd think folks would want to reduce the population a little to avoid the crop damage they do each fall."

"Actually, you'd be surprised," replied Jack. "Our harvest surveys show a fair proportion of the population is killed each year. You're right--harvest is seen as a management tool in places where crop damage is a concern. And, when a species can be sustainably harvested, we usually view that as an opportunity for hunters. But, biologists are actually concerned that harvest mortality may be additive to overall mortality in Sandhill cranes. In

the past, most folks believed that harvest mortality was compensatory for this species, but recent habitat losses have been reducing reproductive efforts. It's not the same ballgame anymore. Some states are reporting a leveling off in the population. That's why I'm out here--to monitor the harvest and the migration."

"Aren't some people afraid we're messing up the cranes' pair bond system," asked Jim. "Is it true they mate for life? Still, we're harvesting them in the fall--I just don't think we can be having much of an impact."

Before Jack could reply, Bill jumped in. "I've heard some people say they don't like the way we decoy the animals in as they pass over," he said. "And I've also heard that the bow season for cranes in some states makes some animal rights people cringe. But, I'll tell you what, if a person can hit a crane with a bow and arrow, I think we ought to let 'em take all they want! I know I couldn't hit one of those skinny things with an arrow!"

"There are some ethical decisions that hunters and state agencies have to make," replied Jack. "We don't allow baiting with food, and we don't allow recorded calls. So, why decoys? Well, where to draw that line is a question for another lunch! I've got to get back to radio-tracking my birds."

END OF STAGE ONE

Link to Stage Two--more details

LEARNING ISSUES: ***Should Nebraska allow harvest of Sandhill cranes?*** What information do you need to learn to answer this question? What other issues regarding hunting, Sandhill crane harvest, and wildlife management were raised in this conversation?

LEARNING ISSUE REPORT: your assignment is to determine whether Nebraska should allow harvest of Sandhill cranes. Your group will prepare a report detailing your position. The report will be due on March 26, in class. You may find it useful to elect a group 'editor' to assimilate the data and information that group members find. The editor should have fewer responsibilities for data gathering. You will receive a survey at the completion of the project where you rate the efforts and contributions of the members of your group. All group members will receive the same initial grade; if consensus shows that an individual did not contribute to the group effort, his/her grade will be lowered from the initial group grade.

Your report should include the following information:

I. Background on the Sandhill crane (life history information)

II. Current status of Sandhill crane harvest in the Central Flyway and nearby flyways

III. Your recommendation and supporting evidence

IV. If harvest was allowed, what should the regulations consist of? Why?

NOTE: Your report should also show that your group has solved the learning issues raised in class during our initial discussion of this case (see link below for issues).

Links to resources for this case problem:

Stage Two--more details and internet links

Potential learning issues for this problem

Teaching blueprint for this case

CASE STUDIES or PROBLEMS

A tale of two Refuges: management solutions

A Wildlife Management problem case prepared by

Larkin A. Powell, School of Natural Resources, University of Nebraska

Note: This case is designed as an applied problem in wildlife management. The characters quoted in the introductory 'story' are fictitious. However, their statements and scientific information are based on facts. Students are referred to various sources of data; therefore this problem case should not be cited as an informational source on animal damage management, forest management, or grassland management.

STAGE 1: The problem

March 1, 2003
Ronnie Shell, Refuge Manager
Piedmont NWR
718 Juliette Road
Round Oak, GA 31038

Dear Ronnie:

Hello from Iowa! Winter is breaking here, and the snow geese are starting to arrive. Their arrival reminded me of our conversation last month at the Refuge Manager's meeting in Tucson. I thought I would give you some more details about our management problems and our current program to see what you might recommend. I agree that our Refuges, although in very different locations and habitats, could benefit from sharing management strategies.

DeSoto National Wildlife Refuge was established in 1958, and is 7,823 acres in size. About half of the Refuge is in Nebraska, and half is in Iowa. The Refuge is centered around an ox-bow lake that is a former bend in the Missouri River. Surrounding the lake are some nice areas of timber, some cropland, and some grasslands. Our big annual event is the arrival of about half a million snow geese in the fall.

Our Refuge Objectives include (1) protection and enhancement of habitat for endangered species, (2) providing a suitable stopover location for snow geese, and (3) providing habitat for migratory and resident wildlife.

During the past several years, we've established food plots for deer and geese. These food plots are located in forest openings as well as in fields in and around the Refuge. Lately, those efforts seem to have been too successful, as we have been having to initiate some animal damage management strategies. With snow goose and deer populations going through the roof, there is really no support for providing food to maintain these species. In fact, we've been accused of being part of the problem! Deer, especially, have been causing crop damage in private fields around the Refuge. Landowners are looking to us to correct the problem.

So, we recently have begun planning for grassland management to replace our food supplement management programs. Many of the food plots will be planted with native grasses, and we'll begin managing these areas for other wildlife species. We hope that this will force deer and geese off the Refuge, where they may be hunted in greater numbers than is currently possible on the Refuge.

This is where I'm hoping you can help us. I remember you mentioned that your Piedmont National Wildlife Refuge uses prescribed burns to manage forests. We probably won't be managing our timber with burns, but fire may be necessary to manage our grasslands. I'm wondering if you have suggestions on the interval of time between burns. We're also wondering about grazing as a tool for grassland management. In the Nebraska Sandhills, grazing is used effectively to manage grasslands. Do you use grazing at your Refuge?

Sincerely,
Larry Klimek, Refuge Manager
DeSoto National Wildlife Refuge

March 10, 2003

Larry Klimek, Refuge Manager
DeSoto National Wildlife Refuge
1434 316th Lane
Missouri Valley, IA 51555-7033

Dear Larry,

Hello from Georgia, and thanks for your recent letter. The dogwoods are about to bloom in our forests--spring is definitely on the way!

I'll be happy to work with you on your management questions. As we discussed earlier, I have some problems of my own that I'm hoping you may be able to help me with.

Piedmont NWR was established in 1939, at the end of the Depression, and we have 35,000 acres. We're just north of Macon, Georgia in the Piedmont (foothills) region. The Refuge is covered with a mixed pine (mostly loblolly pine) and hardwood forest. Historically, the land was home to cotton plantations. When they were abandoned in the Depression, our forests regenerated naturally. So, all of our forests are 80-100 years old, now. Our soil is poor, because of the cotton farming, and some folks say if the Piedmont Refuge can restore forests, then anyone should be able to!

Our Refuge Objectives include: (1) providing habitat for endangered red-cockaded woodpeckers, (2) providing habitat for migratory birds, and (3) providing habitat for resident, native wildlife species.

We are fortunate enough to have 41 active clusters of endangered red-cockaded woodpeckers. Our forest management includes a fairly long (90-year) rotation for sawtimber. This results in large trees that the woodpeckers must have for their nests. We also use an uneven-age harvest management strategy. Our neighboring National Forest uses a much shorter rotation schedule, and they employ mostly even-age harvest management. They don't have as many woodpeckers, either! Much of our management revolves around these woodpeckers.

You mentioned that you don't do much forest management--obviously we have more forests than you do, but I wondered if you might be able to do more forest management? For example, I've heard other Refuges in the Midwest talk about problems with invasive red cedars. We use fire to reduce the understory in our red-cockaded woodpecker colonies--the woodpeckers seem to like an open, 'park-like' habitat. I wondered if you might be able to use fire to keep red cedars from taking over your forests? In addition, you may be able

to harvest some oaks or hickories using an individual selection harvest strategy. It could potentially help your oak tree seedling generation with some open spaces in the canopy for light to get through.

I certainly would think that fire would be a good management tool in your grassland areas. Your largest problem will probably be forest encroachment--I'm trying to grow forests, and you're trying to keep them from spreading! The fire, if properly used, should keep small woody vegetation from becoming established. You may want to consider spring burns--that's when we do our burns.

Piedmont Refuge is not on a major waterfowl flyway, as you are. But, we do maintain 11 ponds for waterfowl benefit. I have been considering some additional habitat management for waterfowl. You've mentioned to me that you use some moist-soil management in some of your grasslands. I wondered if you might tell me more about that. I've been thinking that we might have more waterfowl using our Refuge if we provided foraging areas for them. What kind of water control structures have you used to direct water flows in preparation for the migratory season? What kind of vegetation do you seed in these moist-soil areas? What do you do with these areas during the rest of the year?

Regards,
Ronnie Shell, Refuge Manager
Piedmont National Wildlife Refuge

END OF STAGE ONE

Link to Stage Two--more details

LEARNING ISSUES: ***What should DeSoto NWR do to manage their new grasslands? What should Piedmont NWR do to manage some moist-soil habitats? Should DeSoto NWR consider bolder forest management? Will DeSoto's current plans be effect animal damage management strategies?*** What information do you need to learn to answer these questions?

Links to resources for this case problem:

Stage Two--more details and internet links

Potential learning issues for this problem

Teaching blueprint for this case

CASE STUDIES or PROBLEMS

Where are all the pheasants?

A Wildlife Management problem case prepared by

Larkin A. Powell, School of Natural Resources, University of Nebraska


Photo by Peter S. Weber

Note: This case is designed as an applied problem in wildlife management. The characters quoted in the introductory 'story' are fictitious. However, their statements and scientific information are based on facts. Students are referred to various sources of data; therefore this problem case should not be cited as an informational source on pheasants or pheasant management.

STAGE 1: The problem

15 September 2001

John Tautin, 47, sat at his breakfast table with his son Kyle, 22. Kyle had started his senior year at University of Nebraska-Lincoln; he looked forward to graduating with a Fisheries and Wildlife major. John was a farmer in southeastern Nebraska, but Kyle had always dreamed of being a USFWS Refuge Manager.

John was reading the paper, and frowned. Kyle knew that his dad only frowned at Cornhusker football losses or things that got in the way of a successful hunting season. Today it was the latter.

"Good Lord!" John exclaimed. "What are those Nebraska Game and Parks biologists doing to the pheasants in the state?"

He whipped the newspaper in Kyle's direction, and Kyle read the story in the sporting section:

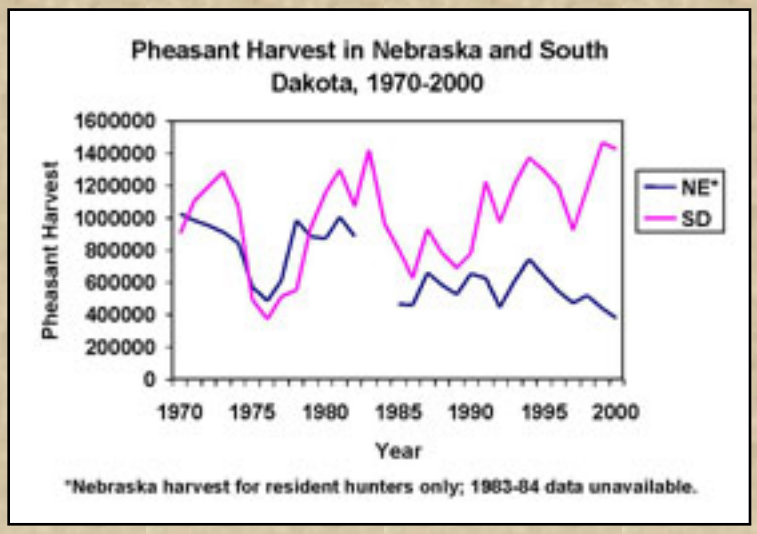
> *NGPC 2001 forecast--As in the rest of the northern plains this year, pheasant hunters in Nebraska will likely find fewer birds over most of the state than last year. Statewide, 2001 brood counts were down 17% from 2000. Regionally, the only area to show an increase from last year was southwest Nebraska, where populations recovered somewhat from last year's severe drought. Northeast and southeast Nebraska brood counts showed declines of 20-30%, with greater than 50% declines in the Panhandle and southcentral regions.*

Southwestern and northeastern Nebraska remain the areas with the highest counts. As of early September, crop maturation was at or ahead of normal, so most fields should be harvested before opening day. This should force birds to concentrate in uncropped habitats, making them more accessible to hunters.

"It doesn't look good," Kyle agreed. "But I'm not sure Game and Parks is to blame."

"How could they not be to blame?" his dad asked. "I remember days when we had to beg people to come hunting with us, just to have people to shoot the birds we'd see. Pheasants were like 'possums--you'd always see them on the roads. In the last few years, I haven't seen a pheasant on our road.

"Pheasants are the easiest animal in the world to manage, too," John continued. "Why do you think their populations took off so fast after they were introduced from China? Our habitat is perfect for them! And look at this graph in the newspaper--South Dakota has been harvesting more birds recently, while Nebraska's harvest goes downhill. It's not like Nebraska and South Dakota are that different. We just hire inept biologists!"



Kyle grinned. Some of the biologists from Game and Parks had given lectures in his classes at UNL. They didn't seem inept.

"Dad," Kyle said. "I think you're being a bit unfair. What do you think the biologists should be doing to improve things?"

"Well for one thing," John replied, "they could enroll more farm land in CRP. CRP ground provides great nesting cover for pheasants--it's where everyone hunts, now. But, no one seems to be out there asking landowners to enroll their acres. No one ever asked me to enroll any acres in the program--they're just lucky I put some land in 9 years ago!"

"I think you're right about biologists working to improve habitat in the state. But, I'm not sure CRP is the answer, Dad," Kyle replied. "The biologists that I've talked to said that most CRP lacks any food plants--it's mostly brome grass. Great for winter cover, but not a lot else! So, I'm not sure it helps their nesting or brood rearing.

"Now, there's a new program that we did get a letter about last week," continued Kyle. "It's called CRP-Management Access Program. It's a state program that uses CRP acres--already enrolled in the CRP program--and they improve them with by interseeding with higher quality forage plants. Then, hunters can access the land. Here--check out this brochure."

How land is enrolled in CRP-MAP:

Land eligible for CRP-MAP must have two or more years remaining on a Conservation Reserve Program contract. Legume inter-seeding to improve habitat for pheasants and other wildlife will be required on 10% of the enrolled CRP-MAP tract, and the entire tract will be open to walk-in access for hunting and trapping during the hunting season. Payments range from $4.00 to $5 per acre, depending on location in the state. Anyone interested in enrolling land in CRP-MAP should contact the Commission's nearest district Wildlife Division programs manager as soon as possible.

