

Plant and Soil Sciences
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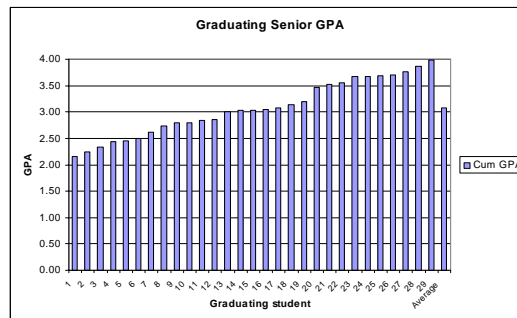
Degree Program(s) Assessed	Assessment Methods Used*	Numbers of Individuals Assessed**
College of Agriculture and Natural Resources, Plant and Soil Sciences, BS	○ Entry level placement	○ 29 graduating seniors
0082 Business	○ Participation, leadership, awards in student organizations	○ Approximately 75 undergraduates
0083 Biotechnology	○ Regional and national academic competitions	
0084 Rangeland Ecology and Management	○ Student tracking	
0086 Agronomy	○	
0088 Crop Science	○	
0089 Soil Science	○	

* Please see #2 below for further explanation; ** Depends upon assessment method

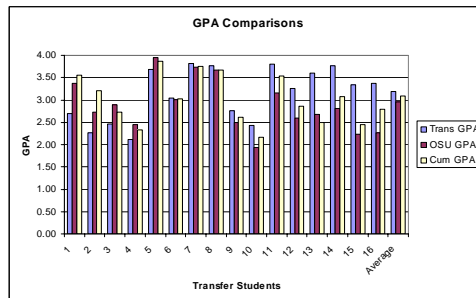
1. **Department:** Plant and Soil Sciences, College of Agriculture and Natural Resources
Degree Programs Assessed: Plant and Soil Sciences BS (Option codes: 0082, 0083, 0084, 0086, 0088, 0089)
2. **Assessment Methods Used:**
 - a. Keeping records of entry level placement of all plant and soil sciences graduates.
 - b. Tracking student progress through the degree program (sources of students, retention, academic performance and graduation)
 - c. Summarizing participation, leadership positions, and awards in student organizations and in academic contests.
 - d. Summarizing the results of regional and national academic competitions by teams in crops, soils, weed science, and range management. This includes activities of graduating seniors and results of the current year participation.
3. **Number of Individuals Assessed:** *Twenty nine BS Graduates; (Fall '02 (13), Spring '03 (16)); (Options: Crop Science (7); Soil Science (7); Agronomy (10); Biotechnology (0); Business (0); and Rangeland Ecology and Management (5)). Average undergraduate enrollment (measured at beginning of each semester)—94 (Fall '02) and 73* (Spring '03). Seventy-three continuing students (Options: Agronomy (20); Biotechnology (5); Business (4); Crop Sciences (10); Rangeland Ecology and Management (17) and Soil Science (17)). Male (61), Female (12); 61 are from Oklahoma, 6 are from out of state, 6 are international.*
 - * Does not include 6 students who had not enrolled, but have not withdrawn from OSU.
4. **Analysis and Findings:**
 - a. *Initial placements of the 29 BS graduates were to private industry (3), farming or family business (5), continuing for graduate education (11; 8 at OSU and 3 elsewhere), state and federal organizations (7 (5 at NRCS, 1 at USDA, 1 at US Forest Service) Undergraduate Assessment Coordinator), self-employed (1). Two are employed outside of their area of study.*

b. The average GPA of the 29 students was 3.08 (compared to 2.84 in '01-'02; 2.85 in 00-01; 3.00 in 99-00 and 3.14 in 98-99), with seventeen at 3.0 or above, including 9 with 3.5 or above. GPA's ranged from 2.16 to 3.98 with an average GPA of 3.08 (see figure below), compared to 2.87 this past year.

c.



Of the 29 BS graduates in 2002-'03, eighteen transferred to OSU; 4 of the 16 from out of state and zero from out of the country. Sixteen of these students transferred more than 50 hours to OSU, while the remaining two transferred at least twenty hours. The cumulative GPA for 16 transfer students (20+ hours transfer) averaged 3.01 compared with an OSU-only GPA of 3.16. Upon comparison of the transfer-institution GPA and these students' OSU-GPA, we find that performance is generally consistent for the individual transfer students between the two institutions. Four students had a full letter grade drop at OSU compared to their transfer institution. Only one student had an OSU-GPA below 2.0. The group average dropped from 3.14 to 2.87. This pattern compares similarly to the last two years' graduating classes of transfer students. The following table shows individual comparisons. Students are ordered based upon differences between transfer- and OSU-institution GPAs.



