ECOSYSTEM SCIENCE AND MANAGEMENT (ESM)

Graduate Program Handbook

Forest Resources (FOR R)
Soil Science (SOILS)
Wildlife & Fisheries Science (WFS)

College of Agricultural Sciences at
The Pennsylvania State University

Revised: October 2021

See Dept. Share Point for all 'ESM Graduate Program' Forms

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SECTION I. GENERAL POLICIES

This document contains information for students enrolled in a graduate program within the Department of Ecosystem Science and Management (ESM) at the Pennsylvania State University. The main text describes the requirements of the Master of Sciences (M.S.) and Doctor of philosophy (Ph.D.) graduate programs. The appendices contain essential forms and checklists that should be referenced frequently during the graduate program. This is an open document revised regularly and suggestions for revisions can be sent to the Graduate Programs Director (Drohan).

Material in this document augments the Graduate School requirements as outlined in the:

- Graduate Bulletin: https://bulletins.psu.edu/graduate/
- Thesis and Dissertation Guide - https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/

Advisors *and* Students are responsible for knowing the regulations and meeting requirements of the Graduate School, the Department of Ecosystem Science and Management, and the degree.

While advisors, the Graduate School, and the ESM Graduate Education team are available for support, it is ultimately the student's responsibility to know and meet degree requirements.

Overview of Degree Programs

M.S. and Ph.D. degrees are conferred in the following three programs:

- Forest Resources (https://ecosystems.psu.edu/graduateprograms/forest-resources)
- Soil Science (https://ecosystems.psu.edu/graduateprograms/soil-science)
- Wildlife and Fisheries Science (https://ecosystems.psu.edu/graduateprograms/wfs).

The objective for students enrolled in a M.S. or Ph.D. is 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 in Sections III and IV under the detailed descriptions of the degree program majors.

In addition to these main areas of study, several dual-title programs are available that give students the option of enrolling in a secondary area of study to receive a dual-title degree. The following are the dual-title degrees available to graduate students in ESM:

- Dual-title degree in Biogeochemistry is available to Ph.D. students in Soil Science (https://www.biogeochemistry.psu.edu/).
- Dual-title degree in International Agriculture and Development (INTAD) is available to both Ph.D. and M.S. students in Forest Resources and Soil Science (https://agsci.psu.edu/international/graduatestudents/intad).
- Dual-title degree in Human Dimensions of Natural Resources and the Environment Program (HDNRE) is available to both Ph.D. and M.S. students in Forest Resources (https://agsci.psu.edu/graduatestudents/hdnre).
- Dual-title degree in Operations Research is available to both M.S. and Ph.D. students in Forest Resources (https://www.or.psu.edu/about-us/).

Each of the dual-title programs includes their own specific degree requirements that students must complete to receive the dual-title degree.

Guiding Principles for Good Practice in Graduate Education
The Department endorses the *Graduate School Guidelines for Recommended Practices in Graduate Education* (Appendix A). 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.gradschool.psu.edu/current- students/student/.

Diversity and Inclusion in ESM
The Department of Ecosystem Science and Management is a community of students, staff, and faculty that values and is committed to advancing awareness and inclusion of diversity and strives to create a climate of mutual respect for all. An environment of diversity and respect is critical to achieve and sustain excellence in learning, teaching, and research.

Further, the responsibility for our values lies within the department: the leadership, faculty, staff, and students. As such, we will hold ourselves to a high standard of excellence and will not stand for the discrimination and harassment of any group or individual. To achieve this, the ESM department will:

- Foster and maintain an environment of respect and inclusion.
- Ensure equal opportunities for all students, including underrepresented students, and to provide resources to ensure a quality learning environment.
- Hold students, staff, and faculty accountable according to Penn State policies and the Student Code of Conduct.

Reporting Incidents: Students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn State are urged to report these incidents as outlined on the University's Report Bias web page (http://equity.psu.edu/reportbias). Incidents of gender-based discrimination, abuse, or harassment should be reported.

Graduate Assistantships and Fellowships
Financial assistance should be available to well-qualified graduate applicants/students advised by graduate faculty members within the Department. The principal types of financial assistance for graduate students are *fellowships* and *assistantships*.

Graduate 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. Fellowship decisions are generally made in early February. For students to be most competitive for these opportunities, applications need to be completed by January 1. 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.

Graduate assistantships are arranged by faculty members, and assistantships are of two types. One type is externally funded from 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., departmental assistantships). Students supported through a departmental assistantship are expected to provide up to 20 hours a week of service to the department. This is often as a teaching assistant in any semester in which they receive departmental funding. Teaching assistants for specific courses will be assigned by the ESM Curriculum Committee; a listing of eligible TAs (based on receiving departmental tuition or stipend support) will be tracked by the Graduate Coordinator on a semester basis. All ESM graduate students who receive GIA (Penn State tuition dollars [not external dollars]) and GA (Penn State assistantship stipend [not external dollars]) support from the department are expected to provide up to 20 hours of service to the department per week.

Over the course of a degree a student may receive both types of financial assistance. The base level for graduate assistantships is Grade 12. 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 that 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).

Assistantships are offered for fall or spring academic semesters. Summer support is provided by the faculty member from project funds. Students need to clarify with their faculty adviser regarding summer financial support. Federal, state, and local taxes are withheld from monthly assistantship deposits according to regulations and University policy. The Department cooperates with graduate assistants in supplying factual information concerning assistantship duties needed for income tax returns.

Responsibilities of the Graduate Programs Committee

The Graduate Programs Committee is an elected committee of faculty members from ESM charged with graduate programs operations. Their responsibilities are to:

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

Responsibilities of the Director of Graduate Studies

The Director of Graduate Studies is an appointed ESM faculty member, and their responsibilities are to:

- Facilitate the nomination of outstanding applicants and enrolled students for Graduate Fellowships.
- Facilitate placement of prospective students and the orientation of new students.
- Oversee graduate student progress and certify program and graduation requirements.
- Evaluate requests for Graduate Student Travel Awards
- Serve as graduate student ombudsperson.
- Represent the Department at the College Graduate Coordinator Meetings.

Scheduling Graduate Level Courses
Most classes can be scheduled through LionPath, however, to schedule any of the following courses (regardless of program FORR, WFS or SOILS) the graduate student must contact the Graduate Program Coordinator (Monteith). The Graduate Program Coordinator will send the student a partially filled out *Request for Graduate Level Course Registration* form (Appendix B) to be completed by the student and advisor.

*ADVISORS - NO Thesis Grades (600 cr) except R are accepted by the Grad School for thesis hours taken beyond 12 hours (6 for MS – 12 for PhD on the respective Graduate Academic Program Forms)

- 596 Independent Studies Credits
- 600 Thesis Research Credits
- 601 Dissertation Full-time Credit
- 602 Supervised Experience / College Teaching Credits
- 610 Thesis Research, Off-Campus Credits
- 611 Ph.D. Dissertation Part-time Credit

SECTION II: TRAINING REQUIREMENTS AND OPPORTUNITIES FOR ALL GRADUATE PROGRAMS IN ESM

All graduate degrees require students to complete Scholarship and Research Integrity (SARI) training. In addition, 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. Details about these training requirements follow.

Scholarship and Research Integrity (SARI)

SARI @ PSU (Scholarship and Research Integrity) is a responsible conduct of research (RCR) education program for students, postdocs, and faculty at Penn State. The SARI program is designed to create an awareness of ethical principles and established professional norms in the performance of all activities related to scholarship and research. Ultimately, our goal is to further foster trust among scientists and to increase the public's support for research.

