

ECOSYSTEM SCIENCE AND MANAGEMENT (ESM)



Graduate Program Handbook

Forest Resources (FOR R)

Soil Science (SOILS)

Wildlife & Fisheries Science (W F S)

College of Agricultural Sciences at
The Pennsylvania State University

Revised: July 2015

The Pennsylvania State University is committed to the policy that all persons shall have equal access to programs, facilities, admission and employment without regard to personal characteristics not related to ability, performance, or qualifications as determined by University policy or by state or federal authorities. It is the policy of the University to maintain an academic and work environment free of discrimination, including harassment. The Pennsylvania State University prohibits discrimination, harassment against any person because of age, ancestry, color, disability or handicap, genetic information, national origin, race, religious creed, sex, sexual orientation, gender identity or veteran status and retaliation due to the reporting of discrimination or harassment. Discrimination, harassment, or retaliation against faculty, staff or students will not be tolerated at The Pennsylvania State University.

TABLE OF CONTENTS

	Page
Section I. General Policies	5
A. Degree Programs	5
B. Responsibilities of the Student, Thesis Adviser, and Student's Committee	6
Section II. Admission Requirements and Procedures	7
A. Application Procedures	7
B. Admission Criteria	9
C. Admission Procedures	10
D. Graduate Assistantships and Fellowships	11
E. Scholarship and Research Integrity (SARI) - Training in the Responsible Conduct of Research and Scholarship.	13
F. AEOCPT - Penn State American English Oral Communicative Proficiency Testing for Prospective International Teaching Assistants.	14
G. Guiding Principles for Good Practice in Graduate Education	15
H. Responsibilities of the Graduate Programs Committee.....	16
I. Responsibilities of the Graduate Program Coordinator	16
Section III: Master of Science Degree	17
A. The M.S. Degree	17
B. Course and Credit Requirements for the M.S. Degree.....	17
C. Seminar Attendance	23
D. Definitions of Major and Minor.....	22
E. Student's Committee for the M.S. Degree	23
F. Research and Thesis for the M.S. Degree.....	24
G. Final Examination for the M.S. Degree	25
Section IV. Doctor of Philosophy Degree	26
A. The Ph.D. Degree.....	26
B. Course and Credit Requirements for the Ph.D. Degree	26
C. English Competency	28
D. Student's Committee for the Ph.D. Degree.....	28
E. Ph.D. Thesis Research.....	30
Section V. Ph.D. and Master's Degree Examinations.....	31
A. Candidacy Examination (Ph.D. Only)	31
B. Comprehensive Examination (Ph.D. Only).....	42
C. Final Oral Examination for the M.S. and Ph.D. Degrees.....	43

Appendixes

Appendix A. Department of Ecosystem Science and Management graduate faculty member listings (by major), their degree, contact information, and research interests are located at the following Web addresses.	45
Appendix B. Department of Ecosystem Science and Management Graduate Academic Plans per M.S. and/or Ph.D. Degree	46
Appendix C. Department of Ecosystem Science and Management Graduate Examination Check Sheets.	49
Appendix D. Department of Ecosystem Science and Management Exam Request Forms.	54
Appendix E. Department of Ecosystem Science and Management M.S. Graduate Student Committee Policies and Procedures and Master’s Committee Appointment Signature Form	57
Appendix F. Department of Ecosystem Science and Management Professional Meeting Travel Award.	61
Appendix G. The Graduate School Check List - Requirements for Ph.D. Candidates.	63

Section I. General Policies

A. Degree Programs

Graduate studies in the Department of Ecosystem Science and Management (ESM) include Forest Resources, Soil Science, and Wildlife and Fisheries Science. Graduate degrees conferred are Doctor of Philosophy (Ph.D.) and Master of Science (M.S.) in all three programs.

In addition:

A graduate option in Watershed Stewardship is available to graduate students in all programs.

A dual degree in Biogeochemistry is available to Ph.D. students in Soil Science. A dual degree in International Agriculture and Development is available to both Ph.D. and M.S. students in Soil Science.

A student may pursue a joint degree program that includes a law degree (J.D.) and graduate degree in Forest Resources (M.S. or Ph.D.) or Wildlife and Fisheries Science (Ph.D.). Students must apply to The Dickinson School of Law and Department of Ecosystem Science and Management separately and must meet each school's admissions requirements. Students are eligible to take courses in Forest Resources or Wildlife and Fisheries Science programs after successfully completing the first-year curriculum with the law school. Learn more about the joint-degree program at The Dickinson School of Law Web site:

http://law.psu.edu/academics/joint_degrees/college_of_agricultural_sciences.

The objectives for students enrolled in a Master of Science or a Doctor of Philosophy degree program are to gain proficiency in research, education, and scientific technology.

A thesis is required for the M.S. degree and a dissertation is required for the Ph.D. degree. Degree requirements are outlined under the detailed descriptions of the degree program majors.

Opportunities to specialize within these broad degree programs are dependent primarily on available courses, within or outside of the Department, and the research interests of the faculty (Appendix A). In selecting a minor, which is optional, the responsible department must be consulted for approval and establishment of requirements. A member from the department of the minor should be a member of the student's thesis committee.

Note that the Department of Ecosystem Science and Management Graduate Programs Committee is selected by a vote of ESM faculty and is not to be confused with the student's degree guidance committee.

B. Responsibilities of the Student, Thesis Adviser, and Student's Committee

Students are expected to assume responsibility for knowing the regulations and requirements of the Graduate School, the Department of Ecosystem Science and Management, and the particular major and degree, as described in:

1. The Pennsylvania State *University Bulletin* Graduate Degree Programs http://bulletins.psu.edu/bulletins/whitebook/graduate_degree_programs.cfm.
2. *Thesis Guide* <http://forms.gradsch.psu.edu/thesis/thesisguide.pdf>.
3. This publication, the *Department of Ecosystem Science and Management Graduate Studies Handbook*, and other policies of the Department, as periodically published.

Exceptions shall not be made when students plead ignorance of requirements, or claim advisers or other officers of the Graduate School / Department did not inform them about such.

Before the end of the second semester of attendance, and preferably early in that semester, in cooperation with the major adviser, students should choose a thesis / dissertation topic, draw up research and coursework plans (a graduate academic plan [available electronically from the graduate studies staff assistant]), identify potential advisory committee members, and begin to schedule required examinations related to their degree. This is especially important for Ph.D. students who must take their Candidacy Exam before the end of their third semester, and preferably before the end of their second semester. Loss of time advancing to any of these goals may add semesters to a program and result in loss of funding. Leadership provided by thesis advisers and committee members should help to balance the demands of coursework with the need to initiate the research program and avoid delays in program completion.

Thesis advisers and graduate committees are responsible for judicious timing of events to avoid prolonging degree programs. For example, in the initial months of residence, students may become preoccupied with course work; at this time, a student should also be outlining her/his program, choosing a thesis topic, and developing research plans.

Responsibilities of thesis advisers and committee members are detailed in later sections of this handbook and in Graduate School publications. It is the responsibility of the adviser to arrange exams in consultation with the Graduate Program Coordinator and the Department's Graduate Program Staff Assistant.

Section II. Admission Requirements and Procedures

A. Application Procedures

1. Requests for admission to the Graduate School <http://www.gradsch.psu.edu/> should be made via the Web-based application form available through The Graduate School site, and submitted to:

Office of Graduate Admissions
114 Kern Building
The Pennsylvania State University
University Park, PA 16802

2. Inquiries about graduate programs in the Department of Ecosystem Science and Management should be directed to:

Office of Graduate Studies
Ecosystem Science and Management
319 Forest Resources Building
The Pennsylvania State University
University Park, PA 16802

All of the general admission information is available on the Internet by links from the <http://ecosystems.psu.edu/> URL. The Graduate Coordinator will handle special questions. If a prospective student has questions about an area of specialization, contact should be made with individual faculty members in that discipline. The following areas of specialization are available:

Forest Science:

Forest Resources Management—Quantitative forest management systems, economics, biometrics, policy, remote sensing and spatial analysis with geographic information systems, forest recreation, watershed management and stewardship, urban forestry, and human dimensions of natural resources management.

Forest Biology—Genetics and breeding, ecology and landscape ecology, silviculture, regeneration of disturbed lands, reproduction of hardwoods, and plantation systems.

Environmental Concerns—Acid precipitation effects, forest microclimatology and hydrology, municipal wastewater and sludge effects, reclamation of mined lands, urban forestry, water yield and quality, and climate change.

Soil Science:

Faculty in this program are competent to prepare candidates in the subfields of Soil Science. Areas of specialization include soil genesis, classification, morphology, mapping, microbiology, chemistry, physics, mineralogy, fertility, geographic information systems, remote sensing, watershed analysis, hydrology, and land management. Applications of these

specializations occur in both natural systems and in managed systems, including in agricultural and forest production systems, reclamation areas, and natural ecosystems.

Wildlife and Fisheries Science:

Habitat evaluation, ecology and management of game and non-game wildlife, animal damage control, urban wildlife, wildlife responses to altered ecosystems, conservation biology, fish systematics, fisheries management, ichthyology, fish behavior and ecology, freshwater ecology, aquaculture, landscape ecology, and terrestrial and wetland ecosystems.

A complete application includes (a) the electronic application form (submitted to The Graduate School), (b) two original sets of transcripts (submitted to the Department), (c) an official report of GRE scores (sent electronically directly from the testing institute), (d) an official report of TOEFL (Test of English as a Foreign Language) or IELTS (International English Language Testing System) scores (sent electronically directly from the testing institute) for applicants coming from countries where English is not the native language or who have not received a baccalaureate or master's degree from an institution in which the language of instruction is English; (e) a personal goals statement (uploaded during the electronic application process), (f) a resume (uploaded during the electronic application process), and (g) three letters of reference (reference names and addresses are submitted as part of the electronic application process; references have the option of uploading their letters, submitting them online, or sending them by mail).

Although there is no fixed deadline for applications (as we accept applications on a continual basis), for summer or fall semester starting date, all application materials should be received by mid-December to early January; for spring starting date applications, all application materials should be received by mid-June of the prior year. Competition for financial support for students is intense and applications should be completed by **January 1** for Fall Semester admission. It should be noted that highly competitive applicants whose materials are received by January 1 of each year are given the greatest opportunity to be considered for University and College fellowships, as well as departmental assistantships or top-up awards.

The personal goals statement should describe the applicant's abilities and achievements, specific graduate goals, and career interests; it is also helpful to include a mention of potential faculty advisers that a student has been in communications with prior to the submission of your application.

An original report of Graduate Record Examination (GRE) scores must be supplied. In areas of science, such as represented by our Departmental programs, it is expected that incoming students' scores fall above the 50th percentile level in their GRE scores as an indication of likelihood of success in a graduate program; however, GRE scores are not the only determinant. GPA, strong letters of recommendation and experience are also considered during the application review process.

The three references required should be from persons familiar with the applicant's academic qualifications and/or work experiences.

Students coming from countries where English is not the native language or who have not received a baccalaureate or master's degree from an institution in which the language of instruction is English, must submit scores for the TOEFL or the IELTS. Minimum acceptable score for the TOEFL is 550 for the paper-based test; 213 for the computer-based test, or a total score of 80 with a score of 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission. Minimum composite score for the IELTS is 6.5.

Continuing within Penn State University from a master's degree to a doctoral degree differs from an external application, but the Department still requires faculty review. It is required that the M.S. student wishing to apply for entry into a Ph.D. program complete and submit a Resume Study / Change of Graduate Degree or Major form, along with the most recent advising transcripts, an updated statement of purpose, a letter from the student's current adviser for the master's degree, and a letter of endorsement from one additional faculty member who is not the student's prospective doctoral adviser. These documents are to be submitted to the Graduate Program Coordinator through the Department's Office of Graduate Studies.

B. Admission Criteria

Minimum admission requirements for the Soil Science M.S. degree include a baccalaureate degree from an undergraduate program in Agronomy or Soil Science or having an emphasis in natural or basic science, with an undergraduate cumulative grade point average of 3.0 and junior-senior year grade point average of 3.2, based on a maximum 4.0 system.

A background in basic and applied natural sciences, including minimum credits in the following areas, is expected for the Soil Science M.S. applicant:

<u>Subject Matter Area</u>	<u>Course Credits</u>
Communications skills (9), including technical writing (3), and speech (3)	9
Chemistry (8), mathematics (3), and physics (3)	14
Soil science	3

Minimum admission requirements for the Forest Resources or for the Wildlife and Fisheries Science majors' master's degrees are a baccalaureate degree from an undergraduate program with an emphasis in natural science, an undergraduate cumulative grade point average of 2.75 and junior-senior average of 3.2, based on a maximum 4.0 system. A background in basic and applied natural sciences, including minimum credits in the following areas, is expected for the Forest Resources or for the Wildlife and Fisheries Science M.S. applicant:

<u>Subject Matter Area</u>	<u>Course Credits</u>
Chemistry and/or physics	8
Calculus, statistics, computer science	12
Biology, botany, zoology	8
Writing and speaking	12
Economics, social sciences, humanities	12
Forest science, wildlife and fisheries science	18

Recipients of baccalaureate degrees from Soil Science, Forest Science or Wildlife and Fisheries Science programs normally will fulfill the course subject areas requirements for their particular major. Students with undergraduate degrees not in these disciplines are invited to apply to these majors, but may be admitted with a “provisional” status pending make-up of deficiencies. The faculty member who agrees to serve as adviser of a provisional student will stipulate conditions to be met for transfer from provisional status to a graduate degree program status, which must be fulfilled within one year. Final decisions on course deficiencies rest with the student’s graduate committee.

The best-qualified applicants are accepted within the limits of available openings in the Department of Ecosystem Science and Management graduate programs of study. Exceptions to the admission criteria may be granted for applicants with special backgrounds, abilities, and interests. Deficiencies, however, must be fulfilled early in the program.

