Graduate Program Review
Department of Botany and Plant Pathology
November 30, 2012

1. Overall Recommendation:
   Expand to Maintain

2. Summary of Findings and Recommendations:

   The graduate program of the Department of Botany and Plant Pathology (BPP) was reviewed on Nov. 30, 2012 by a panel composed of external and internal evaluators. The objective of the review was to evaluate the graduate program of BPP, including its relevance to the land grant mission, strength of the curriculum, student quality and success, and productivity and strength of its faculty. The review team concluded that BPP at OSU brings together programs in three subdisciplines core to the mission of a land-grant institution. These are: i) the causes, control, and impact of diseases of important agricultural plants, ii) basic understanding of plant function (genomics, biochemistry, growth and development), and ii) the ecology, biodiversity and evolution of plants in their native environments. BPP addresses several of OSU’s “Signature Area of Excellence” areas including “improving human health and wellness,” “advancing the science of sustainable earth ecosystems,” and “promoting economic growth and social progress”.

   BPP department attracts high quality students from across the United States and internationally. This graduate program has subdisciplines in ecology, systematics and plant pathology that attract a significant number of students and this is seen by the review team as a strength of the program. Fewer students pursue degrees in “plant function”, but these subdisciplines are strengthened by the department’s commitment and collaboration with the MCB program. Most students are supported on GRAs or GTAs, and the department’s commitment to sustained graduate stipend support was noted by the students as a strength. The review team recommends that the department may want to pursue strategies for increasing international student enrollment. There is also a need to resolve the issue of COS GTAs being supported by departmental grant indirect costs. Student quality is high, with the majority completing their degrees and graduating in a timely manner. Students successfully move to positions appropriate for their training such as university faculty members, scientists at national government laboratories and agencies, scientists at non-governmental agencies, teachers and instructors, postdoctoral scientists, farming, and private practice.

   BPP offers core courses in all areas related to their mission including courses in plant health, plant function, ecology, and systematics. Loss of faculty over the past ten years has reduced the diversity of offerings available to students, and students expressed a need for more specialized course offerings. The review team recommends that BPP review its curriculum to address student interests and changing needs.
BPP has faced a major loss in the number of on campus tenured/tenure track faculty over the past ten years. Twelve positions have been vacated due to retirement or departure from the department. BPP has, over this same time period, acquired six positions with only three based on strategic hires.

The department has benefited from excellent recent hires through various opportunities such as Provost hires and interdisciplinary hires that selected BPP as their tenure home, but has been less successful in hiring faculty based on its own strategic planning. The review team recommends that the CAS administration assess the impact of faculty losses over the past ten years and work with BPP to support BPP’s strategic priorities in hiring faculty in critical areas including Forest Pathology, Plant Genomics and Computational Biology, Plant Ecology, Plant Systems Science, Plant-Microbe Interactions and Ecology and Evolution of Infectious Diseases.

The review team shares the concern of the BPP faculty of the poor facilities that house the department research and teaching programs in Cordley Hall. The review team recommends that the department and CAS administration address strategies to improve basic infrastructure.

The review team found that BPP contributes significantly to interdisciplinary programs at OSU such as the MCB and biology programs. These contributions have come at a cost to sustaining and expanding departmental programs due in part to BPP not receiving credit for interdisciplinary contributions. The team recommends that OSU and CAS evaluate their system of metrics to ensure that they capture total output and contributions in interdisciplinary programs, and that they award support and positions based on total productivity and contributions by BPP faculty.

BPP faculty are nationally and internationally recognized for their scholarly, academic, and outreach contributions. They are recipients of prestigious national awards and are highly competitive for federal grant funds, a measure of the quality and impact of their programs and of faculty stature and reputation. The department also has core responsibilities for education and outreach on plant diseases critical to the productivity of Oregon agriculture, and BPP’s disease diagnostic clinic and its staff are nationally recognized.

