

Integrating Land Conservation Planning in the Classroom

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Abstract

Opportunities for wildlife undergraduates to engage in land conservation planning can bridge the gap between formal academic training and professional wildlife experiences. Land conservation plans are an important component in managing wildlife habitat. In 1995 state legislation offered Texas landowners the opportunity to remain under agricultural valuation (Texas House Bill 1358, Proposition 11, 1-d-1) by designating wildlife management activities as qualifying agricultural practices. To obtain a wildlife management tax valuation, a landowner must have an active, written wildlife management plan. Texas Parks and Wildlife Department (TPWD) biologists often provide technical guidance to landowners in this process. Allowing wildlife undergraduates to have an active role in this process offers a unique opportunity for them to gain practical “hands-on” experiences while improving their writing skills. Students enrolled in Wildlife Habitat Management and Conservation (WFSC 406) work in groups (3–4 students) to develop a management plan for 3 local landowners. In addition to writing an actual management plan, students gain experience in land surveying, vegetation sampling, GIS/GPS technology, and public speaking. Landowners receive 3 peer-reviewed management plans they can select from to implement on their property. Students assist TPWD biologists and Texas Cooperative Extension staff in providing technical guidance to local landowners. Wildlife education can be enhanced by integrating land conservation planning in the classroom via partnerships with natural resource agencies and landowners. (WILDLIFE SOCIETY BULLETIN 34(1):223–228; 2005)

Key words

conservation planning, education, experiential learning, management plans, students, wildlife careers, wildlife education, writing.

The preparation of “workforce ready” wildlife students is becoming increasingly more difficult, with limited teaching budgets and more demanding time schedules. In addition to understanding basic ecological and wildlife management principles, wildlife undergraduates also need better communication, problem-solving, and human-relation skills (Lopez 2001). Active learning strategies such as experiential-learning (Davis 1993, Lewis and Williams 1994, Barr and Tagg 1995) and alternative-writing pedagogies (Bullock 1994, Gottschalk and Hjortshoj 2004) are useful approaches in providing these skills to wildlife students. The efficiency of student learning could be improved if these strategies were incorporated into the classroom. We believe the preparation of undergraduate students is of utmost importance because, ultimately, wildlife conservation is tied to the solid education of future managers (Lopez 2001).

Experiential learning occurs when students are involved in the subject matter, not just passively exposed to it through traditional-style lectures (Keeton and Tate 1978, Millenbah and Millspaugh 2003). Some benefits of experiential learning include capturing student enthusiasm to work outside or directly with wildlife (Millenbah et al. 2000), applying classroom lessons to new situations (i.e., critical thinking skills, Barr and Tagg 1995, Kendrick 1996, Millenbah and Millspaugh 2003), and maximizing opportunities for students with different learning styles (Millenbah et al. 2000). Allowing students to learn by experiencing and participating in their subject provides students with an opportunity to practice the skills needed by today’s wildlife professionals (Ryan and Campa 2000). To better prepare students for the

challenges ahead, it is important to expand experiential learning opportunities across the wildlife sciences curriculum (McCleery et al. 2005).

Writing is an important pedagogical tool for developing critical-thinking skills, retaining discipline-based information and in improving communication skills (Bullock 1994, Gottschalk and Hjortshoj 2004). Recent trends in many universities to promote student writing include curriculum-based writing programs (e.g., Writing Across the Curriculum, Writing in the Disciplines, Writing to Learn) and “writing intensive” courses (Gottschalk and Hjortshoj 2004). The emphasis of writing in the classroom has developed from the growing recognition that communication skills are essential to learning.

One important, yet under-utilized, way to maximize writing assignments in the classroom is peer-review (Gottschalk and Hjortshoj 2004). Peer-review cultivates writing as an iterative process, improving the quality of the final product (Ryan and Campa 2000). Anonymous peer-review is essential, allowing students to feel comfortable critiquing a fellow student’s writing (Mowl and Pain 1995, Venables and Summit 2003). Reviewing the writing of other students can also improve one’s own writing, editing, and critiquing skills (Gottschalk and Hjortshoj 2004). Venables and Summit (2003) reported the superfluous benefits of peer-review are that students find the process intellectually stimulating and gain a better understanding of the course material. For wildlife students opportunities to write and review writing, particularly using the formats they will encounter as wildlife professionals, should be emphasized.