All scholars confront ethical issues in their professions. Training is critical to prepare students and researchers to address ethical challenges that may arise when conducting research. Both the NIH and NSF have requirements for responsible conduct of research (RCR) training for students, postdoctoral researchers, and other trainees working on research supported by either agency. **Penn State requires RCR training for all graduate students, post-docs, and new faculty to ensure the ethical conduct of research at the University.**

The SARI program has two components:

1. Online Training: Completion of at least one online course in CITI (Collaborative Institutional Training Initiative): Responsible Conduct of Research (RCR), Human Subjects Research (IRB), or Animal Research (IACUC). Most students just need RCR training, but some may need IRB and IACUC. Check with your adviser and the graduate program adviser, to determine if an additional CITI course is necessary for your research project.

- SARI Online Ethics Training. Graduate students: 1) Go to the portal of the Collaborative Institutional Training Initiative (CITI) program, online at: http://citi.psu.edu/; 2) Log into CITI and click View Courses; 3) add a course; 4) Check "Responsible Conduct of Research Training"; 5) Complete the seven basic modules plus one of the elective modules. Topics for the basic modules are: Authorship, Collaborative Research, Data Management, Mentoring, Peer Review, Research Misconduct, Plagiarism. Choose one from these three electives: Using Animal Subjects in Research; Research Ethics & Society; or Environmental & Social Dimensions of Engineering Research. A CITI completion form showing successful completion of these eight modules must be turned into the ESM Graduate Coordinator.
- All graduate students being advised by ESM Faculty are required to complete the online portion of this program **within the first year of graduate studies** and submit

evidence of completing the on-line program to the Graduate Coordinator (Monteith)

2. Discussion-based Education: Participation in a minimum of 5 hours of in-person, discussion-based educational activities that address topics related to the Responsible Conduct of Research (RCR) before graduation. This is a one-time requirement that does not need to be fulfilled each year. **To fulfill this requirement, students in ESM are required to register in their first year of study for the course, "Research Integrity and Communication" (FORR/SOILS/WFS 597) (2 credit, typically in Spring).** The participation in and completion of the 5-hour SARI training is a degree requirement that students must complete to file their Intent to Graduate.

- Discussions will encompass both universally relevant and discipline-specific material. Students complete this requirement in the FOR/SOILS/WFS 597 "Research Integrity and Communication" course. Topics of discussion regarding research ethics will be tailored to the individual class, but may include: Topics covered in CITI training, Conflicts of Interest, Protections of Human and Animal Subjects in Research, Relationships Among Researchers, Means for responding to Errors, Misunderstandings, Disputes, or Misconduct.

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/programs/about-the-aeocpt) 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.

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 (Graduate Coordinator in ESM) and reported to the student; Applied Linguistics staff assistants do not supply scores.

Department of Ecosystem Science and Management Graduate Student Travel Award.
The purpose of the ESM graduate student travel award is to encourage and facilitate presentations of original research findings at scientific meetings by graduate students. Awards are a 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 is considered a match to College of Agricultural Sciences Graduate Student Travel Award (https://agsci.psu.edu/students/graduate/funding-opportunities/travel-awards). Only one ESM

award will be granted per student per degree.

For students to be eligible to apply for the travel award they must:

- Still be a student and 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.
- Give an oral or poster presentation at a significant regional, national, or international scientific meeting.
- Be the senior author of the presentation.
- Base the presentation on original research conducted in partial fulfillment of their graduate degree at Penn State.
- Students are limited to one award from the Department during a degree program.

To Apply for the Award: The student should submit a written request to the Graduate Program Coordinator through email as far in advance of the meeting as possible and include the following:

- title and location of the meeting (Web link, brochure);
- description of what type of meeting it is;
- presentation abstract with presentation title and authors and informative relating to the student's thesis research;
- brief email from the adviser stating that student should participate in the meeting/be reimbursed for travel expenses;
- statement of how award will be spent (e.g. lodging, vehicle rental, etc.), and
- confirmation of application for a College of Agricultural Sciences Graduate Student Travel Award.

If given an award, the student should contact the Department's accounting office located in the main office on the first floor of the Forest Resources Building in advance of the meeting to arrange reimbursement of the travel award.

SECTION III: MASTER OF SCIENCE DEGREE

The M.S. Degree

The M.S. is a research-oriented degree. Persons undertaking it may terminate their formal education with the degree or proceed on for a Ph.D. Objectives of M.S. studies include enhancing the understanding of an area of science beyond the baccalaureate level and 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 the student's 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. A suggested timeline for a M.S. degree in ESM can be found in Appendix C.

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 will develop a Graduate Academic Plan** (GAP; Appendix D for FOR and SOILS and Appendix E for WFS) for approval by the student's committee. The M.S. GAP outlines degree requirements, which are described in more detail below. If pursuing a dual-title program, the student should consult with the adviser and the dual-title's chairs regarding courses required above and beyond the home department's requirements.

Degree requirements for all three programs (FORR, SOILS, WFS) are described below and can be found in the respective Graduate Academic Plan (GAP) form.

- Admission deficiencies, if any, must be removed to the satisfaction of the student's committee. Courses taken to overcome deficiencies are excluded from degree credit requirements.
- Major field courses/Formal Courses
    - At least 12 credits in 400- and 500-level courses appropriate to the student's field of interest, excluding the specific course requirements listed below.
    - At least 6 credits of 400- or 500-level statistical methods courses 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.
    - Optionally, at least 6 credits of 400- or 500-level courses are taken in the minor, dual-title or general studies area, according to the minor department or dual-title program. Seminar/colloquium courses are excluded, except where specifically allowed by the program.
    - One graduate seminar/colloquium course (1 credit) is required in which a 20-minute oral presentation is made by the student. This requirement must be met in a regularly scheduled FOR/SOILS/WFS 590 course that should be taken near the end of the student's program so they can present their thesis research.
    - The 2-credit course Research Integrity and Community (FOR/SOILS/WFS 597) is required and includes the mandatory SARI and CITI training (See Section II.A. above).
    - Students in the SOILS program are required to take 1 credit of SOILS 602

"Supervised College Teaching". This requirement can be met by students working with a faculty member to develop a plan for to engage meaningfully in teaching and to build teaching skills. The supervising faculty mentors the TA and assigns a grade at the end of the semester. Students appointed as teaching assistants (TAs) through the department can register to receive 602 credits in the semester they are a TA with the expectation that the graduate student has a meaningful opportunity to develop their teaching skills. 602 credits will not be counted in fulfilling any specific requirement for an advanced degree (i.e. it is not counted toward the 30 credits required for a MS).

- A thesis directly relevant to the student's major field, of at least 6 credits and no more than 15 credits is required (courses FOR/SOILS/WFS 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.
- At least 18 credits of the total M.S. program must consist of 500- or 600-level courses (excluding any 602 credits).
- Additional courses and requirements as required by the advisor and advisory committee.

- A final examination (defense of thesis) is required.

Committee for the MS Degree

It is important that thesis 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.

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 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.

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

- maintain the academic standards of the master's program and to assure that all procedures are carried out fairly;
- ensure that the examination is conducted in a timely fashion;
- arrange and conduct all meetings of the committee; and
- 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.

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 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 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 the functions of the master's committee.

- University and Department eligible faculty
  - A list of department faculty and their research areas can be found here: https://ecosystems.psu.edu/directory/faculty?utm_source=ecosystems.psu.edu&utm_medium=Link&utm_campaign=Left+Navigation
  - A list of University Graduate Faculty (by program) eligible to serve on graduate degree committees can be found here: https://secure.gradsch.psu.edu/gpms/
- When appointing the M.S. advisory committee, the advisor shall use the "MS Committee form" (Appendix F). **The committee should be appointed as soon as possible in a master's degree program.**

Research and Thesis for the M.S. Degree

The thesis adviser will be consulted concerning an appropriate topic early in the student's residence. An acceptable M.S. thesis topic is expected to have attributes like doctoral research but be less rigorous. Thesis topic will be influenced by the intended career, degree of experience of the candidate, and the time and resources available for the program.