Admission to the Ph.D. program requires evidence of research ability, e.g., a master’s degree thesis, paper, or equivalent publication and a grade point average of 3.3 or higher in graduate studies work, exclusive of thesis and special problem courses. In unusual cases, baccalaureate degree students graduating from an honors program with a required thesis, or who have authored a refereed publication, may be considered for admittance without a master’s degree. Admission to all graduate programs requires concurrence of a graduate faculty member to serve as academic adviser, so potential advisers should be contacted prior to applying for admission.

C. Admission Procedures

Evaluation of an applicant for graduate study in the Forest Resources, Soil Science, or the Wildlife and Fisheries Science major is completed by members of the ESM Graduate Programs Committee (GPC) as well as faculty members who may be potential advisers. Applications are not generally reviewed unless all application materials have been received.

For the Graduate Record Examination (GRE), applicants must present scores obtained in Verbal, Quantitative, and Analytical Writing Tests of the GRE. Scores in the 50th percentile or higher in the three areas are expected by the Department for admission into one of our degree programs.

Exceptions and Limitations of Admission: Since graduate studies require close student/professor working relationships and various facilities and equipment, there are limits to the total number of graduate students the Department may accept at a given time; therefore, the Department will admit the most qualified applicants for its openings. We recognize, however, that all qualified students do not fit a common mold. The following statements are for the guidance of students without traditional backgrounds in Forest Resources, Soil Science, or the Wildlife and Fisheries Science majors.

- 1) Deficiencies in Preparation: Students with deficiencies in Forest Resources, Soil Science, or the Wildlife and Fisheries Science coursework, but with qualifications in other areas, may be admitted and permitted to take a limited number of remedial undergraduate courses while proceeding with their graduate programs. Courses taken for this purpose do not apply toward

the credit requirements of the advanced degree. An appropriate course plan will be developed in conjunction with the student's advisory committee.

2) **Minimum Grade Point Averages:** The minimum grade point averages stipulated for admission may be waived for students with special background, abilities, or interests; however, no student may be admitted for a master's degree program with less than a 3.0 grade point average (4.0=A, 1.0=D) obtained during the junior and senior undergraduate years.

3) **Career Experience:** An applicant with career experience having a bearing on graduate qualifications may request that it be considered along with the academic record for admission to graduate school.

Recommendation for acceptance or rejection of an applicant is made to the University's Graduate School by the Graduate Program Coordinator in the Department of Ecosystem Science and Management, in consultation with the reviewing Graduate Program Committee faculty members. A favorable (majority) vote and a willing adviser are required for acceptance.

D. Graduate Assistantships and Fellowships

Financial assistance may be available to selected, well-qualified graduate applicants/students who are advised by graduate faculty members within the Department. The principal types of financial assistance for graduate students are fellowships and assistantships. Fellowships are awarded through The Graduate School. Only students with a grade point average above 3.5 are considered for a fellowship, and other indicators must be similarly strongly favorable. Occasionally students are assigned to work study and are paid at an hourly rate to carry out specific tasks for their graduate faculty adviser. Fellowship decisions are generally made in early February. In order for students to be most competitive for these opportunities, applications need to be completed by January 1.

Minority Graduate Scholar Fellowships through The Graduate School are available to U.S. citizens who are members of minority groups; these are based on promise as a scholar and on financial need.

All decisions regarding assistantships are made in consultation with individual faculty members, but assistantships are of two types. One type is externally funded from outside grants or contracts, in which case the supervising faculty member is entirely responsible for determining academic/research services to be performed. The other type is supported through University/Department general fund allocations or other general-use funds (e.g., endowed fellowships; departmental assistantships).

In addition to research work for the faculty adviser, those students who are supported through a departmental assistantship (as opposed to a grant funded assistantship), have an expectation to provide up to 20 hours a week of service to the department which could include being a teaching assistant in any semester in which they receive departmental funding. Teaching assistants for specific courses will be assigned by the undergraduate program chairs for Forestry, Soils and Wildlife and Fisheries, in consultation with faculty and the Graduate Program Coordinator and

the Department Head; a listing of TAs shall be provided to the Graduate administrative support assistant on a semester basis.

The base level for Master's assistantships is Grade 10 and a Grade 12 for a Ph.D. assistantship. Individual faculty using grant or contract resources may offer assistantships at higher levels. Stipends above these grades may be offered with fellowship or external funds to attract exceptional applicants. A stipend generally is associated with a grant-in-aid which covers tuition. Half-time assistants are required to carry between 9 and 12 credits per semester and contribute 20 hours per week toward research, teaching, or extension activities. Fellowships provide similar stipends and recipients must carry full academic loads (9–12 credit hours for those receiving half-time fellowship support).

A student on a departmental assistantship must be admitted as a regular student (not provisional) through the normal programmatic admissions process. To retain this assistantship, the student must be in good standing and be making normal progress toward his/her graduation. The assistantship allocation may be split as two quarter-time assistantships within the limits of availability for tuition grants-in-aid. To allocate an assistantship, faculty members must communicate with both the Graduate Coordinator and the Department Head concerning the student(s) they wish to accept. With approval, the Staff Assistant in the Department's Graduate Programs office will then process the official offer letter and Terms of Offer. Departmental assistantships are mostly offered on an academic-year basis. Summer support is generally provided by the faculty member from other research project funds, and paid to students as summer wages. Students need to clarify with their faculty adviser regarding the level of summer wage support available.

Federal, state, and local taxes are withheld from monthly assistantship deposits according to various regulations and University policy. Taxes on summer wages are handled differently from taxes on fellowships or assistantships. The Department cooperates with graduate assistants in supplying factual information concerning assistantship duties needed for income tax returns.

All Ph.D. students must teach one 602 course (Supervised Experience in College Teaching) during their tenure, irrespective of funding source. This experience is to involve preparation, presentation and evaluation of course materials for undergraduate formal instruction. It is to provide an opportunity for a supervised and graded teaching experience.

E. Scholarship and Research Integrity (SARI) - Training in the Responsible Conduct of Research and Scholarship.

Penn State offers training in the responsible conduct of research (<http://www.research.psu.edu/orp/sari/>).

Research ethics have become complex, extensive, and important. Graduate education at Penn State must prepare students to face these issues in their professional lives. The mandatory SARI program at Penn State is designed to offer graduate students comprehensive, multi-level training in the responsible conduct of research (RCR) in a way that is tailored to address the issues faced by students in individual programs.

Beginning with the fall 2009 incoming class, all graduate students at Penn State have been required to complete SARI requirements during their graduate program of study. The SARI program contains two parts:

- 1) *During the first year of enrollment, graduate students will complete an online RCR training program provided by the Collaborative Institutional Training Initiative (CITI*).* The Office for Research Protections (ORP) provides the conduit to this training via the SARI Resource Portal on the ORP website: www.research.psu.edu/orp/sari.
- 2) Graduate students are required to engage in an additional five hours of discussion-based RCR education prior to degree completion. These discussions encompass both universal and discipline-specific material. Each college and/or department has developed a unique plan for how graduate students in their programs will meet the requirement for discussion-based RCR education (see the Department of Ecosystem Science and Management plans** below).

The SARI Program was initiated by Penn State's Office of the Senior Vice President for Research and The Graduate School, and is administered by the Office for Research Protections (ORP). ORP provides support to the research community through educational and administrative services, including the formation and administration of compliance committees, assistance with protocol preparation and review, and offering seminars, workshops, and training in the responsible conduct of research. The ORP is located in Innovation Park at 205 The 330 Building (www.research.psu.edu/orp).

*CITI Program (www.research.psu.edu/orp/sari) Requirement:

The CITI program can be accessed through the SARI Resource Portal on the ORP website. Students must first register with CITI and create a unique user name and password. Be sure to select "Pennsylvania State University" as your institution. On the Curriculum Selection page, select the Social and Behavioral Sciences course for W F S and FOR R majors; SOILS majors may select the Social and Behavioral Sciences course or the Physical Sciences and Engineering course, depending upon which best matches their program emphasis.

The student may take the exam as many times as needed. When you have completed the course with an 80% overall or higher score, you will receive a completion report ... a printout of this

completion report must be delivered to the Department's Graduate Studies Office to the Administrative Support Assistant for Graduate Studies in 319 Forest Resources Building.

** ESM SARI Plan for Forest Resources, Soil Science, and Wildlife and Fisheries Science Majors (Requirement)

All graduate students being advised by Forest Resources, Soil Science, and Wildlife and Fisheries Science graduate faculty members are required to complete the online training portion of this program within the first year of graduate studies **and submit evidence** of completing the online program to the Department's Graduate Studies Office.

In addition, each student is required to attend a 5-hour SARI Seminar / Workshop. The Department offers a required colloquium course each spring semester which incorporates this five hour SARI training requirement. It is expected that new incoming students will take this colloquium course during their first year of graduate work (for Spring 2015, the offering is FOR/SOILS/WFS 597E - 1 credit - Research Integrity and Communications).

Topics to be covered in the workshop include:

- Conflict Resolution
- Ethics in Research and Teaching
- Teaching Assistant Development and Preparation
- Animal Welfare
- Peer Review
- Data Ownership

A graduate student's failure to complete the online RCR (CITI) training program within their first year of graduate studies may compromise their assistantship reappointment in future years/semesters.

Students who do not participate in the 5-hour SARI Seminar and complete the CITI training prior to filing their Intent to Graduate will not receive departmental approval on their graduation check sheet.

F. AEOCPT - Penn State American English Oral Communicative Proficiency Testing for Prospective International Teaching Assistants.

International students who are on assistantships and plan to be teaching assistants must take the Penn State American English Oral Communicative Proficiency Test (AEOCPT) at the beginning of their first semester at Penn State (if the student had permission for late arrival in his/her first semester, you will need to do this during the semester immediately following admittance). Visit the following Web site (<http://aplng.la.psu.edu/academicPrograms/itaProgram.php>) to pre-register. Students must input their student I.D. number, then choose their preferred available date(s) and time(s). After pre-registration, students should receive an email within 48 hours with their scheduled test time. Newly accepted International students are encouraged to review the ITA Web pages carefully so that they are prepared for the test. Students may take the test only once in a 12-month period.

An AEOCPT Score is required for enrollment in ESL 115G, ESL 117G, and ESL 118G. Students who have not taken the oral proficiency test will not be permitted to enroll in these courses.

Oral proficiency test scores are posted on the AIS terminal 72 hours after the student has been tested. Scores must be accessed by the student's departmental Office of Graduate Studies administrative support assistant and reported to the student; Applied Linguistics staff assistants do not supply scores.

Proficiency Codes for the Penn State American English Oral Communicative Proficiency Test:

Test Score of 250–300: No Restrictions; this person should be allowed to teach with no restrictions based on ability to communicate in English.

Test Score of 230–249: With Restrictions; this person should not be allowed to teach before completing and receiving a grade of at least "B" in ESL 118G - *American Oral English for ITA's III*.

Test Score of 200–229: this person should not be allowed to teach before completing and receiving a grade of at least "B" in **both** ESL 117G - *American Oral English for ITA's II*, and ESL 118G - *American Oral English for ITA's III*.

Test Score below 200: Speaking/Listening; this person should enroll in ESL 115G - *American Oral English for ITA's I* and receive a grade of at least "B" before taking ESL 117G and ESL 118G; this person should not be allowed to teach before completing and receiving a grade of at least "B" in all three ESL (115G, 117G, and 118G) courses.

G. Guiding Principles for Good Practice in Graduate Education

The Department endorses the Graduate School Guidelines for good practice in Graduate Education (<http://www.gradsch.psu.edu/policies/faculty/guiding.html>) that are summarized below. It is the joint responsibility of faculty and students to work together to nurture a positive learning environment. Additional valuable resources for graduate students are available at: <http://www.gradsch.psu.edu/current/documents/GraduateStudentResources.pdf>

Understanding the work environment. Faculty and students must each take the initiative to learn the policies, rules, regulations, and practices that affect them, their work, and the units in which they work.

Academic honesty, professional integrity, and confidentiality. Each member of the graduate community must endeavor to adhere to the highest level of these ideas in all their personal and professional activities.

A clear course of study. The student and faculty adviser should develop early in a program a clear plan of academic study and the responsibilities associated with it.

An atmosphere of openness. Students and faculty must work to establish and maintain an environment that is open, sensitive, and encourages free discussion among members of the

graduate community.

Acknowledgement of intellectual rights and property. Students and faculty should discuss issues associated with academic freedom, intellectual property, authorship, and publication as part of the student's academic plan.

Opportunities for evaluation. Evaluation, reflection, and feedback are integral parts of the academic process. To this end an annual graduate student review is recommended for all students advised by faculty in the Department of Ecosystem Science and Management.

H. Responsibilities of the Graduate Programs Committee

- Serve as an admissions committee to make recommendations on applicants for departmental graduate programs.
- Ensure proper administration of Ph.D. Candidacy Examinations.
- Rule on special matters pertaining to graduate student programs.

I. Responsibilities of the Graduate Program Coordinator

- Facilitate placement of prospective students and the orientation of new students.
- Oversee graduate student progress and certify program and graduation requirements.
- Serve as graduate student ombudsperson.
- Represent the Department at the College Graduate Coordinator Meetings.

Section III: Master of Science Degree

A. The M.S. Degree

The M.S. degree is a research-oriented degree. Persons undertaking it may terminate their formal education with the degree or proceed on for a Ph.D. degree. Objectives of M.S. studies include: (1) enhancing the understanding of an area of science beyond the baccalaureate level, and (2) attaining scientific research skills. M.S. candidates are considered novice researchers and commonly require considerable guidance in choosing and executing thesis research projects. Upon completion of the M.S., however, the student is expected to have developed the capacity for independent research, which is then considered in assessing his or her ability to pursue a Ph.D. degree program. The M.S. or equivalent degree is the normal prerequisite for a Ph.D. program in the ESM Department.