3. Detailed findings

A. Introduction

The graduate program of the Department of Botany and Plant Pathology (BPP) was reviewed on Nov. 30, 2012 by a panel composed of external and internal evaluators. The Dean of the OSU Graduate Program, Brenda McComb, chaired the panel sessions with the department. Members of the review team were:

‘Margaret Daub, Professor and Dept. Head, Dept. Plant Biology, NC State University (external)
‘Susan Harrison, Professor, Dept. of Environmental Science and Policy, UC-Davis (external)
‘Mark Mousseaux, Oregon/Washington State Botanist, Bureau of Land Management (external)
‘Michael Lerner, Professor, Dept. of Chemistry, OSU (OSU Graduate Council representative)
‘Jo Tynon, Associate Professor, Dept. of Forest Ecosystems and Society, OSU (OSU Graduate faculty-at-large)
The objective of the review was to evaluate the graduate program of BPP, including its relevance to the land grant mission, strength of the curriculum, student quality and success, and productivity and strength of its faculty. Lynda Ciuffetti, Head of the Department, provided the evaluation team with a comprehensive self-study document developed by the departmental faculty. During the review, the panel toured facilities, and met with Dr. Ciuffetti, with members of the Graduate Studies Committee, and with faculty, and with graduate students. The team also met with College of Agricultural Sciences Dean Daniel Arp and Associate Dean Stella Coakley. The graduate review was held simultaneously with a review of the undergraduate programs in the department, conducted by a team composed of external and internal participants. The evaluation of the undergraduate program is summarized in a separate report.

This report of the graduate program is organized based on an outline provided to the review team by Dean McComb. Below we provide our assessment of our findings and recommendations.

B. Inputs

1. Fit of the mission of the program and its relationship to the mission of the academic college and University

The Department of Botany and Plant Pathology conducts scholarship, outreach, and teaching and training in disciplinary areas that are central to the mission of all Land Grant Institutions. A core mission of Land Grant Institutions is to conduct fundamental and applied research and to disseminate information needed to strengthen agricultural productivity, to ensure a sustainable and safe food supply, and to protect our environment. Coupled with this mission is a commitment to train the next generation of scientists to ensure continued advances in promoting the land grant mission. BPP at OSU brings together three subdisciplines core to the land-grant mission. These include fundamental and applied programs that address: i) the causes, control, and impact of diseases of important agricultural plants, ii) basic understanding of plant function (genomics, biochemistry, growth and development), and iii) the ecology, biodiversity and evolution of plants in their native environments. As such, the department’s mission and accomplishments are not only central to the mission of the College of Agricultural Sciences and to Oregon State University, but are also critical for addressing critically important “Grand Challenges” facing our world today: ensuring a sustainable and safe food supply, protecting our environment, and providing a sustainable source of bioenergy. As noted in the self-study document, BPP addresses several of OSU’s “Signature Area of Excellence” areas. These include: “improving human health and wellness,” “advancing the science of sustainable earth ecosystems,” and “promoting economic growth and social progress”. Thus BPP is core to the mission of CAS and OSU. BPP is nationally and internationally recognized for their outstanding faculty and programs, and as such, enhances the reputation of CAS and OSU.

2. Quality of students.

The department attracts high quality students from across the United States and internationally. Over the 2002-2012 review period, approximately half the students pursue studies in ecology and evolution, 40% in plant health, and approximately 10% in plant function.

Ecology and evolution is a strength at OSU, and BPP offers training in specialized areas within these disciplines including plant and fungal systematics, plant-insect interactions, and
community ecology. The Ecology and Evolution program has been recognized for its outstanding research productivity (#4 in US graduate programs in this area in 2005-06). Loss of faculty in this area may be affecting its numerical strength; based on Table 2.3a, it appears that toward the end of the review period (2009-2012), 14 of 61 current graduate students (23%) are in Plant Ecology, while 9 (15%) are in Systematics or Applied Systematics. The overall 10 year average for E&E is higher (48% total students, see Fig 4 in the self-study report).

