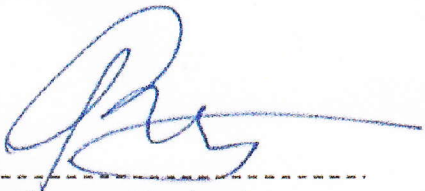


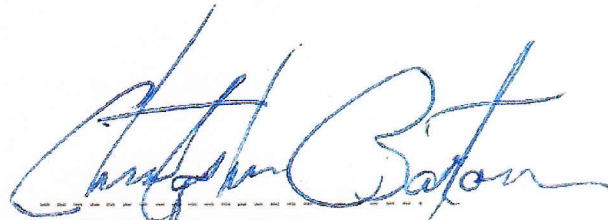
External Review Panel Report of the
Department of Geological Sciences, East Carolina University

Prepared for
Academic Program Planning and Development
Division of Academic Affairs
East Carolina University

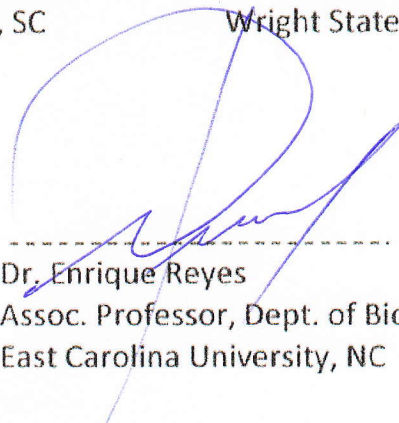
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I Introduction

The material included in this report is a compilation of information gathered by the external review team during a two day visit (March 11-14, 2012) to East Carolina University (ECU), Department of Geological Sciences and of information contained in the self-study report carried by the faculty of the Department of Geological Sciences themselves. The review committee would like to thank the faculty and staff of the Department of Geological Sciences as well as the office of the Vice Chancellor for Academic Affairs at East Carolina University for their hospitality during our stay and for facilitating the interviews with all entities related to the review process.

During the review we had the opportunity to meet with all faculty, staff and selected graduate and undergraduate students of the Department of Geological Sciences. Furthermore, we were able to obtain information from administrators of associated programs (i.e., Coastal Resources Management (CRM), Interdisciplinary Institute for Coastal Science and Policy (ICSP)) as well as from department alumni and teams involved in environmental outreach and education activities that utilize the resources of the University in general and the Department of Geological Sciences in particular.

Furthermore, the external members of the review panel had the opportunity to learn more about the North Carolina University system and administrative opportunities and constraints that this poses to campuses outside the research triangle, like ECU. This is expanded further in the appropriate sections.

The report consists of four sections and an Appendix. The first section provides a brief Review of the Department of Geological Sciences, followed by a section outlining the program strengths. The third section identifies areas for improvement, while in the final section some recommendations are provided. Some additional and more specific recommendations for improvement are also provided in the Appendix.

II Program Overview

The Department of Geological Sciences at ECU is a dynamic organization with large history in regional geological studies dated back to the late 60's. Because of its geographical location, the department has placed a substantial emphasis on Coastal studies. This research focus was particularly targeted since the early 2000's when the majority of new faculty hires had expertise on coastal issues.

The department currently consists of 15 tenured/tenure-track faculty (2-3 of them with joint appointments) and one fixed term faculty making a total of 14FTE. Support is provided by 2 administrative assistants, two technical support staff and one research instructor. The Department's clear focus and strength is in the area Coastal Sciences. The department's two recent hires in the areas of Mineralogy and Structural Geology were made for programmatic reasons to fill core curriculum subjects in traditional geology.

The academic programs offered by the department are BS and MS in Geology, and while no PhD program is associated with the department, faculty from the Department, with related interests, have the opportunity to advise PhD students enrolled in the CRM program.

The undergraduate major population has almost doubled over the last few years, a trend that is very similar to that observed in other institutions with similar programs. The MS program admits approximately 10 students per year.

The current administration of the department has been instrumental in contributing to the growth of the department over the last 10 years by including the department in larger university endeavors such as the ICMS.

III Program Strengths

One of the most remarkable strengths of the Department of Geological Sciences has been its ability to grow the numbers of faculty over the last 10 years. A new generation of faculty with strong research interests and capability has been hired, especially in the areas of Coastal sciences and Hydrology. This was partially due to strategic alliances with CRM. The faculty has a very good reputation and scientific presence in the nation with a commendable research funding and reputation similar to that you find in similar research I institutions. This is particularly of note given that the Department does not have a PhD program itself.