B. Course and Credit Requirements for the M.S. Degree

The M.S. degree student is responsible for consulting with the adviser before each registration period. Prior to the first registration, the student and adviser will discuss the choice of courses for that semester and subsequent semesters. Prior to the end of the first semester, the student and adviser shall develop a **Graduate Academic Plan (Appendix B)** for approval by the student's committee. The Graduate Academic Plan [GAP] may be modified with approval of the committee during any registration or drop/add period. The plan will include alternative courses in case the student is unable to obtain his/her first choice. The minimum Graduate School requirements and specific Department and Major requirements follow:

Forest Resources Major Course and Credit Requirements

1. Admission deficiencies, if any, must be removed to the satisfaction of the student's committee.
2. A minimum of 30 graduate (400-, 500-, 600-level) credits is required, of which at least 20 credits must be earned at an established graduate campus of the University and will include the minimum credits specified in items 3 through 9. Courses taken to overcome deficiencies are excluded.
3. At least 12 credits in 400- and 500-level courses appropriate to the student's field of interest, excluding the statistics requirement as shown below.
4. At least 6 credits of 400- or 500-level courses (usually STAT) are required in courses that cover topics such as analysis-of-variance, correlation, regression, and design of experiments, and are approved by the student's committee.
5. Optionally, at least 6 credits of 400- or 500-level courses are taken in the minor or general studies area, according to the minor department. Seminar courses are excluded, except where specifically allowed by the minor department.

6. One graduate seminar course (of one credit) is required in which an oral presentation is made by the student. This requirement must be met in a regularly scheduled FOR, SOILS, or WFS 590 course.

M.S. degree students and interdepartmental degree program candidates advised by FOR graduate faculty members will give one Seminar presentation of at least 20 minutes duration. Successful completion of the seminar will be documented through taking FOR/SOILS/WFS 590, generally taken during the student's final semester in their program. M.S. degree students are to report on their thesis research. The report will generally be scheduled when the thesis is complete or nearly complete. The seminar will be prepared and presented as a professional report. A professional report consists of a critical review of thesis-topic-related historic and current scientific literature, identification of aspects of the subject area that are poorly understood and merit additional research, presentation of the student's research objectives and plans, and an explanation of how the research will contribute new knowledge to the subject area. This seminar requirement will have equivalent status to every other requirement for a degree; the Graduate Coordinator will not certify that the graduation requirements have been completed without evidence that the seminar has been presented.

7. Students enrolled in an interdepartmental program will be expected to fulfill any separate seminar requirements of their interdepartmental programs. It will be the responsibility of the student and their Adviser to work out the details with those responsible for each seminar series.

8. Research Communication and Integrity

One course (FOR/SOILS/WFS 597G is the offering in Spring 2015) is required in which research integrity is an emphasis during five hours of discussion and in which research communication skills are developed.

Completion of the online CITI program is required.

9. A thesis directly relevant to the student's major field, of at least 6 credits and no more than 15 credits is required (courses 600 and 610, thesis research). Only 6 of the 600-level thesis credits may carry a quality letter grade; additional 600-level thesis credits must carry an "R" grade for research.
10. At least 18 credits of the total M.S. program must consist of 500- or 600-level course series, and only six thesis research credits (600-level) may count in this regard.
11. Additional courses and requirements as required by the advisor and advisory committee.
12. A final examination (defense of thesis) is required.

Definitions of Major and Minor

Major: The course work for the major field shall be chosen to meet the student's primary educational objectives, i.e., accomplishment of thesis research, mastery of discipline subject matter, and preparation for a career. Courses at the 400- or 500-level taken in forestry, soil science, wildlife and fisheries science, and other disciplines may be designated as part of the major if they conform to the objectives. The program must be coherent, i.e., a related series of courses. The choice of courses in the major study area shall be approved by the student's committee in consultation with the student. The thesis adviser shall be responsible for the semester-by-semester direction of the student's academic studies, but review by the student's committee should take place as described in Section III.D.4 and III.E. Students expecting to continue for the Ph.D. after receiving the M.S. should acquaint themselves with the admission and graduation requirements for the Ph.D.

Optional Minor: When a minor is elected, it consists of integrated or articulated work in one field related to, but different from, the major program. Minor requirements are governed by the responsible department or discipline area of the University. If a minor is elected, a faculty member representing the minor will serve on the student's committee, if required by the minor department. The Department also participates in the Dual Title in Operations Research.

Soil Science Major Course and Credit Requirements

1. A minimum of 30 graduate (400-, 500-, 600-level) credits is required, of which at least 20 credits must be earned at an established graduate campus of the University and will include the minimum credits specified in the following items. For a student on a half-time assistantship, approximately two years will be required to complete the M.S. degree. Courses taken to overcome deficiencies are excluded.

- a. Major Field Courses / Formal Courses

Twelve credits of 400- or 500-level formal courses in the major field are required; at least six of these 12 credits must be at the 500-level—excluding seminars and independent studies.

Coursework for the major field will be chosen to meet the student's primary educational objectives—accomplishment of thesis research, mastery of discipline subject matter, and preparation for a career. Courses in this and other departments may be designated as part of the major field if they conform to these objectives. The strength of the program should be maximized by choosing a related series of courses.

The student and thesis adviser, in consultation with the student's advisory committee, will make major course credit choices; the thesis adviser and student are responsible for the semester-by-semester direction of the student's academic studies.

Students wishing to continue on for the Ph.D. after the M.S. should acquaint themselves with the admission and graduation requirements of the Ph.D. degree; although certain courses taken at the M.S. level may be applied toward the Ph.D. requirements, admission to the Ph.D. degree may require preparation in several study areas beyond the minimum necessary for graduation with the M.S. degree. Successful completion of an M.S. degree

within the department does not ensure acceptance into a Ph.D. program in the department.

b. Minor and General Studies Courses

A minor consists of integrated or articulated work in one field related to, but different from, the major field. Other departments and discipline areas of the University govern Minor requirements. If a graduate student is carrying a Minor, a faculty member representing the Minor must serve on the student's advisory committee. As an alternative to a minor, general studies coursework may be taken in a field or in fields different from the major field of study. This is permitted when considered by the thesis adviser and the student's advisory committee to have significance and value for the student's degree. Six credits of 400- or 500-level formal courses in a minor or general studies area are required. Seminar or Independent Studies courses are excluded, except where such courses are specifically permitted by the Minor department.

M.S. students in SOILS may also complete a dual-degree in International Agriculture and Development (INTAD).

c. Statistical Methods

Three credits at the 500-level are required. Courses taken during the M.S. degree program may be used toward the Statistics Minor, if approved by the Statistics Department, or toward the general studies formal course requirement.

d. Seminar

One graduate seminar course (of one credit) is required in which oral presentations are made by the student. This requirement must be met in a regularly scheduled FOR, SOILS, or WFS 590 course.

M.S. degree students and interdepartmental degree program candidates advised by SOILS graduate faculty members will give one Seminar presentation of at least 20 minutes duration. Successful completion of the seminar will be documented through taking FOR/SOILS/WFS 590, generally taken during the student's final semester in their program. M.S. degree students are to report on their thesis research, the report will be scheduled when the thesis is complete or nearly complete, the seminar will be prepared and presented as a professional report—a professional report consists of a critical review of thesis-topic-related historic and current scientific literature, identification of aspects of the subject area that are poorly understood and merit additional research, presentation of the student's proposed research objectives and plans, and an explanation of how the proposed research will contribute new knowledge to the subject area. This seminar requirement will have equivalent status to every other requirement for a degree; the Graduate Coordinator will not certify that the graduation requirements have been completed without evidence that the seminar has been presented.

2. Students enrolled in an interdepartmental program will be expected to fulfill any separate seminar requirements of their interdepartmental programs. It will be the responsibility of

the student and their Adviser to work out the details with those responsible for each seminar series.

3. Research Communication and Integrity

One course (FOR/SOILS/WFS 597G is the offering in Spring 2015) is required in which research integrity is an emphasis during five hours of discussion and in which research communication skills are developed.

Completion of the online CITI program is required.

4. An original research thesis directly relevant to the student's major field, of at least 6 credits and no more than 15 credits is required (courses 600 and 610, thesis research). Only 6 of the 600-level thesis credits may carry a quality letter grade; additional 600-level thesis credits must carry an "R" grade for research.
5. At least 18 credits of the total M.S. program must consist of 500- or 600-level course series, and only six thesis research credits (600-level) may count in this regard.
6. Additional courses and requirements as required by the advisor and advisory committee.
7. A final examination (defense of thesis) is required

Wildlife and Fisheries Science Major Course and Credit Requirements

1. Admission deficiencies, if any, must be removed to the satisfaction of the student's committee.
2. A minimum of 30 graduate (400-, 500-, 600-level) credits is required, of which at least 20 credits must be earned at an established graduate campus of the University and will include the minimum credits specified in items 3 through 9. Courses taken to overcome deficiencies are excluded.
3. At least 12 credits in 400- and 500-level courses appropriate to the student's field of interest, excluding the statistics requirement as shown below.
4. At least 6 credits of 400- or 500-level courses (usually STAT) are required in courses that cover topics such as analysis-of-variance, correlation, regression, and design of experiments, and are approved by the student's committee.
5. Optionally, at least 6 credits of 400- or 500-level courses are taken in the minor or general studies area, according to the minor department. Seminar courses are excluded, except where specifically allowed by the minor department.
6. One graduate seminar course (of one credit) is required in which oral presentations are made by the student. This requirement must be met in a regularly scheduled FOR, SOILS, or WFS 590 course.

M.S. degree students and interdepartmental degree program candidates advised by WFS graduate faculty members will give one (1) Seminar presentation of at least 20 minutes duration. Successful completion of the seminar will be documented through taking FOR/SOILS/WFS 590, generally taken during the student's final semester in their program. M.S. degree students are to report on their thesis research, the report will be scheduled when the thesis is complete or nearly complete, the seminar will be prepared and presented as a professional report—a professional report consists of a critical review of thesis-topic-related historic and current scientific literature, identification of aspects of the subject area that are poorly understood and merit additional research, presentation of the student's proposed research objectives and plans, and an explanation of how the proposed research will contribute new knowledge to the subject area. This seminar requirement will have equivalent status to every other requirement for a degree; the Graduate Coordinator will not certify that the graduation requirements have been completed without evidence that the seminar has been presented.

7. Students enrolled in an interdepartmental program will be expected to fulfill any separate seminar requirements of their interdepartmental programs. It will be the responsibility of the student and their Adviser to work out the details with those responsible for each seminar series.

8. Research Communication and Integrity

One course (FOR/SOILS/WFS 597G is the offering in Spring 2015) is required in which research integrity is an emphasis during five hours of discussion and in which research communication skills are developed.

Completion of the online CITI program is required.

9. Thesis - A thesis directly relevant to the student's major field, of at least 6 credits and no more than 15 credits is required (courses 600 and 610, thesis research). Only 6 of the 600-level thesis credits may carry a quality letter grade; additional 600-level thesis credits must carry an "R" grade for research.
10. At least 18 credits of the total M.S. program must consist of 500- or 600-level course series, and only 6 thesis research credits (600-level) may count in this regard.
11. Additional courses and requirements as required by the advisor and advisory committee.
12. A final examination (defense of thesis) is required.

Definitions of Major and Minor

Major: The course work for the major field shall be chosen to meet the student's primary educational objectives, i.e., accomplishment of thesis research, mastery of discipline subject matter, and preparation for a career. Courses at the 400- or 500-level taken in forest science, soil science, wildlife and fisheries science, and other departments may be designated as part of the major if they conform to the objectives. The program must be coherent, i.e., a related series of courses. The choice of courses in the major study area

shall be approved by the student's committee in consultation with the student. The thesis adviser shall be responsible for the semester-by-semester direction of the student's academic studies, but review by the student's committee should take place as described in Section III.D.4 and III.E. Students expecting to continue for the Ph.D. after receiving the M.S. should acquaint themselves with the admission and graduation requirements for the Ph.D.

Optional Minor: When a minor is elected, it consists of integrated or articulated work in one field related to, but different from, the major program. Minor requirements are governed by the responsible department or discipline area of the University. If a minor is elected, a faculty member representing the minor will serve on the student's committee, if required by the minor department. The Department also participates in the Dual Title in Operations Research.

C. Seminar Attendance

All departmental faculty and graduate students, including students in interdepartmental degree programs, have the responsibility to regularly attend the ESM Seminars.

Conflicts in course schedules or illness are the only satisfactory excuse(s) for resident graduate students' non-attendance at these seminars.

D. Student's Committee for the MS Degree

It is important that thesis or dissertation committees be structured to assist the student through their research activities and *not* simply serve as examination committees. **Regular interactions** between committee members and the graduate student help the student better understand their research project and **reduce misunderstandings** at critical times such as defenses. (Office of Graduate Education, College of Agricultural Sciences; 7/22/2014)

1. The committee shall consist of a minimum of three graduate faculty members, including a minimum of two members of the Department of Ecosystem Science and Management faculty in the student's graduate major. At least one member shall be chosen to represent the minor field, if appropriate; this may be a faculty member within the Department if the minor field is in the Department. Membership from other departments is encouraged. In addition to these minimum requirements, special committee members from outside the Graduate Faculty can be added to the committee with permission of the Graduate Program Coordinator, if their expertise has special relevance to the topic. If such a special member is added, this person does not substitute as one of the three required graduate faculty members.
2. The thesis adviser (if a member of the Department faculty) shall serve as the chair of the student's graduate committee. If the thesis adviser is a co-adviser from another unit of the University, then the co-adviser in the Department serves as the chair. The composition of the committee shall be proposed by the thesis adviser in consultation with the student, and

submitted to the Associate Director for Graduate Studies as part of the Graduate Academic Plan. Notification of changes in the committee's composition should be filed with the Associate Director. Since the constitution of master's committees is a unit-level purview, questions in this regard should be directed to the Associate Director rather than to the Graduate School.