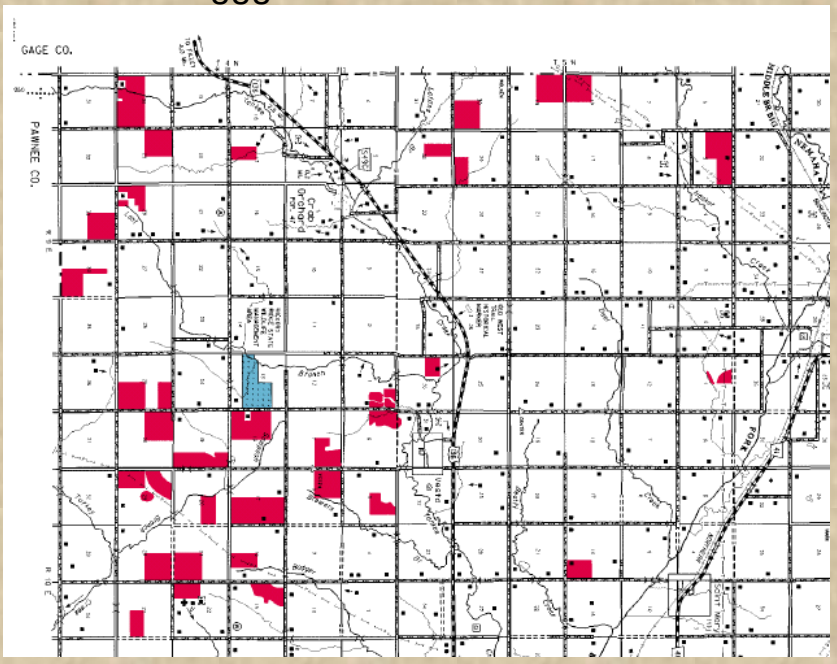
At present, CRP-MAP is a one-year a program that will be evaluated by landowners, hunters, the Game and Parks Commission and Pheasants Forever. Each tract should have a box with "Hunter Survey Cards". Please take time to complete one of these hunter Survey Cards for your hunting party each time you use one of these tracts. Your comments are important. Continuation or expansion of CRP-MAP or similar versions of management and access programs on private lands depends on responsible behavior by hunters and acceptance by landowners.

CRP-MAP promises every hunter who purchases a Habitat Stamp the opportunity to enjoy Nebraska’s diverse wildlife resources. Common sense and ethical behavior used now will ensure that the program is continued and expanded for all to enjoy in the future. Working together, hunters and landowners can preserve the Nebraska hunting tradition!

GUIDELINES FOR HUNTERS USING CRP-MAP TRACTS

1. Hunt only on CRP-MAP property. Do not walk or hunt on adjacent property. Allow a buffer around livestock and buildings.
2. CRP-MAP tracts are for walk-in hunting only. Do not enter properties with vehicles. Do not open gates. Park along the road or in areas designated as parking areas. Avoid stretching fences when crossing them.
3. CRP-MAP tracts are for hunting only. Other activities such as target shooting, camping, horseback riding, or professional dog training are NOT included in the contracts and, therefore, are prohibited.
4. Obey all Nebraska hunting regulations and respect the rights of the landowners when using the area. Treat the land as if it were your own and act responsibly. Current CRP-MAP contracts are only for one year. Hunter behavior will decide the future enrollment of these areas.
5. Take all your trash with you when you leave an area. Make an effort to pick up any trash left by others.
6. CRP-MAP tracts are open during the hunting season.

"That is all we need--another farm program!" his dad responded. "Why won't they just let me farm?! CRP, CRP-MAP...I even heard some guys talking about a new program called EQIP the other day--if they ever figure out what is going to be in the 2002 Farm Bill. What's the different between the EQIP and the WHIP program that we had before? We've got a wetland--perhaps I should enroll it in WRP? Arrgggh!"



"But Dad," Kyle retorted, "these farm programs--in the federal Farm Bill and state programs, too--can really affect the landscape. You said you were worried about pheasant populations--you can't have it both ways! Check out this graph our professor showed us in wildlife management class last Spring. It shows the land in that CRP-MAP program in NW Johnson County in Nebraska. Do you really think all those acres would be good habitat for pheasants without that program? That ground would all be corn or beans. Just look how that one program has affected the landscape in that part of Johnson County!"

"That land is in that program because their soil can't grow good crops! Those guys make as much money letting the land sit there as they did trying to squeeze corn out of it!" said John. "And, you have to agree that if it can't grow crops, it can't grow pheasants."

Kyle reached for his coffee. His dad had a good point--soil quality certainly could be important to wildlife populations. But, Kyle was pretty sure that Johnson County had decent soils--in fact, some of Nebraska's better soils, which he thought matched up with some of the highest pheasant densities, historically.

"Dad," he asked, "I thought it was the slope of most of those acres that made them eligible for the CRP program? Isn't that why our back 80-acre field was eligible?"

Silence. Breakfast was over.

Kyle couldn't help wondering, though--was the habitat available for pheasants in Nebraska really the same as the 'good old days' that his dad remembered? Or, had there been changes to the landscape that his dad hadn't noticed? Were the NGPC biologists doing a bad job managing pheasants? Or, were they simply dealing with a group of aging hunters that remembered better days when the state's land cover was radically different? If so, it seemed to Kyle that private landowners held the cards to improving habitat, but they could only play their cards with help from state and federal programs. Like most things, it all

came down to money in the end.

END OF STAGE ONE

Link to Stage Two--more details

LEARNING ISSUES: What issues do John and his son Kyle raise? What would you need to learn to determine the cause of decline for pheasants in Nebraska? What would you need to learn to determine the effects of various farm programs on wildlife species, like pheasants?

ASSIGNMENT: Working individually, you will conduct research on a a program in the 2002 Farm Bill, such as CRP, EQUP, WRP, WHIP, CPGL, or CSP. You will outline the requirements of each program, along with the potential effects of the program on wildlife in Nebraska. You will present your information to a larger discussion group in class on April 28th.

Answer three questions about the program you are assigned:

1. How does land become enrolled in the program? Are there restrictions to what kind of land can be enrolled?

2. What kind of payments does the land owner receive from the government?

3. How long is the land enrolled in the program?

Links to resources for this case problem:

Stage Two--more details and internet links

Potential learning issues for this problem

Teaching blueprint for this case

NRES 311 Wildlife Ecology and Management
EXAM #1: Review

NOTE: Study the assigned textbook chapters, all of your notes, and readings. This is intended to focus your studying, not to serve as a complete list of test questions.

History of wildlife management (Ch. 1, 2):
What does wildlife management mean?
What three target groups can be managed?
What are some examples of wildlife management in the distant past (pre-Europe)?
How did Roman law influence European views of wildlife ownership?
What were the 5 eras of North American wildlife management, and what happened (generally) during each era?
How is Greer v. Connecticut important to US wildlife law?
What do the Dingle-Johnson Act and Pittman-Robertson Act have in common? What do they do?

Reading Land Ethic (Leopold)
What is a land ethic?
What are problems that Leopold believes stand in the way of developing a Land Ethic?

Moose/wolf case problem essay:
Already turned in!

Intraspecific competition (Ch. 5):
How do interspecific and intraspecific interactions work together to determine when 2 species might coexist?
What is required for true competition?
What is a niche?
Realized and fundamental niche?
How can the Competitive Exclusion Principle create niche partitioning?

Interspecific interactions (Ch. 5):
Difference between exploitation and interference competition?
Logistic vs. exponential growth
What is the difference between a limiting factor and a regulating factor?
What might cause a regulated population to change in size over time?
Examples of how management can be used to affect interspecific interactions?

Reading genetically modified species:
How can genetically modified species pose a threat to native populations through competition?
Why is the risk to ecosystems different from GloFish and GM salmon?

Population dynamics (Ch. 5, computer lab):
Growth rates, death rates
Which population is increasing? (r= 0, r= -0.2, r=0.4).
Is there any scenario in which a highly non-competitive species can be released from competition with a very competitive species?

Predation (Ch. 9):
Functional and numerical response to prey.
What must occur for regulation through predation?
How does handling time affect functional response?
Given a graph of predation and birth rates at various population levels (N), can you predict if a population can be regulated through predation?
What are ways that prey response to predators?

Wildlife disease dynamics (Ch. 8, comp. lab):
What factors can influence the spread of a disease in a wildlife population?
What are some examples of reasons that wildlife managers should be concerned about disease?

Wildlife population genetics (Ch. 21):
Why is heterozygosity used to gauge the genetic variance in a species?
Under H-W theory, what is the highest heterozygosity to expect in a two-allele system?
What mechanisms make genetic diversity (het.) go up or down?

Conservation genetics (Ch. 21):
What is genetic drift? Why are we concerned about it?
Why is a longer bottleneck worse than a short bottleneck?
Why can inbreeding be bad for species? How does asymmetry reflect genetic concerns?

READINGS (genetics) cheetah conservation

FACILITATION of GROUPS for CRANE ASSIGNMENT

Assignment: determine whether Nebraska should allow harvest of Sandhill cranes. Your group will prepare a report detailing your position.

Suggested report sections:

I. Background on the Sandhill crane (life history information)

II. Current status of Sandhill crane harvest in the Central Flyway and nearby flyways

III. Your recommendation and supporting evidence

IV. If harvest was allowed, what should the regulations consist of? Why?

In addition, your report should show that your group has solved the following **learning issues.** BE SURE to include information in your report that shows evidence that you understand these issues:

1. Why no harvest in Nebraska, now? What do other flyways, states allow? Why?
2. Life history of Sandhill cranes (population status, breeding, habitat needs, migratory patterns, etc.).
3. How important are cranes to Nebraska, in terms of social and economic benefits to the state?
4. Subspecies issues. What is a subspecies? How are they distinguished (potential problem for hunting--does a hunter have to distinguish visually?)? What are the ranges of the Sandhill crane subspecies?
5. Is crop damage a problem?
6. Habitat loss/protection. What are threats to subspecies/species?
7. How to harvest cranes. Ethical questions.
8. Is crane harvest additive or compensatory? What do these terms mean?

DECIDE TODAY:

WHO will be responsible for gathering this information?

--How will you split up work, as a group?

Suggest WHERE other group members might find information on their topic.

--Help each other in your tasks!

Discuss HOW your group will coordinate its work.

--Will you use an Editor to gather information from group members?

--Will you meet to bring information together at regular intervals?

--What is the best way to contact each other?

RESEARCH to be accomplished by March 10th and 12th, when you will share a written summary of your findings with your group. This summary should serve as a draft of a section of your group's report.

Your summary will be graded (scale of "10/5/0") by your group on March 12th. I can provide feedback if you desire, but your grade will be from your group.

IMPORTANT:

Your group's interaction is your responsibility! During this problem case, you will learn more from each other than you learn from your instructor. You must work to include all members, and all members MUST have input on the final draft of the report.

Please include this statement at the end of your report:

We have completed this report as a group, and by signing below, we approve of the final draft of our report.

Signed,

_____ _____

_____ _____

GRADING CRITERIA for CRANE GROUP REPORT

90-100	Properly cite all your references, including web-based sources. Majority of references are from peer-reviewed journals. Use literature to support your position. Show evidence that you have solved all learning issues. No mistakes in logic or judgment. Report is typed with limited errors in grammar or spelling.
80-89	Properly cite all your references, including web-based sources. Majority of references are from peer-reviewed journals. Connection between literature and your position is not complete. 1-2 learning issues not solved. Minor mistakes in logic or judgment Report is typed with few errors in grammar or spelling..
70-79	Some sources not properly cited. More than 50% of references are NOT peer-reviewed journals. Little connection between literature and your position. 3-4 learning issues not solved. Significant mistakes in logic or judgment. Report is typed with several errors in grammar or spelling.
60-69	Sources not properly cited. Majority of references are NOT peer-reviewed journals. Failure to show connection between literature and your position. Most learning issues not solved. Significant mistakes in logic or judgment. Report filled with errors in grammar or spelling.
0-59	Sources not properly cited. No peer-reviewed journals used as references. Failure to show connection between literature and your position. No learning issues solved. Significant mistakes in logic or judgment. Report filled with errors in grammar or spelling. Report not turned in by due date.

CITING REFERENCES

Follow guidelines of the American Ornithologists' Union (Journal: *Auk*), reprinted verbatim, below:

Literature citations (in text) are to be as follows:

1. One author: Able (1989) or (Able 1989).
2. Two authors: Able and Baker (1989) or (Able and Baker 1989).
3. Three or more authors: Able et al. (1989) or (Able et al. 1989). In Literature Cited section, give names of all authors.
4. Manuscripts that are accepted for publication but not yet published: Able (1996) if date known.
5. Unpublished materials: (K. P. Able unpubl. data); (K. P. Able pers. obs.); or (K. P. Able pers. comm.).
6. Within parentheses: (Charley 1980; Able 1983, 1990; Able and Baker 1984); (Baker 1989, Able 1992, Charley 1996); (Able 1988a, b, c).

Example: Sandhill cranes have big legs (Able 1989). Able and Baker (1996) suggest that they also have large necks.

Literature Cited section of your report

Citations should follow formats below (*verbatim from AOU's Auk*):

Papers:

Browne, R. A., C. R. Griffin, P. R. Chang, M. Hubley, and A. E. Martin. 1993. Genetic divergence among populations of the Hawaiian Duck, Laysan Duck, and Mallard. Auk 110:49-56.

Fahrig, L., and G. Merriam. 1994. Conservation of fragmented populations. Conservation Biology 8:50-59.

Roth, R. R., and R. K. Johnson. 1993. Long-term dynamics of a Wood Thrush population breeding in a forest fragment. Auk 110:37-48.

Willis, E. O., and Y. Oniki. 1978. Birds and army ants. Annual Review of Ecology and Systematics 9:243-263.

Dissertations, Books, Chapters:

American Ornithologists' Union. 1983. Check-list of North American Birds, 7th ed. American Ornithologists' Union, Washington, D.C.