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Classroom Conservation Planning

Management plans are an integral component in managing wildlife habitat and their populations. In 1995 state legislation offered Texas landowners the opportunity to remain under agricultural valuation (Texas House Bill 1358, Proposition 11, 1-d-1) by making wildlife management activities a qualifying agricultural practice. A landowner must have an active, written wildlife management plan in order to obtain the tax valuation. Texas Parks and Wildlife Department (TPWD) biologists often provide guidance to landowners in the preparation of wildlife management plans.

We integrated writing habitat management plans for local landowners into our Wildlife Habitat Management (WFSC 406) course, a 3-hour senior-level course offered in the Department of Wildlife and Fisheries Sciences (WFSC) at Texas A&M University (TAMU). Student enrollment in WFSC 406 is approximately 30 students each semester (course offered fall and spring). In 2003 TAMU implemented a university-wide curriculum change requiring at least 2 writing-intensive, or “W”, courses in all undergraduate programs or field of study. Course designation as a “W” course requires at least 50% of graded work to be writing based (Core Curriculum Review Committee report, *Educational Leadership at the Beginning of the 21st Century*, TAMU Faculty Senate, Faculty Senate Resolution 20.108). We obtained university approval for WFSC 406 as a “W” course in the wildlife and fisheries program at TAMU in Fall 2003. The development of a wildlife habitat management plan for local landowners was used as the primary writing assignment in our course (55% of total grade).

In this paper we describe how writing habitat management plans for local landowners may offer wildlife students actual professional experiences (i.e., experiential learning) and writing opportunities. We propose that partnerships with natural resource agencies and landowners can improve wildlife undergraduate programs at universities.

Experiential Learning

Each semester WFSC 406 students work in groups (3–4 students/group, 3 groups/landowner) to develop a management plan for 3 local landowners identified by TPWD and Texas Cooperative Extension (TCE) biologists. This provides students an opportunity to experience and synthesize course materials, presented in the form of lectures, readings, lab exercises, and field trips, into a viable management plan.

Each management plan has 3 management *goals* presented by the landowners to student teams (e.g., increase wild turkey [*Meleagris gallopavo*] numbers, improve native songbird viewing opportunities, and increase northern bobwhite [*Colinus virginianus*] numbers). The management goals of the plans are selected by landowners with guidance from TPWD biologists. Goals are then presented to the class during initial site visits. Management *objectives* are identical for all WFSC 406 management plans: 1) conduct a feasibility assessment to identify 1 or more viable management practice(s); and 2) recommend practice(s) to the landowner that would best achieve her or his goals. In order for Texas landowners to remain under agricultural valuation, they must implement a *minimum* 3 of 7 qualifying TPWD wildlife

Table 1. Summary checklist of 7 wildlife management practices and intensity levels approved by Texas Parks and Wildlife Department for landowners to remain under agricultural valuation (1-d-1).

Management practice	Intensity level/ Exemption period
Habitat Control	
Grazing management	1 yr
Prescribed burning	15%
Range enhancement (re-seeding)	10%
Brush management	10%
Erosion Control	
Pond construction	5 yr
Gully shaping	5 yr
Dike/levee construction/management	5 yr
Establish water diversion	5 yr
Predator Control	
Predator management	75%
Imported red fire ant control	10%
Control of brown-headed cowbirds	100#
Grackle/starling control	100#
Supplemental Water	
Marsh/wetland restoration, or development	5 yr
Well/trough/windmill overflow	5 yr
Spring development and/or enhancement	5 yr
Wildlife water guzzlers	5 yr
Supplemental Food	
Grazing management	1 yr
Prescribed burning	15%
Food plots	1 yr
Feeders and mineral supplementation	1/160ac
Providing Shelters	
Nest boxes, bat boxes	1 yr
Brush piles and slash retention	3%
Half-cutting trees or shrubs	25#
Natural cavity/snag development	5/ac on 5%
Census	
Spotlight counts	3/yr
Aerial counts	1 yr
Browse utilization surveys	1 yr
Song bird transects and counts	1 yr