The M.S. Proposal and Proposal Meeting

Students must present a research proposal to their committee within the first year of their program. Typically, the proposal includes a literature review and a thesis research outline including hypotheses, objectives, and procedures. Students should consult with their advisors for guidance on the content of the research proposal, schedule a meeting with their committee to discuss the proposal, and deliver a copy of the proposal to each member of the committee **at**

least one week before the scheduled meeting. The committee will provide recommendations for changes as needed. If a new draft is required, it should be accomplished within three months.

- Proposal approval by committee members is required and a department assessment is made with the *MS Rubric for Research Proposal Eval form* (Appendix G and found in the SharePoint Assessment forms folder under the ESM Graduate Program folder). This form is critical to complete for an annual evaluation to the graduate school.

M.S. Committee Meetings

Annual (or more frequent) meetings of the student's committee should be scheduled to review the progress of the thesis research. While no annual evaluation of the MS student is required like that of the PhD student, it is highly recommended the student receive written committee feedback.

- 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.

Final Examination for the M.S. Degree

Leading up to the final exam for the M.S. degree, students must complete the requirements listed here, which are also summarized in "*M.S. Degree Final Oral Exam check sheet*" (Appendix H).

- The student must file their Intent to Graduate through LionPATH early (first week or so) in their final semester.
- The M.S. final oral examination is scheduled by the adviser in consultation with the student and the committee members. The "*Masters Student Schedule of Examination Request Form*" (Appendix I) should be turned in to the Graduate Studies Office three weeks prior to the scheduled date of examination.
- **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.
- **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*.
- 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.

- The student's committee administers the final oral examination. The final examination is focused on 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.
- 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.
    - **Thesis assessment by committee members is required by ESM and a department assessment is made with the *MS Assessment Form - Communication Evaluation form* (Appendix J and found in the Assessment forms folder, of ESM Graduate Program folder, on SharePoint). This form is critical to complete for an annual evaluation to the graduate school.**
- Students submit their thesis to the University through the Electronic Thesis and Dissertation Application (https://submit-etda.libraries.psu.edu/main), which will be digitally signed by their committee members via the eTD application.

SECTION IV. DOCTOR OF PHILOSOPHY DEGREE (PH.D.)

The Ph.D. Degree

The student should become familiar with the following requirements as well as those posted by the Graduate School.

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 that 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. student 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 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 Ph.D., the candidate must: (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. These steps are described in greater detail below.

Following admission, even if coursework and thesis research have been initiated, full acceptance into the Ph.D. program requires passing the Qualifying Examination early in the residency period (see section E.1 below).

Students are encouraged to use the "Check List of Graduate School Requirements for Ph.D. Candidates" (Appendix K) and consult the "Suggested timelines for a Graduate Degree in ESM" (Appendix L).

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. Following the Qualifying Exam, the student and adviser develop a Graduate Academic Plan (GAP, Appendix J) for approval by the student's committee. The 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.

- Subject matter deficiencies, if any, must be removed to the satisfaction of the student's committee. A doctoral committee cannot be appointed until the student has passed the Qualifying Exam (see section IV.C below on committee appointment).
- 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 program areas.

- 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/colloquium, supervised teaching credits, research credits, and the Research Integrity and Communication course) will need to be taken. A typical Ph.D. student will have approximately 30 to 40 credits in formal course (excluding seminar/colloquium, research, and teaching credits) work beyond the baccalaureate degree.
- In addition to those credits required of FOR/SOILS/WFS 590 for the M.S., Ph.D. students need one additional credit of FOR/SOILS/WFS 590 while in the Ph.D. program, typically taken in the final semester of their program. In this course they are required to present a seminar/colloquium that has the 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/colloquium has been presented.
- One semester of the course FOR/SOILS/WFS 597 "Research Communication and Integrity" is required (see Section II.A. for more information). This course fulfills the Penn State requirements related to research integrity training, in addition to the CITI online training required of all graduate students.
- All Ph.D. students are required to assist in teaching an undergraduate class and to enroll for at least 1 credit of FOR/SOILS/WFS 602 credit "Supervised Experience in College Teaching" during their program. NOTE: Soils Graduate students are expected to TA at least twice at the PhD level. 602 credit requirements can be met by the student working with a faculty member to develop a plan to build teaching skills. The supervising faculty mentors the TA and assigns a grade at the end of the semester. Students appointed as teaching assistants (TAs) through the department can register to receive 602 credits in the semester they are a TA with the expectation that the graduate student has a meaningful opportunity to develop their teaching. Based on Graduate School guidelines 602 credits will not be counted in fulfilling any specific requirement for an advanced degree (i.e. it is not counted toward the 30 credits required for a MS).
- Credits for courses earned in graduate studies at other institutions may be applied toward the degree as follows:
    - The student's committee may approve pertinent courses equivalent to 400- or 500- level formal courses at The Pennsylvania State University.
    - The courses fall within limitations prescribed by the Graduate School for transferable credits (see Graduate Bulletin for transfer process).
- 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.

Committee for the Ph.D. Degree
The Graduate School guidelines for the Ph.D. committee (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-603-phd-committee-responsibilities/) should be consulting for additional information.

- 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 and establish 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).
- 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 director of graduate programs. 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.
- 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 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), 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."
    - 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.
    - University and Department eligible faculty
        - A list of department faculty and their research areas can be found here: https://ecosystems.psu.edu/directory/faculty?utm_source=ecosystems.psu.edu&utm_medium=Link&utm_campaign=Left+Navigation
        - A list of University Graduate Faculty (by program) eligible to serve on graduate degree committees can be found here: https://secure.gradsch.psu.edu/gpms/
- The Ph.D. Committee shall approve a written assessment of the student's progress on an annual basis. This assessment will: Include a review of any prior annual assessments.
    - Address the quality of the student's research and progress toward their degree, including:
    - Recommendations, as appropriate, to improve the student's research;
    - Any concerns identified and recommend actions to address the concerns.
    - Assess the student's professional development and provide any recommendations as appropriate and that reflect, to the extent possible, the student's career goals;
    - Accurately reflect the assessment by all members of the committee, including any minority opinions.
    - Example Form: https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/annual-assessment-phd-student-form/

Research and Thesis for the Ph.D. Degree

Acceptable Ph.D. research must be original in its conception. Such research consists of scholarly inquiry, hypothesis testing, investigation, or experimentation having as its core 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.

The Ph.D. Proposal and Proposal Meeting

Students must present a research proposal to their committee within six months of passing their Qualifying Exam. Typically, the proposal includes a literature review and a thesis research outline including hypotheses, objectives, and procedures.

The proposal is to be prepared in accordance with the Agricultural Experiment Station project format (essentially USDA-NIFA format). Students should consult with their advisors for guidance on the content of the research proposal.

The student and advisor must schedule the proposal meeting with their committee to discuss the proposal and deliver a copy of the proposal to each member of the committee at least **one week before** the scheduled meeting.

At proposal meeting the Committee will also review/approve the PhD Graduate Academic Plan (GAP) form (Appendix M).

Prior to, during, or after the proposal meeting the committee will provide recommendations for additions and modifications to be made. If a new draft is required, it should be completed within three months. Copies of the proposal and feedback are to be retained by the adviser.

- **Proposal assessment by committee members for departmental reporting to the Graduate School, is required by ESM and made with the *Rubric for Evaluating PhD Approved Research Proposal form* (Appendix N and found on SharePoint in the Assessment forms folder, under the ESM Graduate Program folder). This form is for an annual ESM program evaluation to the graduate school**.

Annual Ph.D. Committee Meeting
The student will schedule committee meetings at least once each academic year to review progress in course work and dissertation research. The PhD GAP form should be reviewed once a year too. The student will give a progress report to the committee at the meeting. The finished research will be assembled in approved thesis format (more information below).