Freeman, S. 1991. Molecular systematics and morphological evolution in the blackbirds. Ph.D. dissertation, University of Washington, Seattle.

Gaunt, A. S. 1988. Interaction of syringeal structure and airflow in avian phonation. Pages 915-924 *in* Acta XIX Congressus Internationalis Ornithologici (H. Ouellet, Ed.). National Museum of Natural Sciences, Ottawa, Ontario.

Kear, J. 1970. The adaptive radiation of parental care in waterfowl. Pages 357-392 *in* Social Behaviour in Birds and Mammals (J. H. Crook, Ed.). Academic Press, London.

Lack, D. 1954. The Natural Regulation of Animal Numbers. Oxford University Press, London.

Lowther, P. E. 1993. Brown-headed Cowbird (*Molothrus ater*). *In* The Birds of North America, no. 47 (A. Poole and F. Gill, Eds.). Academy of Natural Sciences, Philadelphia, and American Ornithologists' Union, Washington, D.C.

Walsberg, G. E. 1983. Avian ecological energetics. Pages 161-220 *in* Avian Biology, vol. 7 (D. S. Farner, J. R. King, and K. C. Parkes, Eds.). Academic Press, New York.

Citing on-line sources (from APA website:

http://www.apastyle.org/elecref.html)

Online periodical:

Author, A. A., Author, B. B., & Author, C. C. (2000). Title of article. *Title of Periodical*, xx, xxxxxx. Retrieved month day, year, from source.

Online document:

Author, A. A. (2000). *Title of work*. Retrieved month day, year, from source.

Stand-alone document, no author identified, no date

GVU's 8th WWW user survey. (n.d.). Retrieved August 8, 2000, from http://www.cc.gatech.edu/gvu/usersurveys/survey1997-10/

Other examples at: http://www.apastyle.org/elecsource.html

NRES 311 Wildlife Ecology and Management

GRADING MODEL using a DEFINITIONAL SYSTEM

COURSE GRADES

Final Course Grade*	Minimum Mean on Graded Work**	Pass/Fail Homework Grades
A	90%	“10" on at least 85% of assignments, and no more than 1 “0" “10" on both field trip reports
B+ B	88% 80%	“10" on at least 75% of assignments “5" or “10" on both field trips
C+ C	78% 70%	“10" on at least 65% of assignments
D+ D	68% 60%	“10" on at least 50% of assignments
F	0%	No passing scores

*To get a particular course grade, you must meet or exceed the standards for each category of work. For example, an average graded work score of 75%, and all 10's on pass/fail homework results in a C.

**Graded work includes 3 exams and 1 group project, each equally weighted as 1/4th of the total graded work cumulative grade.

Pass/Fail Homework Scoring

10 (pass) At least 85% of required answers or responses are correct. Answers are detailed, complete, and show evidence of critical thinking. All questions answered. Very few, in any, errors in grammar or spelling.

5 (resubmit) Less than 85% of required answers or responses are correct. Answers are not as detailed as required to show evidence of critical thinking. May not have provided answers for all questions. Contain some errors in grammar or spelling. *To encourage learning, you may correct errors and resubmit within 1 week.*

0 (not completed) Did not complete the assignment. Either absent (unexcused) from class or assignment not received by due date. *No resubmissions possible.*

EXAM #1

NRES 311: Wildlife Ecology and Management
Spring 2004 *

96.5

76.5/80

(100 total points)

Name: [redacted]

MULTIPLE CHOICE–*circle the best answer* (2 pts. each, 20 pts.)

1. Which of the following happened during the Era of Exploitation in North America?
   A. The Endangered Species Act was passed by congress.
   B. The first National Wildlife Refuge was established.
   C. Bison herds were decimated by soldiers, wagon trains, and sport hunters.
   D. Beaver were supporting fashion needs on two continents.

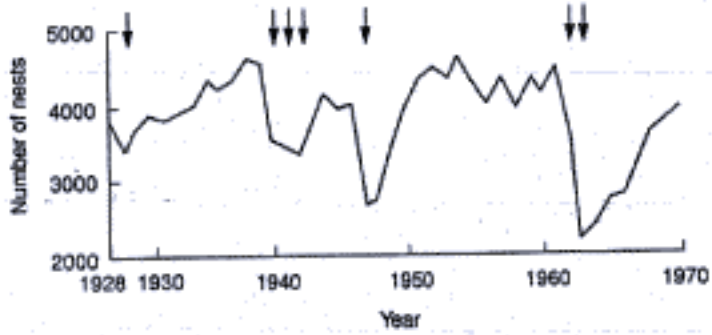


Fig. 8.1 Some populations remain within relatively close bounds over long time periods. The gray heron population of England and Wales [estimated by the number of occupied nests] shows a steady level despite some perturbations due to severe winters. The occurrence of severe winters is shown by arrows. [After Stafford 1971.]

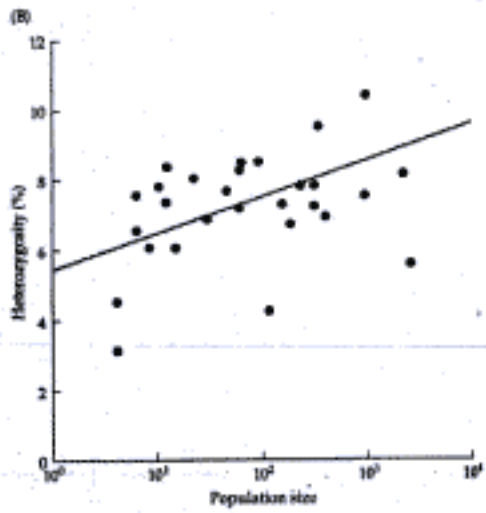
2. In the above graph, the large dips in population size were due to:
   A. Limiting factors
   B. Regulatory factors
   C. Density dependent factors
   D. Predator switching

3. *Competition* is possible in the following situation:
   A. a common resource is needed by 2 organisms, but is readily available
   B. 2 organisms do not need the same resource, which is very abundant
   C. a common resource is needed by 2 organisms, but is very scarce
   D. 2 organisms do not need the same resource, which is very scare

6/6

4. Realized niche can be defined as:
   A. A "smaller than potential" role played by a species in its environment because of interspecific competition
   B. A "smaller than potential" role played by a species in its environment because of predator-prey interactions
   C. A "larger than potential" role played by a species in its environment because of intraspecific competition
   D. A "larger than potential" role played by a species in its environment because of habitat degradation

5. This graph above shows data from red-cockaded woodpeckers in the Southeastern United States. According to the graph:
   A. Small populations show high heterozygosity.
   B. Heterozygosity is lost due to inbreeding.
   C. Large population show high heterozygosity.
   D. There are no heterozygotes in any population.



6. A heterozygote individual is important to small populations, as:
   A. It will give birth to individuals that are best suited to survive
   B. It will give birth to females who can help increase population size
   C. It carries both alleles, at a given locus
   D. It carries the most important allele, at a given locus

7. Biologists brought ibex from Austria to Slovakia. Later, they crossed them with ibex from Turkey. They learned a valuable lesson, in that:
   A. Outcrossing is very important to maintain genetic diversity--their experiment resulted in higher heterozygosity for the herd.
   B. Outcrossing can be tricky--their experiment resulted in increased juvenile mortality due to changes in birthing times.
   C. Outcrossing is sometimes impossible--their experiment resulted in no matings between any of the ibex from different areas.
   D. Outcrossing often does not improve genetic diversity--their experiment did not result in higher heterozygosity for the herd.

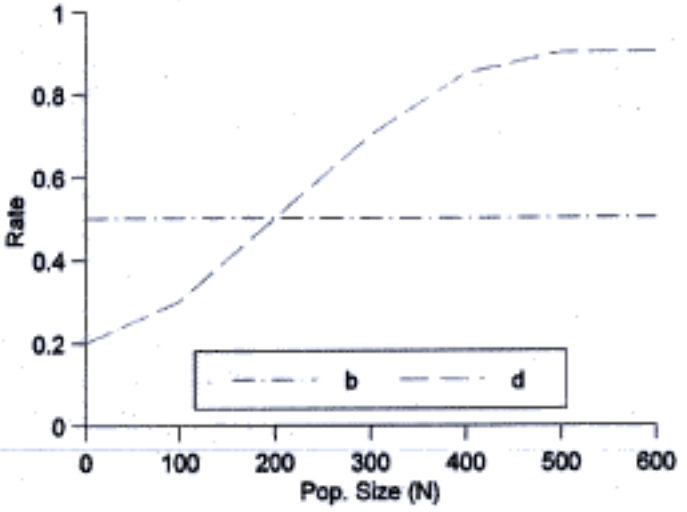
8/8

8. Some biologists suggest that a population's minimum viable size is 50. This is based on the number needed to counteract the effects of:

A. Genetic drift
B. Negative assortative mating
C. Mutation
D. Inbreeding
E. None of the above

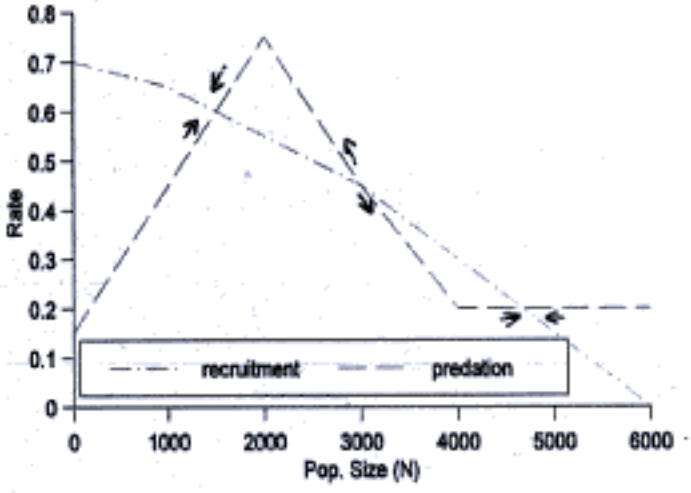
9. In the graph at right, you are shown demographic rates for a population at various sizes. What is the carrying capacity for this population?

A. 0.9
B. 200
C. 0.5
D. 500



10. The graph at the right shows a population's net recruitment (essentially, births) and predator response in terms of % of population killed at various densities. At which range(s) of density of the population regulated by predators? **Circle all that apply.**

A. 0-1700
B. 1700-3100
C. 3100-4700
D. 4700-6000



4/6

FILL IN THE BLANK–Complete each statement below with the best word/phrase possible. (2 pts. each, 12 pts.).

11. The name of the Act that provides funding for habitat restoration and research for wildlife through taxes on sporting/hunting equipment is the:

Pittman-Robertson Act

12. One factor that influences the spread of a disease in a wildlife population is:

host density

13. Biologists at DeSoto Bend National Wildlife Refuge are removing food plots from the Refuge to decrease the number of deer. They are predicting that their actions will increase what type of competition?

intraspecific

14. In class, we listed three approaches to wildlife management, including (1) preservation, (2) direct manipulation of wildlife, and (3) indirect manipulation of wildlife. From lectures or discussions, give one SPECIFIC example of *direct manipulation of wildlife*.

culling of wolves in Alaska

15. Asked to define what 'wildlife' are, most biologists would say that they are:

Vertebrates non-domestic -1/2

16. Wildlife biologists should be concerned about wildlife disease because (one reason):

disease is a natural part of life + can affect population size.

11.5/12

TRUE-FALSE OF THE MOST HORRIBLE KIND--*Circle "T" or "F" for each statement below. <u>If the statement is false, use the blank to correct the portion of the sentence that makes it false. Cross out the portion of the sentence that is false.</u>* (3 pts. each, 18 pts.).

17. T(F) It is now illegal to possess an ornate box turtle in the state of Nebraska.

It is now illegal to collect ornate box turtles from lands in the State of Nebraska.

18. T(F) When European rabbits in Australia reached high population numbers, they were regulated by a naturally occurring viral disease, myxomatosis.

Wildlife managers introduced myxomatosis to reduce high rabbit numbers.

20. T(F) Greer v. Connecticut was important because it reinforced the precedent of Roman Law that stated wildlife were the property of the person who captured them.

It reinforced the Public Trust Doctrine that states that it is the State's responsibility to ensure wildlife populations so wildlife belongs to State

21. (T)F For a given area, carrying capacity may change over time.

22. (T)F In *The Land Ethic*, Leopold argued that conservation decisions should not be made fully on the basis of economic values.

23. (T)F Two species usually coexist when intraspecific competition is greater than interspecific competition.

18/18

LIFE TABLE PROBLEM-- *complete the life table below, and answer the question* (10 pts.)

Age (years)	Number living at beginning of interval (l_x)	Number dying during interval (d_x)	Mortality, or death rate, during interval (q_x)	Per capita birth rate during interval (m_x)	Number of offspring born to age group ($l_x m_x$)
0-1	100	30	.3	0	0
1-2	70	18	.26	0.1	7
2-3	52	19	.37	0.7	36.4
3-4	33	17	.52	0.6	19.8
4-5	16	13	.81	0.5	8
5-6	3	3	1.0	0.4	1.2
6+	0	XXXXXX	XXXXXX	XXXXXX	XXXXXX

10

24. Is this population growing or declining? How do you know?

$F = \Sigma (l_x m_x) = 72.4$ It is declining because the population at the end of time x is ~~the same as it~~ not enough to replace those individuals who are dying. Good!

SHORT ANSWER--*answer the question appropriately in 3-4 sentences, a list, or a short paragraph* (10 pts. each, 20 pts. total)

25. You are a biologist in Yellowstone National Park, helping with the reintroduction of wolves into the Park. Some of your wolves are wandering onto private land surrounding the park, and are killing sheep. One landowner, "Dan", has started killing all wolves that come on to his land, claiming that as soon as they step on to his land, the wolves are his property.

