

**Natural Resource Conservation & Management Program
External Review Report**

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Natural Resource Conservation & Management Program External Review Report

The structure and content of this follows Appendix C, 'Suggested Format/Outline for External Review Report', "Handbook for the External Reviewer", Office of Assessment, WCU

I. Introduction

The team of external reviewers arrived at Western Carolina University on the evening of Thursday, February 14th and conducted interviews throughout the following day. The off-campus members of the external review team were greeted by Peter Bates, Program Director, at Madison Hall on WCU's campus at 5pm on Thursday. The entire team, including the on-campus external reviewer, met for dinner with three of the program's faculty. The last review team meeting occurred over dinner with Peter Bates and Laura DeWald on Friday, February 15; the team dispersed after dinner.

The review team attended meetings throughout the day on Friday, beginning with a brief team meeting in Madison, then breakfast with Mark Lord, Head of the Geosciences/Natural Resources Department. At 8:45 the team assembled in Stillwell 338 and participated in a series of five meetings over the next five hours. The first meeting was with Peter Bates. The second meeting was a teleconference with Wendy Ford, the Dean of Arts and Sciences, who was at home due to illness. Niall Michelsen, an Associate Dean for the college, was present at this meeting. Beginning at 11:00 Beth Tyson-Loftquist, the Associate Vice Chancellor of Academic Affairs, met with the committee as the Provost, Kyle Carter, was out of town and unable to attend. Following that meeting box lunches were served in Stillwell 338 and the review team met with 3 alumni and 8 students of the Natural Resource Conservation and Management (NRCM) Program. The final meeting in Stillwell was with the faculty and included Peter Bates, Larry Kolenbrander, Ron Davis, and Laura DeWald. Joni Bugden-Storie was out due to illness. Following this, Peter Bates took the review team on a tour of the Facilities in Stillwell.

The review team then convened around 3:30 in a conference room in Madison Hall, where we were met by Melissa Wargo, Director of Assessment. She answered the committee's procedural questions and then left the team to plan for writing the report. Peter Bates arrived at Madison Hall before 6:00 and took the team to dinner at Balsam Mountain Inn. We were met there by Laura DeWald..

II. Analysis of the Program

a. Undergraduate Program

Synopsis of the Curriculum

Each student earns a BS in Natural Resources which requires 72 hours in the major (48 hours in core courses and a 21-hour concentration), in addition to 42 hours in Liberal Studies. There are 3 concentrations: Forest Resources (FR), Soil and Water Resources (SW), and the newer Landscape Analysis (LA). The partitioning of hours in the major, concentration, and core, or Liberal Studies, is similar to many of leading, traditional programs in natural resources. The present

program exposes students to a solid and well-balanced mix of foundational natural, social, and applied sciences. A few institutions are experimenting with providing more choices (less prescription) in the courses taken in the major. Naturally, such a structure can result in students missing an appropriate balance of theory and application in their coursework. In its present form, we feel that the Natural Resources Management program and the associated concentrations strikes the right balance. If an expansion position were available, we think that a slightly different set of choices would serve the students better (see Suggestions, below), given the careers most commonly followed by the graduates. We recognize that the limited number of elective credits within their concentration is severely constrained by university policy, and the short list of courses to choose from is a function of the number of faculty in the program and their teaching loads.

Suggested Changes for Curriculum

1. Drop GEOG 402 from the core and add NRM 330 (Intro. Wildlife).

The possible downside to this is that it would force a significant reallocation of the work load of Ron Davis.

2. If staff could be found, add two courses to the elective pool for Forest Resources: i) Fire Management, ii) Forest Products.

3. Require NRM 351 or BIOL 304 in Landscape Analysis (LA) concentration. There is a conflict of information presented on this – this course is listed as part of the core for all concentrations, but it is NOT in the Curriculum Guide for LA.

4. Shift NRM 320 (Soil Conserv.) from elective pool to required for the SWC concentration, and move either MGT 300 or GEOG 300 or CHEM 133 to elective pool. We believe that it would be advisable to maintain a year of chemistry in this Option.

