The Department of Applied Ecology participates in two graduate programs, the [Biology Graduate Program](https://cals.ncsu.edu/applied-ecology/students/graduate/) and the [Fisheries, Wildlife and Conservation Biology Graduate Program](https://cals.ncsu.edu/applied-ecology/students/graduate/fisheries-wildlife-conservation-biology/) that span multiple departments and across multiple colleges. Elements of this plan may thus reach graduate students and faculty in other departments and colleges.

**Faculty’s assessment of obstacles for URM doctoral student’s success**

The overall obstacle for graduate students in the Department of Applied Ecology is the lack of community, and this lack of sense of community is greater obstacle for URM students. URM students self-reported a strong feeling of isolation because of an overall lack of community. Further, during exit interviews many graduate students reported that they did not get to know faculty well other than their immediate mentor. So, the lack of a sense of community is both within graduate students and between graduate students and faculty. Additionally, an obstacle that occasionally arises is that some URM do not have the depth of preparation needed. Therefore, some URM students have difficulty in completing the required coursework and thus may need an extended timeline. Overall, the faculty recognize the importance of diversity and inclusivity and many have successfully mentored URM students; however, a deeper knowledge of the obstacles and mentoring skills could be improved.

**Existing elements that enhance success of URM doctoral students**

The Department participates in the LSAMP Bridge to the Doctorate program to enhance the experience of underrepresented minority students. We currently have one URM student participating in this program.

The Faculty have used what is known as the Target of Opportunity Hire mechanism to successfully recruit diverse faculty.

The Department Head performs exit interviews with matriculating and departing students to understand their experiences at NC State throughout their degree program.

The Department tracks where doctoral students take employment after degree completion.

The Biology Graduate Program has written guidelines in a handbook that is presented and discussed at the fall and spring orientation meetings and is also available online.

The Department of Applied Ecology and members of the graduate program and their PhD students participate in undergraduate URM mentoring at NC State and at off-campus research centers, which engage graduate students in mentoring URM students and also serve as a recruitment mechanism.

As part of the Biology Graduate Program all graduate students are required to complete an Annual Progress Report of their academic coursework and research progress. The Director of the Graduate Program (DGP) reviews each student’s Annual Progress Report, provides feedback via email (to the student and advisor), and only meets with students if areas of concern are identified, such as a delay in their timeline or a deviation between the student’s and faculty’s expectations that is readily identifiable under the optional section entitled “Research Activities (optional)”. See appendix 1 for the Annual Progress Report form.

**Actions to Promote Success of Underrepresented Minority Doctoral Students**

Recognition of Faculty Commitment to URM Training and Success

Informally many faculty support recognizing activities and efforts that promote diversity and inclusivity in the graduate program in annual activity reports, statement of faculty responsibilities, promotion and tenure evaluation. A vote is needed to formalize this.

Support URM faculty who are likely to have a high mentoring workload because they are sought out as mentors by URM graduate students. The URM faculty and Department Head meet annually to develop a plan for committee service that considers mentoring workload.

Venue for promoting more interactions among faculty and graduate students.One ideais to develop a weekly or monthly “brown bag” 1-hr discussion/seminar meeting series in which rough or polished research (ideas or results) could be discussed and vetted. The atmosphere would be informal and graduate students and faculty would participate equally. Since this would not be a required course this may remove some of the power dynamic between faculty and graduate students. The goals would be develop presentation skills, collectively advance faculty and graduate student research and, most importantly, develop a sense of community among graduates student and also between graduate students and faculty who might not normally interact because of barriers, real or perceived, associated with the interdepartmental graduate program, disparate subdisciplines, individual laboratory groups, and on- and off-campus presence. A small subset of the faculty (4-5) have started a Friday afternoon “Big Ideas” informal discussion group where a academically diverse group (e.g., faculty, graduate students, technicians, and postdoctoral scholars) can toss out ideas for discussion. Attendance (i.e., 10-15 people) has been included this academic diversity as well as ~40% URM diversity. In addition, the head of the department’s science communication program has started a “Tuesday Tea” event that is also a informal departmental community event with more diverse topics and training opportunities (i.e., how search engines work, interviewing with a science journalist, giving practice talks, etc) rather than just science ideas.