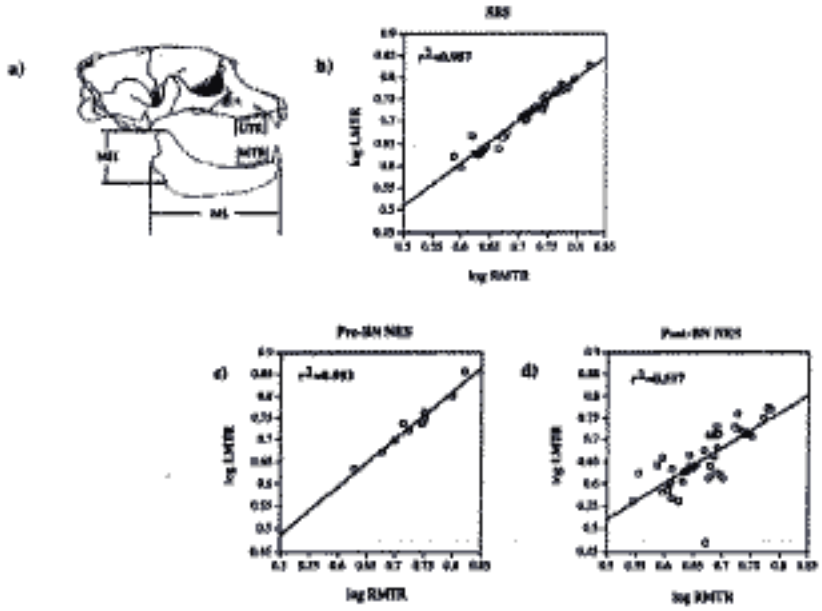
Is "Dan" correct? How does the Public Trust Doctrine apply to this situation?

Dan is not correct. The Public Trust Doctrine says that at least, the "public" in the state. all animals belong to everyone on the planet 0 and it is the government's responsibility to ensure that those animals will be available to future generations. This generally means that the wolves on Dan's property belong to the state. Via ~~the world's population~~ and he is not right to kill them.

1.5/10

19.5/20

26. Here we see data on dental measurement from the left and right jaw of elephant seals from the northern (b) and southern (c, d) populations. For the northern population, we have data from before (c) and after (d) the population encountered a severe bottleneck. What information does this data provide to us, regarding the effect of the bottleneck on the elephant seals?



9.5/10

This information indicates a high level of inbreeding/ loss of heterozygosity caused by the bottleneck. The results of this bottleneck could indicate future problems in the seal population. The inbreeding is indicated by the high levels of asymmetry found ~~on~~ in pairs only after the bottleneck. Inbreeding leads to decreased fitness in individuals + high levels of abnormalities due to a breeding technique where only a few genes exist

no direct evidence!

27. ESSAY: *Do wolves regulate moose populations in Alaska? Take-home essay* (20 pts.). Already turned in.

9.5/10

NRES 311: Wildlife Ecology and Management
February 13, 2004
[redacted]

20/20

Good. Marks!

Do wolves regulate moose populations? In part, the answer to this question is yes. Moose comprise a major source of meat in many of the regions that wolves reside, and it is relatively common knowledge that wolves eat moose. However, in whole, there are also many other factors that kill moose just as efficiently as a wolf pack. Moose are still susceptible to disease, hard winters, lack of food, and other predators (including humans), regardless of how many wolves are licking their chops. But if you consider regulation as a whole and predation as part of that whole, then wolves do regulate moose populations in the areas where they are the primary predator.

can limit, but cannot regulate

If you go by the numbers then much data seems to exist to support the idea that wolves regulate moose populations. After twenty-five years of research data in Alaska, Gasaway et. al. (1983) concluded that wolves regulated moose because moose population size and calf survival increased in areas where wolves had been removed and the population declined during years when wolf predation stayed at high levels, but the population was not replacing itself with new young. Messier and Crete (1985) suggest that the effects of wolf predation are density dependent. They found that when moose were near carrying capacity wolf predation was not as noticeable, but when the moose population dropped due to other factors, predation did seem to have a negative impact on moose numbers. At low moose densities, the effects of wolf predation again diminished due to wolf malnutrition and/or absence of wolves. Also when wolf density was high, the amount of moose consumed per wolf was less than when wolf density was low. Their research suggests that to some extent, wolf predation stabilizes moose populations at a relatively low level and it is uncertain whether the moose would stabilize at a higher level is wolves were removed.

functional response

Although not a great deal of research went into this essay, the two articles cited appear to support the hypothesis that wolves regulate moose populations. There are many factors that go into regulation of a prey population and predators do play their role in wildlife management.

98/101 = 97%

EXAM #3

NRES 311: Wildlife Ecology and Management
Spring 2004–Exam B

(101 total points)

Name: [redacted]

MULTIPLE CHOICE–*circle the best answer* (3 pts. each, 51 pts.)

1. In his article from Wildlife Society Bulletin, Frederick Gilbert addresses three arguments that hunting is ethical. The argument that he does NOT address is:
   A. Animals do not have reflective intelligence, and therefore hunting does not violate their moral rights.
   B. Hunting is an exercise of human skills, which is a sufficient 'good' to compensate for the 'evil' that results from exercising these skills.
   C. Hunting contributes to natural ecological processes–the predator prey cycle.
   (D) Hunters fund the majority of habitat restoration through excise taxes on hunting equipment and supplies.

2. When people complain about nuisance wildlife, they most often complain about:
   A. Personal injury by wildlife
   (B) Damage to structural property (like homes)
   C. Damage to gardens
   D. Damage to livestock

3. In Georgia (and much of the rest of the country), nuisance problems caused by Canada geese have increased most because of:
   (A) Urban sprawl
   B. Reductions in take of geese by hunters
   C. Pesticide affects on the goose populations
   D. Increased abundance of corn fields

4. Many birds in Guam are in danger of extinction because of which exotic species?
   A. Rats
   (B) Brown tree snakes
   C. Mongoose
   D. Llamas

5. The proportion of ranchers that annually report NO LOSSES of lambs to coyotes is usually about:
   A. 0% B. 10% (C) 45% D. 75%

15/15

6. Multiple studies have shown that when coyotes are controlled (mortality increased) through various methods:

(A) Coyote reproduction increases to compensate for the decreased mortality
B. Coyote reproduction decreases to add to the effective control
C. Coyotes from nearby areas fill up the vacant territories
D. Sheep production increases significantly
E. B and D

7. Which of the following are cited by Elia Ben-Ari in the September 1998 Bioscience article as a contributor to increased snow goose populations?

A. Over-protection of geese by an efficient National Wildlife Refuge system
B. Decrease in harvest rates due to declining popularity of hunting
C. The difficulty of harvesting geese by hunting, as they are hard to hunt
D. Reduced number of 'bust' reproductive years on the breeding grounds in recent decades
(E) A and D
F. All of the above
(G) None of the above

8. If a shrubland is burned, you would expect:

A. Grasses to grow back first, as they have more root biomass than shrubs
B. Shrubs to grow back first, as their growth points are at the tips of their branches
(C) Grasses to grow back first, as their growth point is at, or below, ground-level.
D. Shrubs to grow back first, as they are more resistant to fire.

9. Throughout long time periods in history, grasslands have remained grasslands. But, the "Clementsian" view of succession places grasses early in the succession cycle. Which of the following DOES NOT not explain why grasslands have historically remained grasslands?

(A) Periodic overgrazing by bison and other herbivores
B. They may grow on soils that are too poor for trees.
C. They may grow in areas of low precipitation
D. Fires set succession back before trees can become established

10. You apply for a job at a Nevada land area, managed by Bureau of Land Management. During the interview, they mention that portions of the range have been overgrazed. From that statement you can guess that:

A. Large portions of the overgrazed land are now covered by warm-season grasses
(B) Large portions of the overgrazed land are now covered by brush and shrubs
C. The problem has occurred because the ranchers leasing the land have enjoyed the ability to increase the number of livestock they are grazing during the last 10 years.
D. Streams in the area are prime trout habitat due to loss of competing grasses

12/15

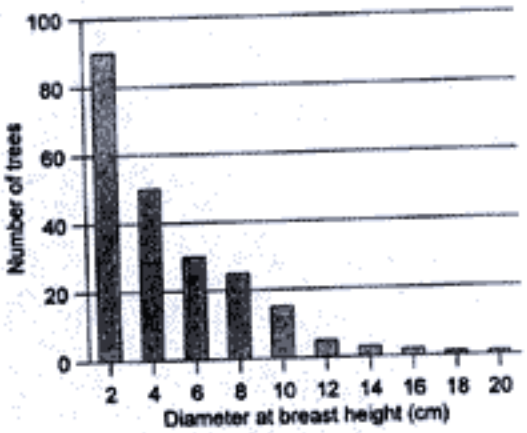
11. Although heavy grazing may improve habitat for some species, it probably does not improve habitat for:

A. Jackrabbits
B. Prairie dogs
C. Nesting birds
D. Grasshoppers

12. A grazing regime that involves smaller, multiple pastures that are each grazed for 2-15 days is called:

A. Continuous grazing
B. Management intensive grazing
C. Deferred grazing
D. AUM grazing

13. If you surveyed a stand of trees and found the distribution of size classes at the right, you would be standing in a(n):



A. Swamp
B. Even-aged stand
C. Uneven-aged stand
D. Pine plantation

14. Missouri's forests were over-exploited because:

A. People abandoned the land in the Depression, and it was purchased by timber companies
B. Society demanded lumber for construction and fuel
C. People in the Ozarks did not realize the long-term potential of their forests to produce wealth for their families
D. Inbreeding was prevalent in the Ozarks.

15. Which of the following is a method of even-aged forest management?

A. Single-tree selection
B. Management intensive grazing
C. Group selection
D. Seed tree

16. Uneven-aged management favors:

A. Early successional bird species
B. Most game species, like deer
C. Interior-dependent species
D. Species that depend on edge, such as raccoons

18/18

17. A forester has the option of producing the following forest landscapes–each with the same area. Which landscape would you predict to have more bird nests with nest parasite eggs?

A. A
(B) B
C. Quit messing with my mind–both are the same size.

A B

TRUE-FALSE OF THE MOST HORRIBLE KIND--*Circle "T" or "F" for each statement below. If the statement is false, use the blank to correct the portion of the sentence that makes it false. Cross out the portion of the sentence that is false.* (3 pts. each, 33 pts.).

18. T(F) According to a January 18, 2002 news article in the New York Times by Jodi Wilgoren, cormorants are considered a nuisance in Michigan because they are ~~damaging golf greens in the area~~.

(perch)
damaging the fish population of area lakes

19. (T)F An exotic species is a species introduced in an area where it was never present.

20. T(F) One method that biologists use to persuade Canada geese to leave a golf course is ~~to ask them politely~~.

using dogs

21. T(F) Compound 1080 was more effective for coyote control in Northern states (in the west) than in Southern states because of ~~genetic differences in coyotes in the two regions.~~

food availability in the north was less, so the cougars took the baits more often.

15/15

22. T(F) The 'growth point' of a plant–the tissue that promotes new growth–is called the ~~"testicular fundus"~~.

meristem

23. T(F) AUM stands for Animal ~~Universal Metric.~~

Animal Unit Months

24. (T)F According to the Wildlife Society, one consideration for introducing an exotic species is whether the species can be contained in the general area of the introduction.

25. (T)F If your family had 400 acres of timber, you might choose to use uneven-aged management to provide your family constant income through tree harvest.

26. T(F) Red-cockaded woodpeckers require older forests because they ~~nest in the heartwood of large trees.~~

prefer areas with less edge to prevent nest ✓ predation from other bird species

27. T(F) Chris Helzer, author of the article *Tree Planting in Nebraska* in the Prairie Plains Journal, promotes ~~the planting of trees for wildlife habitat~~.

considering scale, maintaining biodiversity at a large scale

good

18/18

SHORT ANSWER--*answer the question appropriately in 3-4 sentences, a list, or a short paragraph* (10 pts. each, 20 pts.)

28. According to your text, why was the first National Wildlife Refuge's established? What is the purpose of the system?

The first national wildlife refuge was established on Pelican Island to protect egrets from over harvesting by hunters. The purpose of the system is to ensure that there are always areas of natural ecosystems. They want to preserve wetlands, protect forests, Make sure that their is habitat available for all wildlife and protect those areas that support a wide range of wildlife.

10

29. Frederick Gilbert, in "*Considerations in managing wildlife populations for sport*" tries to define sensible and ethical use of wildlife by discussing "human skills" and "natural goods and evils".

Using these terms in your answer, how do you think **Gilbert** would respond (this may or may not be what YOU believe) if presented with this question:

> *"My sister and I are considering the purchase of a ticket to a hunting safari. In the safari, the 'wild' animals are raised in pens to be released for our hunt. The outfitter has dogs specifically trained to track down the animals. Our job will be follow a GPS unit's instructions to a point along a trail. The dogs will bring the animals to us. At that point, we can shoot them. Our outfitter will then cook us a meal using the liver of the animal; the rest will be fed to the dogs. Do you consider this ethical?"*

No, There is very little if any human skill involved in the above paragraph. In order for this to be ethical, the "good" of using human skills would need to compensate for the "evil" that results (the death of the animal) from exercising these skills. In the above case the natural evils outweigh the natural goods; therefore, the hunting safari is not ethical. The safari does all the work for the hunters, nothing is required from the hunter except to fire the bullet.

10

20/20

good!