Rationale for Suggestions

1. Based on the catalog description, GEOG 402 does not seem to be an effective use of credits. The description reads: “Quantity, quality and distribution of resources in the U.S.; and the dilemma of increasing demand on dwindling resource base.” The students should get a good dose of this view and dilemma for many of the specific resources (timber, soil, water) in other classes. The largest gap in the core is a lack of training in wildlife management. Wildlife populations, both game, non-game and ‘species of concern’ (e.g., endangered, threatened) are a very important part of the objectives we have on all public lands, and on many private lands. Hence it is important enough to require of all majors. Admittedly it has less relevance, overall, to the SWC and LA concentrations. However, this is a prime example of an area of investigation that would be great to include in NRM 371 or NRM 444.

2. The primary employers are US Forest Service, the state forest service and sawmills in western N. Carolina (according to input from NRCM staff). For the first two, fire management (this course would complement the training the students get in fire suppression by focusing on prescribed burning, fuel inventory and fuel management) is extremely important and students interested in either of

these career paths could take this elective to make themselves more 'employable'. On the other hand, students wanting to work for the forest products side of forestry have no formal training in many aspects of Forest Products. They undoubtedly get some relevant background in NRM 352 and NRM 451, but there is a lot more in this topical area that they could benefit from. Even one course would probably make the student more well qualified in the eyes of employers.

3. One of these two courses is essential for the students to be prepared for the Landscape Ecology class (NRM 371) required in the LA option.

4. This course is the true heart of the concentration, and thus the assessment team could not figure out why it is not required.

Students should be able to fulfill their degree requirements on time provided they enter the program early (as sophomores) and required courses are available. Some of the students we met raised concern over the ability of students to graduate on time. They noted that this was a particular concern for transfer students, depending on the institution, and for students who had to take a hiatus in their studies. When asked whether this had been a serious problem, one student noted that it had been for a few students, and that it usually meant delaying graduation. There was widespread praise for the faculty concerning their advising. Excellent advising has helped to keep graduation delays to a minimum.

We consider the range of courses offered and prerequisites to be appropriate, with the exceptions noted above. We were impressed by the ability of the faculty to track majors through their studies such that they approached upper level courses with the requisite background.

The NRCM faculty were especially interested in our views on recruitment and retention. Our comments are based on the points related to Standard 5 (WCU Program Review Standards). Despite the general drop in students majoring in the NRCM Program since 2004, enrollment appears to be stabilizing. There have been cycles in enrollment in natural resources for decades. Factors that appear to influence this pattern are the general economy, job availability and generational trends, among others. The enrollment at a particular institution also reflects the image and efforts [recruiting] of the University and the Program, as well as local conditions. Given that nationwide trends in enrollment appear to be the norm, and that the state, and sequentially WCU, are re-focusing their recruitment efforts, conclusions seem unwarranted at this point. However, it is important to NRCM enrollment that the local region continue to receive adequate attention as changes are made.

Broadening diversity is a very hard goal to meet in the natural resources, agricultural, and environmental sciences disciplines. At the University of Wisconsin-Steven Point (a peer institution) College of Natural Resources (CNR), the percent females in the program has never risen above ~ 22%. It has gone up and down over time more or less independently of staff efforts. Currently, the

percentage is lower than the NRCM despite the fact that the CNR has a large environmental education major which is female dominated. Hence, NRCM is doing quite well if it can maintain a 20-25% female population. The percent of non-white students in the CNR at UWSP is also equal to slightly less than at NRCM. Due to a national decline in enrollments in science programs, especially in natural resources and environmental science, increasing diversity, in a broad sense, is an especially challenging goal. This challenge is further complicated by the demographics of the population in the region. We encourage efforts at recruiting in nontraditional markets (ie. outside of Western North Carolina) if this does not reduce resources towards maintaining the traditional market base. Consideration of reciprocity agreements with other states should be considered.

