

Executive Summary
WSU Five-Year Program Review
Department of Botany
Fall 2018

Summary prepared by Sue Harley, Professor of Botany and Botany Department Chair

The Department of Botany plays many roles in the university. We provide education and training in all areas of botany, in particular for field botanists, an area where there is growing concern as state and federal agencies lose such individuals to retirement and universities lose expertise in this area (see below). The department contributes to WSU's general education program, with 81% of SCHs coming from general education offerings, primarily BTNY LS 1403, Environment Appreciation. A common comment among general education students is that after taking a botany class, they see the world from a new perspective. The faculty participate in interdisciplinary instruction, such as the new applied statistics class, MATH 3450, Advanced Statistical Methods, designed and co-taught by statistics faculty in the Department of Mathematics and a botany faculty member with extensive training in biostatistics. We are also working with the Departments of Microbiology and Zoology to offer an A.S. Biology degree to better guide students who want a 2-year degree into the appropriate course work that will allow them to transition smoothly into a B.S. in the life sciences or related area. The department accommodates student access by offering courses in a variety of formats (face-to-face, on-line, and hybrid) as well as on various campuses (face-to-face at main and Davis campuses), and through IVC (Interactive Video Conferencing) at satellite campuses. We provide on-campus employment for some students, an opportunity that improves student retention and progress toward graduation. Faculty, staff, and students contribute to the local community through a variety of service activities. The greenhouse facility serves not just our majors but also the local community as well through K-12 field trips. The Mary Carver Hall Herbarium supports teaching and the botany profession through its well-curated and historical collection of the regional flora.

What is clear is that we are a department in transition. Since our last program review in 2012, we have hired three new tenure-track faculty, and they now comprise 50% of the faculty. One of the senior faculty is retiring this year, and it is likely that by the time the department undergoes review again the remaining senior faculty will be retired or in the process of retiring. The influx of new faculty has revitalized the department, increasing our scholarly output and hastening the pace of incorporation of high impact teaching practices in classes. Following a period when we were down to four faculty and then the waiting period while the new faculty got settled in, we are now able to tackle several projects recommended in our last review, such as revision of the curriculum to align our learning outcomes with the AAAS Vision and Change document. In conjunction with this, we are also looking to take advantage of the areas of expertise the new faculty members bring as we revise, delete, and add courses. The completion of the Tracy Hall Science Center gave us the ability to provide faculty with dedicated research space as well as new equipment to support scholarship. Of particular importance as we face another round of retirements, is replacing the plant taxonomist/herbarium curator position. Not only is training in plant identification and classification critical for our graduates, especially our field botanists, but the Mary Carver Hall Herbarium, a collection of over 25,000 specimens with an emphasis on the Utah flora, is an important source of information about current and historical regional plant

distributions whose continuity needs to be maintained.

Assessment of learning is one of the areas that reflects the changes going on in the department. We have been raising the bar on student achievement throughout the review period, to the point that weakness can now be seen. In general education classes, we have incorporated more hands-on group activities to address challenging areas and are employing a variety of assessment techniques to measure learning that is poorly captured by multiple choice exams. Our 2000-level majors courses are continually reviewed and revised to better prepare our introductory students for upper division course work. With stabilization of the faculty and increasing numbers of students in upper division courses (numbers that are not reflected well by our fairly static number of majors and number of graduates during the review period), we are able to offer upper division courses more frequently. Upper division courses are being revised to include more research experiences, whether field or laboratory based. We also have a good number of students who did individual research (8), an undergraduate thesis (10), or co-operative work experience (28) during the review period. Graduates are getting jobs with state and federal agencies, botanic gardens, local natural product and biotech companies, and labs that do environmental analyses. Graduates are completing MS and PhD degrees in the US and UK, with one graduate finishing an MD and now doing a residency at the University of Utah.

At the time of our last review, all formal advising was done by the department chair. The review team recommended that the advising be distributed among the faculty. We were able to do this starting last year, but there are some inequities in the advising load that need to be addressed.

Faculty presently number six, which is the minimum level needed for us to successfully carry out our mission as the two program reviews prior to this one both stressed. All faculty hold a PhD and most have postdoctoral experience. Student evaluations of teaching show that the faculty are solid instructors, with the department as a whole averaging 5.57 on a 7 point scale in the evaluations. Faculty are active scholars, whether working on their own projects or mentoring student-initiated projects. Faculty also contribute to both the local community and the professional community.

The department has two invaluable staff members. Our part time administrative assistant does a splendid job supporting the faculty, keeps current with the software and university systems needed for the smooth functioning of the department, and does excellent work keeping the department budget. The full time lab manager is indispensable for the smooth running of classes, maintenance of lab supplies and equipment, supervising of student employees, and operation of the greenhouse.

We are now in our third year in the Tracy Hall Science Center. The teaching labs receive natural light and have improved safety features compared to our former facilities in the Science Lab Building. The greenhouse facility is larger, with a greatly improved workspace. We now have research space for the faculty. There is a shared cell culture facility and a dedicated room housing controlled environment chambers. With the move, we were able to replace a lot of aging equipment, improving both teaching and research resources. The college has common equipment that has been used by the Botany faculty, including an ultracentrifuge, a UPLC set up, an environmental scanning electron microscope, and a confocal microscope. A community garden on the main campus, started by the Botany Department, will now serve students who are food

insecure by supplying fresh produce to the campus food pantry. In addition to the facilities on the main campus, a greenhouse and garden at the Davis campus support Botany and Nutrition courses offered there.

We are, however, still tied to Lind Lecture Hall because of the large (80-120 seat) lecture rooms that Tracy Hall lacks. It is inconvenient to take demonstration materials back and forth between Tracy Hall and Lind. In addition, the Botany Department lost its assigned room in Lind to the Northern Utah Academy for Mathematics, Engineering, and Science (NUAMES), meaning we cannot schedule classes until other departments release the unscheduled times for their rooms in Lind. (Chemistry and Microbiology also lost Lind rooms to NUAMES.)

In our 2012 program review, then chair Barb Wachocki noted:

The Botany Department at Weber State University is **the last remaining undergraduate Botany department in Utah**, and one of the few left nationwide. Trends to downsize, consolidate, or eliminate Botany programs have been occurring for over 20 years. The impact this is having and will have, is well documented in the 2010 report, [*Assessing botanical capacity to address grand challenges in the United States*](#), issued by the Chicago Botanic Garden and Botanic Gardens Conservation International U.S. The report is based on a survey of over 1,500 respondents and 30 workshop members. It states that since 1988, “undergraduate degrees earned in botany are down 50% and advanced degrees earned in botany are down 41%.” In addition, “courses eliminated tend to be from among those required for the 0430 (botanist) federal job code.”

The situation has not improved in the past six years, with continued periodic reports about the loss of field botanists with survey skills and knowledge of plant identification, including recent articles in [*The Wall Street Journal*](#) and [*U.S. News and World Report*](#). With growing concerns about the environmental impacts of climate change, there is a need for the historical records of plant distributions, such as those in the department’s Mary Carver Hall Herbarium, and people trained in surveying and analysis of flora and their growing conditions, such as our graduates. The Botany Department offers the courses that are listed in the 0430 job code, and our graduates have the minimum 24 botany credits needed for these jobs. We have ongoing examination of our course offerings to make sure that the training we provide meets the critical need for field botanists, as well as their laboratory counterparts who do the work of soil, plant physiology, cell biology, anatomy, and DNA analysis that supports field studies.