



U.S. Department of Agriculture

**Cooperative State Research,
Education and Extension Service**

Washington, D.C.

**Final Report of the
Comprehensive Program Review
of the**

College of Natural Resources

**Virginia Polytechnic Institute
and State University**

March 2006

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Comprehensive Program Review
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Virginia Polytechnic Institute and
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**based on a site visit conducted
September 18-22, 2005**

**United States Department of Agriculture
Cooperative State Research, Education,
and Extension Service
Natural Resources and Environment
Washington DC 20250**

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I. INTRODUCTION

This review of the Virginia Polytechnic Institute and State University (Virginia Tech, VT) College of Natural Resources (CNR) was requested by Dr. J. Michael Kelly, Dean of the College. It was requested as a partnership effort between VT and the USDA Cooperative State Research, Education, and Extension Service (CSREES). It is intended to provide an objective assessment of the strengths and weaknesses of the College which then serve as the basis for recommendations that will enable the CNR to more effectively achieve its land-grant university educational, research, and public service goals. Although the historical CNR departments previously underwent CSREES reviews, this is the first CNR college-wide review to be conducted by CSREES.

The review team was assembled based on their professional experience, credibility, vision, and knowledge of natural resources education and management, related agricultural programs, and the land-grant university system. The team was selected by Dr. Eric Norland, CSREES National Program Leader for Forestry, working in consultation with Dr. Robert Bush, CNR Associate Dean for Research and Graduate Studies. The team members were:

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Dr. David W. Smith, CNR Professor Emeritus of Forestry, served as a consultant to the team.

In advance of the September 18 to 22, 2005, site visit, the team was provided with a self-study document prepared by the CNR. Other documents were provided on site, some at the request of the reviewers.

Dr. Bush arranged a busy but informative five-day schedule for the team. Three full days were spent by the group meeting with College and University administrators, and with CNR faculty, staff and students (undergraduate and graduate) primarily in group sessions. Discussions with individuals outside the CNR included:

University – Drs. Mark McNamee, Provost; James Blair, Associate Vice President for Research and Interdisciplinary Studies; David Ford, Vice Provost for Academic Affairs
College of Agriculture and Life Sciences – Drs. Sharron Quisenberry, Dean; Craig Nessler, Director of Agricultural Experiment Station; Mark McCann, Interim Director of Virginia Cooperative Extension
Graduate School – Dr. Karen DePauw, Dean.

Breakfast and luncheon sessions allowed conversations with other administrators: Drs. Keith Moore (Program Director for Training and Technical Transfer, International Research, Education, and Development Office), Roger Avery and Gerhardt Schurig (College of Veterinary Medicine), Lay Nam Chang (College of Science), and Ed Henneke (College of Engineering).

In addition to group meetings with faculty of each of the four CNR academic departments, conferences were held with Dr. David Trauger, Director of the CNR National Capitol Region Natural Resources Program and Dr. Gary Evans, Director of the Natural Resources Distance Learning Consortium, and with directors of three CNR Centers – Drs. Brian Murphy (Conservation Management Institute), Tamim Younos (Virginia Water Resources Center), Audrey Zink-Sharp (Sustainable Engineered Materials Institute). Additionally, useful perspectives were gained from a dinner meeting with representatives from local natural resource agencies and private sector stakeholders.

In the interest of time, planned tours of CNR building facilities were cancelled in favor of more time spent in discussions.

On the final morning of the review, the team made separate presentations on their preliminary findings and recommendations in the Provost's Office, to the CNR administration, and then to an open session of College faculty, staff and students.

The remainder of this report is divided into four sections:

II. Executive Summary

III. Observations - topical overviews, generally directed to the College as a whole, as opposed to the various subunits.

IV. Responses to Questions - in its self-study document, the College posed a number of questions to serve as focal points for the review, and these are the Team's responses.