Some scholars and administrators claim that the ‘quality’ of the incoming student plays an important role in retaining students. Though it is easy to see how there could be some influence, the magnitude of the influence is very difficult to pin down. Retention rates are low at WCU and thus are a valid concern. In a comparison between WCU and UWSP, the ‘quality’ of the incoming student appears to be a little lower, as measured by high school performance (average high school GPA for UWSP is 3.4), but equivalent as indicated by ACT scores (23 at WCU vs. 22.8 at UWSP). Thus, we tentatively conclude that the quality of the student population is not the primary cause of the low retention rates. Further study is required to determine why retention rates are low. Given the feedback we received from students and alumni, we are confident it is not a lack of ‘investment’ or student-focus by faculty.

The NRCM faculty and University Administration asked our opinion on metrics and standards for learning assessment. Indeed, the faculty want to improve the methods of student assessment (see ‘Response to Program Review Standards, 1-4-08, P. Bates). We used the language in Standard 3 (Office of Assessment) as a guide. As the NRCM Program is so field-oriented, practical field skills are best assessed in class exercises. The written assessment metrics used by NRCM are consistent with some peer undergraduate programs. They currently use student GPA in selected, upper level courses to indicate if the graduate has demonstrated adequate attainment of appropriate “knowledge” and “problem solving skills”. This manner of measurement is problematic for at least two reasons: 1) A grade in a course (or courses) is based on a variety of evaluation instruments and reflects performance in a number of areas (i.e., often in areas other than ‘knowledge’ or ‘problem solving’), and thus is imprecise. This becomes more likely as the amount of group work increases. 2) A student could be quite deficient in a particular skill or knowledge area and still earn a C or higher for the course; thus, the grade is not a consistent or reliable indicator. However, a grade is not an inherently incorrect indicator; it simply needs to reflect the attainment of a specific skill or content area. A grade at a course-level is too broad and ambiguous. One approach that could be taken is to set *more specific* goals for the program first, and then in addition to that, goals by concentration. This will provide a framework to judge how the content area(s) and/or skills in each course

feeds into or satisfies, the program and concentration goals. Assessing if students have achieved the outcomes/goals is a thornier issue, but can be done within the framework of classes if there is direct assessment (graded in some way) of each knowledge topic and problem solving skill.

An alternative approach is used by some other institutions (e.g., The University of the South, The University of Georgia). They employ oral and written comprehensive exams during the senior year to gauge the learning outcomes and the effectiveness and consistency of curriculum. Comprehensive exams are administered by faculty within the major. Barring major turnover in faculty, these exams provide an internal metric for departments and programs which can be made consistent, but with reasonable levels of flexibility. The disadvantage to this approach is that it can be a significant time investment for faculty. The significant advantage is that they so comprehensive in coverage.

A third alternative is essentially a blend of the two described above. In this approach, the assessment is done by 'year' in the curriculum (i.e., sophomore, junior, senior). As suggested above, a complete of specific goals [outcomes] is needed for each year, and then suitable evaluation methods (test, demonstration, etc.) devised for each. This alternative falls between the other two in its breadth and costs.

One could make the case that the 'assessments' made by employers is the ultimate assessment. Undoubtedly, their evaluations are a valid input. However, they are neither complete nor unbiased. Each sector, if not each supervisor, has a different set of needs and expectations; and these can change over a relatively short time frame (the national forest system is clear example of this). No program can produce a product that is perfectly trained for all jobs, and not even for a particular job sector. We suggest that the NRCM faculty work on and improve what they have in place, and merge that with what employers and alumni tell them, to provide the broadest based assessment possible. A formal, well-designed survey of alumni could provide valuable information/insight on this topic.

b. Not applicable

III. Analysis of Faculty

a. Qualifications

Generally, we believe the academic program is strong, and the present composition of the faculty meets the needs of the curriculum reasonably well. The faculty are motivated individuals, and have a strong interest in working with undergraduate students on research projects, independent studies, etc. They all are versatile enough to teach effectively in areas that are somewhat outside of their core areas of training. We were impressed by the uniformly positive appraisal of the faculty by current NRCM students and alumni. The Program and faculty are well respected within the University administration