Source: Texas Parks and Wildlife Department (2001), Guidelines for Qualification of Agricultural Land in Wildlife Management Use.

management activities each year (Table 1). For example, in an effort to increase wild turkey numbers (Goal 1), yaupon (*Ilex vomitoria*) control on 10% of the woodland area each year would qualify under the “habitat control” practice (Table 1). Student teams follow TPWD management-plan guidelines (Texas Parks and Wildlife Department 2001) when generating their management plans. A course website (<http://apc.tamu.edu/wfsc406/>) provides students with resources specific to TPWD management plan guidelines and plan development (e.g., TPWD Guidelines for Qualification, Management Plan Forms, etc.). This website mirrors information provided by TPWD to landowners.

The WFSC 406 management plan consists of 3 distinct sections (Parts I–III) written individually and as a team (Tables 2–3). First, student teams write background information on the property and landowner and describe the current habitat conditions and management operations. This requires the students to communicate with the landowner to identify past and current use of the property. A field trip to each of the landowner’s properties is conducted early in the semester (week 3, Table 3) that includes agency biologists. Landowners, TPWD and TCE biologists,

Table 2. Outline used in developing of a wildlife management plan for local landowners in Wildlife Habitat Management (WFSC 406). Plan outline follows guidelines proposed by Texas Parks and Wildlife Department.

Section	Written by
<p>DESCRIPTION</p> <p>PART I - INTRODUCTION</p> <p><i>Executive Summary</i> – summary of principal points of plan. <i>Purpose</i> – purpose of plan. <i>Owner Information</i> – information about property owner/client. <i>Property Description</i> – property location/legal description, size of area, historical/current land use, biological description (soils, topography, cover type, flora, fauna, etc.). Include a general locator map and vegetation cover map. <i>Target Species</i> – identify species targeted for management. <i>Goals and Objectives</i> – describe the wildlife management <i>goals</i> (what you want the property to look like or wildlife you want to produce from it) and <i>objectives</i> (how you intend to achieve these goals) for property. Each management plan will have a minimum of 3 goals with each team member in charge of 1 of the goals. Objectives used to address each goal will be as follows:</p> <ol style="list-style-type: none"> 1. Conduct a feasibility assessment to identify 1 or more viable management practices. 2. Recommend practice(s) to the landowner that would best achieve her/his goal. <p>PART II - MANAGEMENT ANALYSIS</p> <p>Goal 1</p> <p><i>Feasibility Assessment</i></p> <p><i>Species Requirements</i> – life history requirements of species (flora/fauna) of interest. Presented to help the landowner understand the ecology of the species and will serve to justify plan recommendations. <i>Proposed Target Areas</i> – identify where the proposed management activities are to occur. A map identifying those areas should be included. <i>Management Constraints</i> – identify and discuss any limitations to proposed management activities. This can be social, legal, moral, or ethical in nature. For example, mowing should not be done during the nesting season; disking should not be done when ground conditions are wet, etc. Plans should follow <i>Best Management Practices</i> (BMPs). <i>Recommendations</i> Outline proposed management activities referring to feasibility assessment to support recommendations. Recommendations should follow guidelines provided by Texas Parks and Wildlife, and should include <i>at least 1</i> qualifying management practice. <i>Markets</i> Provide landowner with approximate costs for management actions that can be used to compare to other activities. Should include table with costs and benefits.</p> <p><i>*Other team members will repeat for other goals following the above format. Each goal will be discussed separately with final recommendations presented collectively in the final section (Part III).</i></p> <p>PART III - FINAL RECOMMENDATIONS</p> <p>Summarize management recommendations for the landowner. Identify all qualifying TPW wildlife management practices to be implemented on the property during the coming year(s) that will achieve management goals. Include a schedule of events outlining all proposed activities and necessary steps to implement plan. Provide final statement to landowner why team's plan should be selected for final implementation.</p> <p>PART IV - APPENDIX</p> <p>Attach supporting information relevant to the wildlife management plan. This can include popular literature, information from websites, or scientific publications. Some examples include technical assistance sources/contacts, material/equipment sources, or census/monitoring forms.</p> <p><i>*Part IV is not necessarily written by the student teams but rather is information that may be useful to a landowner who wishes to implement the plan.</i></p>	<p>Team</p> <p>Individual</p> <p>Team</p> <p>Team</p>

Note: outline modified from Texas Parks and Wildlife Department (2001), Guidelines for Qualification of Agricultural Land in Wildlife Management Use.