Improve Advising and Mentoring Resources for Faculty and Doctoral Students

The [Biology Graduate Program Handbook](https://cals.ncsu.edu/applied-ecology/wp-content/uploads/sites/4/2019/08/Biology-and-FWCB-Graduate-Student-Handbook.pdf) primarily includes information about coursework, plan of work, committee makeup, timelines for degree programs, and written and oral exams. We will improve this handbook by providing information on mentoring for both faculty and graduate students. For example, we will:

1. Clearly state mentee expectations and mentor expectations. Lack of knowledge or clarity of the expectations of a mentor and mentee has been identified as significant barrier to effective mentoring. An obstacle to URM students can be a lack of knowledge of what questions can be asked and a fear of asking questions that may reveal deficiencies.
2. Require that PhD students set up their committees in their first year and have at least one committee meeting in their first year. Currently, students have until their third semester to set up their committees, which can sometimes be too late. This delays the ability of graduate students, especially URM students, to get feedback from additional mentors or committee members beyond their primary mentor. Setting up their committees early we also hope will create a broader sense of community involved in the education of the students early on in their careers.

Improve Advising, Mentoring, and Community Resources for URM Students

Based on discussions among faculty and peer-reviewed publications, a major limitation for graduate students is the reliance on one person as a mentor and/or advisor. Ideally, graduate students would have multiple mentors, some of whom provide academic and/or research advice, career advice, cultural advice, and some for personal and work-life balance advice. As a first step, our goal is to provide better access to and information about resources that provide students the ability to include multiple mentors and expand the diversity of their community. This places independence and responsibility both on the student and mentor to review this information and act upon it.

We will include the following in the [Biology Graduate Program Handbook](https://cals.ncsu.edu/applied-ecology/wp-content/uploads/sites/4/2019/08/Biology-and-FWCB-Graduate-Student-Handbook.pdf):

1. Graduate students should develop a diverse advisory committee that includes diverse representation based on science, race, culture, and gender.
2. Although a graduate student may identify with single mentor, we encourage graduate students to build a network of multiple mentors.
3. In addition to meeting with committee members annually or semiannually, we will encourage graduate students to develop professional relationships with their committee members beyond these meetings, as committee members can enhance the diversity of advice and mentorship.
4. Underrepresented minority (URM) graduate students are encouraged to develop professional relationships with committee members as well, but we also recommend seeking faculty mentors within or outside their department or college to build a diverse network of mentors.
5. In addition to academic mentors and community, we recommend that graduate students explore other resources on campus to develop their community, as it is unlikely that the department or graduate program will be able to offer all the academic, cultural, racial, social, or gender diversity and inclusivity. We will include a list of the following resources for students to explore (this list is not exhaustive be lists exemplary offices and centers): Office for Institutional Equity and Diversity, African American Cultural Center, the Gay, Lesbian, Bisexual and Transgender Center, Multicultural Student Affairs, the Women’s Center, and the Graduate Student Association. We will also provide information for how students can subscribe to Diversity Digest.
6. We will encourage students to use “paper mentors” or publications and online resources, such as [www.mentornet.net](http://www.mentornet.net), that offer additional mentoring resources.
7. Continue…

Enhance Communication between Mentors and Mentees

We have identified that work and communication styles can be a major hurdle to success for graduate students and especially for URM students. As one step to enhance communication between mentors and mentees, we have incorporated a mentor-mentee work/communication styles learning module into the Biology Graduate Program core course (AEC 502, “Introduction to Biological Research”), a course required for all new PhD and MS students in the Biology Graduate Program, and also taken by many students enrolled in the Fisheries, Wildlife and Conservation Biology Graduate Program. The aim of the mentor-mentee communication module is to use an existing graduate course to develop skills that help acknowledge and understand differences in communication/work styles, and identify and overcome communication barriers, including some that are a consequence of the differential power dynamic between graduate student and mentor.

Specifically, the mentor-mentee work/communication styles module will include a lecture presentation (Appendix 2), readings, taking a modified version of the DiSC personality test, discussion among the students in the class, and a hands-on worksheet exerciseon work and communication stylesthat iscompleted both by the graduate student and their mentor (Appendix 3), then shared and discussed jointly between student and mentor, as well as shared and discussed among the students in the course. This exercise is based on a presentation by Dr. Sharon L. Milgram, Director of the NIH Office of Intramural Training & Education (OITE) that was given at the Spring 2019 AGEP-NC meeting. We will allow opportunities for faculty and student input using a survey and will refine the module for future offerings of AEC 502.