Resource management (Res. Mngt.) is an extremely broad discipline that draws on bodies of knowledge in the biological, physical, economic, management and social arenas. Even though Res. Mngt. Programs draw extensively on departments such as biology and geography, it takes a relatively large number of faculty to cover all courses that fall within the domain of resource management. We think the NRCM faculty at WCU cover an impressive breadth of content, given the size of the staff. It is clear they have chosen to focus more on breadth as opposed to depth in a few areas (e.g., forestry, soils). One of the newer faculty (J. Budgen-Storie, hired in 2005) is trained in geography and remote sensing. Unlike the other faculty who serve a core traditional area in Res. Mngt. (forestry, wildlife, soil+water), the expertise of Ms. Budgen-Storie is at the periphery or interface between Res. Mngt. and geography.

The Program is faced with the impending retirement of Professor Kolenbrander. To maintain the current courses and breadth in the program will require a broadly trained person with depth in soils, watershed management, and general resource management. Dr. Kolenbrander also teaches in the areas of policy and planning. Finding a person with some expertise in all of these areas will be a challenge.

b. Resources and Support

This is a strongly field-based program that relies on good transportation to field sites. Good transportation and easy logistics is also essential to get students and faculty to professional meetings. The university vans currently available for use are inadequate to transport some classes to off-campus field experiences because each van is limited to 8 passengers. Larger vans or buses are needed to ensure that critical field experiences are regularly available to NRCM students. The importance of field exercises and field experience to the professional training of forestry, soils and water resource management cannot be overstated.

Tenure and Ranking Procedures

The Faculty Senate recently passed, overwhelmingly, the Boyer-Model for academic tenure and promotion. The Dean supports this but wants to see the G/NR draft document (response) before she comments further. The review team feels that the current method and priorities for judging progress toward tenure and promotion are appropriate for a program like NRCM which focuses on undergraduates seeking intimate relationships with an excellent teaching faculty and significant field and laboratory experience.

The department is to be commended on the manner in which they evaluate teaching quality and effectiveness (Appendix 4.6). The information that each faculty member must provide is comprehensive (well beyond evaluation by students and peers) and reasonable. The scope of the information is impressive and should provide a complete indication of the time invested by the faculty in his/her teaching-related activities. The 7 dimensions by which a faculty are evaluated is an admirable effort to fully capture all the aspects that feed into 'effective teaching.'

The assessment team does have one concern – there are no full professors despite having two faculty who have been in tenure track positions for at least 15 years. Neither of these has applied for promotion to full professor. This suggested to us that what the university (administration and/or faculty collectively) says and what it does, with regard to TRC decisions, are not the same. It appears as if neither the acquisition of outside money nor involvement in projects (that benefit the students immensely) count as equivalent to peer-reviewed publications. Thus, the faculty in NRCM are at a distinct disadvantage with regards to tenure and promotion decisions. At the very least, there is certainly the *perception* among some faculty that this is the reality. We urge the administration to address this issue as soon as possible to make sure that the Boyer model is indeed being applied.

c. Teaching, Research/Creative Activity and Service

All faculty are fully engaged in the undergraduate program and shoulder a rather large teaching load. In the past few years, the NRCM faculty have offered, on a more-or-less rotating basis, a liberal studies course (NRM 140). Though the motivation behind this is partially practical, it shows the breadth of the NRCM faculty as a whole and their focus on undergraduate teaching. Due to program staffing levels, the faculty also must do all academic and career advising of NRCM majors. This represents a significant investment of time, and is a dimension of ‘teaching’ that can be quite important to student success; yet, it often goes under-recognized. Based on student/alumni input, it is clear that the faculty of the NRCM program go well beyond the typical advising role. They are readily and regularly available to the students, and this is a major reason why the students can develop a full, ‘intimate’ [their word] relationship with the faculty.