76.5 + 20 = 96.5

EXAM #4

NRES 311: Wildlife Ecology and Management
Spring 2003

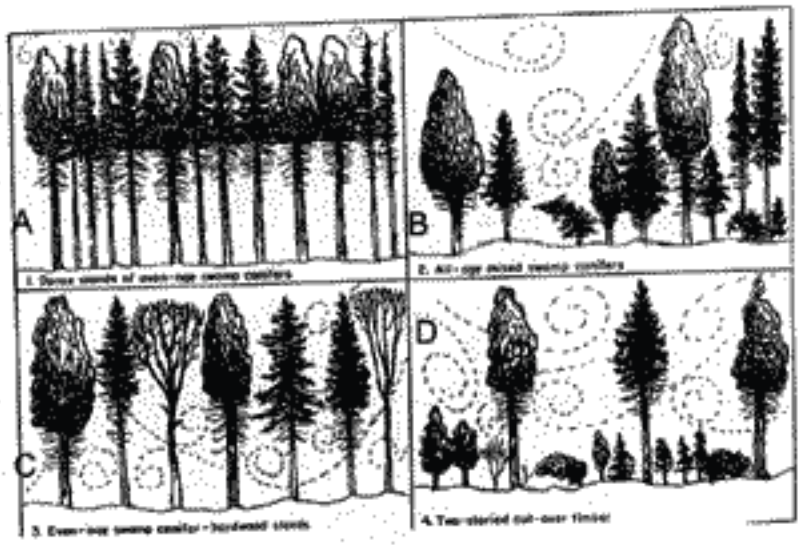
(100 total points)

Name: [redacted]

MULTIPLE CHOICE--*circle the best answer* **(3 pts. each, 48 pts.)**

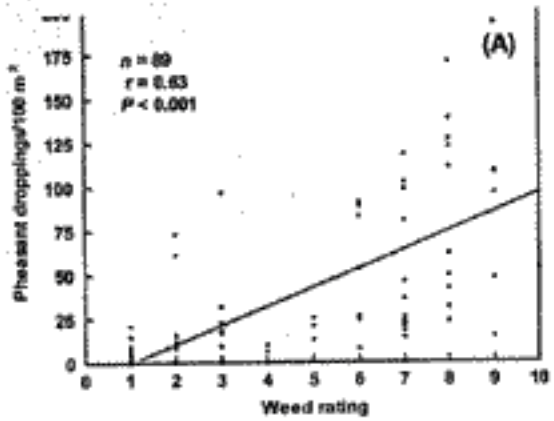
1. In the figure at right, the forest habitat serving as the best source of cover during the winter for deer would be:
   (A) A B. B
   C. C D. D

2. In the same figure, the forest habitat with the best source of food for deer would most likely be:
   A. A B. [redacted]
   C. C D. (D)



3. An example of *cover* is **(circle all that apply)**:
   (A) A patch of bunch grass that shelters a meadowlark from a cold rain
   B. A bush with berries that provides nourishment to a raccoon
   (C) A stone ledge that provides escape for a rabbit from a hawk - Concealment
   D. A rock in a river that serves as a source of insect larvae for a trout

4. A study in Kansas recently published the figure to the right. Based on the figure and what you know of the study, the correct interpretation of these results is:
   (A) Pheasants respond to increased food sources.
   B. Pheasants respond to increased cover.
   C. Weeds respond vigorously to natural fertilizer.
   D. Pheasants migrate miles to find areas with enough cover to hide them while they defecate.



12/12

5. Mark is a biologist studying grizzly bear habitat preferences. He has data from 4 states showing bear habitat use, as well as the % of the landscape for each habitat. Below is the data for "alpine meadows".

STATE	% of time found in alpine meadows	% of landscape covered by alpine meadows
Colorado	7%	1%
Wyoming	30%	40%
Idaho	10%	30%
Alaska	5%	8%

In which state do grizzly bears show <u>preference</u> for alpine meadow habitat?

A. Colorado
B. Wyoming
C. Idaho
D. Alaska
E. None show a preference for the habitat
F. B and C
G. B and D

6. Leopold defined *welfare factors* as:

A. Types of mortality
B. Disease
C. Habitat needs of species
D. A and B

7. Leopold postulated that management should target:

A. The most limiting welfare factor
B. The most limiting decimating factor
C. Wildlife diseases
D. The most abundant welfare factor

8. A problem faced by herbivores is:

A. Their food is often low in calories and protein.
B. Their food is often low in carbohydrates.
C. Their food is often low in water.
D. They expend too much energy capturing their prey.

9/12

9. The cecum is usually larger (longer) in grouse species that:
   A. Eat highly palatable plant tissue
   B. Eat fruit
   (C.) Eat woodier leaves and buds

10. You would expect a young bird, just hatched, to eat insects rather than berries because:
   A. Insects contain more fat than berries
   (B.) Insects contain more protein than berries
   C. Insects contain more carbohydrates than berries
   D. None of the above

11. A hypothetical grass emerges (begins to grow) in early June and reaches full height in 1.5 weeks. The month of highest protein content for the plant would be:
   (A.) June
   B. July
   C. August
   D. Same protein content during the entire summer.

12. Which of the following soils would be predicted to have the most nutrients?
   (A) High clay content
   B. Low clay content
   ~~C.~~ Acidic
   D. Very high precipitation

13. Bill is a new private lands biologist in eastern Nebraska. As he gets to know his district, he should expect the most wildlife to be found on:
   A. The best soils
   (B.) Medium-quality soils
   C. The poorest soils
   D. Public lands

The "reality"

14. If a private land owner does something on his/her land that enhances the "public good", one should expect:
   A. No reaction from society
   B. A tax
   (C.) A subsidy
   D. The landowner would be tickled with an organic carrot

12/14

15. In Missouri, land enrolled in CRP covers 15% of the landscape, because:
    A. At the time of the enrollment, it made economic sense for the landowners to enroll their land in the program.
    B. In areas of high soil erosion, farmers are forced to place their land in the program.
    C. Land owners want to help increase northern bobwhite populations.
    D. It is an region with high concentration of wetlands--the major focus of the program.
16. Most CRP land is found:
    A. In California
    B. In New England (Maine, New Hampshire, etc.)
    C. In the Southeast (Georgia, Florida, Alabama, etc.)
    D. In the Midwest (Iowa, Missouri, North Dakota, etc.)

MATCHING--Match the 2002 Farm Bill program with its description. (2 pts. each, 8 pts. + 1 free point = 9 pts.).

17. WRP A
18. GRP C
19. EQIP D
20. WHIP B

A. provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private land in an environmentally beneficial and cost effective manner. The program provides an opportunity for landowners to receive financial incentives to enhance wetlands in exchange for retiring marginal land from agriculture.

B. program that encourages creation of high quality wildlife habitats that support wildlife populations of National, State, Tribal, and local significance. NRCS provides technical and financial assistance to landowners and others to develop upland, wetland, riparian, and aquatic habitat areas on their property.

C. program that helps landowners and operators restore and protect grassland, including rangeland, and pastureland, and certain other lands, while maintaining the areas as grazing lands. The program emphasizes support for grazing operations, plant and animal biodiversity, and grassland and land containing shrubs and forbs under the greatest threat of conversion.

D. program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. The Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental requirements.

15/15

TRUE-FALSE OF THE MOST HORRIBLE KIND--*Circle "T" or "F" for each statement below. If the statement is false, use the blank to correct the portion of the sentence that makes it false. Cross out the portion of the sentence that is false.* (3 pts. each, 15 pts.).

21. T (F) The Conservation Reserve Program's original purpose was to restore wildlife habitat on the landscape. And to reduce erosion, and help supply & demand on ag market -½

22. (T) F Because of annual variation (example: weather), it is possible for any welfare factor to be the limiting factor for a population in a given year.

23. T (F) Because their food is nutritionally incomplete, ~~carnivores~~ Herbivores often experience food quality deficiencies. usually nutritionally complete, herbivores or rarely experience food quality deficiencies.

24. T (F) The Soil Bank program did ~~not~~ affect pheasant populations in South Dakota because it ~~only focused on private lands.~~ Increased habitat in the states

25. (T) F Conservation programs (example: CRP) on high quality farm land have a higher potential for positively affecting wildlife populations than similar programs on poor soils.

14.5
15

SHORT ANSWER--*answer the question appropriately in 4-5 sentences* (8 pts.)

County	Sample Size	Percent of Doves in Each Fatness Category: No Fat	Little Fat	Moderate Fat	Very Fat
Mason*	51	43	49	8	0
Hancock*	170	9	42	32	16

*Mason County has poorer soil; weed seeds constituted the main dove food. Hancock County has better soil; corn was grown and became available in hog feedlots to doves.

26. The above data was taken from juvenile mourning doves in Illinois, shot in September. You saw this data in class. Explain the above results, as you would to a friend that has not taken this course.
--What did the research find?
--Why does it matter?
--Be sure to emphasize the effect that these results would probably have to the populations of doves in the two counties.

EXCELLENT

The research found that doves [redacted] captured in Hancock County were more likely to have body fat than those captured in Mason County. [redacted] Hancock county has better soils than Mason County & there may be a good direct relationship between high soil quality & more forage available to the doves. Fat reserves are important for a couple reasons; Fat is a great insulator & therefore is needed during cold [redacted] winters, fat is also needed for reproduction. It is used as a great energy reserve when food is scarce therefore if a bird has more fat reserves, it chance of survival is much higher; And a county with better soils will then be more likely to sustain more birds

E/E

great

ESSAY--*turn in your prepared 1-page essay on the benefit of CRP to wildlife* (20 pts.)

2

[redacted]

NRES 511
May 6, 2004

Pheasant Populations and CRP in Kansas and South Dakota

Conservation Reserve Program (CRP) was established in 1985 under the Federal Food Security Act. It is a voluntary, cost-share, program for farmers and ranchers. The land enrolled is seeded to grasslands. The land stays in the CRP for 10 to 15 years, with little or no maintenance requirements. "About 14.3 million ha (35.4 million acres) of cropland in the United States were planted to permanent vegetation" (Rodgers 1999).

Ring-necked pheasants are a wildlife species that utilize habitats similar to many CRP lands. "Green winter wheat (*Triticum aestivum*) is the most important pheasant nesting habitat on the central Great Plains, accounting for greater than half the chicks produced" (Rodgers 1999). The decline of pheasants in Kansas may be intensified by CRP lands in that state. CRP lands in Kansas support native grasses that are not suitable to pheasants for their usage because they provide minimal forage opportunities, are flexible enough to allow for avian predation, and allow for accumulation of detritus which impedes movement of pheasants through cover. "Ring-necked pheasant (*Phasianus colchicus*) populations in western Kansas have declined an average of 65% from 1966-75 to 1986-95, particularly in the 1980's" (Rodgers 1999). Many wildlife managers believed the effects of CRP would help the already low pheasant population in Kansas, but they found that the program was unable to bring the populations back up. "Anticipated pheasant benefits from CRP were not fully realized due to inadequate plant diversity, poor stand maintenance, and large field size" (Rodgers 1999).

However in another study on Ring-necked pheasants in Eastern South Dakota, it was found that different vegetation type CRP lands were used by pheasants more than others. The study found that "Field-age and cover-type effects on pheasant abundance and productivity were largely the result of differences in vegetation structure among fields" (Eggebo 2003). This is important because when CRP lands enter in to contract they are seeded. So depending on what they are seeded with has influenced the pheasant populations in Eastern South Dakota. "More crowing pheasants were recorded in old cool-season CRP fields than any other age or cover type, and more broods were recorded in cool- than warm-season CRP fields…Cool-season grass-legume mixtures (CP1) that support higher pheasant productivity should be given equal or higher ratings than warm-season (CP2) grass stands" (Eggebo 2003).

Even though pheasant population numbers are not going up, the presence of CRP is important for offsetting the effects of more and more land being used for agricultural purposes. Without CRP, it is possible the numbers of pheasants would be much lower than they actually are. CRP has helped to not only supplement farmer's pockets, but also lower erosion, and created wildlife habitat that may otherwise be in row crop production.

Eggebo S.L., Higgins K.F., Nangle, D.E., Chamen, F.E. Effects of CRP field age and cover type on Ring-necked pheasants in eastern South Dakota. Wildlife Society Bulletin 2003; 31(3): 779-783

Rodgers, R.D., Why haven't pheasant populations in western Kansas increased with CRP? Wildlife Society Bulletin 1999, 27(3),634-665.

[redacted]

January 20, 2004
NRES 311: Wildlife Ecology & Management
Writing Assignment #1: Bighorn Sheep and The Land Ethic

Leopold's 'Land Ethic' describes how humans should treat the environment in which we live and prosper. The premise of the ethic is that we should not focus our efforts upon merely one area, but rather the entire ecosystem. A good example of a current event relating to Leopold's ethic can be seen "*Restoring The Prairie*," by Gerry Steinauer, written for the January issue of NEBRASKAland Magazine (pulled it off of their website). The article discusses how Bill Whitney has been working to restore many of Nebraska's native grasslands. His methods focus more upon restoring the native prairies as an entire ecosystem, including several species, rather than focusing on a single or select few species.

Evidence of similarities can be found in the following example. Within Leopold's ethic, he speaks about the A-B Cleavage, or the differences in interests between two groups of people. I would categorize Mr. Whitney as a member of the B-group. He is studying and trying to restore the several roles played by a native ecosystem, such as food and habitat for wildlife, a control for erosion within watersheds, and a sustainable plant community. The ecological conscience of such a person compels them to view the land and ecosystem as less of a production function, and more of a series of biotic and abiotic interactions, culminating in a sustainable community.

Another example of a relation between Leopold's ethic and Mr. Whitney's action can be seen in the fact that man is a steward of the land. Our purpose is not to conquer, but rather to co-exist with the ecosystem. However, being a steward to the land does not mean a hands-off approach, but can instead mean a great deal of involvement meant to favor the ecosystem. This can mean performing controlled burns, meant to replace the once common natural fires that occurred prior to man controlling fire. This can also include grazing livestock, meant to replicate the once dominant large grazers, like bison or elk. These are both practices that Mr. Whitney includes in his management of the restored prairie lands. Instead of simply planting an area and allowing it to grow, protected from fire and grazing, the idea is to replicate the ecosystem that existed before the arrival of Europeans, in turn hoping that a more sustainable and environmentally friendly system will emerge.

[redacted]

80 acres of Land / Kelyse Reading

The 80 acres I was given I would turn into grassland. I would add some trees in one area on the land. The area I would set at a few corners of the land to minimize edged created in the grassland portion. I would attempt to manage for non-edge prairie species and reduce habitat for cowbirds, blue jays and grackels which could disturb the prairie bird species I am managing for. Birds such as swallows, rens and other native/non-native species which prefer prairie habitat. I would add the one group of trees for a wind block for livestock and as possible (small) habitat for tree inhabiting prairie bird species. Again I would keep trees to a minimum to reduce key species and edges. The Kelyse reading taught me that (cowbirds)" haying and burning are tools that can improve native species grassland species numbers. It also taught me that Europeans introduced many trees to prairie areas to make them look more like Europe. The reading gave good references to help people improve grasslands and educated them on how trees affect the wildlife species that utilize different types of habitats.

good

EXAM #1

NRES 311: Wildlife Ecology and Management
Spring 2004 **

47/80

62

(100 total points)

Name: [redacted]

MULTIPLE CHOICE–*circle the <u>best</u> answer* (2 pts. each, 20 pts.)