In the Spring 2020 offering of AEC 502, students will also complete an Individual Development Plan (IDP) using myIDP (<http://myidp.sciencecareers.org/>), a web-based career-planning tool to help graduate students define and pursue their career goals. The goals of using the IDP are to: 1) help students evaluate their skills, values, and interests, 2) identify preferred and alternative careers, 3) set goals to prepare for these careers, and 4) discuss these goals and outline strategies to achieve them with your mentor(s). Another reason for using the IDP is to empower the graduate student to take the lead (the driver) in developing their graduate and future career so that the mentor (the passenger) can provide advice and direction to guide students toward career goals they identify. The plan is for the IDP to be included in subsequent offerings of AEC 502, such that every student in the Biology Graduate Program will have an IDP.

To further the goal of strengthening communication between mentors and mentees, we will invite an expert speaker (such as Dr. Milgram) to give a workshop/presentation to faculty and students on communication and work styles.

Enhance Communication Among Graduate Students with a Peer Mentor Program

A common concern raised by both URM and non-URM students in Applied Ecology and the Biology Graduate Program is a lack of community. This feeling of a lack of community and isolation is stronger by URM students and students in smaller labs who don’t have a set of more senior peers to interact with and guide them. The Biology Graduate Program core course, AEC 502, was created approximately 4 years ago as a way to generate more community among the incoming cohort of students, and we think it is helping. However, this core course only connects students to students in their cohort and not to more senior students outside their lab, department, or building who could provide community, advice, and offer different perspectives, experiences, and diversity. We will also solicit advise from the Graduate Peer Mentoring Collaborative at NC State on how to best use the network to build community and enhance diversity and inclusivity, with the goal of creating a supportive peer community network for all graduate students but especially URM students in the program.

To fill this gap in a sense of community, we will create a peer mentoring network for our graduate program that includes URM and non-URM students. We will solicit volunteers and will also encourage participation from our senior graduate students in the program. We will not make participation mandatory, but we will encourage all incoming students to participate, and we think they will want to be included based on feedback at a Graduate Student Association meeting in Spring 2019 that the DGP held. The senior students will be provided readings on how to be an effective mentor, potential topics that could be discussed between peers, and will meet with a group of three faculty, including the Department Head, to discuss best mentoring practices. We will encourage interaction by offering funds so that graduate peer mentors and mentees can have coffee/tea/snacks in a neutral, non-departmental setting where they can engage in discussions. We hope they will meet 2-4 times per year, but they can meet more often and as the need arises. We will assign PhD students as “senior” if they have passed their qualifying exams, and “junior” if they are incoming students or have not passed their exams yet. This will allow both first and second year students to participate in this first year of the peer mentoring program. Students’ roles in the network will change as they progress through their graduate career, switching from mentee to mentor. We will offer initial and final surveys throughout the first two years of the program to assess meeting frequency and also to assess the range of topics discussed and any new materials needed in mentor training. This peer mentoring program also provides a professional development skill that graduates students in our program can add to their CV.

Emphasize Diversity and Inclusivity through Experiences, Training, and Teaching

**1)** *Workshop on writing and evaluating a job application diversity statement.* Diversity statements are now becoming standard in many academic positions. For example, many of the University of California schools now require diversity statements for all faculty applications, and we have had discussions about a similar requirement on search committees we have served on. Although workshops on writing Research and Teaching Statements for faculty positions are common, less common are workshops that explicitly address how to write a clear and effective Diversity Statement for job applications. It is important to note that these statements are not about an applicant’s personal diversity but how the applicant will contribute to creating a diverse academic community, and how they will help students from diverse backgrounds succeed. We have scheduled the first workshop for mid March and it will be lead by Dr. JoAnn Cohen at NC State. This first workshop will focus on training a subset of interested faculty, the DGP, the Department Head, as well as URM and non-URM graduate students and postdoctoral scholars. Following this initial workshop, we will host a biennial workshop on how to write diversity statements for job applications. By training multiple faculty in writing successful diversity statements, we will ensure we always have an available pool of faculty to teach the workshop.