Table 3. Timeline in developing a wildlife management plan for local landowners in Wildlife Habitat Management (WFSC 406).

Week	Event
1	Introduction to scientific writing and management plan overview. Management plan group assignments for semester (during class).
3	Visit to landowner properties, review of management goals (in field).
4	Part I of management plan due for peer-review.
5	Part I of management plan due for instructor-review.
8	Part II of management plan due for peer-review.
10	Part II of management plan due for instructor-review.
13	Parts I-III of management plan due for peer-review.
14	Parts I-III of management plan due for instructor-review.
15	Management plan presentations and final submission.

TAMU instructors, and students review and discuss potential management options to address management objectives. Through their interactions with landowners, students gain an understanding of the landowner's knowledge of wildlife and natural resource management. This experience helps students to frame their writing and the presentation of their final plans. Part I of the management plan is written as a team effort and includes property description, target species, and the statement of goals and objectives (Table 2). Students are encouraged to incorporate skills learned throughout the semester in preparing their plans, such as the use of Geographical Information System (GIS) data or the use of Global Positioning System (GPS) technology. This requires the students to get in the field and identify different vegetation types and land uses using current technology. For example, a general

locator map, vegetation map, and aerial photo of property are included in the first section of the plan.

Part II of the management plan is written by each individual team member who selects to address 1 of the 3 landowner management goals. This section of the plan includes life history of target species, management constraints, markets (cost-benefit analysis), and recommendations (Table 2).

Finally, Part III of the WFSC 406 management plan summarizes management recommendations, cost of plan implementation, and schedule of events (timeline). This section, like the first, also is written as a team effort (Table 2). The general management plan format used in our course emphasizes the *process* of land conservation planning: assessment, constraints, recommendations (based on species biology/constraints), and recommendations assessment.

An added benefit of the management plan is the experience students gain through professional interactions. A relationship between student teams and landowners is established early in the semester. At the beginning of the semester, students visit landowner properties and discuss management goals and feasible management strategies with the landowners directly. The TPWD and TCE biologists are also on hand to offer guidance to students on the feasibility of management strategies for their management plans. The landowner field day serves to “kick-off” the management plans for the course and allows students to professionally interact with landowners and TPWD and TCE biologists. Following the initial site visit, students are encouraged to maintain contact with landowner and revisit the property to better tailor their plans to meet landowner management goals within the landowner’s budget.

Writing Skills

Student feedback for the WFSC 406 management plan is provided throughout the semester from group members (peer-review) and instructors. First, the management plan is submitted by student teams in sections (Parts I–III, Table 2). Student feedback is provided for management plan sections via grading rubric (Fig. 1), web-based feedback (i.e., list of common mistakes and how to correct them), and class discussions of common writing mistakes. Management plans are graded based on grammar, content, and style (plans follow *Journal of Wildlife Management* style). A peer-review process also is used in providing feedback to students. For example, students submit management plan sections via the course website using their student identification number and password. The paper is then assigned to a student in the course for review and comments, using Microsoft Word’s track changes feature. Student-reviewer comments and feedback are then uploaded to the course website and sent to the student for corrections. A final version of the management plan section is then submitted for instructor review. This process is similar to the on-line submission process currently being used by the *Wildlife Society Bulletin* or *Journal of Wildlife Management* editors. Students are graded on the quality of the feedback provided in their review as well as the final version of their own management plan. The on-line submission website allows instructors to access all documents and track document submissions, reviews, and corrections.