V. Recommendations - suggestions for thought and action on issues of concern to the College and to the Team.

VI. Acknowledgments.

II. EXECUTIVE SUMMARY

General Findings: The College has appropriate focus and scope, is highly productive, and can contribute importantly to VT's goal of achieving "Top 30" research university status. It is well served by its administrative team, and enjoys respect and good working relationships with other colleges. The faculty and staff have distinguished themselves in many ways. The three historical departments of the CNR continue to maintain strong national reputations. The Geography Department is an excellent fit with the CNR and has great potential to contribute to College goals. The various centers and institutes are important contributors to all three land-grant institution mission areas. Overall, faculty and staff morale is good, as CNR and VT emerge from a period of severe budget reductions. The College is known locally and nationally for high-quality teaching and career development of its students. Computer and IT facilities and services are strengths of the College. There is reason for concern, however, about the gender and cultural diversity among faculty, staff and students, and about the quality and quantity of the CNR's space and facilities despite some recent improvements. The Extension/Outreach program is vibrant and future-focused, with additional potential for serving both on- and off-campus. The National Capital Center and distance education programs are filling important needs for non-traditional education, and both have potential for achieving national leadership. To reach its full potential, the CNR international program may need closer administrative attention.

Major Recommendations: The CNR should make diversity in its student body and faculty a priority issue and assume leadership in this regard on-campus and among other Virginia educational institutions. Consideration should be given to restoring the recruitment coordinator position, and there should be a targeted recruitment effort for students and for faculty and staff hires. The National Capital Center and distance education programs should receive greater financial and personnel support to promote the unique Master of Natural Resources program. The general strategic planning process of the College and its subunits needs to be continuous, integrated among the units, and involving specific metrics, targets and evaluation processes. Administration of two USDA funding sources, McIntire-Stennis and RREA, needs to be better clarified at VT. A comprehensive CNR long-term space and facilities needs assessment should be accomplished prior to submission of requests to VT offices. Greater authority and resources should be devoted to coordination of the

international program. The Extension/Outreach program should proceed with its plans for enlarging its staff, should expand its activities in aquaculture, and should actively cooperate with Virginia State University Extension. A plan should be developed for better incorporating the suite of centers and institutions into interdisciplinary and integrated programming. Although the academic departments were not foci of the review, there are several recommended activities for each.

III. OBSERVATIONS

College Focus and Scope: The CNR's foci on conservation, sustainable management and utilization of natural resources, especially those of Virginia, play an appropriate, and indeed vital role in the state. Long the leading Virginia educational program in this field, and nationally prominent as well, it is now poised to contribute to VT's goal of achieving "Top 30 University" status through its established research and scholarly programs and participation in emerging interdisciplinary endeavors. The review team believes that no other Virginia agency or educational institution provides extension/outreach programming in natural resources as well and as comprehensively as does the CNR. Departments of forestry, wildlife and wood products are common core elements of natural resources colleges throughout the country. The recent additions of the Geography Department and the Virginia Water Resources Research Center to the College present exciting new opportunities for collaborations within CNR and with other VT units.

Administration: Virginia Tech is served by highly capable administrators in the CNR and its departments, centers and institutes. Former Dean Gregory Brown established a strong leadership organization which continues today. Although Dean Kelly is the "newest kid on the block" he has rapidly earned the respect of CNR administrators, faculty and staff. The College's four associate and assistant deans, four department heads and eight directors and coordinators are all experienced professionals and administrators. The team notes, however, that all of the deans and heads are senior white males, and that women administrators are present only in several service units and one research center.