**2)** *Provide financial support to attend URM conferences or participate in URM events at scientific conferences.* We will offer our current URM and non-URM graduate students and faculty the opportunity to attend URM specific conferences (e.g., SACNAS, ABRCMS, SREB - Institute on Teaching and Mentoring) or scientific conferences that have diversity enhancement events/groups (e.g., ESA.org SEEDS), and to report back to the faculty and graduate students. This will expand our network outside of NC State and also bring new ideas into our departmental plan and institutional change model. Students will be required to fill out a small application that indicates the name of the conference, the specific event/workshop/mixer they will attend at the conference, how they will transfer the knowledge back to the faculty and graduate students, and relevant details on how the conference and URM event/workshop/mixer will expand their knowledge of and role in promoting diversity and inclusivity, and also how attending the conference more generally will promote their graduate and/or faculty careers. The transfer of knowledge back to the faculty and graduate students is an important professional development skill. In conjunction with the announcement of these funds, we will include information for all of our students on what types of conferences/events they could attend and also tips on how to write their applications. Attending a conference can be an important growth promoter in a graduate student’s career, but many students, including URM students, don’t see the benefits of attending a conference or don’t know they should be attending conferences. In particular, conference URM programs can serve as an important community outside NC State for URM faculty and students (e.g. ESA.org SEEDS, freshwater-science.org INSTARS). These funds should encourage our students to increase their network of peers outside of NC State, engage in conferences and especially at URM events, which will be important experiences for both URM and non-URM faculty and students in order to build and sustain a successful diverse and inclusive graduate program and faculty.

**3)** *Emphasize diversity and inclusion in departmental materials, such as websites and course syllabi.* At the end of each Fall semester, the Department of Applied Ecology will have scheduled a Teaching Workshop involving the faculty to discuss teaching strategies, what they think worked, what they didn’t work well, and what new things they want to develop in their teaching. The first Teaching Workshop is scheduled for December 17th, 2019. As a step towards promoting the overall importance of diversity and inclusivity in the department, we will recommend that faculty add a customized Diversity and Inclusivity Statement to their existing and new course syllabi (Appendix 4). We will also discuss the best practices and strategies for presenting visual materials (e.g., photographs of people) and assigning reading materials (e.g., peer reviewer articles) to ensure diversity and inclusivity.

Long-term Sustainment of the Actions to Promote Success of Underrepresented Minority Doctoral Students

Most of the action items we propose will not require additional budgetary funds once they are in place. For example, the mentor-mentee work/communication styles module and the IDP we be included in each offering of the existing graduate program core course AEC502, and materials for that course are actively shared among the faculty who teach it. Faculty can glean information from diversity statement workshop and convey this to future students.

The two action items that do require budget funds on an annual basis are the peer mentoring network and funds for travel to conferences. We have the following plans in place for their long-term sustainment:

The graduate student peer mentoring network is meant to be a program that is operated each year within the Biology Graduate Program. If necessary, we will seek funds from the Graduate School and the multiple Departments participating in this graduate program for the continuation of the peer mentoring network.

We would like to continue to offer students the opportunity go to conferences to participate in URM events, as this can provide a pipeline of new ideas and information back to the department. The Department of Applied Ecology may have funds to continue supporting of one student per year, with a total of up to $1000 provided for the travel opportunity.

**Appendix 1**

**BIOLOGY and FWCB GRADUATE STUDENT ANNUAL PROGRESS REPORT – Due January 15**

**\*\*Please submit completed electronic report to Freha Legoas <f\_lego@ncsu.edu> and your Advisor\*\***

**Reporting period: Calendar Year 2019**

|  |  |  |
| --- | --- | --- |
| Name | ID # | Semester/Year Admitted |
|  |  |  |

Degree – MR (non-thesis) MS  PhD Program – Biology FWCB

Biology concentration – Ecology & Evolution Physiology & Behavior Aquaculture & Aquatic Sciences Molecular, Cellular & Developmental Biology Forensic Sciences Integrative Biology

Advisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Required: pages 1-2. Optional: page 3 with input from your advisor.**

|  |  |  |
| --- | --- | --- |
| **Benchmark (required)** | **Month/Year**  **Completed/Expected** | **Comments** |
| Date of last committee meeting |  |  |
| **Masters** |  |  |
| Formed Committee |  |  |
| Submitted Plan of Work (due 2nd semester) |  |  |
| Submitted Thesis to Chair |  |  |
| Submitted Thesis to Committee |  |  |
| Scheduled Defense |  |  |
| **PhD** |  |  |
| Formed Committee |  |  |
| Submitted Plan of Work (due 3rd semester) |  |  |
| Written Prelim |  |  |
| Oral Prelim |  |  |
| Submitted Dissertation to Chair |  |  |
| Submitted Dissertation to Committee |  |  |
| Scheduled Defense |  |  |