Ph.D Examinations
Ph D. students must complete three examinations as part of their program: Qualifying Comprehensive, Final Oral Examinations. Academic policies for each exam are provided by the Graduate School and it is strongly recommended that students consult these policies as they are updated regularly and are the authority.

- Qualifying Exam: https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-604-qualifying-exam/
- Comprehensive Exam: https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-606-comprehensive-examination-research-doctorate/
- Final Oral Exam: https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-608-final-oral-examination-research-doctorate/

Qualifying Examination
The purpose of the Qualifying Exam is to assess the student's knowledge and understanding of topics and basic principles that are important in their program, as well as their intellectual capability for study at the doctoral level. English competency is assessed at the same time as the Qualifying exam (see section A below and https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-605-english-competence-research-doctorate/).

Each Ph.D. program (FORR, SOILS, WFS) has its own *Qualifying Exam Committee* and *Qualifying Exam Chair*. The three-member Qualifying Committee is comprised of two members

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 on the Graduate Program Committee (GPC). The GPC member acts as the Qualifying Exam Chair. If the student's advisor is on the Qualifying Exam Committee they need to find a substitute committee member for the exam, in consultation with Qualifying Exam Chair. In rare cases it is not possible for either of the two GPC members from the program to serve as chair, another member of the GPC will be asked to serve in that role. If the student is pursuing a dual-title degree program, a member of that program may have to be added to the Qualifying Exam Committee membership. The student, advisor, and Qualifying Exam Chair should consult with the dual-title program guidelines when arranging for the exam.

The committee is expected to explore the student's knowledge of the scientific method, problem-solving ability, and interpretation of experimental results. Responsibilities of the Qualifying Exam Chair include monitoring procedure and content, as well as participating in the questioning of the student and voting. 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 informed by the WFS Qualifying Exam Committee chair of the results.

The Qualifying 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 if they come to the program with a M.S. or similar experience, or third semester if they do not. The exam must occur after the student completes 18 credit hours beyond the baccalaureate and before the end of the third semester in the program. All exams administered must be approved by the Director of Graduate Studies. The advisor must schedule the exam with the Qualifying Exam Chair and Graduate Coordinator at least one month before the exam is to be taken. A copy of the exam regulations should be provided to all Qualifying Exam Committee members.

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

Assessment Of English Competency

The assessment of English competence will be made at the Ph.D. Qualifying Examination. Candidates for the degree of Doctor of Philosophy in FORR, SOILS, and WFS will be required to demonstrate a high level of competence in the use of the English language (see https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-605-english-competence-research-doctorate/).

The Qualifying Exam Committee will assess both written and oral English competence. Written exam questions (possibly non-subject matter) will be part of the exam and the Ph.D. student also will be expected to demonstrate English competence in the oral portion of the exam. 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 Qualifying Exam Committee determines if the student meets the English language requirement with an exam decision of "Satisfactory" or "Unsatisfactory". In the case of Unsatisfactory the committee decides upon any recommended remedial action. The student maybe required to pass with at least a "B" grade courses recommended by the student's Qualifying Exam Committee in consultation with the student's adviser. Potential recommended courses include ESL 114G (Basic) and/or ESL 116G (Reading and Writing) for students with English as a second language, while native speakers of English may be recommended for ENGL 202 (Effective Writing; with several topical sections) or ENGL 418 (Advanced Technical Writing and Editing). Once remedial requirements are fulfilled the student will be re-evaluated for the English competence component of the Ph.D. Qualifying Exam. If a student fails to demonstrate a high level of English competence at the second assessment, the Qualifying Exam Committee will recommend to the Director of Graduate Studies and Department Head that the student not be allowed to continue in a Ph.D. program.

Qualifying Exam Planning

Candidates must be registered for the semester (excluding summer session) in which the Qualifying Examination is taken.

- FORR and SOILS students should deliver a packet consisting of a CV, a copy of undergraduate and graduate transcripts (can be unofficial), abstracts of M.S. thesis and any publications, and goal statement from the admissions application to the committee **one month** before the oral exam date.
- WFS students should deliver a packet consisting of a copy of their (unofficial) transcripts, and outline of their proposed course of study including how courses fit into requirements, and an updated copy of their CV **one month** before the oral exam date.

Regardless of program, the duration for the oral examination (including Assessment of English Competency) is 2 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. At the end of the questioning period, each of the three committee members will be asked to rate the candidate's performance. Additional questions concerning the examination should be directed to the thesis adviser or the program Qualifying Exam Chair.

Evaluation of Qualifying exam performance:

- Pass without reservation.
- Fail without reservation.
- Fail with the opportunity to retake the examination at a later date. No more than one retake no later than one month following the first examination will be allowed.

Reporting results: The Qualifying Exam committee chair submits the Qualifying Examination results to the ESM Director of Graduate Studies (Drohan) and the Graduate Program Coordinator (Monteith) in writing immediately following the examination, including results of the assessment of English Competency. The Qualifying Exam committee chair also reports specific course deficiencies and other remedial actions recommended by the committee to the faculty adviser. Following passing of the Qualifying 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. It is the responsibility of the adviser to ensure that stipulations from the Qualifying Examination are satisfied in the Graduate Academic Plan (Appendix M) approved subsequently by the student's committee.

Qualifying Exam Procedures by Program

Forest Resources

The Qualifying 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 Qualifying Exam Committee Chair) two weeks before the oral exam. One paper will be a scientific study and the other an opinion or "current topics" piece. The student will write an essay about each paper, addressing the following questions. The essay will be returned to the committee one week prior to the oral exam.

Questions for the scientific paper:

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

Questions for the opinion piece:

- What point are the writers trying to make? Why is it important?
- What evidence do the authors present to support the argument and/or conclusions?
- Is the author's argument persuasive?
- What arguments have been or might be made opposing the author's arguments on the issue?
- During the oral examination the committee will evaluate the student through questions and discussion. Committee members will take turns asking questions that may be based on the students written responses, their basic scientific knowledge, or their critical thinking skills. At the end of the oral exam the committee will vote on the exam outcome and assess the student based on their written and oral communication, understanding of the scientific method, and ability to think critically (See Appendix O for FORR Qualifying Examination Rubric).

Following the qualifying exam, regardless of the outcome, the exam 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.

Soils

The exam consists of written and oral components. Two weeks in advance of the scheduled oral qualifying exam the student will be assigned a peer-reviewed research journal article selected by the student's adviser and the Qualifying Exam 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 15-minute presentation describing and critiquing the article. The oral assessment will start with the 15-minute oral presentation on the article by the student, followed by questions from the committee. Each member of the committee will be asked to evaluate the candidate's writing and speaking competency.

Wildlife and Fisheries Sciences
The exam will consist of written and oral components. One month prior to the oral examination the Qualifying Exam 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 Qualifying Exam Committee at least one week before the oral examination. The student's responses on the written document may serve as the basis for questions during the oral examination.

In the oral examination, the committee will ask a series of questions that assess the student's understanding of the scientific method. The student should possess a basic knowledge in the design of experiments, which includes such topics as treatments and controls, replication, and randomization. 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. 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. The committee will evaluate the student using the "Wildlife and Fisheries Science Qualifying Exam Scoring Sheet" (Appendix P).

Comprehensive Examination
The structure of the Comprehensive Examination is the same for all three ESM programs. The Comprehensive Examination should be scheduled within 1 year after the Ph.D. candidate completes course requirements. 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 of the Comprehensive Exam. Check the Graduate Schools policies regarding the examination (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-606-comprehensive-examination-research-doctorate/).

- 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.
- The committee should confer prior to the Comprehensive Examination to review the

objectives of the candidate's program and the structure of the examination. The candidate should provide copies of his/her dissertation research proposal prior to the examination. Questions should examine the candidate's knowledge of his/her major and minor fields of specialization.
    - The examination can consist 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 a single day.
    - Each committee member 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.
- 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 (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 forwarded to the Graduate School and a copy is added to the student's academic file. 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.
- 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.