College-level administrators, individually and as a team, interact well with the VT administration which, in turn, holds the College and its administrators in high regard. The mutual respect between the College and University was evident in interviews and in a history of support for each other's programs and initiatives. The College greatly appreciates the central administration's decision to save it from a proposed merger several years ago. The Graduate School's strong support for the CNR's initiatives at the National Capital Center is also highly valued. In turn, the College is supportive of VT's Top-30 research university goal and programs initiated to achieve this, such as Ph.D. 2010. Deans of the colleges of Engineering, Science, and Veterinary Medicine expressed their respect for the CNR and its administrative team. If there is any contentious campus relationship for CNR, it may be with the Agriculture and Life Sciences College. This is a situation with a long history, perhaps exacerbated by the recent merger proposal. However, the team was impressed by the willingness of both deans to concentrate on areas of mutual interest and cooperation such as faculty cluster hires, collaborative teaching efforts, and the new Ag-NR building.

Faculty: As a group, CNR faculty members have excellent academic pedigrees and professional reputations. A number are leading authorities in their disciplinary areas. The team does have some concern about faculty age, gender and racial balance, however. Two-thirds of the regular university faculty members are senior white males. Only 15% are women, mostly assistant professors. There seem to be no faculty from racial minority groups. This relative homogeneity among the faculty is not unlike the situation in other forestry and natural resources academic units nationwide. The team believes that the College's pattern of recent hiring reveals sensitivity to the issue. The presumptive impending retirements of a number of faculty and the faculty cluster hiring plans offer important opportunities to improve the gender and cultural diversity among the CNR faculty.

Productivity: While CNR is the smallest college at VT in terms of personnel and space, it excels at many of the standard metrics used to measure success. The team notes, for example, that among the eight VT colleges, CNR consistently ranks above average for research proposals submitted, awards received, sponsored funding expenditures, and overhead earned. When expressed relative to measures of University investment, such as research space, overall, CNR ranks second among those colleges. Much of this success is probably attributable to the activities of the special centers and institutes.

Collegiality and Morale: Faculty, staff and students in all four departments spoke of the collegial, supportive, and friendly atmosphere in CNR. Students frequently mentioned the personal attention they receive, while staff addressed the respect afforded to them by faculty and that they felt they are an integral part of the team. It is clear that this atmosphere has contributed directly to CNR's high productivity and that it should be treasured and conscientiously fostered.

Staff size was reduced several years ago to meet required budget reductions, and there is some feeling among staff that this has resulted in excessive workloads or the neglect of some important activities. Some staff members expressed unhappiness over salaries and opportunities for personal advancement, while acknowledging that the CNR is supportive of professional development. The team suspects that this is fundamentally a university-level issue but encourage joint college-university administrative attention to this matter.

Overall, the team judges the College's faculty morale to be good. Members of the Geography Department are quite delighted with what they feel is their good fortune to be part of the CNR. Faculty in the other departments seem to feel relieved that their units survived the proposed college merger and several years of severe budget cuts, and they are cautiously optimistic that better financial times lie ahead, including a better salary structure. They seem to be quite willing to commit themselves to new initiatives being developed at both the college and university levels. As a group, they are strongly loyal to the CNR and to VT.

Undergraduate Programs: Although the team did not engage in detailed curricular review, its sense is that the curricula and courses of the four departments are relevant and modern. Students repeatedly stressed to us the high quality of their classes, the personal attention they receive and the opportunities they are provided in research, practica and internships. By virtue of VT's high admission standards, the CNR undergraduate body is also of quite high quality.

Teaching facilities seem to be at least adequate overall. There may be deficiencies in some areas but we did not have time to explore this. The team would caution, however, that as the natural resources field becomes more “high-tech,” there will be increasing need to provide teaching programs with modern, and often expensive, tools of the trade.

Undergraduate programs of the departments of Forestry, Fisheries and Wildlife Science, and Wood Science and Forest Products have well deserved strong national reputations among peers. The team anticipates that Geography will develop a similar reputation given its high quality faculty and pending new hires. The proposed new Meteorology major offers exciting prospects.