The undergraduate program has doubled in enrollment over the last few years following national trends. This suggests that the Department of Geological Sciences at ECU is considered as an undergraduate education program like any department in the nation and does not fall behind. The Department has acted in hiring 2 new faculties in support of the core curriculum as this ensures fulfillment of the Department's goal to provide a good education in Geology. It was striking to the committee the enthusiasm shown for the program by the undergraduate students. They expressed a sincere appreciation for the faculty and their teaching capabilities. Overall the undergraduate program has a core mission and the students can take directions in areas reflecting the research interests of the faculty.

At graduate level the MS student population is healthy, especially under the current constraints in funding MS students are supported mostly through Instructional and Teaching assistantships. A large number of the graduate students come from the ranks of the u/g program and the MS program and the directions of the student work predominantly reflect the research interests of the faculty.

Overall, the Department provides Geoscience education and research at a regional level in Eastern Carolina, fulfilling the mission of ECU within the NC University system. Additionally, the Department has achieved a national recognition in the area of Coastal Sciences through its ability to create a cluster of faculty working in this area and capitalizing on the historical strengths of the Department.

The introduction of the Certificate program in Hydrogeology and Environmental Geology most likely will enhance the visibility of the Department at regional level and might provide closer ties with the environmental consultancy industry.

Several faculty members have initiated international research activities, some of which include exchange of students and researchers. An enhanced international footprint is critical for the improvement of the quality of student research experiences and raising the academic profile of the Department.

The operation of an annual Field Geology Camp for Geology students from within ECU but from other universities in the region and beyond is a very good vehicle for providing recognition for the department and potentially attracting graduate students from other schools.

The Department has substantial involvement in interdisciplinary research. Faculty members work closely with ECU RENCI (Renaissance Computing Institute) particularly on coastal research (Dr. J.P. Walsh is the Associate Director), the Center for Natural Hazards Research, and, with the Center for Sustainable Tourism. Most recently, in coordination with the Director of ICSP, the department took a leading role in the formation of a Coastal Water Resources Center with Dr. R. Spruill as its Founding Director.

IV Areas for Improvement

Despite the positive aspects of the Department of Geological Sciences at ECU there are a number of areas that could aid the Department in improving its mission and potentially increase its visibility and take the research productivity at a higher level.

Although a clearly collegiate atmosphere was observed amongst the faculty, the existence of faculty with dual appointments and the recruitment of young faculty has created some internal concerns that most likely are perceptions rather than real concerns.

Those identified were:

- (i) Burden of teaching load required for upper level core curriculum where the faculty needs to teach both the class and the labs. While for lower level introductory classes the labs can be taught by graduate instructional assistants this does not appear to be the case for upper level courses. This places more burden to the newly hired, non-tenured faculty. This higher load in terms of contact hours combined by the fact that the area of these faculty is not closely aligned with the “traditional” strengths of the department might make these faculty feel more vulnerable and with less opportunities for research enhancement.
- (ii) The lack of clearly defined tenure and promotion criteria and evaluation processes that the junior faculty can consult on a regular basis and guide them provide another perception of vulnerability. It was understood that there is an annual feedback on performance and progress toward tenure, but it did not appear that this process is formalized and fully alleviates the concerns of junior faculty. This can be attributed to “growing pains” in number of faculty and the fact that evaluations have been done for the past 12 years by the same person. Consistency has been achieved but lack of formal documented and faculty agreed evaluation process is potentially contentious.
- (iii) The graduate program appears to be admitting a large proportion of its students from within ECU and in particular the ranks of u/g students from the Department of Geological Sciences. Although this is a good strategy for identifying and recruiting talent early, it does not contribute in enhancing the reputation of the Department by sending the brightest of the u/g students to highly ranked research universities. In addition, the entrance GPA of the graduate students is relatively low mainly because of the low grades the u/g students that consist the u/g population received before they declare Geology as a major. These students later on move into the graduate program.
- (iv) The research productivity exhibited by at least some of the faculty in the Department is due to their expertise and facilities available in their laboratories for carrying out specialized analyses. However, the equipment used represents a major investment on behalf of ECU,

the Department, and the faculty themselves. Provisions need to be made for extending its life and/or replacing it as it ages. Failure to make such provisions might result in decreased productivity due to lack of appropriate instruments and facilities.

