During AY 2012/13 and 2013/14 there were approximately 35 MS students enrolled in the Biological Sciences program, slightly fewer than were enrolled during the previous 2-year period. 19 new students entered the program and 14 students graduated during the two most recent years. Numbers of students matriculating and graduating were similar to the previous 2-year period (Table 1). The median duration of the MS degree program for the 14 graduates was 4.7 years (range 2.4 – 8.4 years), considerably longer than the 3.3-year median degree duration of MS students who entered between 2000 and 2010 (n = 243; data from a recent internal departmental review).

Table 1. Numbers of students in the Biological Sciences MS program.

<table>
<thead>
<tr>
<th>Number of students</th>
<th>2013/14</th>
<th>2012/13</th>
<th>2011/12</th>
<th>2010/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Majors</td>
<td>37</td>
<td>34</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>Newly enrolled</td>
<td>11</td>
<td>8</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Graduated</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>

1. Assessment information collected

1.1. Knowledge

The academic background of incoming MS students is assessed by the department to ensure that students have adequate knowledge to make a productive start on their degree program. The Assessment Interview should take place at the beginning of the student’s first semester. It is administered by two members of the Comprehensive Exam and two members of the Graduate Advisory Committee. The Assessment Interview often results in recommendations for remedial coursework.

Established students are expected to demonstrate knowledge of biology related to the thesis project. This is assessed using the Comprehensive Exam, administered by the Graduate Advisory Committee. Ideally, the exam is conducted before the end
of the first year. To pass both written and oral portions of the Comprehensive Exam, a student must write a research proposal, present the proposal to the committee, and answer questions related to the biology subject areas relevant to the thesis.

1.2. Communication of Science

MS students should make a contribution to scientific knowledge in their field of study, communicated in oral and written form. To assess this objective, we evaluate two criteria.

- Students must write a thesis, publically present their results, and defend the work in an oral exam setting. The Graduate Advisory Committee assesses the quality of the written thesis and its defense.
- Students should publish papers and make presentations at professional meetings. Additionally, students should write grant proposals, in order to gain feedback on their ideas, help to support their research, and to develop this important professional skill.

1.3. Occupation

Students should obtain employment related to biology or continue their education. We track student employment by communicating directly with former students, surveying former major advisors, and by using online resources such as ResearchGate and LinkedIn.

2. Conclusions drawn from the information summarized above

2.1. Knowledge

All new MS students underwent an Assessment Interview within their first semester at UAF except one, who completed the interview during the second semester. Common course recommendations were Research Design (BIOL F602), Regression and ANOVA (STAT F401), Data Analysis in Biology (BIOL F680), and Principles of Evolution (BIOL 681).

Nine MS students took their Comprehensive Exams during AY 2012/13 and 2013/14. All but one passed both written and oral portions of the exam on the first try. One student received a conditional pass on the oral portion and plans to repeat the exam in fall 2014.
2.2. Communication of Science

Twelve students defended their theses during the period of record and all were successful on both written and oral portions of the defense.

During AY 2012/13 and 2013/14, approximately 85% (30 of ~35) of MS students submitted at least one supplemental annual report to the department detailing their publications, presentations, and grant proposals. The following paragraphs summarize the information contained in those reports.

Across the two years of review, 13% of respondents (4 of 30) published at least one peer-reviewed journal article or book chapter. The average rate of publication was 0.1 per student per year; similar to the rate reported for 2010-2012. This low rate of publication during the MS degree program is not unexpected. The departmental expectation for MS students is that they will produce 1 – 2 publishable manuscripts from the thesis, and typically these are not submitted until after graduation.

During AY 2012/13 and AY 2013/14, 16 of 30 respondents (53%) delivered at least one oral or poster presentation on their research. Students averaged 0.7 presentations per year, a rate similar to that reported for the 2010-2012 period (0.8 presentations per student per year). Approximately one-third of these presentations were delivered at international or national conferences, while two-thirds were delivered at state or regional levels.

The 30 respondents applied for 40 research grants, fellowships, scholarships, and travel grants per year during the period of review. Of the applications, 34% were to agencies and institutions outside UAF (including the NSF-funded program CASE). 67% of respondents applied for at least one award during the two years. On average, each student submitted 1.3 proposals per year, slightly higher than the 1.1 applications per year reported for the previous 2-year period. Overall, at least 58% of proposals were successful; a subset of proposals was pending when the data were tabulated.

2.3. Occupation

The department obtained current employment information for 11 of the 14 most recent MS graduates (Figure 1). The majority of graduates have obtained biology-related positions. Two graduates are enrolled in doctoral or MD programs. Seven are working as professional biologists or biological technicians for federal and state agencies and environmental consulting firms. One is in science education. One is unemployed and searching for a biology-related position, and another is working outside biology.
Figure 1. The occupations of MS students graduating in AY 2012/13 and AY 2013-14, on a percentage basis.

3. Curricular changes resulting from conclusions drawn above
   • Over the past few years, the median duration of the MS degree program in Biological Sciences has lengthened and it is currently taking too long for students to graduate. The department’s Teaching Advisory Committee will study the Biological Sciences MS program over the next two years and will develop recommendations to shorten the duration of the degree.
   • While we do not expect most MS students to publish their research before they graduate, we do expect students to gain experience presenting their work and to learn to write effective grant proposals. Participation in research presentations and proposal writing was rather low (53% and 67%, respectively, across 2 years) and could be improved. The opportunity to present work at professional meetings may be limited by the availability of travel funds, but there are several regular opportunities to present work within the department each year, including the BioBites graduate seminar series, the Midnight Sun Graduate Research Symposium, and the Long Term Ecological Research Symposium. The importance of presenting research and writing proposals will be stressed in new-
student orientations and in courses commonly taken by new MS students, such as Research Design (BIOL F602).

- The department needs a more integrated data storage and retrieval system that will allow us to more effectively relate policies and practices to measures of student progress and success, including degree duration, publications, and employment. The development and implementation of such a system is a priority for the next few years.

4. Identify the faculty members involved in reaching the conclusions drawn above and agreeing upon the curricular changes resulting

Jeremy Jones (Chair, Teaching Advisory Committee)
Diane Wagner