The Graduate Program in Applied Systematics offered by BPP is designed to provide students with both advanced technical skills in plant systematics and taxonomy, as well as a good foundation in ecology, data analysis, and communication which are skills necessary to function effectively in either private industry or government plant conservation programs. This program leads to a Master’s in Applied Systematics in Botany and has an internship component that emphasizes practical experience in-lieu of a thesis. Although not enrolling a large number of students due to the lack of financial support for these students, the program fits an important training niche for plant conservation in the U.S. and needs to continue to serve this important area of plant biology.

The Department of BPP at OSU offers one of the best environments in the western U.S. to pursue graduate study in plant systematics. The OSU Herbarium, is the central university facility in the state for research, instruction, and public service in plant identification and classification. The Herbarium is a modern facility that contains a plant collection of over 330,000 specimens and a mycological collection that exceeds 70,000 specimens. These collections are among the largest in the Pacific Northwest, and they are a major regional, national, and international resource for basic and applied work in plant and fungal systematics. The faculty associated with the OSU Herbarium and the program are nationally and internationally recognized for their expertise in the systematics of vascular plants, non-vascular plants (lichens and mosses) and fungi. This expertise, in combination with other programs in other Colleges at the University (e.g. forestry, statistics, communication), as well as other BPP programs like the Oregon Flora Project, provides students entering the systematics program with an exceptional education opportunity to obtain the skills needed to pursue a successful career in Applied systematics and plant conservation.

The programs in plant health are unique within the state of Oregon, and are nationally recognized. Programs available for graduate student training span from the very fundamental understanding of genomics and molecular biology of host-pathogen interactions, to understanding pathogens and disease at the population level, to programs that prepare students for applied research on plant diseases and disease control. Mentoring of graduate students in plant health is greatly strengthened by the participation of courtesy faculty with expertise in these areas. Although the courtesy faculty do not teach courses in the department, they have mentored approximately 25% of the students trained in plant health over the past ten years and thus play an important role in sustaining the strength of the plant health graduate program. Graduate training in this area is greatly enhanced by the outreach mission of the department including the resources and expertise of the OSU plant disease clinic, the off-campus research stations, and opportunities provided by Oregon’s diverse agricultural economy.

Graduate opportunities in plant function, per se, are supported by a small number of faculty and attract the smallest number of students. However, members of the two other subdisciplines conduct work that overlaps with this area, and in addition, this track provides another linkage with the MCB program, enhancing interdisciplinary interactions. Basic research
on plant genetics and genomics, cell and molecular biology, physiology and biochemistry, and development are critical to promoting advancements in our understanding of plants. BPP programs address fundamental questions on plant function as well as how to manipulate plants for improved nutrition and stress tolerance. Faculty in BPP study model and agricultural terrestrial plants as well as marine algae.

On average, the department admits about 13 new graduate students per year in BPP (10) and in MCB (3). Students come with good GRE scores. Student quality and the strength of mentoring by faculty are also reflected in the high proportion of students who complete their degrees and the timeliness of completion. Two of their students were awarded NSF Graduate Research Fellowships, one of the most prestigious awards for graduate education in the US. BPP admits predominantly US students with a smaller cohort of international students. Although this demographic reduces diversity, the ability to attract high quality US students is seen by the review team as a strength.

3. Admissions selectivity

BPP applicant pools have ranged from 50-84 students over the past 7 years, with admission offered to the top 15-30% of applicants each year. Of these admitted students, an encouragingly high percentage (typically 60-70%) matriculate into the program. These data indicate a selective application process and a high interest by the selected students in the OSU program. Over the past 6 years, admitted student GRE score averages have remained high (72/62/51 percentiles).

As noted above, the international student numbers are low, in large part due to the ability to fill positions with strong domestic candidates. With about 25-50 international applicants per year, only five international students have been admitted into the graduate program in the past seven years. Although the relevant data are not broken out for domestic vs international students, the low number of international admissions may also result from differences in the applicant pool qualifications. Faculty indicated that concerns over GTA English abilities were one concern in evaluating international candidates.

Recommendation: BPP might explore ways to increase international involvement in their graduate program. Such an effort was suggested by students and would be in line with OSU strategic goals.