1. Which of the following happened during the Era of Abundance in North America?
   A. The Endangered Species Act was passed by congress.
   B. The first National Wildlife Refuge was established.
   C. Bison herds were decimated by soldiers, wagon trains, and sport hunters.
   (D.) Beaver were supporting fashion needs on two continents.

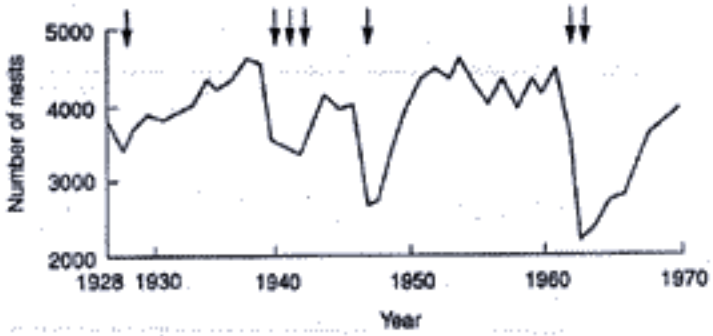


Fig. 8.1 Some populations remain within relatively close bounds over long time periods. The gray heron population of England and Wales (estimated by the number of occupied nests) shows a steady level despite some perturbations due to severe winters. The occurrence of severe winters is shown by arrows. (After Stafford 1971.)

2. In the above graph, the <u>large</u> dips in population size were due to:
   A. Density dependent factors
   (B.) Limiting factors
   C. Regulatory factors
   D. Predator switching

3. *Competition* is possible in the following situation:
   (A.) a common resource is needed by 2 organisms, but is very scarce
   B. 2 organisms do not need the same resource, which is very scare
   C. a common resource is needed by 2 organisms, but is readily available
   D. 2 organisms do not need the same resource, which is very abundant

6/6

4. Realized niche can be defined as:

(A) A "smaller than potential" role played by a species in its environment because of interspecific competition

B. A "smaller than potential" role played by a species in its environment because of predator-prey interactions

C. A "larger than potential" role played by a species in its environment because of intraspecific competition

D. A "larger than potential" role played by a species in its environment because of habitat degradation

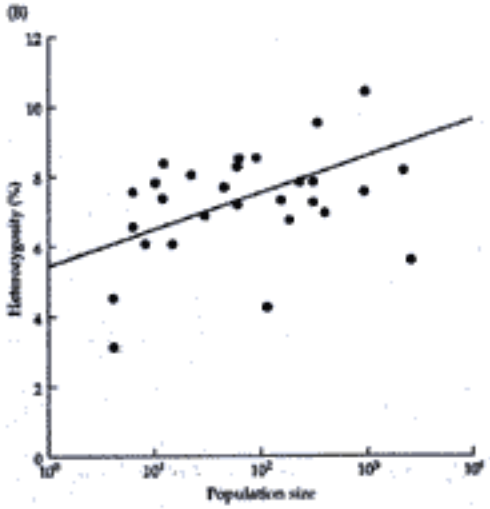
5. This graph above shows data from red-cockaded woodpeckers in the Southeastern United States. According to the graph:

A. Small populations show high heterozygosity.

(B) Large population show high heterozygosity.

C. There are no heterozygotes in any population.

D. Heterozygosity is lost due to inbreeding.



6. A heterozygote individual is important to small populations, as:

(A) It carries both alleles, at a given locus

B. It carries the most important allele, at a given locus

C. It will give birth to individuals that are best suited to survive

D. It will give birth to females who can help increase population size

7. Biologists brought ibex from Austria to Slovakia. Later, they crossed them with ibex from Turkey. They learned a valuable lesson, in that:

A. Outcrossing is sometimes impossible–their experiment resulted in no matings between any of the ibex from different areas.

B. Outcrossing often does not improve genetic diversity–their experiment did not result in higher heterozygosity for the herd.

C. Outcrossing is very important to maintain genetic diversity–their experiment resulted in higher heterozygosity for the herd.

(D) Outcrossing can be tricky–their experiment resulted in increased juvenile mortality due to changes in birthing times.

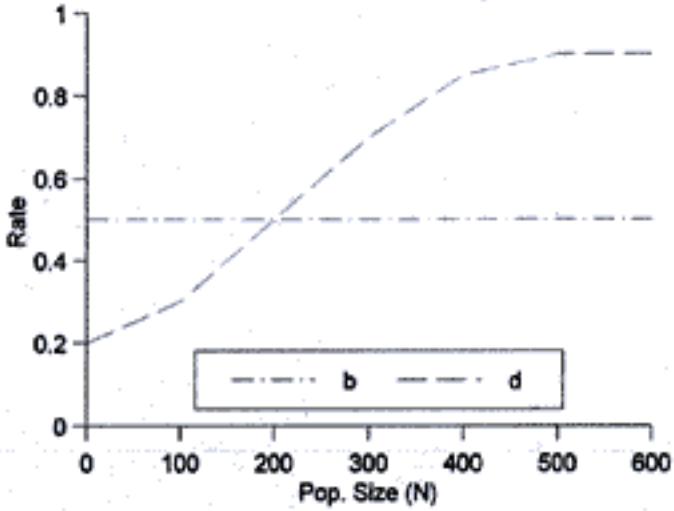
8/8

8. Some biologists suggest that a population's minimum viable size is 50. This is based on the number needed to counteract the effects of:

A. Mutation
B. Negative assortative mating
C. Genetic drift
D. Inbreeding
E. None of the above

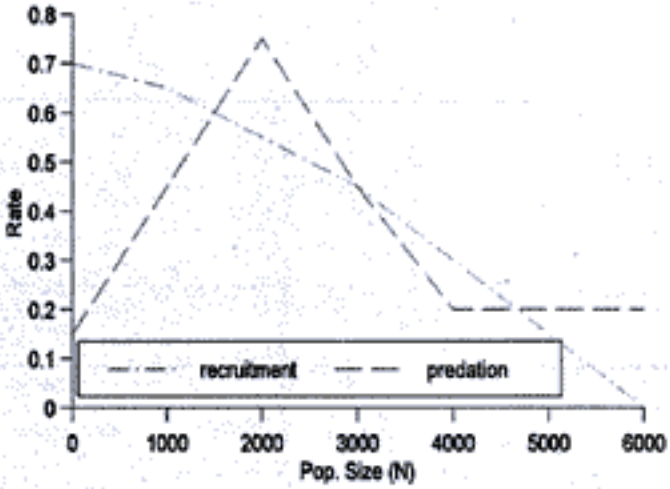
9. In the graph at right, you are shown demographic rates for a population at various sizes. What is the carrying capacity for this population?

A. 0.9
B. 500
C. 0.5
D. 200



10. The graph at the right shows a population's net recruitment (essentially, births) and predator response in terms of % of population killed at various densities. At which range(s) of density of the population regulated by predators? **Circle all that apply.**

A. 0-1700
B. 1700-3100
C. 3100-4700
D. 4700-6000



3/6

FILL IN THE BLANK–Complete each statement below with the best word/phrase possible. (2 pts. each, 12 pts.).

11. In class, we listed three approaches to wildlife management, including (1) preservation, (2) direct manipulation of wildlife, and (3) indirect manipulation of wildlife. From lectures or discussions, give one SPECIFIC example of *direct manipulation of wildlife*.

THE CROSSBREEDING OF IBEX From 2 DIFFERENT AREAS

12. Asked to define what 'wildlife' are, most biologists would say that they are:

(jellyfish?)
WILD ANIMALS vertebrates – 1
(non-domestic)

13. Wildlife biologists should be concerned about wildlife disease because (one reason):

IT CAN WIPE OUT AN ENTIRE SPECIES POPULATION.

14. The name of the Act that provides funding for habitat restoration and research for wildlife through taxes on sporting/hunting equipment is the:

THE "I CANT REMEMBER THIS ACTS NAME" ACT
-2 P-R Act

15. One factor that influences the spread of a disease in a wildlife population is:

-2 ALL INDIVIDUALS HAVING THE SAME 2 ~~HOOFS~~ allele?.

16. Biologists at DeSoto Bend National Wildlife Refuge are removing food plots from the Refuge to decrease the number of deer. They are predicting that their actions will increase what type of competition?

-2 INTERSPECIFIC COMPETITION
Intra

5/12

TRUE-FALSE OF THE MOST HORRIBLE KIND--*Circle "T" or "F" for each statement below. If the statement is false, use the blank to correct the portion of the sentence that makes it false. Cross out the portion of the sentence that is false.* (3 pts. each, 18 pts.).

17. (T) F It is now illegal to collect ornate box turtles in the state of Nebraska for pet trade.

18. (T) F Biologists initially lowered the population size of European rabbits in Australia by introducing a viral disease, myxomatosis.

20. T (F) ~~Greer v. Connecticut~~ was important because it reinforced the precedent of Roman Law that stated wildlife were the property of the person who captured them.

PUBLIC TRUST DOCTRINE

21. ~~(T) F~~ For a given area, carrying capacity ~~remains~~ does not constant over time.

-3

22. (T) F In *The Land Ethic,* Leopold argued that conservation decisions should not be made fully on the basis of economic values.

23. T (F) Two species usually coexist when ~~interspecific~~ competition is greater than ~~intraspecific~~ competition.

INTRASPECIFIC HIGHER THAN INTERSPECIFIC

15/18

LIFE TABLE PROBLEM– *complete the life table below, and answer the question* (10 pts.)

-2 (-1) -3 (+3)

Age (years)	Number living at beginning of interval (l_x)	Number dying during interval (d_x)	Mortality, or death rate, during interval (q_x)	Per capita birth rate during interval (m_x)	Number of offspring born to age group ($l_x m_x$)
0-1	100	0 30	~~0~~ 30/100	0	0
1-2	70	30 40	~~2.3~~ 18/90	0.4	28
2-3	52	18 19	~~2.9~~ 9/52	1.2	62.4
3-4	33	19 17	~~1.7~~ 17/33	1.2	39.6
4-5	16	17 13	~~0.94~~	1.0	16
5-6	3	13 3	~~0.23~~	0.4	1.2
6+	0	XXXXXX	XXXXXX	XXXXXX	XXXXXX

4/10

24. Is this population growing or declining? How do you know? (147)

-4 no answer 147 > 100 (growing)

SHORT ANSWER–*answer the question appropriately in 3-4 sentences, a list, or a short paragraph* (10 pts. each, 20 pts. total)

25. You are a biologist in Yellowstone National Park, helping with the reintroduction of wolves into the Park. Some of your wolves are wandering onto private land surrounding the park, and are killing sheep. One landowner, "Dan", has started killing all wolves that come on to his land, claiming that as soon as they step on to his land, the wolves are his property.

Is "Dan" correct? How does the Public Trust Doctrine apply to this situation?

No – property of public, in trust of the state. Dan may not kill them w/o permission.

DAN IS CORRECT IN THIS SITUATION. ONCE THESE WOLVES WANDER ONTO A PERSONS LAND AND START TO CAUSE DANGER TO A PERSONS LIVESTOCK THEN THEY CAN SHOOT THEM. THE PUBLIC TRUST DOCTRINE HELPS THIS IN SAYING THAT WILDLIFE ARE THE PROPERTY OF WHOEVER CATCHES THEM.

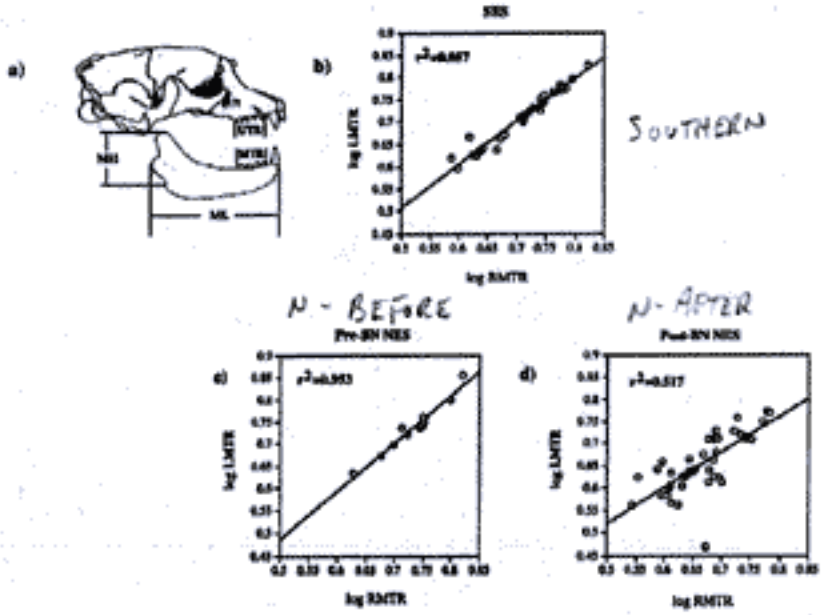
0/10

NO 6

Public Trust: property of public, held in trust by state.

4/20

26. Here we see data on dental measurement from the left and right jaw of elephant seals from the ~~northern~~ southern (b) and ~~southern~~ northern (c, d) populations. For the northern population, we have data from before (c) and after (d) the population encountered a severe bottleneck. What information does this data provide to us, regarding the effect of the bottleneck on the elephant seals?