3. The committee shall be established during the student's first four months (first semester) of residence.
4. Responsibilities of the student's committee follow:
 - a. To determine course deficiencies to be remedied, courses to be taken, and to approve the student's research and "Graduate Academic Plan". A copy of the student's Graduate Academic Plan should be provided to the student, each committee member, and the Department's Office of Graduate Studies immediately following the initial meeting; i.e., *preferably before the end of the student's first semester in residence*.
 - b. To be available for consultation with the student on an individual basis.
 - c. Before the end of the student's first semester in residence and at 12-month intervals or more frequently, the committee shall be assembled to hear progress of the student's course work and research. Committee members from other departments shall be informed of the M.S. requirements of the Department of Ecosystem Science and Management.
 - d. To read and evaluate the thesis. During thesis preparation, **frequent contact with the committee is valuable**. Finished copies of the thesis must be delivered to the members at least two weeks prior to the scheduled final defense date.
 - e. On completion of the academic program and thesis, a final examination shall be given by the assembled committee. It is the responsibility of the committee chair to arrange the examination and announce it by email to faculty and graduate students in the Department at least two weeks in advance. The examination opens with an oral presentation by the student. The student must file their Intent to Graduate on eLion early in their final semester.

E. Research and Thesis for the M.S. Degree

1. The thesis adviser shall be consulted concerning an appropriate topic early in the student's residence. An acceptable M.S. thesis topic is expected to have attributes similar to doctoral research, but be less rigorous. Thesis topic choice will be influenced by the intended career, degree of experience of the candidate, and the time and resources available for the program. It should contribute to an organized research project in the Department.
2. Thesis research should begin as early as possible. A literature review shall be initiated and a written thesis research outline (including hypotheses, objectives, and procedures) shall be prepared for the student's committee meeting to be held within the first academic year of residence. A copy of the plan shall be delivered to each member of the committee at least one week before the scheduled meeting. Recommendations for changes shall be sought. If a new draft is required, it shall be accomplished within three months. Approval by

committee members is required. Committee members may be consulted individually on specifics of the work.

3. Annual (or more frequent) meetings of the student's committee shall be scheduled to review the progress of the thesis research.
4. The finished research shall be assembled in approved thesis format (see "Thesis Guide" <http://www.gradsch.psu.edu/current/thesis.html>) and according to the timelines published by the Graduate School and Thesis Office. One electronic (PDF) copy of the final thesis filed with The Graduate School is to be available to the Department's Graduate Programs Office.

F. Final Examination for the M.S. Degree

1. The assembled student's committee shall administer the final oral examination.
 - a. Primarily, the final examination is of the student's completed thesis. The student should be able to defend the methodology, findings, and conclusions of the thesis, and be able to relate findings to the pertinent literature. Little time during the examination should be spent on minor editorial comments that can be addressed in separate meetings with the committee members.
 - b. The committee should also examine the student on academic studies and may recommend that a portion of the examination be written.
2. The M.S. final oral examination is scheduled by the adviser in consultation with the student and the committee members, giving two weeks advance notice to all faculty, the administrative support assistant for graduate studies, and graduate students in the Department. The Department's Office of Graduate Studies is to be notified when the exam is scheduled, and given a written report of results (see Section VI.C).
3. Student delivers thesis (in final form approved by the thesis advisor) to the committee members at least one week before the examination. The thesis should represent the student's best effort at scholarly exposition and should be complete, clearly legible, neat in appearance, and essentially in compliance with the form required for the Graduate School.

Section IV. Doctor of Philosophy Degree

A. The Ph.D. Degree

The student is encouraged to become familiar with the following requirements as well as those posted by the Graduate School at:

<http://bulletins.psu.edu/graduate/degreerequirements/degreeReq1>

The objectives of the Ph.D. degree are: (1) to attain the highest level of scholarship and independent research in one of the three subject matter areas within the Department of Ecosystem Science and Management, (2) to conduct original research in a scholarly manner which represents a significant contribution to knowledge within the scope of the Department's programs, and (3) to develop a proficiency in a basic scientific discipline in relation to one of the Department's subject matter areas.

The Ph.D. candidate must develop and demonstrate the ability to conceive and conduct independent research. The degree is designed to produce a scientist proficient in scientific principles and capable of academic teaching and/or scholarly research.

The M.S. or equivalent degree, as described in Section III of this handbook, typically is earned prior to admission to the Ph.D. program. Baccalaureate degree students who have authored a refereed publication, graduated from an honors program, or demonstrated ability to conduct original research **may** be considered for admittance without a master's degree. To earn the degree, the candidate shall: (1) satisfy Graduate School requirements; (2) complete independent study and course work approved by the student's committee; (3) accomplish required research and prepare a thesis embodying the research findings; (4) pass examinations; and (5) complete all other requirements prescribed by the Department of Ecosystem Science and Management and the Graduate School.

Following admission to residency, even if coursework and thesis research have been initiated, full acceptance into the Ph.D. program requires passing the Candidacy Examination early in the residency period. The student must be registered during the semester that the Candidacy Exam is administered.

Students are encouraged to use the "Check List of Graduate School Requirements for Ph.D. Candidates".

B. Course and Credit Requirements for the Ph.D. Degree

The student is responsible for consulting with the adviser before each registration period. Prior to the first registration, the student and adviser will discuss the choice of courses for that semester and subsequent semesters. Subsequent to the Candidacy Exam, the student and adviser shall develop a Graduate Academic Plan for approval by the student's committee. The development of a plan should be initiated early in the student's program; preferably prior to the end of the first semester of the Ph.D. degree program. The Graduate Academic Plan (GAP) may be modified

with approval of the committee during any registration or drop/add period. The plan will include alternative courses if a first choice is unavailable.

1. Subject matter deficiencies, if any, must be removed to the satisfaction of the student's committee. A doctoral guidance committee cannot be appointed until the student has passed the Candidacy Exam (see item D below on committee appointment).
2. The student's doctoral committee has the responsibility to approve the courses and credits it considers essential for the education and development of the candidate. The committee must ensure that the student is properly trained and prepared to conduct doctoral-quality research in a basic scientific discipline applicable to one of the Department's subject matter areas – forest science, soil science, or wildlife and fisheries science.
3. The Graduate Academic Plan for the Ph.D. shall include courses for the major and for the basic scientific disciplines, as appropriate.
4. Minimum course credits required for the Ph.D. are those defined for the M.S. degree (Section III.B). If the minimum course requirements have been fulfilled by the student having obtained his/her M.S. or equivalent degree, only additional courses required by the student's doctoral committee (along with seminar, supervised teaching credits, research credits, and SARI and CITI requirements) will need to be taken, except that SOILS students are required to take an additional three credits of statistics classes beyond the 3 hours required for their M.S. degree. A typical Ph.D. student will have approximately 50 to 60 credits in formal course (excluding seminar, research and teaching credits) work beyond the baccalaureate degree.

In addition to those credits required in SUBJ 590 for the M.S., Ph.D. students should have one credit of SUBJ 590 while in the Ph.D. program.

Ph.D. degree students will present a seminar of 50 minutes duration in addition to any seminar given for the M.S. degree. Generally, the seminar will be documented through taking FOR/SOILS/WFS 590, which is usually taken during the student's final semester in their program. It is typically scheduled after the Comprehensive Examination. This seminar requirement will have equivalent status to every other requirement for a degree; the Graduate Coordinator will not certify that the graduation requirements have been completed without evidence that the seminar has been presented.

5. One course (FOR/SOILS/WFS 597G is the offering in Spring 2015) is required in which research integrity is an emphasis during five hours of discussion and in which research communication skills are developed. This has been a requirement for a number of years at Penn State and is required of all ESM Graduate students prior to graduation. This course is part of the Penn State requirements related to research integrity training. It is in addition to the CITI online training required of all Graduate students.
6. All Ph.D. students are required to assist in teaching an undergraduate class and to enroll for at least one SUBJ 602 credit (Supervised Experience in College Teaching) during a student's program. The student's adviser and the course instructor will assign teaching duties for this teaching expectation. The assignment must include some direct interaction

with students. If the student is on a departmental assistantship, and therefore has been assigned to TA a course, one of the courses TAed may be taken for 602 credit, if the adviser agrees. The expectations are that the TA assignment will be sufficiently meaningful so as to meet the expectations for 602 credit.

7. Students enrolled in an interdepartmental program will be expected to fulfill any separate seminar requirements of their interdepartmental programs. It will be the responsibility of the student and their adviser to work out the details with those responsible for each seminar series.
8. Credits for courses earned in graduate studies at other institutions may be applied toward the degree as follows:
 - a. The student's committee may approve pertinent courses equivalent to 400- or 500-level formal courses at The Pennsylvania State University.
 - b. Special problem courses are excluded.
 - c. The courses fall within limitations prescribed by the Graduate School for transferable credits (see Graduate Bulletin for transfer process).
9. Residence requirements for the Ph.D. are specified in The Pennsylvania State University bulletin "Graduate Degree Programs." **Students must maintain continuous registration (summers excluded) after passing the Comprehensive Examination. This may be accomplished by registering for SUBJ 601 (full-time status) or SUBJ 611 (part-time status) thesis credits. These do not carry academic credit, but are entered on the academic transcript to indicate registration and that the nature of the activity is academic. Students may also register for a maximum of 3 additional course credits, if necessary, when taking 601.**

C. English Competency

1. a. Assessment of English Competence

Candidates for the degree of Doctor of Philosophy in Forest Resources, Soil Science, or Wildlife and Fisheries Science will be required to demonstrate a high level of competence in the use of the English language (see Graduate Degree Programs Bulletin). An assessment of English competence will be made at the Ph.D. Candidacy Examination, which is normally given before or during the second semester of the student's residence. (See Section V. Ph.D. and Master's Degree Examinations, Subsection A. Candidacy Examination for additional details.)

D. Student's Committee for the Ph.D. Degree

1. The doctoral committee should meet with the student at least once per year to
 - 1) provide guidance, 2) finalize and approve the research proposal of the student so that there is a clear understanding of the research goals and objectives, 3) assess the quality and progress of the research, and 4) discuss programmatic issues (e.g., course requirements).

2. The chair or at least one co-chair must be a member of the graduate faculty of the specific doctoral program in which the student is enrolled. A retired or emeritus faculty member may chair a doctoral committee if he/she was officially appointed and began chairing the committee prior to retirement, and has the continuing approval of the department head or graduate program coordinator. The primary duties of the chair are to: (1) maintain the academic standards of the doctoral program and the Graduate School and to assure that all procedures are carried out fairly, (2) ensure that the comprehensive and final examinations are conducted in a timely fashion, (3) arrange and conduct all meetings, and (4) ensure that requirements set forth by the committee are implemented in the final version of the dissertation.
3. A doctoral committee must consist of four or more active members of the Graduate Faculty, which includes at least two faculty members from the student's major field. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the student is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed. In most cases, the same individual (e.g., dissertation adviser) is a member of the Graduate Faculty in both the major and dual-title fields, and in such cases may serve as sole chair.

At least one regular member of the doctoral committee must represent a field outside the student's major field of study in order to provide a broader range of disciplinary perspectives and expertise within the committee. This committee member is referred to as the "Outside Field Member." In cases where the student is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser's primary appointment is held (i.e., the adviser's administrative home; in the case of tenure-line faculty, this is the individual's tenure home), in order to avoid potential conflicts of interest. This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student's dissertation adviser and also represent a field outside the student's major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

If the student has a minor, that field must be represented on the committee by a "Minor Field Member." (For additional information related to minors for D.Ed. students, see also "Major Program and Minor Field" under "D.Ed. - Additional Specific Requirements" in the University Bulletin.)

A person who is not a member of the Graduate Faculty (and may not be affiliated with Penn State), but who is otherwise qualified and has particular expertise in the student's research area, may be added as a "Special Member," upon recommendation by the head of the graduate program and approval of the Graduate School dean (via the Office of Graduate Enrollment Services). A Special Member is expected to participate fully in the functions of the doctoral committee.

4. Both the chair and the student are responsible for providing a copy of the final draft of the dissertation to the committee at least two weeks prior to the scheduled date of the final oral examination. The chair should schedule a date for the examination with the ESM Graduate Program Staff Assistant four weeks prior to the examination.
5. Both the chair and the student are responsible for ensuring the completion of a final draft of the dissertation, and for adequate consultation with members of the doctoral committee, well in advance of the final oral examination. Major revisions of the dissertation should be completed before this examination. The dissertation should be complete and in its “final” form, with correct and polished content and style, appropriate notes, bibliography, tables, etc., at the time it is distributed to the committee members. If committee members find that the draft submitted to them is not in this form, the chair is notified and postponement of the examination is considered.
6. If a committee member finds that the “final” draft is not correct and polished with respect to content and style, it is his/her responsibility to notify the committee chair (or adviser) at least one week in advance of the final oral examination date. The committee member should indicate his/her concerns regarding the draft and recommend consideration of postponement of the examination to the committee chair (or adviser). The committee chair (or adviser), in consultation with committee members, is responsible for notifying the student and assessing whether the student can make the necessary revisions to the “final” draft before the examination date. If it is determined that revisions cannot be made in time, the examination should be postponed. If differences exist among committee members, the head of the graduate program (department head) should be consulted to hear the expressed concerns and determine whether the examination should be postponed.
7. If the dissertation is deemed unsatisfactory at the time of the examination by at least two-thirds of the committee, the student will fail the examination. If a student fails, it is the responsibility of the committee to determine whether another examination may be taken by the student.