- (v) Graduate student research in well-funded labs seems to be carried out with no problems. However, since the department wants to support core geology areas, where the research focus might be limited because of junior level or faculty and lack of a cluster of faculty with similar interests some incentives for independent graduate student research might be required.
- (vi) Overall at every level the student population is much less multiculturally diverse than the ECU average, this trend is exacerbated at the graduate level.
- (vii) Master's student stipends although in line with the ones offered by other sciences departments is low. This is a hinder for the recruitment of (top) students. Efforts to increase this should be a Departmental priority.
- (viii) Despite great efforts in the past to create some strong connections with alumnae, these seem to be at a low at present.
- (ix) Finally, while the Department of Geological Sciences and ECU do aspire to gain the productivity and reputation of a research university, the lack of disciplinary PhD program in Geological Sciences inhibits the rapid development of this goal. Although PhD opportunities exist through CRM these are limited to the area of "Coastal Sciences" and even there the PhD in Coastal Resource Management might preclude the recruitment of highly qualified but disciplinary, science oriented graduate students.

V Recommendations for Improvement

The panel has a number of recommendations to make that can be categorized in terms of actions that can be carried out within the Department, actions that need to be supported by ECU's higher administration and the North Carolina University system as a whole. These are:

- (i) Recommendation for action at the Unit level.
 - a. There is a need for improving the quantitative skills for all students (graduates and undergraduates). This might be facilitated by accepting students from highly quantitative disciplines (i.e., math, physics) in the department for research in related areas (i.e., geophysics, coastal processes, etc). As a corollary, incoming students at all levels should have SAT's and GRE's (required for all majors) in the top 10% of all scores. GPA's are 3.5 and higher.
 - b. The Department should create beneficial strategies that will enable access to Honor college students. The creation of earth science Honor's sections for courses taught by faculty of the Department will provide such access. At the same time, incentives for the creation of these courses should be given to the Department and not solely to the faculty as it is the case at present. The latter is recommended only if this activity is beyond the normal teaching load of the faculty.

- c. Place an effort in attracting graduate students with higher GPA. This can be achieved by expanding the pool of prospective graduate students from other disciplines. To-date, this has been restricted by an earlier ECU requirement that graduate teaching assistants need to have had formally taken the course for which they act as instructional assistants. That policy has placed serious restrictions on the incoming graduate students as it requires them to have a degree in Geology and mainly from ECU. Relaxation of this policy allows for recruitment from other areas of the natural or physical sciences and potentially increasing the GPA of the incoming graduate student population. MS students should be TA's for upper level Earth science courses and for MS and PHD courses.
- d. Secure the funds and create a small, competitive graduate student research grants that can facilitate research in any area of the Department's faculty expertise.
- e. Implement mentoring program for junior, untenured faculty. This should be in addition to the currently implemented annual evaluation and meeting with the chair as it will provide an additional level of re-assurance and provide a continuous guidance for the junior faculty. Give the junior faculty the opportunity to select their mentor as mentoring requires a degree of personal connection.
- f. Make a collective departmental effort, including the junior faculty, to clarify and if possible standardize the annual evaluation and tenure and promotion criteria. Inclusion of some hard metrics like averaged publications per year; clearly defined teaching load (i.e., courses per year); funded research projects per faculty can constitute part of the metrics, although quality should remain an important parameter and not being overshadowed by numerical quantity.
- g. Increase the visibility of the Department at various levels including: (i) the development of a good web page as this is the main portal for information for today's highly technological environment; (ii) ensure that good u/g students are sent for graduate work to Departments top national Institutions; (iii) consider a name for the Department that it is more inclusive and that highlights the current strength of the Department in Coastal Sciences (e.g., Dept. of Earth Sciences, or Dept. of Earth and Coastal Sciences).
- h. Allow for the development of a mechanism for the creation of a cost-per-service laboratory facility within the Department.
- i. The department should re-establish the alumni connection with the support of all faculty as this can provide the seed funding for the student research grants suggested above, an endowment, and funds for space renovations.
- j. Finally although the committee recognizes the great efforts of the current administration of the Department in getting the unit to its current position, as the faculty hired over the past 10 years mature, opportunities need to be created for their participation in administrative posts and their professional development through participation in administrative positions. Positions should be rotated on a regular basis (at least for graduate and undergraduate director) as to enable all faculty members to

exhibit their abilities and potential capabilities for higher post in Departmental and University administration.