CNR has the smallest undergraduate enrollment among the eight baccalaureate-granting colleges, and there has been a recent trend of enrollment decline, especially in the Fisheries and Wildlife Sciences and Forestry majors. This situation is reflective of a national trend. We do not attribute it to problems with the CNR programs. Nevertheless, the team thinks that CNR may need to develop a more aggressive recruitment effort. The team notes with some concern that the College’s recruiting coordinator position was dropped because of budget cuts. If that position is not restored, faculty may need to take a more active role in the recruitment effort. The team especially worries about the racial and cultural diversity of the undergraduate student body.

The team is also concerned about the budgets for the College’s teaching programs. These underwent significant reductions during the recent period of economic recession. While recognizing that this is probably a university-wide issue, the team encourages creative administrative actions at both the university and college levels to provide financial relief to the departments’ teaching programs.

Graduate Programs: The College’s many graduate program alumni who hold prestigious positions in science, management, education and industry throughout the country exemplify the high quality of the program and the respect it enjoys among peers. The quality of today’s CNR graduate program and students seem to continue in this tradition. Graduate students to whom the team talked were generally pleased with their choice of CNR and VT for reasons of collegiality, facilities, and other resources available on campus. Faculty reputations have been the primary recruiting mechanism for attracting quality graduate students from across the nation, and students have not felt disappointed in this. Indeed most of the students who met with the team were from out-of-state, and several international students were present. The team notes, with approval, that most graduate students are required to do some undergraduate teaching regardless of their appointment base, and that they do this without significant complaint, and even with enthusiasm. The team was also pleased to learn that nearly all graduate students have assistantship support, with about three-quarters of the total stipend funding derived from sponsored sources.

The team heard some minor concerns, mostly of the type commonly heard among their peers elsewhere: there could be a better information system about campus events; student offices could use some refurbishing, etc. Interestingly, some of the students have a skeptical attitude toward the Top-30 goal and worry about impacts of VT growth. There was some interesting discussion about the need for a core graduate curriculum but there was not agreement on this issue.

National Capital Center and Distance Education Programs: The Master of Natural Resources (MNR) program at the National Capital Center in Alexandria was started only in 2001; yet, already there are 45 MNR majors, 60 students in graduate certificate programs, 260 students in classes, and a consortium developing graduate distance education programs. By any measure, these metrics demonstrate the value of the programs to CNR and VT. The team was glad to hear that Provost McNamee, Dean DePauw and Dean Kelly have committed new resources to them. The MNR program serves a real need for the population centers in the capital area, contributes markedly to CNR student diversity, enhances VT's reputation, and has tremendous growth potential. There is a well-conceived and documented strategic plan for achieving this potential. Likewise, the development of a nationwide distance education program is well thought-out and has potential to reach a large student audience, both on- and off-campus.

Extension/Outreach: The team was impressed by CNR's extension/outreach programs. At a time when many similar programs nationally are still reeling from deep budget cuts, the CNR's extension/outreach is vibrant and future-focused. The five focus areas are appropriate, and the impact of the programs is clear. Especially important is the proposed hiring of six District Agents with MS degrees in forestry/natural resources. The new Virginia Master Naturalist program reflects a national thrust for more comprehensive and integrative public natural resources education. The team's sense is that the CNR Extension program should be, and is, a strong linkage across campus and especially with the College of Agriculture and Life Sciences. The team encourages greater joint efforts with Extension programming at Virginia State University as well. The international development programs further broaden CNR's influence and service. Extension is perhaps an underutilized tool for recruiting students. On the whole, CNR faculty members feel that they have a personal commitment to VT's outreach program. Indeed, this is an expected part of their professional activities.

International Programs: International activities involving faculty within the College are numerous and take place in all the departments. The motivation and effort comes mainly from individual faculty members through their personal contacts and experiences in international venues and projects. There is active participation in these programs, and the faculty is to be commended for creating these opportunities. There appears, however, to be insufficient communication and coordination with the University/College's Office of International Programs. This includes a lack of recognition for the faculty who engage in international activities. The team felt that this is an awkward situation at the very least and that the College does not take full advantage of the depth and breadth of its international opportunities. There also appears to be a lack of focused effort within the College for faculty to work together to exchange ideas and experiences for international activities as a whole.