4. Level of financial support of students

Just over half of BPP graduate students are funded on Graduate Research Assistantships (GRA) from extramural grants. There are also many Graduate Teaching Assistant (GTA) positions supported from departmental or College of Science (COS, $12,129) support as well as from funds returned to the Department from grant indirect costs (over $200,000 in FY 2012). Seventy-seven percent of graduate students are supported as GTAs in their first year, and graduate students are grateful for the support. However, the use of indirect costs to support GTAs for teaching in the interdisciplinary undergraduate Biology program offered by COS is a significant source of concern for BPP faculty, as they see returned indirect costs as funds
intended to support BPP research and graduate training, not GTAs. External members of the review team were also perplexed by this funding arrangement for GTAs.

Students remarked positively on BPP’s commitment to provide and sustain assistantship support. A source of concern for BPP faculty was the level of stipend and benefit support provided to students, which faculty view as non-competitive. A limited analysis done on stipend levels at other institutions showed BPP lagging some institutions, but competitive with others, particularly at the Master’s level. Students remarked on the need for stipend levels adequate to support basic costs, but did not view relative stipend levels as a factor in their choice of graduate programs.

The Department also has funds to support graduate student travel to professional meetings and to support research. Creating BPP program-based funding sources (e.g., GTAs, Laurel Awards, Provost awards, eCampus) can allow the BPP program to be more strategic in its recruiting and also allow supplements and/or rewards be used to support students and faculty who contribute to the program.

**Recommendation:** BPP should seek institutional support for funding GTAs rather than the use of indirect cost funds returned to the department, freeing up returned indirect costs for GRAs and improvements to infrastructure.

**Recommendation:** BPP should continue to pursue avenues to increase graduate stipends to levels competitive with comparable institutions.

5. Curriculum strength

Graduate curriculum offerings in BPP face a challenge due to the diversity of subdisciplines covered (Plant Health, Plant Function, Ecology and Evolution). At many universities, these disciplines are separated into multiple departments. BPP attracts students in all of these subdisciplines, thus curriculum offerings need to address the diverse needs of students. BPP has also faced significant losses in faculty over the last ten years, further limiting course offerings. In the review team’s meeting with students, lack of specific course offerings was the only area of discontent noted. Students expressed interest in having a greater diversity of course offerings tailored to their interest areas. Also, cancellation of courses due to low enrollments further limited course opportunities. The offering of “slash” (dual undergraduate/graduate) courses is one option to offer a greater diversity of courses, and is a tool also used by institutions of some of the review team. Students noted that there was a limit to the number of slash courses allowable by OSU. Also, some slash courses were viewed as successfully meeting the needs of graduate students, whereas others were not. Students suggested that the joint 300/500 level introductory plant pathology course, for example, was not advanced enough for graduate students.

In the area of plant health, BPP offers courses in forest insect and disease management, mycology, and plant pathology which are offered annually with solid enrollments. Alternate year courses include ones on plant disease management and molecular plant pathology. Together, these offerings provide a core of fundamental courses (i.e., general plant pathology, disease management, and molecular plant pathology) widely viewed to be the foundation of a plant pathology graduate degree. Students expressed concern, however, about the combining of
the undergraduate and graduate general plant pathology course and noted that it does not meet the advanced needs of graduate students. BPP also offers more specialized courses in nematology, plant disease dynamics, plant disease diagnosis, and forest pathology, however, some have not been offered recently perhaps due to insufficient enrollment. Special topics courses have been offered in mycology and plant pathology to fill some of those needs. Additionally, some MCB offerings taught by BPP faculty are important offerings for students in molecular areas of plant pathology. Overall, the curriculum offers a basic foundation of courses needed by students in plant pathology, but lacks consistent offering of specialized courses particularly in the applied areas of plant pathology and the biology of plant pathogens. In the past, “plant health” graduate courses included ones on plant virology, plant pathogenic fungi, plant pathogenic bacteria, and fungal genetics, courses that are common at other institutions. However, these courses are no longer offered in BPP.