- (ii) The higher administration at ECU and NC system in collaboration with the Department should work to:
- a. Provide incentives to the Department to allocate resources for the Honor's College. It is our understanding that currently the incentives are directed to individual faculty, but given that every faculty member is a departmental resource, appropriate incentives should be given to the Department to deal with this. As an example, re-allocation of teaching duties of a faculty to Honors sections should be compensated with funds to the department for hiring a teaching assistant to cover the faculty's teaching obligations and contributions to the Department.
 - b. Given the multidisciplinary nature of the ICSP and the fact that administratively this is a unit outside the College, some clarification of reporting structure is required for faculty with joint appointments. This will be helpful to both faculty and individual Departments as will clearly define obligations and benefits. This issue should be clarified even in the tenure and promotion criteria of the Department as to alleviate perceptions of different categories of faculty within the same unit.
 - c. Increased departmental research visibility and productivity in areas beyond those covered by ICSP's CRM PhD program requires access to PhD program with disciplinary focus. The University should work with the Department to accomplish this goal if the faculty is willing.
 - d. Finally, an important issue for further developing the research productivity of the Department is the ability to attract highly qualified graduate students. Part of this is the monetary value of graduate assistantships available for prospective graduate students and tuition abatement available for students. It is the understanding of the committee that NC University system regulations control the amount of tuition remission and that tuition reduction to in-state level for out of state and international students is controlled centrally by the NC University system favoring the major universities at the research triangle. It is imperative that the same opportunities are provide to ECU from the NC legislature to compete in the national and global graduate student market.

APPENDIX

Recommendations to Improve the Quality of an Earth Science Program Prepared for East Carolina University

by

Christopher C. Barton, Ph.D.

INTRODUCTION

Significant improvement in the quality of a department's program is the primary way to increase its national/ international standing. This section sets out the attributes of a high quality program for an Earth Science department. Program here includes undergrads, graduate students, faculty, and departmental administration.

The department's current standing can be evaluated against this standard to evaluate how far the department needs to improve from its current status. Any changes from the current situation will require the cooperation of the faculty, the chair and appropriate levels of the administration above. Implementation may result in a temporary decrease in number of undergraduate majors, but in the long run, will attract and graduate higher caliber undergraduate students. Many of the attributes of a high quality program need not cost additional funds and depend primarily on the faculty and department head. A department should take primary responsibility for raising any funds necessary for improving the quality of its program. The university should participate in providing some of the funding needs of a department, by either paying for it all or, for example, by establishing a policy of providing matching funds for changes that will improve program quality.

UNDERGRADUATE STUDENTS

1. Students at all levels have SAT's and GRE's (required for all majors) in the top 10% of all scores. GPA's are 3.5 and higher.
2. Undergraduate program is structured exclusively toward student entrance to MS and PhD programs at leading top 10% of Earth Science departments nationally and internationally.
3. Students are required to take courses (intro. followed by upper level) in math, computer science, geography, statistics, biology, physics, and other sciences.

MS STUDENTS

4. Entering students have GRE scores and in the top 10% nationwide.

5. Entering students are drawn from a wide range of disciplines outside Earth Science including, math, physics, computer science, biology, chemistry, geography as determined by faculty research.
6. Entering students are from the top 10% of their respective departments.
7. Only 1 or 2 entering students are matriculated from the ECU Geological Sciences department.
8. 80-100% of MS graduates go on for a PHD in Earth Science and other sciences.
9. Students are required to take courses (intro followed by upper level) in math, computer science, geography, statistics, biology, chemistry, and other sciences.
10. MS students should be TA's for upper level Earth science courses and for MS and PHD courses.
11. Student tuition waver and stipend should be competitive with programs in the top 10% nationally.