BEFORE THE BOTTLENECK, IN THE NORTHERN AND AND SOUTHERN SEALS, THE PROPORTION OF THE SIZE FROM LEFT TO RIGHT STAYED RELATIVELY CONSTANT. AFTER THE BOTTLENECK OCCURED THE NORTHERN POPULATIONS' JAW SIZES FROM LEFT TO RIGHT STARTED TO SPREAD OUT ALL OVER THE PLACE. — more asymmetrical.
what does this mean to population?
(indicates genetic problems)

27. ESSAY: *Do wolves regulate moose populations in Alaska? Take-home essay* (20 pts.). Already turned in.

6/10

[redacted]
Professor Powell
NRES 311
February 10th, 2004

15/20

Wolves could be one of the things limiting the number of moose in a certain area but there are many other factors that could limit the numbers of a species. The big one of these limiting factors could be the fact that they are running out of food and intraspecific competition is starting to take its toll on the population. If there are not enough resources to go around for a population of animals then we fall into the old saying that, "the strong shall survive". The stronger animals of the population are going to get more of the resources and those that are not that strong will not get as many resources such as food, and they will begin to die off. The resources for the wolves could be getting scarcer also, forcing them to start hunting higher numbers of the moose to make it look like they are the limiting factor but in a round about way it is not their fault. In the November, 2003 issue of Wyoming Wildlife, the story called The Wolves That Were (Pg. 6-11), the point is brought up that the wolf's population were starting to be regulated by farmers with cattle because the wolves were attacking and eating the cattle. One of the reasons for this is because the hunters were depleting the numbers of bison, deer, and elk, which the wolves had been feeding on. This could be the case with the wolves and moose. The wolves could be regulating the numbers of moose, but it may not be their fault. The other resources that they use to supply them food could be low right now so the wolves could be attacking higher numbers of moose right now.

There are just too many things that could be regulating the number of moose to narrow it down to just the wolves. This is one thing that you would have to do time in the field to check. Some of the things brought up in the case study can have some things to do with it. The death rate for moose could just be higher than the birth rate at this moment and there could be many moose dieing. The other big one brought up is will the number of moose actually go up if the wolves are removed. Up through the time of this case study they had not done a study on this to find out if the numbers would actually go up if their were no predation. Like I have said many, many things could be limiting the moose. There is evidence of this on the State of Alaska Fish and Game website. Some other factors that could be limiting the moose numbers could be things like hunters, bears, and the weather. The Fish and Game website says that deep crusted snow can lead to malnutrition in moose and death of hundreds moose and decrease the survival of the succeeding year's calves. Maybe a storm hit the area and thinned out the numbers of moose in the certain area. Like I have already stated many times there are just too many factors that could be regulating the number of moose in the population. So, as of now, until I get more info on this study, no I don't think the wolves are the only thing regulating the number of moose.

- but not regulating?
- one, good.
Probably better references available for wolves and moose.
— functional response! good.
count regulate, though.
more is available!

Literature Cited

Internet sources of information

Alaska Department of Fish and Game: moose information

Author? website? where can I find that?

Literature sources on subject

November 2003. The Wolves That Were. Wyoming Wildlife. 6-11

Author?

52.5/101 = 52%

EXAM #3

NRES 311: Wildlife Ecology and Management
Spring 2004–Exam B

(101 total points)

Name: [redacted]

MULTIPLE CHOICE–*circle the best answer* (3 pts. each, 51 pts.)

1. In his article from Wildlife Society Bulletin, Frederick Gilbert addresses three arguments that hunting is ethical. The argument that he does NOT address is:
   A. Animals do not have reflective intelligence, and therefore hunting does not violate their moral rights.
   B. Hunting is an exercise of human skills, which is a sufficient 'good' to compensate for the 'evil' that results from exercising these skills.
   C. Hunting contributes to natural ecological processes–the predator prey cycle.
   D. Hunters fund the majority of habitat restoration through excise taxes on hunting equipment and supplies.

2. When people complain about nuisance wildlife, they most often complain about:
   A. Personal injury by wildlife
   B. Damage to structural property (like homes)
   C. Damage to gardens
   D. Damage to livestock

3. In Georgia (and much of the rest of the country), nuisance problems caused by Canada geese have increased most because of:
   A. Urban sprawl
   B. Reductions in take of geese by hunters
   C. Pesticide affects on the goose populations
   D. Increased abundance of corn fields

4. Many birds in Guam are in danger of extinction because of which exotic species?
   A. Rats
   B. Brown tree snakes
   C. Mongoose
   D. Llamas

5. The proportion of ranchers that annually report NO LOSSES of lambs to coyotes is usually about:
   A. 0% B. 10% C. 45% D. 75%

9/15

6. Multiple studies have shown that when coyotes are controlled (mortality increased) through various methods:

A. Coyote reproduction increases to compensate for the decreased mortality
B. Coyote reproduction decreases to add to the effective control
C. Coyotes from nearby areas fill up the vacant territories
D. Sheep production increases significantly
E. B and D

7. Which of the following are cited by Elia Ben-Ari in the September 1998 Bioscience article as a contributor to increased snow goose populations?

A. Over-protection of geese by an efficient National Wildlife Refuge system
B. Decrease in harvest rates due to declining popularity of hunting
C. The difficulty of harvesting geese by hunting, as they are hard to hunt
D. Reduced number of 'bust' reproductive years on the breeding grounds in recent decades
E. A and D
F. All of the above
G. None of the above

8. If a shrubland is burned, you would expect:

A. Grasses to grow back first, as they have more root biomass than shrubs
B. Shrubs to grow back first, as their growth points are at the tips of their branches
C. Grasses to grow back first, as their growth point is at, or below, ground-level.
D. Shrubs to grow back first, as they are more resistant to fire.

9. Throughout long time periods in history, grasslands have remained grasslands. But, the "Clementsian" view of succession places grasses early in the successional cycle. Which of the following DOES NOT not explain why grasslands have historically remained grasslands?

A. Periodic overgrazing by bison and other herbivores
B. They may grow on soils that are too poor for trees.
C. They may grow in areas of low precipitation
D. Fires set succession back before trees can become established

10. You apply for a job at a Nevada land area, managed by Bureau of Land Management. During the interview, they mention that portions of the range have been overgrazed. From that statement you can guess that:

A. Large portions of the overgrazed land are now covered by warm-season grasses
B. Large portions of the overgrazed land are now covered by brush and shrubs
C. The problem has occurred because the ranchers leasing the land have enjoyed the ability to increase the number of livestock they are grazing during the last 10 years.
D. Streams in the area are prime trout habitat due to loss of competing grasses

6/65

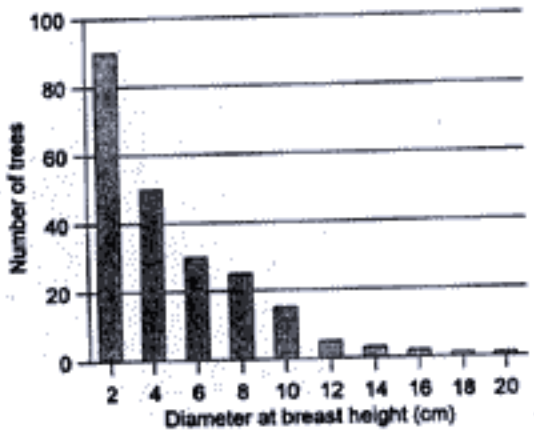
11. Although heavy grazing may improve habitat for some species, it probably does not improve habitat for:

A. Jackrabbits
B. Prairie dogs
C. Nesting birds
D. Grasshoppers

12. A grazing regime that involves smaller, multiple pastures that are each grazed for 2-15 days is called:

A. Continuous grazing
B. Management intensive grazing
C. Deferred grazing
D. AUM grazing

13. If you surveyed a stand of trees and found the distribution of size classes at the right, you would be standing in a(n):



A. Swamp
B. Even-aged stand
C. Uneven-aged stand
D. Pine plantation

14. Missouri's forests were over-exploited because:

A. People abandoned the land in the Depression, and it was purchased by timber companies
B. Society demanded lumber for construction and fuel
C. People in the Ozarks did not realize the long-term potential of their forests to produce wealth for their families
D. Inbreeding was prevalent in the Ozarks.

15. Which of the following is a method of even-aged forest management?

A. Single-tree selection
B. Management intensive grazing
C. Group selection
D. Seed tree

16. Uneven-aged management favors:

A. Early successional bird species
B. Most game species, like deer
C. Interior-dependent species
D. Species that depend on edge, such as raccoons

3/18

17. A forester has the option of producing the following forest landscapes–each with the same area. Which landscape would you predict to have more bird nests with nest parasite eggs?

A. A
(B) B
C. Quit messing with my mind–both are the same size.

A B

TRUE-FALSE OF THE MOST HORRIBLE KIND--*Circle "T" or "F" for each statement below. If the statement is false, use the blank to correct the portion of the sentence that makes it false. Cross out the portion of the sentence that is false.* (3 pts. each, 33 pts.).

18. (T) F According to a January 18, 2002 news article in the New York Times by Jodi Wilgoren, cormorants are considered a nuisance in Michigan because they are ~~damaging golf greens in the area~~.

-1 eating too many fish

Personal property i.e. in houses w/ a mess

19. (T) F An exotic species is a species introduced in an area where it was never present.

20. (T) F One method that biologists use to persuade Canada geese to leave a golf course is to ~~ask them politely.~~

-1/2 the grass they don't like taste

The only speak French-Canadian to its word eg. (!) spray

their asses w/ grape soda.

21. ~~(T) F~~ ~~Compound 1080~~ was more effective for coyote control in Northern states (in the west) than in Southern states because of ~~genetic differences in coyotes~~ in the two regions.

-3 climate differences

10.5/15

22. T (F) The 'growth point' of a plant–the tissue that promotes new growth–is called the "~~testicular fundus~~".

"MERISTEM"

23. T (F) AUM stands for ~~Animal~~ Universal Metric.

-1 Animal Unit Month

24. (T) F According to the Wildlife Society, one consideration for introducing an exotic species is whether the species can be contained in the general area of the introduction.

25. (T) F If your family had 400 acres of timber, you might choose to use uneven-aged management to provide your family constant income through tree harvest.

26. (T) F Red-cockaded woodpeckers require older forests because they nest in the heartwood of large trees.

27. T (F) Chris Helzer, author of the article *Tree Planting in Nebraska* in the Prairie Plains Journal, promotes the planting of ~~trees~~ grasslands for ~~wildlife habitat~~ land conservation.

-1

16/18

SHORT ANSWER--*answer the question appropriately in 3-4 sentences, a list, or a short paragraph* (10 pts. each, 20 pts.)

28. According to your text, why was the first National Wildlife Refuge's established? What is the purpose of the system?

The first National Wildlife Refuge was established due to -4
the fact of the president's love for wildlife. (Teddy Roosevelt) GIC
It was used to provide a safe place for animals to
have a natural environment as well as increase population
of some animals. habitat
read text - protect egrets from plume hunters -2

4/10

29. Frederick Gilbert, in "*Considerations in managing wildlife populations for sport*" tries to define sensible and ethical use of wildlife by discussing "human skills" and "natural goods and evils".

Using these terms in your answer, how do you think **Gilbert** would respond (this may or may not be what YOU believe) if presented with this question:

> *"My sister and I are considering the purchase of a ticket to a hunting safari. In the safari, the 'wild' animals are raised in pens to be released for our hunt. The outfitter has dogs specifically trained to track down the animals. Our job will be follow a GPS unit's instructions to a point along a trail. The dogs will bring the animals to us. At that point, we can shoot them. Our outfitter will then cook us a meal using the liver of the animal; the rest will be fed to the dogs. Do you consider this ethical?"*

Wrong... wrong. That is not ethical and you should
not breed because you are stupid. There is no
fair game or fair chance for the animal.
Pens and dogs and/or GPS is not the ethical way to
hunt, especially if there is no real need to harvest
because no human skills.
the animal. I would not consider it much sport
either. It ain't good. But good luck and send me
pictures 6 define natural good vs. evil what are they?
— Gilbert.

4/10

8/20

45.75 + 12
57.75

EXAM #4

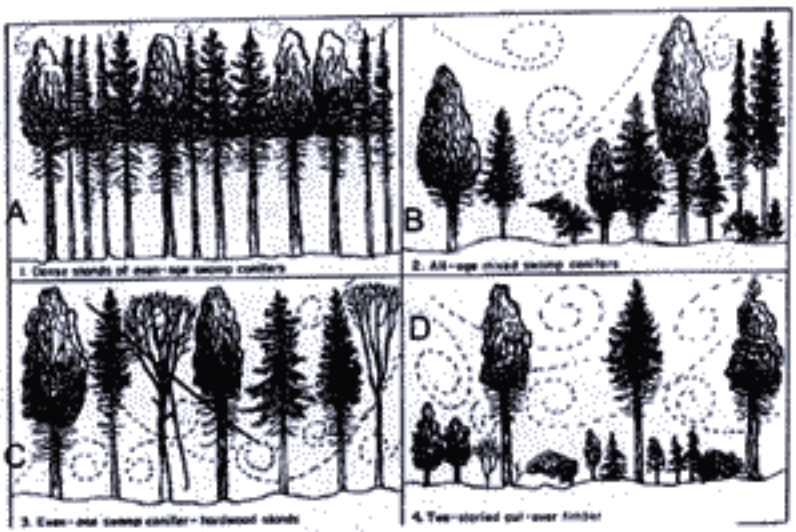
NRES 311: Wildlife Ecology and Management
Spring 2003

(100 total points)

Name: [redacted]

MULTIPLE CHOICE–*circle the best answer* (3 pts. each, 48 pts.)

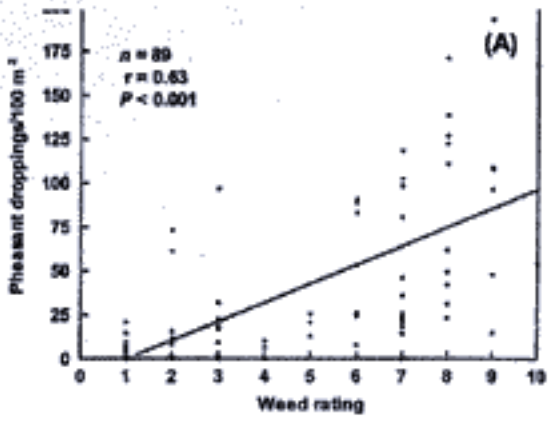
1. In the figure at right, the forest habitat serving as the best source of cover during the winter for deer would be:
   A. A B. B
   C. C D. D



2. In the same figure, the forest habitat with the best source of food for deer would most likely be:
   A. A B. B
   C. C D. D

3. An example of *cover* is (**circle all that apply**):
   A. A patch of bunch grass that shelters a meadowlark from a cold rain
   B. A bush with berries that provides nourishment to a raccoon
   C. A stone ledge that provides escape for a rabbit from a hawk
   D. A rock in a river that serves as a source of insect larvae for a trout

4. A study in Kansas recently published the figure to the right. Based on the figure and what you know of the study, the correct interpretation of these results is:
   A. Pheasants respond to increased food sources.
   B. Pheasants respond to increased cover.
   C. Weeds respond vigorously to natural fertilizer.
   D. Pheasants migrate miles to find areas with enough cover to hide them while they defecate.