**PUBLICATIONS, CONFERENCES, and GRANTS/FELLOWSHIPS (required)**

1. List all publications (journal articles, book chapters, etc.) that you have written since your last report and status (published, submitted, draft). Include full citations and DOI for published papers this [google sheet](https://docs.google.com/spreadsheets/d/1VDn1OaZTiitNXxb5fieO7eP5lm81poNFpG7o0yZjwJM/edit?usp=sharing):

*New*

*From prior report*

2. List all conferences attended and presentations given (name of conference, location, date, title, co-authors, talk or poster) since your last report here and in this [google sheet](https://docs.google.com/spreadsheets/d/1VDn1OaZTiitNXxb5fieO7eP5lm81poNFpG7o0yZjwJM/edit?usp=sharing):

*New*

*From prior report*

3. List grants/fellowships/awards received (please include the name of the grant/fellowship, date of award, and amount) or industry internships performed.

*New*

*From prior report*

**COURSEWORK and TEACHING (required)**

1. List classes taken during the 2018 calendar year (include course name/number and credit hours).

2. Are there any classes you want to take but NCSU doesn’t offer them? What are they?

3.List the courses you TA’ed (please include the term, and if you wish, a description of any contributions to the course outside of the “typical” TA responsibilities, such as guest lectures, updates to lab materials, etc.)

**SERVICE and OUTREACH (required)**

1. Professional service: list leadership activities, membership in professional organizations, offices held (president, treasurer, etc.), committee memberships, reviews of papers or proposals, etc.

*New*

*From prior report*

2. List all outreach activities and extension activities or reports (include description, date, and number of people attending).

*New*

*From prior report*

**RESEARCH ACTIVITIES** **(optional)**

1a. Student input: What research progress did you make towards your degree in the past year? Compare to your previous goals if you completed this part of the progress report last year. For goals you did not obtain, identify specific reasons why, where possible.

1b. Faculty input: Please comment on the student’s progress during the past year as described above. It will be most helpful for students if faculty comment on concrete behaviors, situations, or activities that may have hindered student progress.

2a. Student input: What are your research and writing goals for the upcoming year. Please be as specific as possible.

2b. Faculty input: Do the research and writing goals as outlined by the student reflect the same goals you have for the student? Please comment specifically on where any discrepancies exist and how student goals should be updated.

**Appendix 2**

/Users/bwtaylo3/Google Drive/Documents/Professional Service/AGEP-NC Fellow/Dept of Applied Ecology AGEP Diveristy Plan/Mentor-mentee work & communcation styles/Mentee-Mentor work and communication styles.pdf

**Appendix 3**



Appendix 4

Example of a recommended statement to be included on each faculty’s course syllabus. Statement will be unique for each faculty.

**Diversity and Inclusivity commitment**: The diversity that each student brings to class will be viewed as a resource, strength, and benefit. I will strive to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, culture, immigration status, and religion. I will recognize, as should each student, that in some cases historical factors have unfortunately limited this diversity. Therefore, the diversity of scientists’ whose work we discuss are not my selection but a historical consequence of low diversity in science. Despite these constraints I will strive to include scholarly works that better represents racial, cultural, ethic, and gender diversity. As NIH Director Francis Collins and Lawrence Tabak, NIH’s principal deputy director, have stated, the lack of diversity in the STEM leads to “the inescapable conclusion that we are missing critical contributions.” Thus, an aim of this class is to train and promote a more diverse community of scientists who will enhance and broaden scientific creativity and understanding. I intend to serve the learning needs of students regardless of their backgrounds and perspectives, both in and out of class as needed. Further, you also have the right to be addressed and referred to in accordance with your personal identity. Please let me know your preferred name and preferred pronouns, and I will do my best to refer to all students accordingly and support your classmates in doing so as well. I prefer Jane, but you can refer to me as Professor Jones if you prefer. If any class meetings conflict with events related to religious, cultural, race, or other aspects of your diversity and identity please let me know by the second week of classes so that together we can make arrangements for material you might miss. Suggestions to enhance the quality and inclusiveness of this class in any way are encouraged and appreciated.