Centers and Institutes: The CNR is to be commended for its foresight in establishing and maintaining ten specialized units to forward its missions. Although the IFO Research Co-op dates from 1973, most of the units are less than 10 years in age, the most recent additions being the Sloan Foundation Forest Industries Center (2004) and the Virginia Water Resources Research Center (2005). Some are tightly focused and essentially serve a single department (e.g. Center for Unit Load Design,). Others have broader missions and

stakeholders (e.g. CEARS, CMI). Based on literature provided to us and interviews with directors of three centers, the team believes that these units are well-managed, vital elements of the CNR's research, education and outreach missions. While they are serving their original purposes well, they seem to be doing this largely as independently functioning, disciplinary entities. In an intellectual environment that is now actively promoting interdisciplinary programs, the suite of centers and institutes may be capable of making even greater contributions through collaborative efforts.

Computer Facilities and Information Technology: Computer facilities and IT support are provided well at both the university and college levels. There are VT centralized facilities. While the University strongly encourages their use, colleges and departments can provide their own computational facilities. This joint responsibility approach seems to serve the university community well. The Equipment Trust Fund is a valuable resource for meeting the CNR's constant challenge of maintaining up to date computer facilities. Faculty, staff and students independently opined that overall, VT's computer facilities are outstanding. Faculty commended the University for providing software short courses, while all three groups mentioned the two dedicated IT support staff within CNR and the quality of the service they provide.

Space and other Facilities: As noted above, the review team spent little time seeing specialized space and facilities in order to have more discussions. Its sense, however, is that the College is making do with somewhat cramped and aging campus facilities. Basically, the College is out of space for increasing its capacity. Faculty offices of the Wood Science and Forest Products Department, for example, are split between Brooks Center and Cheatham Hall, and the faculty seems divided on the wisdom of this. The current physical isolation of the Geography Department from the rest of CNR is not perceived as a major problem by its faculty but the quality of its space and facilities in Major Williams Hall seems to need upgrading. Similar comments were heard about the Fisheries and Wildlife Science Department space. There is feeling that facilities for wood products teaching and research have not been keeping up with industry technological advances. Some people wonder how CNR can move into new research arenas without commitment of appropriate space and facilities. Building maintenance seems to be seriously under funded, especially for research space, with the burden for this having been shifted to departments. Concern was expressed that departments must work primarily with the physical plant in this regard, and that it is difficult to obtain services of outside contractors who might offer better financial options.

Nevertheless, there was optimism among faculty that the situation is improving. Occupancy of the new Agriculture and Natural Resources annex is eagerly awaited. This may also foster closer working relationships between the two collaborating colleges. In view of VT's goal to become a Top-30 university, research space and facilities is an overriding concern. The College desires to cooperate with the University in utilizing more space at the Corporate Research Center but securing funding for rental may be challenging.

IV. RESPONSES TO COLLEGE'S QUESTIONS

What barriers to increased external funding does the Team recognize?

The team sensed that contributions from private sources lag somewhat in CNR. This was mentioned as a specific problem for the Fisheries and Wildlife Science and Geography departments. In tight budget times, especially, the availability of college and department endowment funds can make significant contributions to maintaining program quality. On the other hand, the College's extramural research funding effort is strong, with the various research centers and institutes playing a central role in this success. There is good reason to expect that the newly added programs in geography and water resources and participation in interdisciplinary research initiatives will yield additional financial rewards. The current policies for sharing indirect cost income among the university, college, and departments seem fair and equitable. Although we understand that internal funding may be needed to advance the University's large scale research agenda, we caution against deeper tapping into indirect cost returns to researchers for this purpose. The CNR's developing distance education program offers great potential for income generation.

Are the CNR's strategic goals appropriate?