8.25/12

5. Mark is a biologist studying grizzly bear habitat preferences. He has data from 4 states showing bear habitat use, as well as the % of the landscape for each habitat. Below is the data for "alpine meadows".

STATE	% of time found in alpine meadows	% of landscape covered by alpine meadows
Colorado	7%	1%
Wyoming	30%	40%
Idaho	10%	30%
Alaska	5%	8%

In which state do grizzly bears show <u>preference</u> for alpine meadow habitat?

A. Colorado
B. Wyoming
C. Idaho
D. Alaska
E. None show a preference for the habitat
F. B and C
G. B and D

6. Leopold defined *welfare factors* as:

A. Types of mortality
B. Disease
C. Habitat needs of species
D. A and B

7. Leopold postulated that management should target:

A. The most limiting welfare factor
B. The most limiting decimating factor
C. Wildlife diseases
D. The most abundant welfare factor

8. A problem faced by herbivores is:

A. Their food is often low in calories and protein.
B. Their food is often low in carbohydrates.
C. Their food is often low in water.
D. They expend too much energy capturing their prey.

3/12

9. The cecum is usually larger (longer) in grouse species that:
   A. Eat highly palatable plant tissue
   B. Eat fruit
   C. Eat woodier leaves and buds

10. You would expect a young bird, just hatched, to eat insects rather than berries because:
   A. Insects contain more fat than berries
   B. Insects contain more protein than berries
   C. Insects contain more carbohydrates than berries
   D. None of the above

11. A hypothetical grass emerges (begins to grow) in early June and reaches full height in 1.5 weeks. The month of highest protein content for the plant would be:
   A. June
   B. July
   C. August
   D. Same protein content during the entire summer.

12. Which of the following soils would be predicted to have the most nutrients?
   A. High clay content
   B. Low clay content
   C. Acidic
   D. Very high precipitation

13. Bill is a new private lands biologist in eastern Nebraska. As he gets to know his district, he should expect the most wildlife to be found on:
   A. The best soils
   B. Medium-quality soils
   C. The poorest soils
   D. Public lands

14. If a private land owner does something on his/her land that enhances the "public good", one <u>should</u> expect:
   A. No reaction from society
   B. A tax
   C. A subsidy
   D. The landowner would be tickled with an organic carrot

9/16

15. In Missouri, land enrolled in CRP covers 15% of the landscape, because:
    A. At the time of the enrollment, it made economic sense for the landowners to enroll their land in the program.
    B. In areas of high soil erosion, farmers are forced to place their land in the program.
    C. Land owners want to help increase northern bobwhite populations.
    D. It is an region with high concentration of wetlands–the major focus of the program.
16. Most CRP land is found:
    A. In California
    B. In New England (Maine, New Hampshire, etc.)
    C. In the Southeast (Georgia, Florida, Alabama, etc.)
    D. In the Midwest (Iowa, Missouri, North Dakota, etc.)

MATCHING–Match the 2002 Farm Bill program with its description. (2 pts. each, 8 pts. + 1 free point = 9 pts.).

17. WRP A
18. GRP C
19. EQIP D
20. WHIP B

A. provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resource concerns on private land in an environmentally beneficial and cost effective manner. The program provides an opportunity for landowners to receive financial incentives to enhance wetlands in exchange for retiring marginal land from agriculture.

B. program that encourages creation of high quality wildlife habitats that support wildlife populations of National, State, Tribal, and local significance. NRCS provides technical and financial assistance to landowners and others to develop upland, wetland, riparian, and aquatic habitat areas on their property.

C. program that helps landowners and operators restore and protect grassland, including rangeland, and pastureland, and certain other lands, while maintaining the areas as grazing lands. The program emphasizes support for grazing operations, plant and animal biodiversity, and grassland and land containing shrubs and forbs under the greatest threat of conversion.

D. program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. The Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental requirements.

12/15

TRUE-FALSE OF THE MOST HORRIBLE KIND--*Circle "T" or "F" for each statement below. If the statement is false, use the blank to correct the portion of the sentence that makes it false. Cross out the portion of the sentence that is false.* (3 pts. each, 15 pts.).

21. T F The Conservation Reserve Program's original purpose was to restore wildlife habitat on the landscape.

22. T F Because of annual variation (example: weather), it is possible for any welfare factor to be the ~~limiting~~ factor for a population in a given year.

23. T F Because their food is nutritionally ~~incomplete~~, ~~carnivores often~~ experience food quality deficiencies.

Herbivores

-1/2

24. T F The Soil Bank program did ~~not~~ affect pheasant populations in South Dakota because it only focused on private lands.

25. T F Conservation programs (example: CRP) on <u>high quality</u> farm land have a higher potential for positively affecting wildlife populations than similar programs on poor soils.

11.5/15

SHORT ANSWER--*answer the question appropriately in 4-5 sentences* (8 pts.)

County	Sample Size	Percent of Doves in Each Fatness Category: No Fat	Little Fat	Moderate Fat	Very Fat
Mason[a]	51	43	49	8	0
Hancock[a]	170	9	42	32	16

[a]Mason County has poorer soil; weed seeds constituted the main dove food. Hancock County has better soil; corn was grown and became available in hog feedlots to doves.

26. The above data was taken from juvenile mourning doves in Illinois, shot in September. You saw this data in class. Explain the above results, as you would to a friend that has not taken this course.
--What did the research find?
--Why does it matter?
--Be sure to emphasize the effect that these results would probably have to the populations of doves in the two counties.

Hancock County has better soils so they are able to grow better food (corn, etc.) than Mason. Having the soil to grow food it will allow a higher population of Doves. Thats why you have a higher + healthier Sample Size. This is important because we can find out what needs to be in Mason by looking at the landscape of Hancock.

B/8

different food

maybe they stopped more?!

No, what role does fat play

ESSAY--*turn in your prepared 1-page essay on the benefit of CRP to wildlife* (20 pts.)

[redacted]
Wildlife Ecology 311
Final Essay

12/20

Affects of CRP

According to the CRP reports that I have read and actually seen on our farm back home, that they have had an overwhelming affect on the bird species population. As stated in by James Herkert the CRP Program only affects usually 5 out of 10 birds. His big theory is that there needs to be a variety of small and large grasses. There seem to be an abundance of larger grass, which mean that it only helps those birds that prefer larger grass.

The CRP program has increased the pheasant population dramatically. All reports have shown a an increase in the areas that CRP was established. Having CRP has provided the cover that most bird species especially the pheasant.

major

Last but not least you have to look at the economic impact of CRP. Having CRP has lead to the increase in out of state hunters. Hunters have to pay for licenses, fees, and guides, which produces a lot of money for the state and the people.

relevance to habitat article?

All in all the CRP has a overwhelming positive impact which needs to be looked at. As with everything there are a few flaws but they will be worked out as we find more studies on the subject of CRP.

such as?

[redacted]
NRES 311 – Land Ethic Paper
January 18, 2004

On January 7, 2004, an article was published in the Omaha World Herald that Jason Klaiber of Lineville, Iowa shot and killed a young male mountain lion. Apparently, it was the third lion to be killed in the state of Iowa in the past two years. According to Todd Gosselink, a wildlife biologist with the Iowa DNR, Klaiber and his friends saw the young male lion feeding on a deer carcass, scared the lion into a tree with their dogs, and then shot it out of a cottonwood tree.

The migration of mountain lions into the Nebraska – Iowa region seems to currently be at a high. There are reports of people finding the tracks of mountain lions when the animals' presence in the area was suppose to be myth only. Now, mountain lions are being seen and even killed by residents of the states. The primary reason for the killings seems to be because people fear them. Should these animals be feared? Is killing them, especially in the fashion Mr. Klaiber and his friends did, even to be considered ethically moral or right?

According to Jim Coffey, a wildlife technician with the Iowa DNR says that you should "never say never with wildlife." In other words, there is a possibility that mountain lions, or even cougars and bobcats, could attack a human being. They may do this because they are reacting out of fear and protecting themselves. They may because they mistake a human as a potential prey. Coffey said that young males are even known to attack because they are inexperienced – "Like teenage boys, young and dumb, building up their experiences."

Coffey, however, did mention that felines are very shy animals and though many people see them as a potential threat, they normally would not attack a human. These animals are highly misunderstood by people, as like many other types of wildlife (such as sharks). To put things into perspective, Coffey stated, "I have no problem taking my 3-year-old daughter out there. I'd worry more about a tree falling on us."

Mountain lions are relatively harmless to humans, then, if they are unprovoked. But many who are uninformed still believe them to be dangerous and will kill one without thinking twice about it. In the case of Mr. Klaiber and his friends, I was disgusted the first time I read the article. They saw a mountain lion minding his own business—eating a meal, nonetheless—then chased the poor creature with dogs up into a tree which, I am sure, where it went in a state of panic. And without giving a second thought about the welfare of the animal, it was shot. It hadn't harmed anyone. But it was still killed because of what it was.

I find this story wrong in so many ways—ethically, morally, etc. I cannot understand how humans can be so heartless when it comes to wildlife. Having seen others do it first hand, I feel that people in these situations think with their egos rather than their heads and, as a result, carry out an act of stupidity. I feel sorry for the animals that have suffered fates like this. It is stories such as these that make me ashamed to be a human being.

5

[redacted]

311 W. Plotte Ave

GIVEN: -80 ACRES OF LAND

-NEED TO MAKE HABITAT FOR WILDLIFE

I WOULD FIRST START BY MAKING MY LAND MORE OF A TIMBER THAN A PRAIRIE. I WOULD LINE THE OUTSIDE EDGE OF MY PROPERTY WITH CEDAR & PINE TREES. (FOR A PROPERTY LINE) IT WILL ALSO PROVIDE A WALL FROM THE OUTSIDE AREAS. AFTER THAT I WOULD PUT FOOD PLOTS ON ALL CORNERS & THAN a FOOD PLOT IN THE MIDDLE. I WOULD BUILD A RUNOFF POND ON THE PROPERTY AS WELL. NEXT I ~~WOULD~~ WOULD PUT A ASSORTMENT OF TREES IN THE MIDDLE. THESE TREES WOULD INCLUDE COTTON, Hedge, Maple, and ELM. ALL IN ALL THIS WOULD BE A WELL ROUND HABITAT. for certain species

very detailed! Good!

* your idea is fine - your land, your opinion. Can you contrast your ideas with the Helzer reading? (on the back) ↓

= Cedar/Pine
FP = FOOD PLOT
WH = WATERING HOLE
= ASSORTMENT OF TREES.
π TREE STAND

CRANE GROUP REPORT

Group: [redacted] Grade: 95

Suggested report sections included?

I. Background on the Sandhill crane (life history information) very good

II. Current status of Sandhill crane harvest in the Central Flyway and nearby flyways good

III. Your recommendation and supporting evidence very good

IV. If harvest was allowed, what should the regulations consist of? Why? fair/good

Learning issues solved?

1. Why no harvest in Nebraska, now? What do other flyways, states allow? Why? ✓
2. Life history of Sandhill cranes (population status, breeding, habitat needs, migratory patterns, etc.). ✓
3. How important are cranes to Nebraska, in terms of social and economic benefits to the state? ✓
4. Subspecies issues. What is a subspecies? How are they distinguished (potential problem for hunting--does a hunter have to distinguish visually?)? What are the ranges of the Sandhill crane subspecies? ✓
5. Is crop damage a problem? ✓
6. Habitat loss/protection. What are threats to subspecies/species? ✓
7. How to harvest cranes. Ethical questions. ✓ ethical harvest not addressed
8. Is crane harvest additive or compensatory? What do these terms mean? ✓

A References properly cited? yes

B Majority of references are from peer-reviewed journals? 6-8/15 ≈ 50% (could use more journals)

A Literature used to support your decision? yes (pers. comm.)

A- Mistakes in logic or judgment? minor

A Report typed, with limited errors in grammar or spelling? yes

CRANE GROUP REPORT

Group: [redacted] Grade: 82

Suggested report sections included?

I. Background on the Sandhill crane (life history information) Good

II. Current status of Sandhill crane harvest in the Central Flyway and nearby flyways Good

III. Your recommendation and supporting evidence OK

IV. If harvest was allowed, what should the regulations consist of? Why? Fair

Learning issues solved?

1. Why no harvest in Nebraska, now? What do other flyways, states allow? Why? ✓
2. Life history of Sandhill cranes (population status, breeding, habitat needs, migratory patterns, etc.). ✓
3. How important are cranes to Nebraska, in terms of social and economic benefits to the state? ✓ not directly addressed
4. Subspecies issues. What is a subspecies? How are they distinguished (potential problem for hunting--does a hunter have to distinguish visually?)? What are the ranges of the Sandhill crane subspecies? ✓ not completely addressed
5. Is crop damage a problem? ✓
6. Habitat loss/protection. What are threats to subspecies/species? ✓
7. How to harvest cranes. Ethical questions. ✓ briefly addressed
8. Is crane harvest additive or compensatory? What do these terms mean? ✓ inadequate coverage

C References properly cited? yes, but many points in text missing citations!

B/C Majority of references are from peer-reviewed journals? 6/16 ← good! <50%

B Literature used to support your decision? some

B Mistakes in logic or judgment? some minor/major (fall season, hunting season for majority)

A Report typed, with limited errors in grammar or spelling? yes