PHD STUDENTS

12. Department faculty accepts applicants whose GRE scores and GPA are in the top 10% nationally/internationally.
13. Entering students are drawn from a wide range of disciplines outside Earth Science including, math, physics, computer science, biology, chemistry, geography, etc. as determined by faculty research needs.
14. Entering students are matriculated from the top 10% of students in their respective departments.
15. Only 1 or 2 entering students are matriculated from the ECU Geological Sciences Department.
16. 80-100% of PHD graduates pursue research positions after graduation in the Earth Science

RESEARCH

17. Faculty produces two or more publications per year in high quality international journals.
18. Faculty has two or more funded research projects per year on average.
19. Research funding comes primarily (> 75%) from science/investigator driven science proposals (e.g. NSF, NASA, DOE BASIC RESEARCH PROGRAM)
20. Contract science (i.e. those not science/investigator driven proposals) from local and state agencies or private companies is minimal or absent.

21. Faculty works with top researchers in their field nationally/internationally, coauthoring papers, joint grant proposals, etc.
22. Faculty holds senior positions in professional societies including, editor of a major journal, section president or other office, in national/international professional societies (GSA, AGU, etc.).
23. Faculty proposes, organize and lead one or more sessions at national/international meetings each year.
24. Faculty regularly serves on national funding agency peer review panels.

TEACHING

- 25 Teaching load is one course per term during the school year for faculty with an active research program (described above).
- 26 Faculty without an active research program teach 2 courses per term.
- 27 Faculty teaches courses informed by their own research. This should provide depth and infuse cutting edge science into the courses.
- 28 Courses not covered by #25-27 should be taught by instructors or in the summer by faculty without active research programs.
- 29 GenEd courses and their labs should be taught by instructors.
- 30 The department has a blockbuster undergraduate/grad course (enrollment 100-200 students) in COASTAL SCIENCE at the 200 or 300 level. The course is team taught by coastal research faculty from geology, biology, chemistry, coastal science center, and geography. This course is recognized as one of the best taught on this subject nationally and internationally.
- 31 Faculty is primary advisor to 2 MS and 1 PHD student each year (on average).
- 32 Faculty teach highly quantitative courses.
- 33 The department has exchange arrangements with other departments at the undergraduate MS, and Ph.D. levels that require students from math, computer science, biology, geography, statistics, and other sciences to take one or two upper level or graduate Earth Science courses, just as the Earth Science students are required to take upper level courses in these subjects (see # 3 and 9 above).

DEPARTMENT ADMINISTRATION

- 34 Department head is relieved of day to day administrative responsibilities by transferring as much of these as possible to an administrative assistant or assistant chair.

- 35 Top priority for Department Head is to raise funds from any source (including writing grants) to improve the quality of the department's program and facilities. This is in addition to faculty responsibility for raising their own research funds.
- 36 Second priority for the department head is work with the faculty and the administration to improve the quality of the program.
- 37 Department head is on top of and brings to the attention of the faculty via email the latest opportunities in research funding, by holding bi-weekly meetings exclusively on this topic.
- 38 Department head leads interested faculty to write large interdisciplinary, inter-university research proposals.
- 39 The department head works with the faculty and upper administration to change the name of the department to reflect the broadest possible range of faculty research. The present name "Geological Sciences" is too narrow and excludes oceans and the atmosphere. A broader name such as "Earth, Environmental, and Coastal Sciences" would convey better the faculty's research interests and project to the world a strong coastal studies emphasis. Note: Coastal Studies is an area of research to which the administration has devoted significant funding and new faculty positions in recent years. It needs to be better coordinated across the departments through participating faculty if it is going to establish itself as at or near the top nationally /internationally.
40. The department head in concert with the university administration need to make sure that all faculty in the department have access to Ph.D. students. Creating a PhD program at the department level is a time honored basis for improving of the quality and stature of a department program at all levels. If a PhD program is not established, then other means, such as creating ways for faculty to access PhD students within existing PhD programs should be pursued.
41. The department head should lead the faculty in discussions and keep a running list of the research fields for additional faculty positions and share this often with the administration. The areas of research for the two most recent hires were made for programmatic reasons (to perpetuate a subjects taught in a traditional geology undergraduate and MS program). The two hires now find themselves without a PhD program to work in. This is a serious problem and should be avoided in the future by considering new hires in research fields that can tie into the shared Coastal PhD program. The most important areas of research currently missing from ECU are climate/climate change and meteorology. Climatic change is an important driver for change in the coastal zone. Adding this research capability should be a top priority.
42. Do not fall into the trap of comparing the department to those in peer institutions as a standard for measuring program quality.