*Although master’s programs vary widely across the University and differ from doctoral programs, departments and programs are urged to follow the spirit of the Procedures for Doctoral Students (points 1-7 above), as appropriate, for appointing graduate committees of master’s students.

E. Ph.D. Thesis Research

1. Acceptable Ph.D. research must be original in its conception. Such research consists of scholarly inquiry, hypothesis testing, investigation, or experimentation; having as its objective, the revision of existing concepts, development of new concepts, or development of new or improved techniques in some specialty area. It is research that is well structured, uses appropriate techniques, and is adequately described. It should illuminate areas of controversy, or areas that seem significant and lack information, based on an adequate literature review and interpretation. The results should be acceptable for publication in a refereed scientific journal, thereby making a contribution to scientific knowledge.

2. The short time span of Ph.D. programs limits choice and design of research projects. Appropriate Ph.D. dissertations high in quality are possible and are expected when students choose suitable problems in consultation with their adviser and doctoral committee. Collaboration among these individuals should ensure reliable techniques and appropriate experimental designs, and should assist students in achieving high levels of originality, creativity, and resourcefulness in their research.
3. Dissertation research should begin as early as possible in a student's program. The adviser shall be consulted concerning an appropriate problem early in the student's residence. A literature review shall be initiated and a written research outline (including hypotheses and/or objectives, and procedures) shall be prepared for the student's committee no later than six months after the student has passed the Candidacy Examination. A copy of the plan shall be delivered to each member of the committee at least one week before a meeting is scheduled. Recommendations for changes shall be sought. If a new draft is required, it shall be accomplished within three months. The student's committee must approve the final dissertation plan.
4. Subsequent revisions of the plan necessitated by minor changes in objectives may be accomplished by consulting committee members individually. The committee shall approve major revisions. Copies are to be retained by the adviser in the student's file.
5. Meetings of the student's committee shall be scheduled at least once each academic year to review progress in course work and dissertation research. The student shall give a progress report to the committee at the meeting.
6. The finished research shall be assembled in approved thesis format (see "Thesis Guide").

Section V. Ph.D. and Master's Degree Examinations

Descriptions of the examinations are also given in the PSU bulletin "Graduate Degree Programs."

Graduate student examinations are NOT permitted to be conducted by telephone or other remote methods. This practice is strictly forbidden for Ph.D. defenses as stated in the online policy (<http://bulletins.psu.edu/graduate/degreerequirements/degreeReq1#doctoralFinalExam>). It is permissible for an exception to be made if one of the committee members (faculty) needs to participate via phone or video conferencing, but this needs to be approved by the Graduate School in advance. In all cases, the student must be physically present.

A. Candidacy Examination (Ph.D. Only)

1. The Candidacy Examination should be scheduled soon after a student begins doctoral studies at this university, and typically occurs during the second semester of the student's Ph.D. program and must occur before the end of the third semester in the program. The adviser and Candidacy Examination Chair should make the necessary arrangements with the Staff Assistant in the Department's Graduate Programs Office with approval of the

Graduate Program Coordinator at least **one (1) month in advance**. A copy of the exam regulations should be provided to committee members.

2. The Candidacy Examination should determine whether a student is qualified to become a candidate for the Ph.D. degree and should identify deficiencies that need to be addressed through course work or other means.

Each program has its own Candidacy Exam Committee. The purpose of the Candidacy Exam Committee is to assess the student's written and oral competence in English, their knowledge and understanding of topics and basic principles which are important in their program, as well as their intellectual capability for study at the doctoral level. Knowledge of the scientific method, problem-solving ability, and interpretation of experimental results are general areas which the committee is expected to explore. If the student is pursuing a **dual degree program**, a member of that program must be added to the Candidacy Committee membership for the student.

Members of the Candidacy Exam Committee shall be those selected by the program faculty and appointed by the department head annually. In addition, a representative from any dual degree program in which the student is seeking a Ph.D., must be present.

During the FOR and SOILS programs, the adviser will attend the exam, but will not participate in asking questions. The adviser will participate in the vote regarding the student's performance.

During the WFS program, the adviser will not attend the exam (and therefore will not participate in the vote regarding the student's performance). However, the adviser will be consulted by the WFS Candidacy Exam Committee chair prior to informing the student of the results.

- See additional details below regarding each program's specific approaches used for the Candidacy Exam.

3. The doctoral student, assisted by his/her adviser, will prepare sufficient copies for the Candidacy Examination committee of a resume of graduate study objectives, an outline of the proposed program, evidence of a high level of competence in use of the English language (reading, writing, speaking), and other candidacy qualifications. These should include clear evidence of scholarly and research abilities. Examination scores, such as GRE, may supplement academic records.
4. The Candidacy Examination will consist of oral and written questions; at least one general written question (may be non-subject matter) will be used to assess written English competence.

General Scheduling Guidelines and Exam Objectives

1. Student meets with the thesis adviser to ensure that all the requirements for the examination have been met, and to arrange possible dates and place of the examination.

2. Student contacts each member of the Exam committee and arranges a convenient date and time for the examination.
3. Thesis adviser contacts Graduate Program Coordinator and Staff Assistant with date, time, place, and list of committee members.
4. Graduate Program Coordinator Staff Assistant confirms the scheduled examination by letter and sends a copy to the student as well as to the Committee members.
5. Adviser and Candidacy Exam chair communicate the written assignment to the student.
7. Student provides the writing assignment to the Committee members.
8. Student prepares a summary of his or her records and appropriate materials for the examination, and provides these to the committee one week prior to the exam.
9. Immediately following the Exam, the Committee Chair submits the examination results to the Graduate Program Coordinator and Staff Assistant in writing.

Assessment of English Competency

Candidates for the degree of Doctor of Philosophy in Forest Resources, Soil Science, or Wildlife and Fisheries Science will be required to demonstrate a high level of competence in the use of the English language (see Graduate Degree Programs Bulletin). The assessment of English competence will be made at the Ph.D. Candidacy Examination.

The Candidacy Exam Committee will assess both written and oral English competence. In general, a written question (possibly non-subject matter) will be included in the examination. Some programs will use a review of a manuscript for the purpose of assisting the committee in assessing the student's English Competence. The Ph.D. candidate also will be expected to demonstrate English competence in oral (and possibly written) answers to questions dealing with subject matter. Competence will be demonstrated by using proper vocabulary, spelling, grammar, sentence structure and punctuation, and by constructing answers in an understandable and organized manner.

The three-person (or more, in the case of a dual degree program) committee will evaluate all answers given by the student to written and oral questions at the Ph.D. Candidacy Examination. Foreign students are also required by the Graduate School to be certified in oral English proficiency prior to serving as teaching assistants (see section II. F - AEOCPT).

a. Objective:

To determine if the student can demonstrate a satisfactory level of competence in the use of the English language, including reading, writing, and speaking.

b. Scheduling:

This assessment should be scheduled in conjunction with the Candidacy Examination. It must be completed by the end of the third semester – and preferably during the second semester.

c. Procedure of the examination:

- (1) See specific details below regarding each program's approach used for the Candidacy Exam.
- (2) The oral assessment will occur as part of the oral Candidacy Examination.
- (3) Each member of the committee will be asked to evaluate the candidate's writing and speaking competency.
- (4) Alternatively, a student in agreement with his/her adviser may elect to forego the assessment and pursue a remedial work plan.

d. Evaluation of English competency performance:

The Candidacy Committee determines if the student meets the English language requirement and decides upon any recommended remedial action which is needed.

- (1) Satisfactory
- (2) Unsatisfactory (see items e and f, following)

e. Reporting results:

The Candidacy Committee chair submits the assessment results to the Graduate Program Coordinator and Staff Assistant in writing immediately following the examination.

f. Improvement of English competency:

Improvement of English Competence

A Ph.D. candidate who does not adequately demonstrate competence in English shall be directed into one or more special remedial courses. These courses will be recommended by the Candidacy Committee, depending on the student's inadequacies. Non-native speakers of English will be required to pass with at least a "B" grade ESL 114G (Basic) and/or ESL 116G (Reading and Writing). Native speakers of English will be required to pass with at least a "B" grade at least one of the following courses: ENGL 202 (Effective Writing), or ENGL 418 (Advanced Technical Writing and Editing); or another comparable course recommended by the student's Candidacy Committee in consultation with the student's adviser.

Attainment of English Competence

A Ph.D. student who has not adequately demonstrated competence in the English language at the Ph.D. Candidacy Examination shall fulfill all remedial requirements recommended by the Candidacy Examination Committee. The student then will be required to retake the

English competence component of the Ph.D. Candidacy Examination. If a student fails to demonstrate a high level of English competence at the second assessment, the Candidacy Examination Committee will recommend to the Graduate Program Coordinator and Department Head that the student not be allowed to continue in a Ph.D. program.

- (1) Students with English deficiencies will schedule remedial courses as soon as possible after the Candidacy Examination. Any advanced (400 and 500-level) or remedial undergraduate courses taken to meet the deficiencies must be completed before the Comprehensive Examination is scheduled.
- (2) The choice of appropriate remedial and advanced courses will be made by the student's thesis adviser and advisory committee, with recommendations of the Candidacy Committee.

g. Time Frame

The Assessment of English Competency must be satisfactorily completed before the Comprehensive Examination is scheduled.

Candidacy Assessment

a. Objective: To determine if the student is qualified in terms of (A) basic intellect, (B) attitude, and (C) ability to apply previous training and the fundamentals of the scientific method in order to successfully pursue a Ph.D. program.

b. Scheduling:

- (1) The candidacy examination may be taken after at least 18 credits have been earned beyond the baccalaureate. This means that most Ph.D. students entering the program with an M.S. degree may schedule their candidacy examination very early in their Ph.D. program. It would not be unreasonable to schedule the candidacy exam early in the second semester.
- (2) The candidacy examination should be completed as soon as feasible, but **must** be taken within three semesters (summer sessions do not count) of entry into the doctoral program.

c. Procedure of the examination:

- (1) An oral examination will be administered by the three-member Candidacy Committee, which is comprised of two members who are selected by the program faculty and appointed by the department head on an annual basis; a third member is selected from one of the program area faculty members who serves on the department's Graduate Program Committee (GPC). The GPC member chairs the candidacy exam to monitor procedure and content, as well as participate in the questioning of the student and voting. In rare cases, and in consultation with the adviser, if it is not possible for either of the program's GPC members to serve as

chair due to scheduling constraints, another member of the GPC will be asked to serve in that role. The target time for the examination (including Assessment of English Competency) is 2-2.5 hours, with time allocated approximately equally among participating faculty. No more than one hour of questions should relate to the written submission used in the Assessment of English Competency. Additional topics for questions should be relevant to the student's program. At the end of the questioning period, each of the three committee members will be asked to rate the candidate's performance.

- (2) At the discretion of the committee or request of the student, a written examination may be given in addition to an oral examination.
- (3) Candidates must be registered for the semester (excluding summer session) in which the candidacy examination is taken. Candidates should also prepare a packet consisting of undergraduate and graduate transcripts, GRE scores, abstracts of M.S. thesis and any publications, and goal statement from the admissions application. This packet should be distributed to the examining committee members one week before the exam date. Additional questions concerning the examination should be directed to the thesis adviser or the Chair of the Graduate Programs Committee.

d. Evaluation of candidacy exam performance:

- (1) Pass without reservation.
- (2) Fail, with an opportunity to retake the examination at a later date. No more than one retake, at a date no later than one month following the first examination, will be allowed.
- (3) Fail without reservation.

e. Reporting results:

The Candidacy Exam committee chair submits the Candidacy examination results to the ESM Graduate Program Coordinator and Staff Assistant in writing immediately following the examination.

5. Immediately following the completion of the Candidacy Exam, the Chair of the Candidacy Committee reports specific course deficiencies and other remedial actions recommended by the committee to the faculty adviser. The student's objectives and a comparison of his/her completed courses with the Department's B.S. and M.S. degree requirements should be taken into consideration. It is the responsibility of the adviser to ensure that stipulations from the Candidacy Examination are satisfied in the Graduate Academic Plan approved subsequently by the student's committee. Following passing of the Candidacy Exam, it is to the student's benefit to soon form their Graduate Committee, which will provide additional guidance regarding course deficiencies, as well as recommended courses to be completed in their graduate program.

6. A two-thirds favorable vote is required for approval, after which the ESM Graduate Program Staff Assistant will notify the Graduate School that the student has passed his/her candidacy exam.
7. If a student does not pass, the committee decides whether or not the student will be permitted to take another Candidacy Examination.

Candidacy Exam Procedures by Program

FOREST RESOURCES Format / Guidelines:

The exam will consist of a written and an oral evaluation. For the written evaluation the student will be given two papers (chosen in consultation with student's adviser and Candidacy Committee Chair) one month before the oral exam. One paper will be a scientific study and the other an opinion or "current topics" piece. The student will write a written essay about each paper, addressing the following questions. The essay will be returned to the committee **two weeks prior** to the oral exam.

For the scientific paper

1. What are the specific hypotheses, objectives, or research questions put forth?
2. What methods are used? Are they appropriate for the research questions being addressed?
3. What are the major findings or results of the study?
4. How well are the findings supported by the evidence that is presented?
5. Are there alternative interpretations of the data or results that the author did not address?
6. Are the conclusions significant or interesting?
7. How does the paper relate to the research you are interested in doing?

For the opinion piece

1. What point is the writer trying to make? Why is it important?
2. What evidence does the author present to support the argument and/or conclusions?
3. Is the author's argument persuasive?
4. What arguments have been or might be made opposing the author's arguments on the issue?

During the oral evaluation the committee will ask the student follow up questions and evaluate the student using the following rubric:

Topic	Score (1-5) ¹	Comments
Written communication		
Oral communication		
Understanding the scientific method		
Ability to think critically ²		

1/ 1=Poor, 2=Below Average, 3=Average, 4=Above Average, 5=Outstanding.