Final Oral Examination

The "Ph.D. Final Oral Exam Check Sheet" (Appendix Q) should be consulted prior to scheduling the exam as well and the Graduate School's policy regarding the exam (https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-608-final-oral-examination-research-doctorate/).

The **semester prior** to scheduling the Final Oral Examination, the student and her/his adviser should request a written transcript audit from the Graduate Program Coordinator (Monteith) 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 structure of the final oral exam is the same for all three ESM graduate programs. Students and faculty advisers should prepare for the Final Oral Examination for the Ph.D. months in advance.

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. It is scheduled after completion of other requirements for the degree.

- The student meets with the adviser to 1) ascertain if all requirements for the degree have been met (use the PhD Final Oral Exam Check Sheet, Appendix Q); 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.

- 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.
- 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.** An updated copy of the Graduate Academic Plan, signed by the student and the adviser, is taken/sent to the Department's Office of Graduate Programs at this time.
- The Graduate Coordinator in the Department's Office of Graduate Programs, with the Director of Graduate Studies approval, schedules the examination for Ph.D. candidates via a letter through the Graduate School ("Doctoral Student – Schedule of Examination Request Form" Appendix R). The adviser may request that the Graduate Coordinator in the Department's Office of Graduate Programs announce the thesis/dissertation defense to the Department's listserves (faculty, grad students, associates, and staff) by way of e-mail transmittal at least 10 days prior to the scheduled date, or the adviser may do this with a copy to the Graduate Coordinator in the Department's Office of Graduate Studies. The presentation part of the Ph.D. Final Oral Examination is open to the public.
- The student, in consultation with the advisor, is 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. 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. 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. The chair should schedule a date for the examination with the ESM Graduate Programs Coordinator **four weeks prior to the examination**
- 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.
- 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 Graduate Program

Coordinator in the Department's Office of Graduate Programs.

- A two-thirds favorable vote of the student's committee is required for successful completion of the Final Oral Examination.
- The adviser presents the results of the Final Oral Examination in writing to the Graduate Program Coordinator immediately following the 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.
    - **PhD thesis assessment by committee members for departmental reporting to the Graduate School, is required by ESM and made with the *PhD Assessment form – Communication Evaluation* (Appendix S and found on SharePoint in the Assessment forms folder, under the ESM Graduate Program folder). This form is critical to complete for an annual evaluation to the Graduate Cchool.**
- Students submit their dissertation through the Electronic Thesis and Dissertation Application (https://submit-etda.libraries.psu.edu/main), which will be digitally signed by their committee members via the eTD application.

APPENDICES

Appendix A. Guidelines for Recommended Practices in Graduate Education

Graduate School Recommended Practices in Graduate Education

Fostering successful interactions among faculty, administrators, and graduate students

This document suggests examples of recommended practices in each of three core areas for all of the key participants in graduate student education. Programs are encouraged to use these suggestions as a starting point to develop a set of recommended practices that meets the needs of their students.

The six core Penn State Values form the fundamental principles underlying our institutional mission of teaching, research and service. These values are: *Integrity, Respect, Responsibility, Discovery, Excellence and Community*. All of our students, faculty and staff are expected to embody these values throughout their time at Penn State. The Graduate Council believes these core values are central components of effective advising and mentoring of graduate students across the University and that they contribute to ensuring the climate within all of our graduate programs is one of inclusion and respect. Successful and productive advising relationships with students require that both students and faculty promote and demonstrate the highest ethical and professional standards, while maintaining open communication and a shared sense of community and accountability.

The following statements are recommended practices for creating and sustaining important developmental relationships between faculty and students within our graduate programs. The Graduate Council strongly recommends every graduate degree program develop a set of similar statements outlining recommended practices that fit the needs of the program. The statement should be disseminated to all graduate students and faculty members at the start of each academic year to outline expectations for all student-faculty-administrator interactions, which include but are not limited to advising, mentoring, teaching, research, and training.

In each of the following areas, *faculty members* are expected to act in accordance with the practices described below:

Climate:

Practices that contribute to a respectful, stimulating, supportive climate include the following:

1. Serve as a role model by demonstrating ethical, professional, and courteous behavior toward all students, staff, and faculty.
2. Be supportive, equitable, accessible, and respectful.
3. Promote an environment that is intellectually stimulating, collaborative, respectful, and collegial.
4. Recognize and respect the diversity and actively promote and practice inclusivity within our community consistent with Penn State's overall commitment to diversity and inclusion.
   Show sensitivity to the power imbalance in the faculty-student relationship.
5. Take into consideration a student's need to manage competing demands while maintaining timely progress towards their degree.
6. Meet with students to discuss topics such as climate, collegial relations, etc. should the

need arise.
7. Refer students proactively to appropriate university resources to provide support (e.g. financial, physical/emotional health, career development).

Academic Issues:
Practices that promote students' academic success include the following:
1. Advise students on the selection of appropriate course work, thesis/dissertation committee and topic or capstone project, and completion of other benchmarks.
2. Set clear expectations and goals for students regarding their academic performance and progress toward degree completion.
3. Discuss policies and expectations for assistantship hours, responsibilities, and absences related to university closure, holidays, illness, etc.
4. Develop an appropriate schedule to meet with students to provide feedback on scholarly activities and progress.
5. Provide students with oversight, as appropriate, to the discipline in all relevant aspects of research, training and scholarship.
6. Guide and recommend training, study, and other resources to develop or enhance students' skills and competencies.
7. Devise effective ways of providing students with guidance and supervision during a prolonged absence should the need arise.
8. Provide and discuss clear criteria for authorship and acknowledgement of contributions at the beginning of all collaborative projects.

Career Development Issues:
Practices that promote the career development of students include the following:
1. Encourage participation in professional meetings, associations, collaborations, and opportunities within and beyond the university. Assist students with identifying resources to fund such activities.
2. Provide career advice, offer help with interview and application preparation, and write letters of recommendation in a timely manner.
3. Ensure that students receive assistance with developing the skills needed for a successful career in their field/discipline, including oral and written communication, and grant preparation as appropriate.
4. Recognize that students will pursue a variety of careers, including those outside of academia and/or their discipline, and assist them in achieving their chosen career goals.
5. Schedule meetings to discuss topics such as professional development, career objectives, and opportunities, etc.
6. Align assigned responsibilities and activities with students' academic/professional career development as appropriate.

In each of the following areas, ***graduate students* are expected to act in accordance with the practices below:**
Climate Issues:
Practices that contribute to a respectful, stimulating, supportive climate include the following:
1. Demonstrate ethical, professional, and courteous behavior toward other students, staff, and faculty.

2. Recognize and respect the diversity and actively promote and practice inclusivity within our community consistent with Penn State's overall commitment to diversity and inclusion.
3. Be proactive about communicating needs, concerns, etc. with faculty and staff, understanding that communication is a two-way endeavor.
4. Take into consideration, in interactions with faculty and staff, competing constraints on their time.
5. Inform relevant faculty of potential and/or existing conflicts, and work toward their resolution. In the event that a solution cannot be reached, students should seek assistance from graduate program chairs, department heads, college administrators of graduate education, program or college ombudsperson (if applicable), or the Graduate School.

Academic Issues:
Practices that promote students' academic success include the following:

1. Recognize that while faculty and staff are there to assist and guide students, the student bears the primary responsibility for the successful completion of their degree.
2. Discuss expectations and goals regarding academic performance and progress toward degree completion with advisors, committees, and other relevant faculty members.
3. Maintain the highest ethical standards and academic integrity in all aspects of scholarship, teaching, research, and other responsibilities.
4. Be familiar with program and Graduate School policies governing graduate education and adhere to all program and Graduate School policies and deadlines.
5. Act proactively to improve research and scholarship skills (e.g. writing, presenting, teaching, etc.).