BPP offers few courses in the area of “plant function,” but the curriculum is strengthened by course offerings in MCB taught by BPP faculty including courses in genome organization, genome expression, cell and developmental biology, and bioinformatics. BPP has recently added a new course in comparative genomics, and also offers courses in photosynthesis and in physiological ecology, the latter covering water relations, plant stress, and growth. The only graduate offering in general plant physiology, plant anatomy, or plant development, is BOT505 (Plant Physiology Reading & Conference). Such courses are usually part of botany curricula and may be offered by other plant-based departments at OSU, and/or may not be possible due to the limited number of “plant function” faculty and their responsibilities to MCB. Graduate students commented that it was difficult for students entering the department without a plant background to obtain basic understanding of plants due to the lack of general offerings at the graduate level. Admitting students with diverse disciplinary background strengthens the graduate program; BPP may want to consider ways to offer course material in general plant function at the graduate level.

Graduate offerings in Ecology include Plant Population Ecology, Plant Community Ecology, Field Methods in Vegetation Science, Nutrient Cycling, and Environmental Physiology. This is a very basic set of coursework for a graduate program in plant ecology. Students commented on the need for more coursework in restoration ecology. Additional elements that would strengthen the program and complement its current foci include fire ecology, global change ecology, landscape ecology, evolutionary ecology, and perhaps a course that took a primarily ecological approach to plant-insect and plant-pathogen interactions. Finally, we note that many BPP graduate students go on to agency science jobs, and a conservation-oriented course that covered relevant aspects of environmental policy would be valuable.

The graduate curriculum in Plant Systematics provides graduates with the coursework necessary to address the conservation of endangered plants, the control of invasive plants, and habitat restoration. Core systematic and taxonomy courses like Mycology, Agrostology, Lichenology or Bryology, Aquatic botany and the Flora of the Pacific Northwest serve as the base platform of the program and should remain so. An improvement suggested by students would be to also offer an optional systematics courses at a larger scale, perhaps the Flora of North America, or in Tropical flora. Industry, private environmental consulting firms, and government agencies all continue to have a need for graduates that are trained in plant taxonomy and ecology. A number of optional electives (seven credits) are shared with Ecology, such as Population Ecology, and Community Ecology. Plant Genetics is an optional elective taught in
Crop and Soil Science (CSS 530) that is critical for a solid foundation in plant conservation. If the student’s undergraduate experience did not cover genetics, then Plant Genetics should be required for a systemsatics Master’s degree. Ecological restoration could be expanded (additional class or a practicum), to provide a more ‘real’ world experience given the future demands on systemsatics graduates in the work place. Course work on community structure and analysis, as well as data analysis methods, are also optional – at least one of these should be required. Graduates in the fields of plant conservation need to know how to analyze data. A number of excellent professional cohort courses (18 credits) are required, including Science Communication, Ethics, and Accounting and Finance for Scientists. Two required courses, Management and Marketing Scientific Technologies and Innovation Management, are two courses that could be optional, in lieu of a few other elective courses that should be required (e.g. Genetics, and Data Analysis). This program also has a required internship which is an excellent way to focus a graduate’s work into a certain area and can provide a pathway for a non-thesis option.

**Recommendation:** BPP should review its curriculum to address student interests and changing needs. The use of 300/500 slash classes should be reassessed. A series of changing special topics classes may allow for specialized offerings based on student interests.

6. Quality of personnel and adequacy to achieve mission and goals

BPP has faced a major loss in the number of on campus tenured/tenure-track faculty over the ten years covered by this review. Of the current 23 TT faculty, four have primary or major administrative positions. The number of non-administrative tenured/tenure-track faculty is now equivalent to the number of courtesy faculty affiliated with the department. BPP is fortunate to have such a large number of courtesy faculty affiliated with their department, as these faculty mentor graduate students and contribute significantly to research productivity and reputation of the department. However, they do not have formal teaching responsibilities. As noted above, BPP spans disciplinary areas often separated into distinct departments at other institutions. The loss of faculty limits their ability to provide comprehensive curricula to their students. In addition, 16 of the 23 tenured/tenure-track faculty are full professors, and the department is facing additional retirements in the near future.