CNR's vision and strategic goals are clearly defined in its Strategic Plan (July 2004) as updated in 2005. These goals seem to be consistent with the higher university goals (e.g., increased external funding, emphasis on doctoral education, cluster hires). Outcomes and benchmarks are clearly stated.

What is the Team's assessment of appropriateness of the programmatic thrust areas identified by the College?

The team consistently found the faculty and programs at both departmental and college levels to have the appropriate scope in teaching, research, outreach, external funding and international programs. So, while emphasis has increased on securing research funding, CNR has not lost focus on quality education and the extension/outreach responsibility of the land grant mission.

What is the Team's assessment and recommendations regarding the CNR distance education program?

This area has tremendous growth potential for CNR. In general, university natural resources programs across the country have not been "early adopters" of distance education. CNR's initiative can place it, along with the growing Natural Resources Distance Learning Consortium, at the forefront of this developing field. The establishment of an on-line Masters of Natural Resources program would be a first-in-the-nation, and would be an enormous contribution to the natural resources profession (besides generating substantial income for CNR). The team suggests that consideration be given to ways that this technology can contribute to extension/outreach programming. Overall, CNR's distance education plan is very well conceived and is receiving excellent leadership. The team's concern is that the investment in it seems limited, and that the CNR faculty as a whole seems to be slow in embracing the concept and participating in the effort.

What opportunities exist to better integrate programs within the College (e.g., the Water Resources Research Center, Conservation Management Institute, Sustainable Engineered Materials Institute, and the Department of Geography)?

It is clear that the University is strongly supporting interdisciplinary initiatives, for example, through the ongoing cluster hires. CNR units are in an excellent position to take advantage of this policy through a strategic planning process on integration. The aim should be to applying their combined capabilities and strengths to fit into VT interdisciplinary initiatives as well as exploring other avenues for collaboration, especially big-picture needs of the state. In brief, achieve better integration by participating in cluster hires, and conducting interdisciplinary research across departments, centers, and institutes. Develop major cross-disciplinary programs and build capacity and infrastructure through grants for research, education, and extension.

What opportunities for collaborations with other units at Virginia Tech is the CNR missing or underutilizing?

A clear distinction of CNR is the institutionalized nature of the spirit of collaboration that has produced inter-departmental and inter-collegiate programs, interdisciplinary research projects, endorsement and engagement in the cluster hires, and high degree of participation in college and university centers. Deans of other colleges expressed to the Team their desire to expand collaboration with CNR. The team had the most time to discuss this with Agriculture College Dean Quisenberry. She expressed enthusiasm for cluster hiring in the area of biomaterials/bioprocessing and mentioned other inter-collegiate initiatives in forest products and water resources. That college's increasing emphasis on molecular biology and plant and animal health also should be considered as opportunities for collaboration. CNR's growing capability in GIS and related geographical technologies can be extremely valuable tools for fostering collaboration across campus. As previously suggested, when contemplating collaborative opportunities, the planning process should involve all land-grant mission areas.

Does the team recognize administrative and/or organizational issues that negatively impact progress toward our goals?

The team reiterates that the CNR's administrative and organizational structure is basically sound, and that, overall, the administrative group is doing a fine job both within the College and the University. The team thinks there may be reasons for concern in the areas of undergraduate student recruitment, faculty and student diversity, international activities, and development, but that perhaps some of the perceived problems are shared with the general university organization and administration.

Does the Team recognize resource issues that negatively impact progress toward goals?

As noted above, the following resources issues may be having negative impacts: reductions in teaching program budgets and support personnel, cramped and aging facilities, faculty and staff salaries, maintenance funds, both financial and personnel support for the program at the National Capital Center and the distance education program.

What is the Team's assessment and recommendations regarding the international activities of the College (level, quality, focus, quantity, etc.)?