Career Development Issues:
Practices that promote the career development of students include the following:

1. Take an active role in identifying and pursuing professional development opportunities.
2. Communicate with faculty members regarding career goals.
3. Seek mentoring and support/resources beyond faculty advisor (e.g. other faculty members, peers, and organizations).

In each of the following areas, *representatives of academic departments and graduate programs* are expected to act in accordance with the practices below:
Climate Issues:
Practices that contribute to a respectful, stimulating, supportive climate include the following:

1. Maintain an open, inclusive, and respectful environment that is free from harassment and discrimination, in accordance with university policies and initiatives.
2. Recognize and respect the diversity and actively promote and practice inclusivity within our community consistent with Penn State's overall commitment to diversity and inclusion.
3. Refer students proactively to appropriate university resources to address potential issues (e.g. financial, physical/emotional health, career development).
4. Provide students with contacts and resources for potential conflict resolution (e.g. graduate program chairs, department heads, college administrators of graduate education, program or college ombudsperson, the Graduate School, Office of Sexual Misconduct,

Prevention and Response, Affirmative Action Office, Office of Ethics and Compliance, Diversity and Inclusion/Multicultural Affairs Office, etc.).

Academic Issues:

Practices that promote students' academic success include the following:

1. Provide students with up-to-date information that includes policies, practices, degree requirements, and resources.
2. Assist students with selection of their advisor as needed. Monitor and document graduate student progress toward their degrees and professional development, including committee meetings, exam completion, and other benchmarks appropriate to their discipline.
3. Provide and monitor training in academic integrity and the ethical conduct of research.
4. Provide infrastructure, as appropriate, to allow students to complete their education and research/scholarship in a timely and productive manner.
5. Establish, communicate, and adhere to policies for absences, emergencies, and unplanned situations that may disrupt the work of students and/or faculty.
6. Ensure that university policies related to graduate assistantships (e.g. assistantship hours, responsibilities, and absences related to university closure, holidays, illness, etc.) are followed.
7. Incorporate these guidelines and recommendations in readily accessible departmental policies or handbooks and actively promote their observance.

Career Development Issues:

Practices that promote the career development of students include the following:

1. Encourage participation in professional meetings, associations, collaborations, and opportunities within and beyond the university. Assist students with identifying resources to fund such activities.
2. Ensure that students receive assistance with developing the skills needed for a successful career in their field/discipline, including oral and written communication and grant preparation as appropriate.
3. Recognize that students will pursue a variety of careers; including those outside of academia and/or their discipline, and assist them in achieving their chosen career goals (e.g. provide and/or refer students to appropriate professional development activities/resources).
4. Provide students with access to pedagogical training and regular assessment of their teaching and other assistantship activities.
5. Partner with students and their advisors to align assigned responsibilities and activities with students' academic/professional career development goals as appropriate.

In each of the following areas, *representatives of the Graduate School* are expected to act in accordance with the practices below:

Climate Issues:

Practices that contribute to a respectful, stimulating, supportive climate include the following:

1. Maintain an open, inclusive, and respectful environment that is free from harassment and discrimination, in accordance with university policies and initiatives.
2. Recognize and respect the diversity and actively promote and practice inclusivity within our community consistent with Penn State's overall commitment to diversity and inclusion.
3. Collaborate with academic programs, university offices/committees, and student

organizations to address issues and concerns related to the well-being of graduate students.

4. Refer students proactively to appropriate university resources to address potential issues (e.g. financial, physical/emotional health, career development).
5. Provide students with contacts and resources for potential conflict resolution (e.g. graduate program chairs, department heads, college administrators of graduate education, program or college ombudsperson, the Graduate School, Office of Sexual Misconduct, Prevention and Response, Affirmative Action Office, Office of Ethics and Compliance, Diversity and Inclusion/Multicultural Affairs Office, etc.).

Academic Issues:

Practices that promote students' academic success include the following:

1. Provide students, faculty, and staff with up-to-date information regarding graduate education that includes policies, practices, degree requirements, and resources.
2. Monitor and document graduate student progress towards their degrees and professional development, including exam completions and other formal benchmarks.
3. Provide resources to support the development or enhancement of students' skills and competencies.

Career Development Issues:

Practices that promote the career development of students include the following:

1. Provide and/or refer students to a broad range of professional development activities/resources to prepare them for careers upon degree completion.
2. Connect students with the Graduate School alumni network to facilitate the establishment of mentoring relationships and career development opportunities.

Approved by Graduate Council, February 14, 2018.

Appendix B. Example 'Request for Graduate Level Course Registration form'
(student will be sent this form from the Graduate Program Coordinator [Monteith] upon a scheduling request)

Department of Ecosystem Science and Management
Request Form for Graduate Level Course Registration
for Departmentally Controlled Courses …

596 Independent Studies Credits
600 Thesis Research Credits
601 Dissertation Full-time Credit
602 Supervised Experience / College Teaching Credits
610 Thesis Research, Off-Campus Credits
611 Ph.D. Dissertation Part-time Credit

Please print legibly

Name: ______________________ **User ID** (i.e., evh2) ____________ **Date:** ____________

PSU Id # ______________________ **Degree (circle one):** **M S** **Ph D**

Academic Area (circle one): **FOR** **SOILS** **WFS**

Course Number (circle one): **596** **600** **601** **602** **610** **611**

Semester/Year: ______________________ **Number of Credits:** ____________

Instructor's Name: ______________________________________

To schedule subject 601 (full-time status) or 611 (part-time status) thesis credits, the PhD student/candidate must have taken and passed their Comprehensive Examination and must have met the two-semester residence requirement. Subject 601 and 611 credits do not carry academic credit, but are entered on the academic transcript to indicate registration and nature of academic activity. Students may take Subject 601 and up to 3 additional credits, if necessary.

If requesting 596 Independent Studies credits, attach brief description.

______________________________ ______________________________
Student's Signature **Instructor's Signature**

Please complete, sign, and return this form to Diane Monteith, 319 Forest Resources Building

~ ~

***Office of Graduate Studies Use Only*:**

Class #: ________________ **Schedule Add Date:** ____________
Section #: _______________ **Initials:** ____________
Adjusted credits:__________

Appendix C. M.S. Suggested Timeline

* 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 Coordinator, 319 FRB
2. Complete CITI Training and give the certificate of completion form to the Graduate Staff Assistant, 319 FRB - this will count as an assignment in the Research, Integrity, and Communications Course (see number 7 below).
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 (The designation is: FOR/SOILS/WFS 597, Research Integrity and Communications)
8. Complete the Committee form (available from Graduate Coordinator) to establish committee. Graduate Staff Assistant sends a memo to committee members to confirm appointment to committee
9. Have an 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. Have adviser obtain proposal review forms from the ESM Graduate Program Coordinator prior to the meeting and share with the committee for approval of the research plan.
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 Coordinator), 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. Revise thesis and submit to committee for review at least 2 weeks in advance of final defense
15. Hold thesis defense
16. Chair of committee sends letter to ESM Graduate Program Coordinator with results of the final defense and includes final defense review forms.
17. Submit thesis to the University through the Electronic Thesis and Dissertation Application (https://submit-etda.libraries.psu.edu/main), which will be digitally signed by their committee members via the eTD application.
18. Submit checklist (Checklist for MS) signed by thesis adviser that requirements for MS have been met. This checklist needs to be signed by adviser and ESM Director of Grad Studies before a notice can be filed with Grad School by ESM Graduate Program Coordinator 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 Coordinator is important if the thesis is being submitted to the Grad School near the deadline, so all approvals are completed in a timely manner.