BPP has benefited from excellent recent hires through various opportunities such as Provost hires and interdisciplinary hires that selected BPP as their tenure home. BPP has been less successful in hiring faculty based on its own strategic planning. Of the 12 on-campus tenure-track faculty lost over the last ten years, three were refilled based on positions returned to the department and prioritized through strategic planning. In order for BPP to move strategically to meet the future needs and goals of their department and disciplines, faculty positions need to be provided with positions that meet the goals of their strategic plan. BPP has undergone strategic planning and prioritized positions in Forest Pathology, Plant Genomics and Computational Biology, Plant Ecology, Plant Systems Science, Plant-Microbe Interactions and Ecology and Evolution of Infectious Diseases. All of these positions would enhance BPP’s research and academic mission.

**Recommendation:** CAS administration should assess the impact of faculty losses over the past ten years and work with BPP to support BPP’s strategic priorities in hiring faculty in critical areas such as Forest Pathology, Plant Genomics and Computational Biology, Plant Ecology,
Plant Systems Science, Plant-Microbe Interactions and Ecology and Evolution of Infectious Diseases.

7. Level and quality of infrastructure

The Department is housed in Cordley Hall, built in 1959. Both faculty and graduate students expressed dissatisfaction with the size and functionality of the existing infrastructure (e.g., laboratories, classrooms, office space). Space allocations for labs and offices are too small to meet OSU guidelines. More space is needed for housing the fossil collection and herbarium specimens. There is no dedicated graduate common space; the only common area available for BPP graduate students is the Department-shared conference room. Electrical and plumbing problems and a lack of air conditioning in the summer have seriously impacted research efforts. External members of the review team did not understand why BPP faculty in unairconditioned space were not provided window air conditioning units, an inexpensive and functional approach to provide basic quality infrastructure critical to sustaining excellent research programs. Controlled environment rooms and growth chambers need upgrading. In recognition of the problems faced by BPP, new faculty negotiated for upgraded laboratory space as a condition of hire. The BPP program needs upgraded labs, teaching space, and offices if the program is to grow.

Recommendation: Freeing up indirect costs now targeted to paying COS GTAs would allow BPP to address some infrastructure improvements.

Recommendation: CAS administration should prioritize the most basic needs for infrastructure improvement such as providing air conditioning.

Recommendation: BPP should continue to be innovative and entrepreneurial in generating revenue to address infrastructure needs.

8. Quality of organizational support

As noted, the department has faced a significant loss of faculty over the last ten years, raising a concern by the faculty of diminishing support by the college and university and an inability to sustain their research and teaching programs. Some of this problem was due to the protracted separation from the College of Science and the lack of support for the department’s programs by that college. However, the problem persists, and the faculty believe that their programs and contributions are not adequately measured and recognized by the upper administration.

In the view of the review team, the OSU administration appears to be facing a disconnect, common to many institutions of higher education, between what the institution values (i.e. interdisciplinarity, innovation, entrepreneurship, shared responsibility, a focus on providing quality educational programs) and the metrics universities use to measure output, many of which are designed to measure numbers rather than quality and to measure productivity within defined units such as traditional departments. BPP is a model for 21st century institutions of higher education. For example, they are major contributors to the interdisciplinary biology teaching program in addition to their own departmental programs. They are among the strongest in the
college in securing external funding for their programs. They provided ideas and funding to allow for the recent restructuring of the CGRB, an innovative facility that was the envy of some external members of the team. They have a strong record of providing research experiences for undergraduates from diverse majors, an expensive and time-consuming commitment that is poorly captured by numerical assessment but is increasingly core to a quality undergraduate experience. However, the metrics used to evaluate departments do not fully credit these contributions. For example, the Department does not receive credit for the credit hours it generates in teaching courses in the Biology Program. In order to accurately evaluate contributions, OSU needs to bring its system of metrics in-line with their value system. At a minimum, BPP faculty should be credited with the course credit hours of biology courses they teach. Other universities compile credit hour data both by the unit offering the course and by the unit of the faculty member teaching the course. This should be a very straightforward way to recognize BPP’s many teaching contributions and to credit them for the credit hours delivered.