2/ process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information.

Overall assessment: PASS; FAIL with the opportunity to re-take; FAIL with no opportunity for a re-take.

Following the candidacy exam, regardless of the outcome, the candidacy committee will meet with the student and the adviser to review the outcomes of the exam and provide their recommendations on deficiencies to be addressed by the student.

In the case of a PASS, these recommendations would be in the form of recommended courses or areas where the student needs additional self-study. In the case of a FAIL, with the opportunity to re-take, the Committee should provide clear recommendations on the deficiencies that must be addressed prior to re-taking the exam. In the case of a FAIL, the committee will also provide their best guidance on future professional training options for the candidate.

Following the completion of the Candidacy Exam, the Chair of the Candidacy Committee the Candidacy Exam committee chair submits the Candidacy examination results to the ESM Graduate Program Coordinator and Staff Assistant in writing immediately following the examination.

SOILS Format / Guidelines:

Assessment of English Competency

- (1) Two weeks in advance of the candidacy exam, the student will be assigned a peer-reviewed research journal article selected by the student's adviser and the Candidacy Committee chair. The student will prepare a written summary (e.g. one to two pages) of the assigned article. The summary will be submitted to the examining committee **one week before** the oral examination date. The student will also prepare a presentation describing and critiquing the article. The objective is to determine if the student is capable of performing Ph.D.-level research and communicating its results.
- (2) The oral assessment will occur at the beginning of the Candidacy Examination.

(3) The student will make a 15-minute oral presentation of the written summary during the examination period. Each member of the committee will be asked to evaluate the candidate's writing and speaking competency.

(4) Alternatively, a student in agreement with his/her adviser may elect to forego the assessment and pursue a remedial work plan.

Candidacy Examination

a. Objective: To determine if the student is qualified in terms of (A) basic intellect, (B) attitude, and (C) ability to apply previous training and the fundamentals of the scientific method in order to successfully pursue a Ph.D. program.

b. Procedure of the examination:

(1) Candidates must be registered for the semester (excluding summer session) in which the candidacy examination is taken. Candidates should also prepare a packet consisting of undergraduate and graduate transcripts, GRE scores, abstracts of M.S. thesis and any publications, and goal statement from the admissions application. This packet should be distributed to the examining committee members one week before the exam date. Additional questions concerning the examination should be directed to the thesis adviser or the Chair of the ESM Graduate Programs Committee.

(2) An oral examination will be administered by the three-member Soils Candidacy Committee, which is comprised of two members who are selected by the Soils faculty and appointed by the department head on an annual basis; a third member is selected from one of the Soils faculty members who serves on the GPC. The Graduate Program Committee (GPC) Soils member chairs the candidacy exam to monitor procedure and content, as well as participate in the questioning of the student and voting. In rare cases, and in consultation with the adviser, if it is not possible for either of the Soils GPC members to serve as chair due to scheduling constraints, another member of the GPC will be asked to serve in that role. The target time for the examination (including Assessment of English Competency) is 2-2.5 hours, with time allocated approximately equally among participating faculty. No more than one hour of questions should relate to the journal article used in the Assessment of English Competency. Additional topics for questions should be relevant to the student's program. At the end of the questioning period, each of the three committee members will be asked to rate the candidate's performance.

(3) At the discretion of the committee or request of the student, a written examination may be given in addition to an oral examination.

Immediately following the completion of the Candidacy Exam, the Chair of the Candidacy Exam Committee submits the Candidacy examination results to the ESM Graduate Program Coordinator and Staff Assistant in writing.

WFS Format / Guidelines:

The Candidacy Committee will select a scientific article and the student will prepare a written document explaining how the article furthers our scientific understanding or methods. In

particular, the student should explain how the work builds on previous work. The written document will be graded by the Candidacy Committee. An oral examination will then be given. This should be scheduled **within one week** of the written document being completed. The student's responses on the written document may serve as the basis for initial questioning. Both written and oral components of the Candidacy Examination will be used to assess English competence (demonstrated by proper use of vocabulary, grammar, and sentence structure, and by constructing answers in an understandable and organized manner). (The Chair of the Candidacy Exam Committee will report any course deficiencies or other remedial action recommended by the committee to the adviser.) A two-thirds favorable vote is required for approval. If a student is not acceptable, the committee decides whether or not to permit another Candidacy Examination.

Following the completion of the Candidacy Exam, the Chair of the Candidacy Committee the Candidacy Exam committee chair submits the Candidacy examination results to the ESM Graduate Program Coordinator and Staff Assistant in writing immediately following the examination.

WFS Guidance to Graduate Student: The purpose of the candidacy exam is to assess the potential for students in the Wildlife and Fisheries Science Graduate Program to successfully complete a Ph.D. The examination will consist of both written and oral evaluation to assess your skills and knowledge. The student will be evaluated on a range of areas, the overview described below is to help prepare the student for the examination, and to give a sense of the subject areas that a student is expected to be familiar with. The examination will also assess the student's competence in English, both written and spoken.

1. **A month before the examination**, the Candidacy Committee will assign a scientific article for the student to read and then prepare a written document that explains how the article furthers our scientific understanding or methods. In particular, the student should identify and explain how this work builds on previous scientific research. This should be completed and submitted to all members of the Committee at least one week before the candidacy oral examination.
2. In the oral examination, the committee will ask a series of questions that assess the student's understanding of the scientific method.
3. The student should possess a basic knowledge in the design of experiments, which includes such topics as treatments and controls, replication, and randomization.
4. The student is expected to have a basic understanding of statistical inference, (including topics such as random variables, the role of probability in rejecting hypotheses, measures of precision, accuracy (bias), and hypothesis testing versus model selection.
5. Wildlife and fisheries management is the application of ecological principles to solve management problems. The student will be asked to demonstrate an understanding of basic spatial ecology (with respect to resource selection, movement, dispersal, and connectivity), landscape ecology, principles affecting the management of fish and

wildlife (including management of harvest, nuisance and invasive species, conservation and diversity, and threatened and endangered species), and population genetics.

In addition, the student should provide the Chair of the Candidacy Committee with a packet that contains the following:

- (1) A copy (unofficial) of your academic transcripts
- (2) An outline of your proposed course of study (Please organize courses to show where they fit into requirements)
- (3) An updated copy of the resume (CV)

**Department of Ecosystem Science and Management
Wildlife and Fisheries Science
Candidacy Exam Scoring Sheet**

Topic	Poor	Below Average	Average	Above Average	Outstanding
1. Written assignment: Performance in writing about a scientific article and how it has changed our understanding, or improved a methodology					
2. Understanding of scientific method					
3. Ability to design experiments					
4. Understanding of statistical inference					
5. Understanding of the principles of wildlife and fisheries science					
6. Competence					

Overall Assessment of Candidacy Exam: PASS or FAIL

Comments:

Name (print)

Signature

Date

B. Comprehensive Examination (Ph.D. Only)

1. The Comprehensive Examination will be scheduled after the Ph.D. candidate completes requirements in the majority of courses. The Comprehensive Exam is administered by the student's graduate committee. It is scheduled by the Graduate School through the Department's Office of Graduate Programs with the Graduate Program Coordinator's approval. **At least four weeks (in advance of the exam) should be allowed** for receiving exam reporting forms from the Graduate School. The student must be registered during the semester the Comprehensive Exam is conducted.
2. The purpose of the Comprehensive Examination is to evaluate whether the doctoral candidate has acquired sufficient knowledge in his/her field, has the ability to design and evaluate significant research, has resourcefulness in formulating and solving problems in his/her field, and has the ability to communicate effectively with both scientists and laypeople. The Comprehensive Examination will probe the student's scientific and general knowledge and ability to do original thinking.
3. The committee should confer prior to the Comprehensive Examination to review the objectives of the candidate's program and the structure of the examination. Questions should examine the candidate's knowledge of his/her major and minor fields of specialization. The examination consists of both written and oral components, with the written component preceding the oral component. A committee member may choose to not require a written component for their portion of the exam. Each set of written questions is not to take more than 3 hours to complete. No more than 2 sets of questions may be assigned a student in any particular day. Each committee may require their written questions be responded to either as an open book or a closed book exam. The oral exam should be scheduled within ten days following the last written exam.
4. The candidate should provide copies of his/her dissertation research proposal prior to the examination. The proposal is to be prepared in accordance with the Agricultural Experiment Station project format (<http://agsci.psu.edu/research/ag-experiment-station/developing/proposal-guidance/proposal-instructions>). During the oral portion of the examination, the candidate should review the proposal and describe his/her progress.
5. A two-thirds favorable vote of the student's committee is required for successful completion of the Comprehensive Examination. The committee Chair notifies the Department's Office of Graduate Programs and the Graduate Program Coordinator of the results of the examination by completing the forms supplied by Graduate School at the time of scheduling. The Report on Comprehensive Examination is copied for the student's academic file and then the original is forwarded to the Graduate School. In the case where a student does not pass the Comprehensive Examination, the committee is responsible for deciding if a second examination will be permitted.
6. **Students must be registered continuously (SUBJ 601 full-time; SUBJ 611 part-time) each semester (excluding summers) beginning with the semester following the passing of the Comprehensive Examination and continuing each semester until the Final Oral**

Examination (Defense) is passed. International Ph.D. students should contact Global Programs regarding their visa status after passing the Final defense.

C. Final Oral Examination for the M.S. and Ph.D. Degrees

Students and faculty advisers should prepare for the Final Oral Examination months in advance. The semester prior to scheduling the Final Oral Examination, the student and her/his adviser should request a written transcript audit to confirm that the student is on track for the defense, verifying that there are no missing grades and no missing credit requirements, and that there are not too many graded thesis 600-level credits.

The Final Examination is oral and related in large part to the thesis/dissertation, but it may cover the candidate's whole program of study without regard to courses that have been taken either here or elsewhere. It is scheduled after completion of other requirements for the degree.

1. The student meets with the adviser to: 1) ascertain if all of the course requirements for the degree have been met; 2) verify that the thesis/dissertation is complete, and 3) arrange possible date, time, and place of examination. The adviser should have records available at the examination indicating compliance with degree requirements.
2. The adviser contacts the committee members and arranges a convenient time for the examination within specified time limits set by the Graduate School in relation to date of graduation (and Comprehensive Examination for the Ph.D.).
3. **The adviser** contacts the Department's Office of Graduate Programs with the date, time, location, and thesis/dissertation title (and the list of committee members) **at least four weeks before the scheduled date for a Ph.D. and at least three weeks before the scheduled date for the M.S.** An updated copy of the Graduate Academic Plan, signed by the student and the adviser, is taken to the Department's Office of Graduate Programs at this time.
4. The Staff Assistant in the Department's Office of Graduate Programs, with the Graduate Program Coordinator's approval, schedules the examination for Ph.D. candidates via a letter through the Graduate School. The adviser may request that the Staff Assistant in the Department's Office of Graduate Programs announce the thesis/dissertation defense to the Department's various listserves (faculty, grad students, associates, and staff) by way of e-mail transmittal (in writing) at least 10 days prior to the scheduled date, or the adviser may do this himself/herself with a copy to the Staff Assistant in the Department's Office of Graduate Studies. The presentation part of the Ph.D. Final Oral Examination is open to the public. Master's thesis exams are to be similarly announced, but students and the general public may be excluded at the discretion of the adviser.
5. The student delivers the thesis/dissertation in final format approved by the adviser, and in compliance with the "Thesis Information Bulletin," to the committee **members at least two weeks** prior to the Final Oral Examination.
6. The thesis/dissertation should be reviewed by members of the student's committee prior to the examination. At the time of the Final Oral Examination major revisions should not be

necessary. The student should be prepared to defend the methodology, findings, and conclusions of the thesis/dissertation, and relate the findings to pertinent literature during the examination. Little time should be spent on minor editorial comments that can be resolved in separate meetings with committee members.

7. If, in the opinion of a committee member, the thesis/dissertation is not ready to be defended, that member shall **notify the committee chair / dissertation adviser one week in advance** of the final original examination date. The committee member should indicate his/her concerns regarding the draft and may recommend consideration of postponement of the examination to the committee chair/dissertation adviser. The chair/adviser, in consultation with committee members, is responsible for notifying the student and assessing whether the student can make the necessary revisions to the final draft before the examination date. If it is determined that revisions cannot be made in time, the final oral examination must be postponed. Written notification of this postponement shall be communicated by the adviser to the Staff Assistant in the Department's Office of Graduate Programs.
8. A two-thirds favorable vote of the student's committee is required for successful completion of the Final Oral Examination.
9. The adviser presents the results of the Final Oral Examination in writing to the Department's Graduate Program Staff Assistant and the Graduate Program Coordinator immediately following the examination.
 - a. There is a *Department of Ecosystem Science and Management Report on Master's Final Oral Examination - Thesis Defense* which is to be completed, signed, and dated and then returned to the Department's Office of Graduate Studies (319 FRB).
 - b. In the case of the Ph.D. final examination, the student's committee chair returns the completed Graduate School's Report on the *Doctoral Final Oral Examination form* to the Department's Office of Graduate Studies where a copy is made for placement in the student's academic file and the original is then sent to the Graduate School.

Appendix A. Department of Ecosystem Science and Management graduate faculty member listings (by major), their degree, contact information, and research interests are located at the following Web address.

http://ecosystems.psu.edu/directory/faculty?utm_source=ecosystems.psu.edu&utm_medium=Link&utm_campaign=Left+Navigation

Appendix B. Department of Ecosystem Science and Management
Graduate Academic Plans per M.S. and/or Ph.D. Degree

M.S. Graduate Academic Plan

Ph.D. Graduate Academic Plan

Ph.D. - GRADUATE ACADEMIC PLAN (GAP)
Department of Ecosystem Science and Management

Instructions: Prior to first registration, consult with adviser concerning initial choice of courses. Complete plan for entire degree program and obtain approval of committee promptly after Candidacy Exam. Adviser reviews plan with student before each registration. Provide original GAP to the Department Graduate Studies Office for approval, 319 Forest Resources Bldg. After approval, the original will be signed by major Graduate Coordinator, copied for the student's academic record, and then returned to the student for safekeeping.