Of the ten students completing all of their hours at OSU, two graduated in 8 semesters; 3 in 9 semesters and the other 5 in ten or semesters. The average time to completion for transfer students bringing in at least 60 hours (~half of the total credits required to graduate) is 5.14 semesters. Three transfer students finished their OSU hours in 4 semesters. Therefore, we should advise transfer students that even if they transfer from in-state schools they will most likely require 2.5 years to complete their degree.

Over the past three years we have tracked the progress and retention of our students. This information is summarized in the following table. Of significance, most students take more than four years to complete a degree in our major. Also, we can expect an attrition of 30-50% of our incoming freshman before graduation. As indicated by our ability to maintain total enrollment, this loss of freshman is balanced, however, with transfer students from other institutions or from other departments within OSU. We are attempting to track the number of students who transfer from other departments within OSU.

Year entered OSU	Graduated	Still in PASS	Left PASS	Left OSU	Total
1997	18	1	1		20
1998	14	2	7	3	26
1999	16	8	7	5	36
2000	10	16	6	1	33
2001	0	18	7	2	27
2002	0	18	1	0	19

d. Of 29

the BS

graduates, 16 were members of at least one of the two departmental clubs (Agronomy Club or Soil and Water Conservation Club). Twelve of the 16 club members served as local club officers for one or more years. Two of the club members took the opportunity to attend at least one national or regional professional meeting during their undergraduate careers. Eight of the graduating seniors had participated in national academic contests as part of the American Society of Agronomy Student Activities Subdivision. Two of these students placed in the top 3 in the manuscript contest, and the papers were published in the *Journal of Natural Resources and Life Sciences Education*. Another two students placed in the top 3 in the nation in the visual presentation contest. Participation in national contests is highly encouraged by the faculty. One graduated student also presented two undergraduate research papers at the ASA meetings. Placement of the students in these contests at the national level is indicative of the high quality of these students.

Student clubs and teams considered an important co-educational opportunity that is meant to complement classroom learning and also introduces students to other professionals in their chosen discipline. Additionally, participation in student clubs is an important social activity that allows for development of support groups that can aid in retention of students. Although slightly better than last year, participation by incoming freshman was very poor. Of the 10 freshman in 2002, only four students participated in a student club. The Agronomy Club had approximately 20 active members which is about 25% of our students. The Soil and Water Conservation Club had about 15 active members which is about 20 % of our students. Seven students are members of both clubs.

e. Five of the graduating seniors were members of the Crops Judging or Soils Judging teams, participating in one or more regional and/or national contests for at least two years. Three seniors were on the Soils Team, which placed 1st out of 8 schools in the regional contest in 2002. As individuals, they placed 2nd, 4th and 10th. The two students on the Crops Judging team did not place at the regional level and did not compete nationally.

During 2002, seven students attended the regional crops judging team in Manhattan, KS including one freshman and 3 sophomores, 1 senior and 2 students from out of the department. The team placed second out of 6 teams. The senior student and one non-departmental student participated in the national crops judging contest in Kansas City, MO and Chicago, IL. The student from our department placed 7th and 8th overall, respectively, out of 40 students.

Five students including 3 seniors, 1 junior and a student not in the department, placed 1st in the regional Soils Judging Contest in College Station, TX. Eight schools from the Southern Region participated. As individuals, team members placed 1st, 2nd, 4th and 10th out of 32 contestants. The team members traveled to the National Soils Judging Contest also at College Station, TX. The team placed 11th out of 22 schools at the national contest. Individuals placed 17th, 18th, 30th and 36th out of 85 students.

Eight students participated in national contests of Student Activity Subdivision of the American Society of Agronomy at Indianapolis, IN; two in multiple contests. Students submitted 3 manuscripts, one receiving 3rd. The third place article will be published in a peer-reviewed journal. Three (six at the local contest) students participated in the visual presentation contest for which 2 third place awards were earned. Four students participated in the Student Research Symposium Contest, for which one 3rd place was received for a poster entry. As a student organization, the Agronomy Club enters several contests. The student club was named the top agronomy club in the nation for the 14th consecutive year, receiving three 1st places and three 2nd place award in the various contests. Two students served as national committee chairs.

We did not participate in the Range Management Contest or the NACTA Agronomy contest this year. However, 3 students did travel to the Society for Range Management meetings in Wyoming.

5. Changes due to assessment:

Utilizing data collected for this annual report, a seminar was given on March 24, 2003 to the faculty members of Plant and Soil Sciences. We have used this opportunity to identify potential strengths and weaknesses that will guide us in our future activities and in the strategic planning effort taking place in the OSU system. Relevant highlights of that presentation are given below.