Appendix D. Example 'MS Graduate Academic Plan' Form (FOR & SOILS)

(see SharePoint for form)

M.S. - 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 members within three (3) months. Adviser reviews plan with student before each registration period. Provide original GAP to Department Graduate Studies Office for approval, 319 Forest Resources Bldg. After approval the original will be signed by the Graduate Coordinator, copied for the student's academic record, and then returned to the student for safekeeping.

Student Name: _____ Today's Date: _____

Degree: _____ Major: _____ Minor: _____

PSU E-mail Address: _____ Student PSU ID #: _____

Graduate Goals (attach student's statement).

Thesis Title: _____

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

Enrollment Semester/Year: _____ Dual Degree: _____

SARI "5 Hour" Requirements met date: _____ CITI Online Portion of SARI date: _____

Research Plan Approved: _____ Adviser Name: _____

Final Exam Date, Time, Location: _____

Summary of Courses (Minimum of 30 total credits including 6 thesis 600 credits): (number of credits/course in parens)

Admission Deficiencies	400-, 500-level in Major (12 cr) (6 cr at 500-level)	Statistics (STATS) 400-, 500-level (FOR; WFS=6 cr) (SOILS=3 cr [500-level])	Optional/Other/Minor Course Credits (6 cr*) Dual Degree (15 cr)	List All 500- and 600-level cr (18 cr) (Max 6 of 600 or 610)

Colloquium (1 cr)

Seminar (1 cr)

A tentative course schedule should be attached.

Copies: Student Signature _____ Adviser Signature _____

Committee _____

Members' _____

Graduate Coordinator _____ Signatures _____

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

Form revised August 2014

Appendix E. 'MS Graduate Academic Plan' Form (WFS)

(see SharePoint for form)

WFS

M.S. - 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 (above) and obtain approval of committee members within three (3) months. Adviser reviews plan with student before each registration period. Provide original GAP to Department Graduate Studies Office for approval, 319 Forest Resources Bldg. After approval the original will be signed by the Graduate Coordinator, copied for the student's academic record, and then returned to the student for safekeeping.

Student Name: _____ Today's Date: _____

Degree: _____ Major: _____ Minor: _____

PSU E-mail Address: _____ Student PSU ID #: _____

Graduate Goals (attach student's statement).

Thesis Title: _____

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

Enrollment Semester/Year: _____ Dual Degree: _____

SARI "5 Hour" Requirements met date: _____ CITI Online Portion of SARI date: _____

Research Plan Approved: _____ Adviser Name: _____

Final Exam Date, Time, Location: _____

Course/Credit Requirement Guidelines for WFS. The University requires 30 credits, 18 of the 30 must be 500 and 600 level. The student most have a minimum of 6 credits of thesis research (max of 15 credits).6 of these credits may be graded, A minimum of 12 credits in course work (400, 500, and 800 series) must be completed in the major program. WFS requires 6 credits of Statistics, 1 credit Research Integrity and Communication, and 1 credit Seminar/colloquium with additional courses determined by the student and the student's committee. Requirements are listed below. Note that some courses may fulfill more than 1 requirement.

- 30 required credits (400 plus) – Includes course work and thesis research credits
- 18 credits – 500-plus – (Includes course work and thesis research credits)
- 6 thesis – (WFS 600 – can be graded or ungraded)
- 12 credits – 400-plus courses (may include independent study 496, 596 and experimental courses 497, 597)
- 6 credits statistics (400 plus) as approved by the committee
- 1 Research Integrity and Communication (WFS 597) (counts towards 12 credits of coursework)
- 1 seminar/colloquium (WFS 590) (counts towards 12 credits of coursework)

NOTES:

Courses may count in more than 1 place. E.g. a 500 level class counts as part of the 18 credits (500) as well as the 12 credits of courses

You may have up to 15 thesis credits but only 6 may be graded

Appendix F. Example 'M.S. Committee Signature' form

(see SharePoint for form)

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.

*Student's Name	*PSU ID#	Check Committee Type:	☐ New ☐ Revised

*Degree	*Major	Dual-Title	Minor
M.S.			

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.

	Printed Name	Signature	Date
***Student:**			
***Chair/Adviser** must be major program member			
Co-Chair/Co-Adviser if applicable			
***Major Field Member(s)** in addition to adviser/co-adviser			
***Outside Field Member**			
List the field you represent outside the student's major field of study:			
Minor Field Member(s) if applicable			
Special Member if applicable			

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

Printed Name	Signature	Date

***Required Field**

Appendix G. Example MS Rubric for Research Proposal Eval Form (FOR, SOILS, WFS)

(see SharePoint for form)

Rubric for Evaluating MS Approved Research Proposal

Committee Members and Students are responsible for being aware of this evaluation rubric before the proposal is presented to the committee.

*(This page will be **completed by the student's Graduate Committee** and a copy of this rubric will be distributed by the Graduate Program Coordinator staff assistant to the committee **and** student prior to presentation of the research proposal.)*

Student Name: Major Advisor(s):
Proposal Approval Date: Research Proposal Title:

Graduate Committee Member:
At the conclusion of the proposal presentation meeting, **each committee member will respond to the following three questions.**

1) Does proposal clearly state one or more valid hypotheses? ***Yes/No***. **Comments** related to strengths and needs for improvement

2) Does proposal incorporate original or novel questions or approaches? ***Yes/No***. **Comments** related to strengths and needs for improvement

3) Are methods feasible and appropriate? ***Yes/No***. **Comments** related to strengths and needs for improvement

4) Is the proposed work put in the context of existing work in the field (i.e. does it contain a thorough review of previous work, properly summarize this work, and build on this work? ***Yes/No***. **Comments** related to strengths and needs for improvement

Overall Quality of Proposal (Please circle) **Excellent; Very Good; Good; Fair; Poor**

Upon approval of the proposal, copies of these completed forms are to be treated as confidential and are to be collected ***by*** the Major Adviser and turned in ***to*** the Director of Graduate Programs (or designee) office ***by*** the Major Adviser. *A* copy of written comments and overall evaluation from the committee members will be retained by the Major Adviser. The major adviser is encouraged to provide a summary of the comments to the student, and to spend time in discussion of ways to strengthen the proposal, as appropriate.

Appendix H. Example M.S. Degree Final Oral Exam Check Sheet Form

(see SharePoint for form)

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/colloquium 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

Appendix I. Example M.S. Schedule of Examination Request Form

(see SharePoint for form)

Department of Ecosystem Science & Management
Master's Student - Schedule of Examination Request Form

__X__ Final Oral Examination / Thesis Defense

_____ _____

Student's Name | Student's Penn State ID#

Degree: M S Major:

Dual Title: _____ Minor: _____

Examination Date, Time, and Location: _____

Thesis Title:

Master's Committee for Final Oral Examination:

Chair of the Committee: _____

Co-chair (if necessary): _____

Major Field Member(s): _____

_____

Outside Member(s): _____

_____

Minor Field Member (s): _____

_____

Special member(s): _____

_____

This request must be submitted to the **Ecosystem Science & Management Graduate Studies Office located in 319 Forest Resources Building** at least three (3) weeks prior to the scheduled date of examination to allow for any required processing and announcement to the ListServ.

Appendix J. MS Assessment Form - Communication Evaluation

(see SharePoint for form)

NOTE: This form is ***NOT*** the form filled out by the Outside committee member only. A copy of ***this*** form is to be completed by each committee member and retained within the ESM Graduate Programs Office, as required by the Penn State University Graduate Assessment Office.