Recommendation: OSU should put in place a system that computes credit hours not only by the unit offering the course but also by the unit of the faculty member teaching the course.

Recommendation: CAS administration should give BPP credit for the total credit hours delivered by BPP faculty in all courses as well as credit for BPP’s portion of enrollment increase in Biology in decisions about appropriating faculty positions.

C. Productivity

1. Level and quality of student performance

The self-study report documents success and productivity of graduate students. As noted previously, a high proportion of students receive degrees and do so in a timely manner. Many students receive awards from professional societies (American Phytopathological Society, Botanical Society of America, Ecological Society of America, Mycological Society of America) as well as other society awards. Students presented their research at diverse scientific meetings, and have a strong record of publications in excellent journals, noted in a 24 page list in the self-study document. Upon graduation, students have moved to positions appropriate for their training such as university faculty members, scientists at national government laboratories and agencies, scientists at non-governmental agencies, teachers and instructors, postdoctoral scientists, farming, and private practice.

2. Level and quality of faculty performance

BPP faculty are nationally and internationally recognized for their scholarly, academic, and outreach contributions. The quality of the faculty is evident in rankings of the graduate program and of OSU scholarly impact as noted in “Outcomes” below. Former and current faculty in BPP have been honored with prestigious awards including one member of the National Academy of Sciences, three faculty named as Fellows of the American Association for the Advancement of Science (AAAS), and ten faculty named as Fellows of their professional societies.

BPP faculty are highly competitive for federal grant funds, a measure of the quality and impact of their programs and of faculty stature and reputation. Over the last ten years, BPP
faculty have generated almost $80,000,000 in grant funding, averaging around $5 million to $9 million annually. In the last two years, BPP was responsible for 14-15% of the total grant dollars in CAS, placing them among the top three departments on campus for extramural funding levels for fiscal years 2005-2011 (Self-study report, pg. 33)

BPP faculty also contribute significantly to interdisciplinary and outreach/extension programs and support of critical facilities. The department has core responsibilities for education and outreach on plant diseases critical to the productivity of Oregon agriculture. BPP’s disease diagnostic clinic and its staff are nationally recognized. Extension faculty provide disease control recommendations for Oregon and other regions of the Pacific Northwest, essential to supporting a sustainable and productive agricultural industry. BPP faculty were core in the recent restructuring of the CGRB, an impressive facility that supports research of many students and faculty across campus. BPP houses and supports the OSU Herbarium, a resource nationally and internationally recognized for plant ecology and systematics research.

3. Viability of scholarly community within which students can interact

As noted above and in the section on ratings below, BPP faculty are nationally and internationally recognized for their scholarly contributions. Their scholarly reputation is evident in their recognition for distinguished national awards, their productivity, their competitiveness for funding, and the contributions they make to applied agriculture and the academic mission of OSU. It is notable that graduate students identified the excellence of faculty programs and faculty reputation as a major criterion for their decision to attend graduate school at OSU. Further, BPP faculty have expertise in a broad range of subdisciplinary areas, allowing for interdisciplinary scholarship and training.

D. Outcomes

1. Professional viability of graduates

As noted above, upon graduation, students have moved to positions appropriate for their training such as university faculty members, scientists at national government laboratories and agencies, scientists at non-governmental agencies, teachers and instructors, postdoctoral scientists, farming, and private practice. These positions overwhelmingly are in areas of responsibility relevant to their graduate training.