In addition to submitting a written management plan, final

Grade Sheet for Management Plan – Part I

Outline Criteria	Total \$	Comments
Purpose – what is the purpose of the plan?	750	
Owner Information – information about property owner/client.	750	
Property Description – property location/legal description, size of area, historical/current land use, biological description (soils, topography, cover type, flora, fauna, etc.). Include a (1) general locator map and (2) vegetation cover map, and (3) other maps that you feel are important.	2,000	
Target Species – Identify species targeted for management.	1,000	
Goals and Objectives – Describe the wildlife management goals (what you want the property to look like, or want to be able to do with it) and objectives (how you intend to achieve these goals) for this piece of property. Each management plan will have a minimum of 3 goals with each team member in charge of 1 of the goals. Objectives used to address each goal will be as follows: 1. Conduct a feasibility assessment to identify 1 or more viable management practices. 2. Recommend practice(s) to the landowner that would best achieve her/his goal.	500	
This plan can serve as a multi-year plan, and should include a minimum of 3 different practices each year (required to receive the tax-valuation).		

Total Possible \$5,000

\$5,000

Dollars Earned

>80%	Thorough, creative, ideas clearly stated/supported, well-organized, neat, few grammar errors, few errors with the <i>Journal of Wildlife Management</i> (JWM) style.
60–80%	Adequate range, limited development, logical but incomplete, loosely organized but main ideas stand out, occasional grammar errors but meaning not obscured, common errors with JWM style.
40–60%	Limited perception/substance, inadequate development, ideas confused or disconnected, frequent grammar errors with meaning confused or obscured, frequent JWM-style errors.
<40%	Lack of perception/substance, lack of development, does not communicate, dominated by grammar errors, no understanding of JWM style.

Figure 1. Sample of grading rubric used in assessing wildlife management plan (Part I) in Wildlife Habitat Management (WFSC 406) by students and instructors. In our course student teams are treated as private consultants and earn “dollars” for their management plan efforts.

management plan recommendations are presented (10–15-minute slideshow) to invited landowners and a panel of wildlife biologists for final evaluation. Management plan presentations serve as the capstone activity in WFSC 406. Student teams present their plan and are graded on their ability to “sell” their plan to the landowner and panel of wildlife biologists. Class presentations serve to provide critical feedback to student teams in a professional setting by multiple landowners and state agency biologists in a seminar-style format.

Classroom Impact

We found use of experiential learning and writing pedagogies in WFSC 406 to be effective in teaching wildlife undergraduates the basics in wildlife-habitat management and conservation planning. In addition to a strong background in basic ecological and wildlife-management principles, wildlife students also obtained problem-solving skills, team-work experience, and exposure to budget management and report writing. Students also gained experience in habitat assessment, GIS and GPS technology, and public speaking. Most importantly, wildlife students were able to synthesize and present information learned in the classroom in the form of a written wildlife management plan presented to landowners and professional wildlife biologists.

One of the unique results from our classroom activity was the interaction of student teams with actual landowners as opposed to fictitious scenarios often presented in wildlife courses. Students gained an understanding of the challenges of working with landowners with diverse perspectives and opinions during the development of landowner plans.

Student feedback has been positive in the use of a wildlife management plan in the classroom. For example, students responded the management plan was a useful exercise in class

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from recent class surveys (Fall 2004 and Spring 2005 class survey data, $n = 50$; 41/50, 82%, A = strongly agreed; 9/50, B = 18% agreed). Students also like the idea of working with local landowners (Fall 2004 and Spring 2005 class survey data, $n = 50$; 45/50, 90%, A = strongly agreed; 5/50, B = 10% agreed) and TPWD biologists (Fall 2004 and Spring 2005 class survey data, $n = 50$; 45/50, 90%, A = strongly agreed; 4/50, B = 8% agreed; 1/50, 2%, C = undecided).

For landowners, class participation resulted in 3 peer-reviewed management plans they could select to implement on their property. Landowner feedback throughout the semester allows management plans to be tailored to landowner objectives and needs. To date, all previous management plans have been used by landowners (10 landowners since 2003), though the number of actual recommendations implemented has varied (e.g., landowner implements 2 of 3 recommendations selecting to implement a different recommendation for his or her third option). Management plans were conducted free of charge.

For TPWD biologists, WFSC 406 students assisted them in fulfilling their mission of providing technical guidance to local landowners. In our case the regional TPWD biologist was assisted in preparing 10 management plans for local landowners since 2003. We propose that wildlife education can be enhanced by integrating land-conservation planning in the classroom via partnerships with natural resource agencies and landowners.

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