All faculty members are professionally active, as shown by their participation in professional meetings, both national and regional, service to professional organizations, and project involvement. In many of these roles, the faculty involve undergraduate students. The number of students presenting at professional meetings (Appendix 4.8) is indeed impressive for the size of the student body. This involves significant input from a mentor, and is yet further evidence of the devotion of the faculty to the professional development of their students. We were struck by the enthusiasm with which faculty members discussed these aspects of their professional activity and impressed that faculty were finding and pursuing new professional problems of interest. The level of faculty success in securing extramural research funds is outstanding for some faculty, given their heavy teaching load and involvement in projects that serve the region and students. Two faculty were hired since 2005 and it is too early to assess their scholarship productivity within the framework of their appointments at WCU. The overall scholarly productivity of the faculty is commendable, though their productivity in the form of peer-reviewed publications in the last 5 years is slightly below average; we believe this largely reflects the heavy teaching load and development of projects. It is important to note that a substantial number of

the projects set up by faculty, which often involve students, are quite complex. By this we mean that a wide array of factors (e.g., social, political, economic, ecological) must be considered and evaluated as the management plan is developed. Furthermore, the implementation of the plan is typically multi-faceted, and single activities may be very technical and delicate. Management plans for resource management objectives are usually long-term endeavors; hence, the ecological and non-ecological constraints may change mid-stream. For these reasons, among others, these projects often do readily equate to scholarship as defined in the Boyer model.

IV. Analysis of Operational Facilities and Budget

a. Adequacy of facilities

The combination of the existing facilities and the almost completed science wing will adequately support a vibrant program, even with planned growth in the College. However, excellent facilities and equipment require a dedicated staff member to ensure that operations run efficient, safely and smoothly. This staff person would a) provide students with adequate safety training and instruction in use of equipment, b) complete regular set-up and take-down of labs, c) assemble necessary equipment for field trips and d) do routine maintenance of equipment. It is clear to the assessment team that the NRCM program needs a technician-level staff position to assist in its daily operations. In a field-based program, the lack of a technician means too much faculty time is spent on logistics.

b. Adequacy of budget

The travel and instructional (equipment) budgets are far too low compared with those for similar programs (accounting for FTE's and student numbers) with which the reviewers are familiar. The budget for library materials is very good. We would recommend doubling the budgets for teaching and transportation. At the very least, the addition of new facilities to Stillwell will require a greater budget. The students and faculty acknowledged a need for updates to the GIS-related equipment such as new and faster computers; current machines fail frequently.

V. Summary of Strengths and Areas of Improvement

The greatest strengths of the program are two: the breadth of academic training provided and the dedication of the faculty. Student development is at a high level due to the breadth of opportunities and frequent, regular input from faculty.

Curricular improvement can be made by requiring NRM 330 of all majors, making NRM a required course in the SW option, and providing a few more forestry electives for the FR option.

Assessment of student growth can be improved by elaborating more completely the goals of the program/options and by identifying current activities, or devising new ones, that provide direct and suitable modes of assessment for each goal.

VI. Summary of Recommendations

The greatest challenges the review team found were:

1. Inadequate transportation (vans) for academic trips and outings;
2. The lack of technical assistance for the faculty and students. Lack of dept. technical assistant *and* seeming lack of help from the University IT division;
3. Extraordinarily inadequate Dept. budget, especially for instruction and travel);
4. Falling numbers of majors relative to previous 10 years. Admissions and Public Information Office must work with faculty on producing colorful, engaging admission materials and having an appropriate recruitment strategy for the population (region) they have served historically; and
5. Finding replacement faculty with sufficient breadth to cover all courses previously taught and who also have the requisite devotion to undergraduate education and student development.

The review team recommends:

1. The program, with support from the appropriate offices, conduct a formal survey of alumni.
2. The administration examine the TRC process to insure consistency between the stated criteria and those actually applied.
3. NRCM faculty make some minor changes in the required courses.