The team's general sense is that while international activities are considered to be valuable, these have not been a priority of CNR. Rather, they seem to be more of a matter of individual faculty interest and initiative. Most of the Geography faculty is involved in international activities. About one-third of the Forestry Department faculty present at the team's session with them indicated that they had some international involvement, and it was noted that departmental international projects had been ongoing for many years. In the Fisheries and Wildlife Sciences Department, the sentiment was that international activity was not strongly encouraged, and again was based on individual interest. A strong negative sentiment was expressed by some members of this group concerning the university international office, that it was ineffective and indeed counterproductive. It was stated during the discussion with the Wood Science and Forest Products faculty that there is a general expectation that senior faculty will become involved in some international activities. The team is aware that there are study-abroad opportunities but undergraduate students did not mention international programs at all. Graduate students were pleased, however, that there have been a growing number of students from other countries, noting that this cultural diversity is valuable.

V. RECOMMENDATIONS

Diversity

During the course of the site visit, the team became increasingly concerned with the issue of diversity at VT and the CNR. The University does not recruit an undergraduate student body that reflects the proportions of the racial and cultural mix of Virginia, and even women are somewhat under-represented. The team's conversations with administrators, faculty, staff, and graduate students all produced the impression that diversity issues are of major concern in the University and in the Blacksburg community. A rather shocking surprise came from the undergraduate students, mostly Virginians, who generally did not perceive this as a serious issue.

However, within the employment lifetimes of those undergraduates, the country's demographics will change such that there will no longer be a racial majority population. In some areas, like Virginia, this will occur relatively soon. And in some areas, like Virginia, non-native and first generation citizens will comprise increasingly greater proportions of Society.

Historically, the development of philosophies and practices of natural resources conservation and management in this country has been strongly influenced by European cultural attitudes and beliefs. As the American population becomes more culturally mixed, natural resources controversies may be expected to ensue. Professionals in the field must be prepared to understand and deal with stakeholders who do not always share the same values for natural resources and objectives for their utilization. The team is concerned, therefore, that CNR undergraduate students may not be receiving adequate preparation for careers in a more racially and cultural heterogeneous society. While the team is confident that this issue is given attention intellectually in CNR's classrooms, it senses that there is a need for CNR students to gain more direct, personal experience in multicultural social situations.

Therefore, the team recommends:

- development of specific metrics, targets and strategies within the College and its departments to increase racial and cultural diversity among CNR's student, staff and faculty populations
- increased emphasis on provision of real-life multicultural experiences to students
- focused recruitment efforts in high schools and community colleges with high proportions of minority students
- collaborative endeavors with Virginia State University and similarly populated 4-year colleges and
- cooperation with sister land-grant universities.

In short, CNR needs to focus on diversity issues wherever and whenever possible to promote a diverse and culturally-conscious professional cadre. CNR should take a leadership role in innovative programs that emphasize the importance of cultural diversity not only in its own community but within the entire University.

National Capital Center Program

The team is impressed that this program is a true "Diamond in the Rough." The proximity of the Center to Washington D.C. and to that area's abundance of natural resources professional expertise and potential students seeking graduate education is a truly unique situation for which every effort should be made to exploit. A fine strategic plan has already been developed for the program but now administrative resolve and commitment are needed to realize its potential.

To this end, it is recommended that the CNR continue to emphasize and build the MNR and graduate certificate programs by:

- encouraging and rewarding Blacksburg faculty to develop and deliver distance education classes and serve on MNR student committees
- securing funding to stabilize and increase faculty, assistantships and operating funds, and
- continuing to explore the potential for doctoral program offerings in targeted areas.

Strategic Plans and Governance Documents

The team previously noted satisfaction with the general goals of the CNR strategic plan. After our site visit we were provided with copies of departmental strategic plans. The team has not made a detailed study of them but it recommends that

- College and departmental plans be compared for consistency and complementarities, and that appropriate adjustments be made in them.

Further, that the planning process proceed to

- develop College and departmental strategic implementation plans, including consistent indicators, metrics, and quantitative measures of outcomes.