Student: _____ Date _____

Degree: _____ Ph D Major: _____ Minor: _____

Graduate Goals (attach student's statement).

Dissertation Subject: _____

Schedule of Major Events (month, year); committee meets annually.

Entered	_____	Candidacy Examination	_____
SARI Seminar Attendance date	_____	CITI Online Portion of SARI date	_____
Research Plan Approved	_____		_____
Research Progress Rep.	_____	Comprehensive Examination	_____
Superv'd Exp. / College Teaching	_____	Final Examination	_____

Summary of Courses for those without a M.S. degree.

Ph.D. students who **do not have a Masters degree** must meet M.S. requirements (i.e., list 30 credits below); include number of credits/course in parens, i.e., FOR 596 (1).

Deficiencies	Major (12 cr)	Statistics (6 cr FOR, W F S) (3 cr SOILS)	Other Courses (6 cr*)	500+600 (18 cr)

Colloquium (1 cr):

--

Ph.D. students who **do hold a Master's degree** complete this section. A typical Ph.D. student will have approximately 50-60 credits in formal course work beyond the baccalaureate degree; include number of credits/course in parenthesis, i.e., FOR 600 (12).

Deficiencies	Colloquium (1 cr)	602 (2 cr) Supv Exp/Coll Tchg	Other Courses (# cr)	All Courses (# cr)

A tentative course schedule should be attached.

Copies:	Student Signature	Adviser Signature
	Graduate Coordinator	Committee Members' Signatures

* 6 credits are required IF the student is carrying a "minor" toward their degree.
 Form revised August 2014

Appendix C. Department of Ecosystem Science and Management
Graduate Examination Check Sheets.

M.S. Degree Final Oral Exam Check Sheet

Ph.D. Degree Candidacy Exam Check Sheet

Ph.D. Degree Comprehensive Exam Check Sheet

Ph.D. Degree Final Oral Exam Check Sheet

M S Degree Final Oral Exam Checksheet

Student Name: _____ PSU ID# _____
LASTNAME, Firstname

Yes No	Date	Adviser's Initials	Specific Criteria
			Does the student have any "Provisional Admittance" criteria that need removed?
			Does the student have at least 30 credits?
			Has the student earned at least 20 of the above mentioned 30 here at University?
			Does the student have at least a 3.0 GPA?
			Has student met the 5-hour SARI Seminar Requirement/Research Communication and Integrity?
			Has student taken / provided proof of CITI on-line portion of SARI requirement?
			Does student have at least 12 credits at 400- and 500-level (STATS for WFS and FOR R students does not count towards the 12 credits)?
			Does student have at least six (6) STATS credits at the 400- or 500-level? (Soils students require 3 STATS credits at the 500 level)
			Does the student have at least one (1) credit of Colloquium? (FOR R/SOILS/WFS 590)
			Does the student have at least six (6) thesis 600 credits?
			Are there no more than six (6) thesis credits with a "quality letter grade?"
			Are there at least 18 credits at the 500- and 600-level (Excluding 602)? ONLY six (6) thesis 600 credits may count toward this 18.
			Are there at least 12 credits in "the major" courses?
			Is the student carrying a Minor or in a Dual Degree Program? If so, in what program?
			If carrying a Minor; are there at least six (6) credits in the Minor?
			If carrying a Minor, are at least 3 of the 6 credits at the 500-level?
			Does the student have any MISSING or DEFERRED Grades?
			Has the student met the requirements of the degree and major within eight (8) years of admission?
			Have TA requirements been met? _____ List semesters.
			If an "extension" has been granted, through what semester and year?

Thesis
 Title: _____

Adviser confirms all requirements have been met. The Graduate School will not be notified of successful completion without this form being completed.

 Adviser Signature

 Student Signature

Ph.D. Degree Candidacy Exam Check Sheet

Student Name: _____ PSU ID# _____
LASTNAME, Firstname

Yes No Date Name	Specific Criteria
	Date M.S. was conferred
	M.S. Major
	College or University of M.S. Degree
	Does the student have any "Provisional Admittance" criteria that need removed?
	Does the student have at least 18 graduate credits following B.S.?
	Does the student have at least a 3.0 GPA?
	Has student met the five-hour SARI Seminar Requirement / Research Communication and Integrity?
	Has student taken / provided proof of CITI on-line portion of SARI requirement?
	Is the student carrying a Minor or in a dual degree program? If so, in what program?
	Does the student have any MISSING or DEFERRED Grades?
	Will the student be registered during the semester of the Exam?
	Are there more than 12 credits of subject 600/610 carrying a quality letter grade?
	No 601 courses should be taken prior to the Candidacy Examination
	Candidacy Examination Date and Time
	Candidacy Examination Location
	Candidacy Examination Chair
	Candidacy Examination Committee Member
	Candidacy Examination Committee Member
	Candidacy Examination Committee Member
	If carrying a Minor or enrolled in a dual-degree program, Candidacy Exam Minor/dual degree program Committee Member

Advisor Approval Signature _____

Ph.D. Degree Comprehensive Exam Check Sheet

Student Name: _____ PSU ID# _____
LASTNAME, Firstname

Yes No Date Name	Specific Criteria
_____	Has the student completed all of their graduate course work? (Submit GAP Plan indicating completed courses).
_____	Does the student have at least a 3.0 GPA?
_____	Has student met the five-hour SARI Seminar Requirement / Research Communication and Integrity?
_____	Has student taken / provided proof of CITI on-line portion of SARI requirement?
_____	Is the student carrying a Minor or in a dual-degree program? If so, in what program?
_____	Does the student have any MISSING or DEFERRED Grades?
_____	Date of Candidacy Examination
_____	Will the student be registered during the semester of the Comprehensive Exam?
_____	Is the student within the eight-year time limit from date of Candidacy Examination?
_____	Has department certified student has met the English Competency Requirement?
_____	Are there more than 12 credits of subject 600/610 carrying a quality letter grade?
_____	No 601 courses should be taken prior to the Comprehensive Examination
_____	Has the student completed a Doctoral Committee Appointment Signature Form?
_____	Comprehensive Examination Date and Time
_____	Comprehensive Examination Location
_____	Comprehensive Examination Chair / Adviser Name
_____	Comprehensive Examination Co-Chair / Co-Adviser Name, if there is one
_____	Comprehensive Examination Major Committee Member
_____	Comprehensive Examination Major Committee Member
_____	Comprehensive Examination Outside Major Committee Member
_____	Comprehensive Examination Outside Unit Committee Member
_____	Comprehensive Examination Special Member
_____	If carrying a Minor/dual-degree program, Comprehensive Exam Committee Member

Advisor Approval Signature _____

Ph.D. Degree Final Oral Exam Check Sheet

Student Name: _____ PSU ID# _____
LASTNAME, Firstname

Yes No Date Name	Specific Criteria
_____	Does the student have any "Provisional Admittance" criteria that need removed?
_____	Does the student have at least a 3.0 GPA?
_____	Has student met the five-hour SARI Seminar Requirement / Research Communication and Integrity?
_____	Has student taken / provided proof of CITI on-line portion of SARI requirement?
_____	Has student received at least one credit of SUBJ 590?
_____	Is the student carrying a Minor/dual-degree program? If so, in what program?
_____	If the student is carrying a Minor/dual-degree program, has he/she earned at least 15 credits in the Minor or required credits in the dual-degree program?
_____	Does the student have any MISSING or DEFERRED Grades?
_____	Will the student be registered during the semester of the Comprehensive Exam; may not be in SCHADD status?
_____	Date of Candidacy Examination
_____	Date of Comprehensive Examination
_____	Have at least three months passed since the date of Comprehensive Exam?
_____	Is the final oral exam being held within six years from date of passing Comprehensive Exam?
_____	Has the student been registered continuously each Fall and Spring semester beginning with the Semester following the passing of the Comprehensive Examination; does the student meet the "continuous registration requirement?"
_____	List Semesters of continuous registration.
_____	Is the student within the eight-year time limit from date of Candidacy Examination?
_____	Are there more than 12 credits of subject 600/610 carrying a quality letter grade?
_____	Is the 602 teaching requirement of 1 credit met?
_____	Has student met the two-semester, one-year full-time residency requirement?
_____	List semesters to verify.
_____	Final Oral Examination Date and Time
_____	Final Oral Examination Location
_____	Final Oral Examination Chair / Adviser Name
_____	Final Oral Examination Major Committee Member
_____	Final Oral Examination Major Committee Member
_____	Final Oral Examination Outside Major Committee Member
_____	Final Oral Examination Outside Unit Committee Member
_____	Final Oral Examination Special Member
_____	Have TA Requirements been met? _____ List Semesters
_____	Thesis Signature Page ONLY ... Special Signatory

Thesis Title: _____

Advisor Approval Signature _____

Appendix D. Department of Ecosystem Science and Management Exam Request Forms.

MS Final Oral Exam / Thesis Defense Request Form

Ph.D. Candidacy Exam, Comprehensive Exam, Final Oral Exam / Dissertation Defense Request Form

**Department of Ecosystem Science & Management
Doctoral Student - Schedule of Examination Request Form**

Type of Exam _____

Student's Name	Student's Penn State ID#
Degree: <u> Ph.D. </u>	Major: _____
Dual Title: _____	Minor: _____

Examination Date, Time, and Location: _____

If Final Oral Defense,
provide Thesis Title here

If Candidacy Examination, complete this section:

Chair of the Committee: _____

Other Member of the Committee: _____

Other Member of the Committee: _____

Other Member of the Committee: _____

Other Member of the Committee: _____

If Comprehensive Examination or Final Oral Examination, complete this section:

Chair of the Committee: _____

Co-chair (if applicable): _____

Major Field Member(s): _____

Outside Member(s): _____

Minor Field Member (s): _____

Special member(s): _____

This request form must be submitted to the **Ecosystem Science & Management Graduate Studies Office located in 319 Forest Resources Building** at least four weeks prior to the scheduled date of examination to allow for required processing to and return from Graduate Enrollment Services and any necessary distribution to the committee members via campus mail, email, and/or ListServ communication channels. Prior to scheduling a Comprehensive Examination or Final Oral Examination, a **Ph.D. Committee Appointment Signature Page must be completed** soon after passing of the Candidacy Exam and must be on file.

Appendix E. Department of Ecosystem Science and Management
M.S. Graduate Student Committee Policies and Procedures
and Master's Committee Appointment Signature Form

M.S. Graduate Student Committee Policies and Procedures and Master's Committee Appointment Signature Form

(For a complete list of master's committee policies, please refer to the *Departmental Graduate Studies Handbook*)

1.) Justification

A graduate student's committee is responsible for approving a student's program of study; providing constructive input to help guide the student's research/scholarship; promoting effective communication among the graduate student, committee chair/adviser, and other members of the committee; and, more generally, for helping to promote the successful completion of the student's program. The committee should be appointed as soon as possible in a master's degree program. The following Departmental policies and procedures are intended to help achieve these goals, to minimize misunderstandings, and to help foster a collegial relationship among the graduate student, the committee chair/adviser, and the members of the committee throughout the graduate student's program. Each master's degree student, adviser, and committee member should receive a copy of these policies and procedures.

2.) Policies and Procedures for Master's Students and Committees

- A. The **master's committee** should meet with the student **at least once per year** to
 - a) provide guidance;
 - b) finalize and approve the research proposal of the student so that there is a clear understanding of the research goals and objectives;
 - c) assess the quality and progress of the research; and
 - d) discuss programmatic issues (e.g., course requirements).
- B. **Both the adviser and the student** are responsible for providing a copy of the final draft of the master's thesis to the committee **at least two weeks prior** to the scheduled date of the Final Oral Examination
- C. **Both the adviser and the student** are responsible for ensuring the **completion** of a **final draft** of the thesis **and for adequate consultation** with the members of the master's committee, **well in advance** of the Final Oral Examination. Major revisions of the thesis **should be completed before** the Final Oral Examination. The thesis should be **complete and in its final form with corrected and polished content and style, appropriate notes, bibliography, tables, etcetera, at the time it is distributed to the committee members prior to the Final Oral Examination. *If committee members find that the draft submitted to them is not in this form, the adviser is notified and postponement of the examination is considered at least one week prior to the scheduled date of the Final Oral Examination.***
- D. **If a committee member finds that the final draft is not correct and polished with respect to content and style, it is his/her responsibility to notify the committee chair/adviser at least one week in advance of the final oral examination date. The committee member should indicate his/her concerns regarding the draft and recommend consideration of postponement of the examination to the committee chair/adviser. The committee chair/adviser, in consultation with committee members, is responsible for notifying the student and assessing whether the student can make the**

necessary revisions to the final drafter before the scheduled examination date. If it is determined that revisions cannot be made in time the examination should be postponed. **If differences exist among committee members**, the Department's Graduate Program Coordinator (or Department Head) should be consulted to hear the expressed concerns and determine whether the examination should continue as scheduled or be postponed.