Enrollment goals Four years prior, an enrollment goal of 100 students had been set. During this time, we averaged 92.5 students (high 97). At the time of this seminar (and for this assessment), our enrollment was 73 students. This did not yet include new freshman and transfers

	F	T	O	Total
Business	1	2	1	4
Biotechnology	2	3	0	5
Agronomy	14	5	1	20
Rangeland Ecology and Management	11	3	3	17
Crop Science	3	6	1	10
Soil Science	3	10	4	17

students who will enter OSU in Fall 2003. A discussion was initiated as to why we have enrollment goals. Suggestions were given that included: administrative goals from above; critical mass is required to justify resources; the desire to share our knowledge; gives us strength relative to other programs; to serve the industry needs; to serve our public citizens so as to make our state more successful, and because a large enrollment demonstrates our currency and relevancy to society's needs and interests. A separate discussion was raised regarding whether these objectives are met with a large number of majors or with a large number of students in service-courses. This is a question to be considered as we examine utilization of teaching resources.

Recruitment and retention As shown in the table at right, 34 of our current 73 students began as freshmen (F), 29 began as transfers (T) and 10 transferred from other departments within OSU (O). Additionally, this table shows the option that was chosen by students in each of these three groups. Although, 4 of the 6 options have similar enrollment, Agronomy and Rangeland Ecology are the options most often chosen by freshmen, tending to demonstrate that when freshmen students identify with our program, they 'see' Agronomy and Rangeland Ecology and Management. Transfer students appear to be more aware of the broad selection of options within the program. There are no trends regarding the majors from which the O-students have transferred.

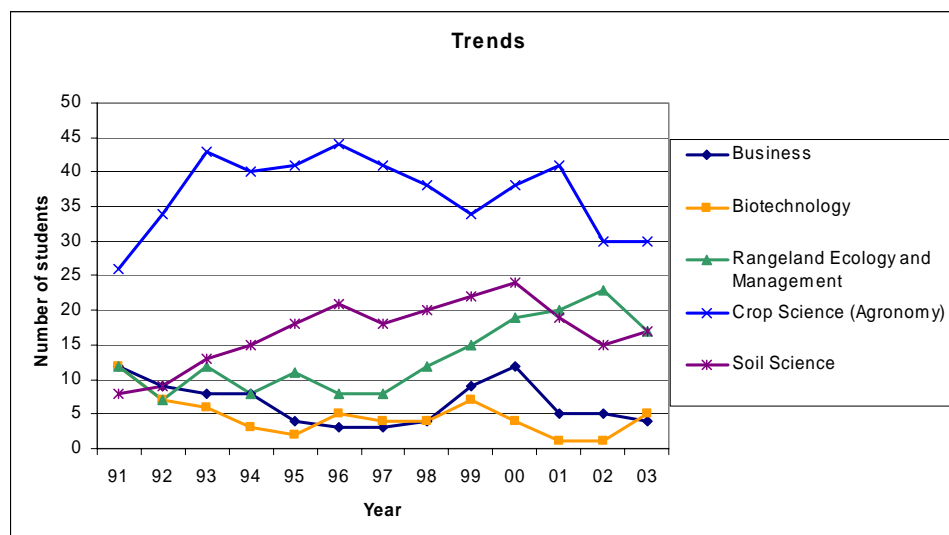
Our assessment data indicate that our freshman retention rate is 50- 70%. In the past three years, 20 of our students have left OSU and 32 have left our program to another at OSU. The following table summarizes the options from which those students left and the number currently enrolled in

	# left in past 3 years	# currently enrolled
Business	5	4
Biotechnology	4	5
Agronomy	1	20
Rangeland Ecology and Management	11	17
Crop Science	8	10
Soil Science	3	17

each. The list of other departments to which students have left (not shown) does not necessarily indicate the movement is to escape the rigor of our program. Although the number of students currently enrolled in the Agronomy and Rangeland Ecology and Management are near equal and predominant in the department, it appears as if Rangeland Ecology and Management is the most dynamic option and the Agronomy option is the most stable.

Trends The 12 year trends in enrollment among our department options are shown below. (The newer Agronomy option is taking

the place of the older version of the Crop Science option. They are therefore shown together.) The combined enrollment in these two options is dipping slightly, but relatively strong. Soil Science remains a common choice among transfer students and is one to which students change, likely due to the associated career opportunities. Enrollment in Rangeland Ecology and Management has grown in the past 5 years. The Biotechnology option is one that is growing only slightly and has great room for growth.



Our traditional student clientele are students who are familiar with production agriculture. These students are the ones who most often choose the Agronomy option, which consistently remains our most popular. However, the number of Oklahoma farmers is not increasing, and based upon national trends, the desire of many of their children to go into production agriculture per se is declining. Our enrollment in this option is in line with the national trend.

Meeting future needs A more important assessment in determining our future needs is to determine who the students are that, based upon their interests, goals and needs, would benefit from what we have to teach in our department. Given the valuable diversity of research and teaching areas within our department, it is often difficult for an incoming freshman to really understand what all of the opportunities for study are within our program and what principles tie us together as a program. The first goal must be for us to develop a recognizable image that captures and ties together the diversity of activity in our program.