MASTER'S THESIS
Communication Evaluation- Departmental Form;
Part 1 – Written Communication

*(To Be Completed by **EACH** Committee member and turned in to the ESM Graduate Programs office by the Committee Chair)*

Name of Master's Student: PSU ID:

Degree: Master of Science

Major:

Committee Chair: _____ Committee Co-Chair:_____

Name of Thesis Adviser (if different than chair): _____

Administrative Home (Department/College) of Thesis Adviser:

Thesis Title: _____

Rating for Written Communication (check one for each performance criterion)

Written Communication Criterion	Excellent	Very good	Good	Fair	Poor	N/A
Clarity of thesis statement/hypothesis/objectives						
Depth of content reflecting understanding of the thesis topic						
Clarity of language (word choice, sentence structure, and variety)						
Appropriateness of writing conventions (grammar, punctuation, spelling, paragraphing, thesis format)						
Organization of thesis (focus, coherent, and progression of ideas)						
Overall quality of writing						

N/A not able to assess

Appendix K. 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 Qualifying examination, students must be registered full time for two semesters in a twelve-month period. This may include the semester of Qualifying 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 Qualifying exam date.
- Students **MUST** be registered the semester of Qualifying 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

Appendix L. Ph.D. Suggested Timeline

ADVISORS - 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)

Beginning the PhD

- Meet with adviser and determine first semester coursework
- Complete CITI Training, if not completed for MS
- Develop a written tentative research plan with adviser
- Develop a written tentative course work plan with adviser
- 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 597**G**, Research Integrity and Communications)

Qualifying Exams and Committee Formation

- Establish a potential list of committee members with adviser
- Schedule qualifying exam with Program's Qualifying 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 Coordinator.
- Committee chair should obtain the Report on Doctoral Qualifying form from the ESM Graduate Program Coordinator. When completed after the qualifying exam, the committee chair should return it to the ESM Graduate Program Coordinator immediately after the exam, for submission to the Grad School.
- File Ph.D. Committee Appointment worksheet with the ESM Graduate Program Coordinator to appoint committee members soon after the candidate has passed the Qualifying exam.

Research and Comprehensive Exams

- 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. Have adviser obtain proposal review forms from the ESM Graduate Program Coordinator.
- 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 Coordinator of the date, time and location. The ESM Graduate Program Coordinator 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 Coordinator AT LEAST four (4) weeks in advance of the exam!
- Continue with research work and complete research. Maintain contact with committee members as well as ongoing communication with adviser.

Preparing to Defend

- Draft written thesis. Provide copy to adviser for review and revision 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!
- Complete dissertation research and writing. In consultation with adviser, schedule dissertation defense and file the Final Exam Scheduling Worksheet via ESM Graduate Program Coordinator at least four (4) weeks in advance of the exam.
- 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 Coordinator.
- Complete dissertation for submission to committee for review **at least 2 weeks in advance** of final defense.

Thesis Defense

- Hold dissertation defense.
- Adviser is to obtain signatures from committee members regarding acceptance of dissertation on the Dissertation Approval Page. Adviser sends letter to ESM Graduate Program Coordinator with results of the final defense, and includes final defense review forms.
- Submit checklist* (Checklist for Ph.D.) signed by dissertation adviser that requirements for PhD have been met.

*This checklist needs signed by adviser and Director of Graduate Studies before a notice can be filed with Grad School by ESM Graduate Program Coordinator 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 Director of Graduate Studies is important if the Dissertation is being submitted to the Grad School near the deadline, so all approvals are completed in a timely manner.

Appendix M. Example Ph.D. Graduate Academic Plan Form

(see SharePoint for form)

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 (2 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 N. Example *Rubric for Evaluating PhD Approved Research Proposal*
(see SharePoint for form)

Rubric for Evaluating PhD Approved Research Proposal

Committee Members and Students are responsible for being aware of this evaluation rubric before the proposal is presented to the committee.

*(This page will be **completed by the student's Graduate Committee** and a copy of this rubric will be distributed by the Graduate Program Coordinator staff assistant to the committee **and** student prior to presentation of the research proposal.)*

Student Name: Major Advisor(s):
Proposal Approval Date: Research Proposal Title:

Graduate Committee Member:
At the conclusion of the proposal presentation meeting, **each committee member will respond to the following three questions.**

1) Does proposal clearly state one or more valid hypotheses? ***Yes/No***. **Comments** related to strengths and needs for improvement

2) Does proposal incorporate original or novel questions or approaches? ***Yes/No***. **Comments** related to strengths and needs for improvement

3) Are methods feasible and appropriate? ***Yes/No***. **Comments** related to strengths and needs for improvement

4) Is the proposed work put in the context of existing work in the field (i.e. does it contain a thorough review of previous work, properly summarize this work, and build on this work? ***Yes/No***. **Comments** related to strengths and needs for improvement

Overall Quality of Proposal (Please circle) **Excellent; Very Good; Good; Fair; Poor**

Upon approval of the proposal, copies of these completed forms are to be treated as confidential and are to be collected ***by*** the Major Adviser and turned in ***to*** the Director of Graduate Programs (or designee) office ***by*** the Major Adviser. *A* copy of written comments and overall evaluation from the committee members will be retained by the Major Advisor. The major advisor is encouraged to provide a summary of the comments to the student, and to spend time in discussion of ways to strengthen the proposal, as appropriate.

Appendix O. Example *FORR Qualifying Examination Rubric*

(see SharePoint for form)

FOR Qualifying Examination Rubric

Topic	Score[1] (1-5)	Comments
Written communication		
Oral communication		
Understanding of 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.

Appendix P. Example *WFS Qualifying Exam Scoring Sheet*

(see SharePoint for form)

Department of Ecosystem Science and Management
Wildlife and Fisheries Science
Qualifying 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					

Comments:

_____ _____ _____

Name (print) Signature Date

Appendix Q. Example Ph.D. Final Oral Exam Check Sheet

(see SharePoint for form)

PhD 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 a 3.0 GPA?
			Has student met the 5-hour SARI Seminar Requirement?
			Has student taken / provided proof of CITI on-line portion of SARI requirement?
			Is the student carrying a Minor? If so, in what program?
			If the student is carrying a Minor, has he/she earned at least 15 credits in the Minor?
			Does the student have any MISSING or DEFERRED Grades?
			Will the student be registered during the semester of the Comprehensive Exam; many not be in SCHADD status?
			Date of Candidacy Examination
			Date of Comprehensive Examination
			Have at least three (3) months passed since the date of Comprehensive Exam?
			Is the final oral exam being held within six (6) years from date of passing Comprehensive Exam?
			Student did not register for 601 courses until the semester AFTER the 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 8-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
			Thesis Signature Page ONLY … Special Signatory

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

Appendix R. Example Doctoral Student – Schedule of Examination Request Form

(see SharePoint for 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: **Ph.D.** 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

Appendix S. Example *PhD Assessment form – Communication Evaluation*

(see SharePoint for form; in the Assessment forms folder, under the ESM Graduate Program folder)

NOTE: This form is ***NOT*** the form filled out by the Outside committee member only. A copy of ***this*** form is to be completed by each committee member and retained within the ESM Graduate Programs Office, as required by the Penn State University Graduate Assessment Office.

DOCTORAL DISSERTATION
Communication Evaluation- Departmental Form;
Part 1 – Written Communication

*(To Be Completed by **EACH** Committee member and turned in to the ESM Graduate Programs office by the Committee Chair)*

Name of Doctoral Candidate: PSU ID:

Degree: Doctor of Philosophy

Major:

Committee Chair: _____ Committee Co-Chair:_____

Name of Dissertation Adviser (if different than chair): _____

Administrative Home (Department/College) of Dissertation Adviser:

Dissertation Title: _____

Rating for Written Communication (check one for each performance criterion

Written Communication Criterion	Excellent	Very good	Good	Fair	Poor	N/A
Clarity of dissertation statement/hypothesis/objectives						
Depth of content reflecting understanding of the dissertation topic						
Clarity of language (word choice, sentence structure, and variety)						
Appropriateness of writing conventions (grammar, punctuation, spelling, paragraphing, dissertation format)						
Organization of dissertation (focus, coherent, and progression of ideas)						
Overall quality of writing						

N/A not able to assess