- E. **If the thesis is deemed unsatisfactory at the time of the Final Oral Examination by at least two-thirds vote of the committee, the student will fail the examination.** If a student fails the Final Oral Examination, it is the **responsibility of the committee** to determine whether another Final Oral Examination may be taken by the student.
- F. The chair, or at least one co-chair, (adviser, or at least one co-adviser) must be a member of the graduate faculty of the specific master's program in which the student is enrolled. A retired or emeritus (graduate) faculty member may chair a master's committee if he/she was officially appointed and began chairing the committee prior to retirement, and has the continuing approval of the Graduate program Coordinator and Department Head. The primary duties of the chair/adviser are to
- a) maintain the academic standards of the master's program and to assure that all procedures are carried out fairly;
 - b) ensure that the examination is conducted in a timely fashion;
 - c) arrange and conduct all meetings of the committee; and
 - d) ensure that the requirements set forth by the committee are implemented in the final version of the student's academic plan and in the final version of the student's thesis.
- G. A master's committee must consist of three or more active members of the University Graduate Faculty, which includes at least two members from the student's major field (e.g., FOR R, SOILS, or W F S). The thesis adviser must be a member of the master's committee. The thesis adviser serves as the chair of the committee. If the student is also pursuing a dual-title field of study, a co-chair/co-adviser representing the dual-title field of study must be appointed. In many cases, the same individual (e.g., thesis adviser) is a member of the Graduate Faculty in both the major and the dual-title field, and may, therefore, serve as sole chair/adviser.

At least one regular member of the master's committee must represent a field outside the student's major field of study in order to provide a broader range of disciplinary perspectives and expertise within the committee. This committee member is referred to as the "Outside Field member." In cases where the student is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member.

Additionally, if the student is carrying a minor, that field must be represented on the committee by a Minor Field Member.

A person who is not a member of the Graduate Faculty (and may not be affiliated with Penn State), but who is otherwise qualified and has particular expertise in the student's research area may be added as a Special Member upon recommendation by the adviser to the departmental Graduate Studies Coordinator. A Special member is expected to fully participate in all of the functions of the master's committee.

Master's Committee Appointment Signature Form

3.) Master's Committee Appointment Signature Page – Please refer to the previous page for detailed guidelines.

Please note: If the composition of the master's committee changes, a revised committee appointment signature page must be completed to the Department's Office for Graduate Studies as soon as possible. All members of a revised committee must be listed on the form; however, only the new committee member(s), the student, the adviser, and the Graduate Program Coordinator must sign it.

These policies and procedures pertain to master's students within the department only.

_____	_____		<input type="checkbox"/> New <input type="checkbox"/> Revised
*Student's Name	*PSU ID#	Check Committee Type:	
M.S.	_____	_____	_____
*Degree	*Major	Dual-Title	Minor

As the Student/Chair(Adviser)/Committee Member, I have carefully read and understand the policies and procedures outlined on pages 1 and 2 and agree to adhere to these policies and to serve as a member of the master's committee for the student specified, if official appointed by the Department's Graduate Studies Coordinator.

*Student:	_____	
	Signature	Date
*Chair/Adviser <small>must be major program member</small>	_____	_____
	Printed Name	Signature
	_____	_____
	Printed Name	Date
Co-Chair/Co-Adviser <small>if applicable</small>	_____	_____
	Printed Name	Signature
	_____	_____
	Printed Name	Date
*Major Field Member(s) <small>in addition to adviser/co-adviser</small>	_____	_____
	Printed Name	Signature
	_____	_____
	Printed Name	Date
*Outside Field Member	_____	_____
	Printed Name	Signature
	_____	_____
	Printed Name	Date
Minor Field Member(s) <small>if applicable</small>	_____	_____
	Printed Name	Signature
	_____	_____
	Printed Name	Date
Special Member <small>if applicable</small>	_____	_____
	Printed Name	Signature
	_____	_____
	Printed Name	Date

Name and Signature of the Graduate Program Coordinator or Graduate Program Head verifying the above information:

_____	_____	_____
Printed Name	Signature	Date

***Required Field**

Appendix F. Department of Ecosystem Science and Management
Professional Meeting Travel Award.

Purpose: To encourage and facilitate presentations of original research findings at scientific meetings by graduate students.

Award Amount: Maximum of \$300 per student to help defray costs to an international, national, or significant regional scientific meeting; this will always be pending availability of funds and will represent a match of an equal amount to CAS funds.

Award Frequency: Multiple awards may be given per semester depending on availability of funding and number of applicants, but only one award will be granted per student per degree.

Eligibility:

1. Must still be considered to be a student and must be officially enrolled for credits as a graduate student during either the semester in which the paper is presented or the semester immediately prior to the presentation.
2. Must give an oral or poster presentation at a significant regional, national, or international scientific meeting.
3. Must be the senior author of the presentation.
4. Student must base the presentation on original research conducted in partial fulfillment of their graduate degree at Penn State.
5. Students are limited to one award from the Department during a degree program.

To be Considered for the Award:

The student should submit a written request /proposal to the Graduate Program Coordinator through email to Diane Monteith (dxm66@psu.edu), 319 Forest Resources Building, as far in advance of the meeting as possible, to include the following:

1. Whether or not they received a travel award through the College;
2. Title and location of the meeting (Web link, brochure);
3. Description of what type of meeting it is;
4. Presentation **Abstract** with presentation title, author(s) name(s), objective, methodology, results, and conclusions, limited to one page, single-spaced, and informative relating to the student's thesis research;

5. Recommendation letter from adviser that student should participate in the meeting / be reimbursed for travel expenses; and
6. Statement of how award will be spent (e.g. lodging, vehicle rental, etc.).

Abstracts will be reviewed and ranked by the ESM Graduate Program Committee.

If given an award, the student should contact the Department's accounting office **in advance** of the meeting to arrange reimbursement of the travel award.

It is to the financial advantage of the student to pursue travel awards through the College of Agricultural Sciences program that entails matching funds from the Department of Ecosystem Science and Management (link: <http://gradstudents.cas.psu.edu/TravelAwards.htm>).

Revised 11/18/10

Appendix G. The Graduate School Check List - Requirements for Ph.D. Candidates.

Following is a summary of Graduate School requirements that Ph.D. students must meet before the Office of Graduate Programs may approve their graduation. Please use this as a guide for advising your students and provide a copy of it to students when they pass their Comprehensive Examination. The Graduate School sends copies to the students with the congratulatory candidacy letter. For more detailed information on these and other requirements, please refer to the Graduate Degree Programs Bulletin.

--**Residency requirement.** After passing the doctoral candidacy examination, students must be registered full time for two semesters in a twelve-month period. This may include the semester of candidacy examination if it is taken during spring or fall.

--A candidate for the Ph.D. must have satisfied the departmental communication and foreign language requirement (if applicable) before taking the comprehensive examination.

--Three or more months must have elapsed between the passing of the comprehensive examination and scheduling of the final oral examination.

--The final oral examination must be held within six years of the date the comprehensive examination was passed. If more than six years have passed, a second comprehensive examination must be given before scheduling the final oral examination.

--**Continuous registration requirement.** Students must be registered continuously each semester (excluding summers, but see below*) beginning with the semester following the passing of the comprehensive examination and continuing each semester until the final oral examination is passed.

--**Time limitations.** All requirements including submission of the thesis must be completed within eight years of the candidacy date.

--*Students **MUST** be registered the semester of candidacy examination, comprehensive examination and the final oral examination -- even if taken during summer session.

--No missing or deferred grades can appear on a student's transcript when the oral comprehensive examination or the final oral examination is scheduled.

--Students must have at least a 3.0 grade point average to schedule an oral comprehensive examination or final oral examination and to graduate.

--No more than 12 credits of thesis research (600/610) may be assigned a quality letter grade. Any credits over this maximum must be changed to 'R' before a student will be permitted to graduate.

**THESE ARE GRADUATE SCHOOL REQUIREMENTS ONLY AND DO NOT
INCLUDE SPECIFIC PROGRAM/DEPARTMENT REQUIREMENTS**

Suggested timelines for a Graduate Degree in ESM

MS

* ADVISERS - NO Thesis Grades except R are accepted by the Grad School for thesis hours taken beyond 6 hours

- 1) Meet with Adviser and determine first semester coursework – begin to complete the Graduate Academic Plan (GAP) and submit to the Graduate Staff Assistant, 319 FRB
 - 2) Complete CITI Training and give the certificate of completion form to the Graduate Staff Assistant, 319 FRB
 - 3) Develop a written tentative research plan with adviser
 - 4) Develop a written tentative course work plan with adviser
 - 5) Establish a potential list of committee members with adviser
 - 6) Through contact with potential committee members develop a proposed list of committee members in consultation with Adviser
 - 7) Complete Research Integrity (SARI) and Communications Training – during first Spring (For Spring 2015 the designation is: FOR/SOILS/WFS 597G, Research Integrity and Communications)
 - 8) Complete the Committee form (available from Graduate Staff Assistant) to establish committee
- Graduate Staff Assistant sends a memo to committee members to confirm appointment to committee
- 9) Have initial meeting with committee and discuss both the proposed research plan and the proposed list of course work – This is best done before the end of the second semester. Ideally, it should be done early in the second semester so the research plan can be revised in time to incorporate changes into field and/or lab work during the summer.
 - 10) Conduct research. Maintain contact with committee members as well as ongoing communication with adviser
 - 11) Draft written thesis. Provide copy to adviser for review and revision
 - 12) By DUE DATE provided by the Graduate School, file an intent to graduate. This usually occurs early in the final semester, with somewhat different deadlines for summer graduation. CHECK on this EARLY!

- 13) Schedule final thesis defense with committee members (informing Graduate Staff Assistant), leaving plenty of time for any thesis revisions between the final defense and the deadline for the submission of the final thesis to the graduate school
- 14) Complete thesis for submission to committee for review at least **2 weeks in advance** of final defense
- 15) Hold thesis defense
- 16) Chair of committee sends letter ESM Graduate Program Staff Assistant with results of the final defense
- 17) Obtain signatures from committee members regarding acceptance of thesis on the Master's Approval Page (this generally is completed when the committee is satisfied with the changes, but in some cases committee members may sign off prior to the completion of changes).
- 18) Submit checklist (Checklist for MS) signed by thesis adviser that requirements for MS have been met.

This checklist needs signed by adviser and ESM Grad Program Coordinator before a notice can be filed with Grad School by ESM Graduate Program Staff Assistant that the person has met all graduation requirements. Therefore, the Thesis should be submitted and accepted by the Grad School before the form is finalized. Communication with the ESM Graduate Program Staff Assistant is important if the Thesis is being submitted to the Grad School near the deadline, so all approvals are completed in a timely manner.

PhD

* ADVISERS - NO Thesis Grades except R are accepted by the Grad School for thesis hours taken beyond 12 hours (see above – 6 for MS – 12 for PhD)

- 1) Meet with adviser and determine first semester coursework
- 2) Complete CITI Training, if not completed for MS
- 3) Develop a written tentative research plan with adviser
- 4) Develop a written tentative course work plan with adviser
- 5) Complete Research Integrity (SARI) and Communications Training – during first Spring semester if not completed for MS (For Spring 2015 the designation is: FOR/SOILS/WFS 597G, Research Integrity and Communications)
- 6) Establish a potential list of committee members with adviser

- 7) Schedule candidacy exam with Program's Candidacy Exam committee. This should be done early – after 18 units of graduate credits (this number includes MS credits) have been completed, and no later than the THIRD semester of a PhD program. Use the Examination Request Form and submit it to the Grad Program Staff Assistant.
- 8) Committee chair should obtain the Report on Doctoral Candidacy form from the ESM Graduate Program Staff Assistant. When completed after the candidacy exam, the committee chair should return it to the ESM Graduate Program Staff Assistant immediately after the exam, for submission to the Grad School.
- 9) File Ph.D. Committee Appointment worksheet with the ESM Graduate Program Staff Assistant to appoint committee members soon after the candidate has passed the Candidacy exam.
- 10) Maintain communication with committee members during research and coursework following their appointment. At least annual progress meetings with committee members are expected, with a written progress report made available to the committee members by the student. Committee members should review coursework and research proposal at the first such meeting, provide feedback / recommendations, and approve the research and proposal plans.
- 11) Schedule Comprehensive Exam (Written and Orals) in consultation with adviser and committee members (use the form). THIS should occur when *essentially* all coursework is completed. Schedule comprehensive exam and inform the ESM Graduate Program Staff Assistant of the date, time and location. The ESM Graduate Program Staff Assistant uses the form you file to obtain and file a form with the Graduate School. The form must be filed with the ESM Graduate Program Staff Assistant AT LEAST four (4) weeks in advance of the exam!
- 12) Continue with research work and complete research. Maintain contact with committee members as well as ongoing communication with adviser.
- 13) Draft written thesis. Provide copy to adviser for review and revision
- 14) By DUE DATE provided by the Graduate School, file an intent to graduate. This usually occurs early in the final semester, with somewhat different deadlines for summer graduation. CHECK on this EARLY!
- 15) Complete dissertation research and writing. In consultation with adviser, schedule dissertation defense and file the Final Exam Scheduling Worksheet via ESM Graduate Program Staff Assistant at least four (4) weeks in advance of the exam.
- 16) Grad School forwards Final Exam Form to Committee Chair prior to the Dissertation Defense. Following the defense, Committee Chair files signed form with the ESM Graduate Program Staff Assistant.
- 17) Complete dissertation for submission to committee for review **at least 2 weeks in advance** of final defense.

18) Hold dissertation defense.

19) Obtain signatures from committee members regarding acceptance of dissertation on the Dissertation Approval Page.

20) Submit checklist (Checklist for Ph.D.) signed by dissertation adviser that requirements for PhD have been met.

This checklist needs signed by adviser and Grad Program Coordinator before a notice can be filed with Grad School by ESM Graduate Program Staff Assistant that the person has met all graduation requirements. Therefore, the Dissertation should be submitted and accepted by the Grad School before the form is finalized. Communication with the Graduate Program Coordinator and ESM Graduate Program Staff Assistant is important if the Dissertation is being submitted to the Grad School near the deadline, so all approvals are completed in a timely manner.

Suggestions for Improving This Document

I suggest the following for consideration:

Page No.	Suggestion

Name (optional) _____

Please submit to the ESM Graduate Program Staff Assistant, Room 319 FRB Bldg.