One commonality we have within the department is that of land management. Each faculty member's activities within the department revolve around one of three land uses—cropland, pastureland or rangeland. (Together these land uses constitute 72% of the land in Oklahoma.) While each of these land uses may have somewhat different objectives, the components of these systems are the same—plants and soils. The tools and the intensity by which these land uses are managed may differ, but the basic scientific principles guiding our management decisions are still the same within each of these systems. There is no reason for these systems to be studied separately through out the entire curriculum. Indeed the argument can be extended to conclude that there is little reason for forestry or horticulture to be studied as separate land management issues.

We must strive to be relevant and to meet the needs of the population of the state. Land management for the purpose of food production is just one of the several major land uses in the state. The growing of food and fiber continues to be a primary economic factor for the state and a primary interest among a specific portion of the state's population. This group of producers has traditionally been our dominant clientele in the department. The population which we are serving in this manner is no less important, but is becoming smaller.

As society in general is becoming more aware of the food and fiber production system; as rural and urban land uses conflicts increase and as the public becomes more environmentally conscientious, agriculture as an industry is becoming less capable of being socially and geographically isolated. The activities that once took place without much outside scrutiny and which often fulfilled just a single purpose, must now conform to local and global societal pressures and with fewer resources must continue to fulfill the purpose of food production, and also fulfill new objectives such as improvement of soil quality or the maintenance of wildlife habitat. We must serve those that are on the land so that they may fulfill these new objectives, and we must *also* serve the non-farming clientele of the state in order to meet their needs and desires.

We are well suited as a department to lead the state in a land management program. We must learn and teach the management of our state's plant and soil resources so they may be utilized to fulfill the needs and desires of the producers in the state, the small land owner and even of the urban population who are not on the land but have a vested interest in its proper use. Given that the primary land management activities exist in a fragmented mixture in the state and that these applied ecosystems fulfill similar functions, they should not be studied separately. Nor should the primary components of these ecosystems, plants, animals, soil, water and climate be studied in isolation. This systems approach to studying plant and soil systems has become a central theme in our curriculum discussions.

An integrated curriculum. A faculty retreat was held on May 27th and 28th to discuss and create a curriculum based upon the new vision. The theme of the curriculum discussions and modifications has been *integration and interaction*.

- Land management has been chosen as a general descriptor that can be used to capture and integrate all areas of study that take place within our department and may even be expanded to capture activities in or not in other departments. The definition of land currently consists of the soil and of the plants and microbes that live in it. Management is the study of how the components of the land interact to give rise to the structure and function of the ecosystem.
- Courses will build upon one another. We will enforce prerequisites when they are given. Course content will also be integrated laterally so that reference can be made to classes that may be taken subsequently or in close proximity.
- Students in the department should not be separated into sub-disciplines. In this way they can more easily see the commonalities and understand the issues of other land use systems.

- All students who study land management should have a comprehensive background in the processes that give rise to the functions of soils and of plants. Specifically, these topics include in soils: Soil chemistry, soil physics, soil taxonomy, and in plants: plant physiology, plant genetics, plant taxonomy.
- The study of ecosystems is to study the interaction of ecosystem-components that give rise to the function of the ecosystem. We will stress this skill of studying functional interactions with a series of courses to highlight component interactions within plant and soil ecosystems. These courses include: plant-soil interactions, plant-plant interactions, plant-climate interactions, soil water interactions and soil-microbe interactions. More such 'interdisciplinary' courses may be created or available as desired or needed.
- Within the current department, our focus is on the management of plants and soils to produce food and/or increase wildlife habitat. Our perspective needs to broaden to include other functions and qualities of the land.
- The manipulation of plants and soils to fulfill specific purposes is studied only at an advanced level after a strong understanding of principles is gained.
- Given the highly fragmented landscape of Oklahoma, students must study how the interaction of the various ecosystems impacts the function and structure of the landscape and region.

While we are currently building the details of our curriculum and working on the restructuring of our courses, some concrete changes have already taken place. The core courses of our program (PLNT1213, PLNT2013, SOIL2124, RLEM2913) are now required courses for all students in Plant and Soil Sciences. Additionally, the content of these courses has been modified to emphasize a systems-based approach to studying plant and soil sciences; to increase lateral integration of information and to increase the relevancy to the students' needs and interests. As the curriculum modifications are completed, they will be communicated by way of the department curriculum committee to the other programs and committees.

We look forward to the changes that are taking place within our program. The information that we have gathered as part of the assessment activities has been valuable in providing the impetus to initiate these changes.

This report has been submitted to the faculty of the Department of Plant and Soil Sciences and the administration of the College of Agricultural Sciences and Natural Resources.