Please attach a narrative (not to exceed 4 pages, excluding appendices) addressing the following:

- What are the student learning outcomes? Please provide a numbered list.
- Which learning outcomes were assessed?
- How were they assessed? (Programs must use at least one direct assessment of student learning.)
- Undergraduate programs should assess at least one University Undergraduate Learning Outcome (UULO) each year, which may or may not overlap with a program learning outcome.
- Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:
  - student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.
  - activities requiring originality, critical analysis and expertise.
  - the development of extensive knowledge in the field under study.
- What was learned from the assessment results?
- How did the program respond to what was learned?

Please limit the narrative portion of your report to no more than four pages. You may attach appendices with data, tables, charts, or other materials as needed. Please explain the relevant conclusions from any appendices in your narrative. Please contact the Office of Academic Assessment if you have questions or need assistance.

Learning Outcomes for the M.S. program
All students graduating with a Master of Science in Biological Sciences should be able to:

1. Master a critical set of key concepts specific for each sectional concentration.
2. Become familiar with key methodologies specific for each sectional concentration.
3. Comprehend and critically evaluate the current published scientific literature.
4. Engage in scientific research in which the individual can formulate hypotheses, generate high quality data, and evaluate that data for reasonable scientific conclusions.
5. Communicate scientific results effectively in oral presentations to general and specialized audiences.
6. Communicate scientific results effectively in written reports suitable for publication.
7. Instruct and engage students and members of the community at all levels to appreciate the importance of biology in their lives.

Learning Outcomes Assessed in 2017

Learning Outcomes 1, 2, 3, 4, and 5 were assessed in 2017. These outcomes are all aligned with the graduate level requirements of “student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice” as well as “the development of extensive knowledge in the field under study”. A variety of instruments were utilized including the Graduate Advisory Committee Annual Meeting Form, Colloquium Comment Sheets, Thesis seminars, Thesis documents, and an open response survey to gather feedback from both students and faculty about graduate program development.

The Graduate Advisory Committee Annual Meeting Form includes information about course work, research accomplishments, research objectives for the following year, oral presentations, poster presentations, publications, grant applications, grant awards, and outreach activities.

Once a year, each graduate student gives a professional presentation to an audience of fellow graduate students and department faculty. The Colloquium Comment Sheets provide feedback on areas of strength and opportunities for development; comments may address background knowledge, clarity of research design and data analysis, quality of slide design, oral communication skills, and ability to handle questions from the audience. Student presenters receive comments (anonymously) from both faculty and student peers the week after their presentation.

Early in the fall semester, an open response survey was distributed to all department faculty and graduate students to gather feedback about graduate program development. Topics addressed in the survey included recruitment activities, the admissions process, graduate curriculum and diversity of course offerings, the comprehensive examination process, progression to graduation, retention, career placement, and alumni outreach.
What was learned from the assessment results?

Overall students in the Master of Science program are achieving the learning outcomes, as evidenced by their scholarly engagement and successful completion of the degree program. Highlights from the 2017 assessment activities are listed below.

In 2017, there were a total of 11 students enrolled in the Master of Science program.
- 11 students (100%) submitted the Graduate Advisory Committee Annual Meeting Form
- All advisory committees determined that students were making adequate progress toward their degree
- Students gave a cumulative total of 5 oral presentations and 4 poster presentations during 2017
- In addition to participation in GPSA events, students also presented at regional and national scholarly conferences
- One scientific article was published that included a Master of Science student as an author
- Students received a cumulative total of 3 research grants and 1 travel grant; additional grant applications that were unfunded were also submitted
- Students participated in a cumulative total of 6 different outreach activities, including volunteering at the Clark County Wetlands Park, Cooperative Extension, and the Boys and Girls Club
- All student Colloquium presentations were deemed satisfactory
- 6 students successfully prepared and defended a thesis, culminating in conferral of a Master of Science degree

Regarding the open response survey about graduate program development, responses were submitted by about two-thirds of the faculty and about half of the graduate students. Responses were compiled by the Associate Director, who then organized a “town hall” style meeting to facilitate discussion. Strengths, weaknesses, and ideas for development were discussed for all topics on the survey. About 22 faculty and 13 graduate students attended this meeting and participated in a lively discussion. Working groups were formed around 7 major themes: (1) recruitment, (2) orientation for new graduate students, (3) curriculum, (4) comprehensive exams, (5) progress through the program & retention, (6) career placement & alumni outreach, and (7) mentorship. Each working group contained both faculty and graduate student members. Working groups met throughout the fall semester to discuss their topic and develop ideas for expanding and improving components of the graduate program. Working groups will submit preliminary reports and another “town hall” discussion will be scheduled for the 2018 spring semester.

How did the program respond to what was learned?

One change implemented this year based on previous activities was a modification of the structure of the Colloquium presentations. Previously all Colloquium presentations were scheduled for one hour with an additional 15 minutes for questions. Two main
challenges were identified with this structure: (1) two years passed between successive presentations for some students and (2) an hour was too much time for students in early stages (possibly their first semester) of the degree program. The schedule was modified to facilitate all graduate students giving presentations approximately once per year and to assign more appropriate amounts of time. In the updated schedule, some days have two shorter presentations (20-minute presentation with 10 minutes for questions) while other days have longer presentations (50-minute presentations with 15 minutes for questions). It was also discussed that these times are professionally relevant; many conference presentations are about 20 minutes long, and the thesis defense as well as presentations for a job interview are typically 45 to 50 minutes long.

Another change implemented in the 2017 Fall semester was an initial “pilot” offering of a new graduate core course for incoming students. This new course was designed to help incoming graduate students prepare for independent research and careers in the biological sciences. The course was organized into modules on the following topics: (1) library resources, (2) learning styles and effective communication, (3) developing research questions and hypotheses, (4) writing an effective literature review, (5) experimental design, sampling, and statistical techniques, (6) preparing effective figures and tables, (7) writing effective grant and scholarship proposals, (8) oral and poster presentations, (9) science ethics, (10) writing Graduate Research Fellowship proposals and in-house review of student proposals (many students subsequently submitted their GRFP proposals to NSF), and (11) best practices for success in graduate school and beyond. Twelve faculty participated in offering various modules. Feedback will be gathered from this first group of students and presented at a faculty meeting in the 2018 spring semester. Faculty will evaluate “what worked” and “what didn't work” in this initial offering of the core course. Faculty input and student feedback will inform revisions for future offerings of the course.

In sum, although current students in the Master of Science program are successfully achieving the learning outcomes, both students and faculty are engaged in various facets of program development. The initial offering of the new core course and the modifications to the Colloquium structure were substantial changes implemented during 2017. The open response survey about graduate program development, along with the subsequent “town hall” meetings and generation of working groups, will yield new ideas for program development throughout 2018 and beyond.