2. Satisfaction of students and graduates

The review team’s discussion with students showed high enthusiasm by the students in the programs of the department. Students commented that they chose OSU because of the strength of their mentors’ reputations and research programs and for the diversity of Oregon’s agriculture. Many mentioned the department’s culture of community and commitment to students as a significant strength of the graduate program. They noted that interdisciplinary projects were supported and encouraged, and that they had access to the equipment and facilities needed to conduct their research. Other strengths of the program included the commitment of the department to maintain assistantship support, funding to attend professional meetings, departmental social events (especially those connected with the seminar program), their participation and involvement in recruiting new students, the GTA mentoring program and opportunity to obtain teaching experience, and opportunities to develop mentoring skills due to the faculty’s commitment to having undergraduates conduct research in their labs. Although the
self-study document expressed a concern about student diversity, several students valued the diversity present and noted that the department was one that valued diversity.

Surveyed graduate alumni indicated high rates of satisfaction over most of the program components queried (Table 4.5 in the self study document), with approx 60-90% indicating 4 or 5 scores on a 5 point scale. Two areas with slightly lower ratings were in the diversity of course offerings and the departmental advising/guidance efforts. These issues and associated recommendations are addressed elsewhere in this report. As noted, the high rates of student satisfaction likely reflects both individual mentorship and overall program effectiveness. Other contributing factors include: (1) high level of graduate student success -- from 2002-2011, 93% of matriculated students attained a degree or are currently in the program, with an average of 2.44 (MS) and 4.88 (PhD) years to degree over the past few years, (2) continual supported for PhD students by RA or TA appointments, and (3) successful employment search in their field (76% within 6 months of graduation).

3. Rankings/ratings

BPP is nationally and internationally recognized as a department and also for its graduate program. In the most recent National Research Council ranking of graduate programs, BPP ranked in the top 25-30% of 116 Plant Biology graduate programs evaluated across the US based on reputational rankings. This is an outstanding accomplishment.

Other rankings have also documented the strengths of BPP and its faculty. The Chronicle of Higher Education in 2007 ranked the plant pathology program as 5th in the US based on faculty productivity. High rankings were also noted for citation impact and numbers of published papers by OSU faculty in agriculture and environment and ecology, areas central to BPP.

E. Conclusions

1. Maintain current program. The BPP graduate program as presently configured has all the markers of success. A high-quality faculty is recruiting, supporting, and graduating an appropriate per-faculty number of high-quality students. Student productivity and morale are high. Students are especially positive about the program’s cohesion and sense of identity, combined with a campus culture that encourages collaboration and sharing of facilities across departmental and disciplinary boundaries. Within the department, student productivity is supported by critical shared resources such as the genomics and informatics facilities and the biological collections. While many of these strengths might be maintained under other programmatic structures, we saw no need to recommend reorganization at present.

2. Expand current program through targeted faculty hires. Graduate students stressed the critical need to maintain current strengths that are vulnerable because of impending retirements (e.g. Forest Pathology), as well as to build strength in areas where need for graduate training is not being met (e.g., Restoration Ecology). Of the department’s three broad areas, Ecology was regarded by students as the most understaffed, followed by Cell and Molecular Biology, while only Plant Pathology was seen as large enough to maintain overall viability. New faculty FTE would also help alleviate the students’ strongly felt
need for more graduate-level courses, although we note that it may be inevitable that some of this need will continue to be met by mixed-level (‘slash’) courses.

3. **Maintain and expand the funding base for graduate studies.** The funding base is adequate at present, largely owing to the faculty’s success at attracting grants and their conservatism in accepting only the number of students they can support. Students expressed general satisfaction with their support packages. However, this situation is threatened by the rapidly rising cost of student support. We note that this is a pervasive nationwide problem with no easy solution. Possibilities deserving of investigation include expanding e-campus offerings and urging the campus to support Biology GTA’s from tuition-derived funds, thus freeing more of BPP’s returned overhead to support graduate GRA’s.

4. **Upgrade the facilities.** While the specialized equipment and facilities, collections, and field-based facilities are all adequate to excellent, the poor quality of the building is a problem for graduate student as well as faculty research productivity.

5. **Strengthen graduate advising.** Students described it as difficult to navigate course offerings across departments. This could be alleviated through a joint effort of faculty and staff to maintain the relevant information and extend it systematically to incoming students.