The team understands that there is a University faculty handbook that includes information on promotion and tenure procedures, and we did not sense any particular dissatisfaction among faculty relative to the promotion and tenure process. Nevertheless, because of the increasingly contentious, and litigious, nature of promotion and tenure and other personnel

issues on campuses nationwide, the team recommends consideration of the development of College and departmental governance documents.

Funding and Collaborative Considerations

VT's goal of achieving Top-30 research university status for external funding was a recurring theme throughout the site visit. Thus, the Administration's message has been received and is being taken seriously by CNR administrators and faculty. The team applauds this but at the same would admonish the College to

- not lose sight of maintaining balanced education, research, and extension/outreach programs consistent with the land-grant mission.

Further, it recommends that the College

- continue seeking interdepartmental, intercollegiate and even inter-institutional collaboration in all aspects of the land-grant mission.

This will facilitate, for example, applying for external funding from non-traditional sources that require interdisciplinary research approaches, development of novel curricula, and extension/outreach programs to broader audiences.

The team further recommends development of specific metrics, targets and strategies for each of the four departments to increase funding of all types and sources for teaching, research and outreach through:

- targeted private support development for creating quality research space
- University and state funding for key staff personnel in student recruitment, diversity development and technical support
- external funding for applied, stakeholder driven research
- competitive federal funding for large, interdisciplinary grants, and
- endowments.

The team was surprised to learn that the College of Agriculture and Life Sciences continues to administer some federal formula funds provided by CSREES which are clearly the responsibility of the University natural resources program. We recommend that the following adjustments be made at the earliest possible time:

- The Administrative Technical Representative (ATR) for McIntire-Stennis forestry research funds should be designated as the Dean of CNR, in accordance with CSREES recommendations which identify the appropriate ATR as the director of the University's forest resources research program.
- Renewable Resources Extension Act funds, if not fully administered by CNR Extension, should be passed through to CNR undiminished (Note: since the site visit, CSREES has required participating RREA institutions to designate a Principal Investigator for their project. It is noted that Dr. Jim Johnson has been identified as the PI. This is appropriate, and the team trusts that this arrangement will permit RREA funds to be applied fully toward programming activities.)
- Moreover, it is recommended that VT follow CSREES encouragement to wean faculty salaries off these and other federal formula funds for direct application in programmatic areas.

Space and Facilities

No documented plan was presented to the team for future CNR and departmental space needs. Existing space is aging and limited, in particular that associated with graduate student office and laboratory space. While the new Agriculture and Natural Resources Building begins to alleviate some space concerns, the team believes that this problem will persist in the future as the CNR pursues increased research funding and develops in new research areas.

- The CNR needs to develop a long-term space needs assessment and to prepare a space and facilities request for submission to appropriate VT offices.

Undergraduate Programs

In view of the trend of declining undergraduate enrollments nationwide in natural resources, shifting demographics in Virginia and elsewhere, and related factors, it is incumbent upon the CNR and its departments to develop enrollment and placement strategies. In particular, the team recommends considering increasing emphasis on:

- targeted recruiting and development of articulation agreements with Virginia community colleges,
- targeted recruiting of minority and urban students through innovative methods such as personal letters from the Dean, increased engagement of CNR students through an ambassador program, reaching high school counselors, utilization of the National Capital Center, CNR Extension, freshman scholarships, and on-campus visitations,
- development of introductory general education classes at the freshman level to attract undeclared students,
- enhanced placement services to students and graduates,
- reinstating the position of Recruitment Coordinator, perhaps with added placement responsibilities,
- applying affirmative action principles to acceptance policies to minimize the effect that VT's high academic standards seem to be having on recruiting minority group students, and
- aggressively pursue the necessary resources for establishing a highly respected Meteorology degree program.

Graduate Programs

To improve upon an existing strong graduate program, the team recommends that the CNR:

- enthusiastically promote growth of the Master of Natural Resources program at the National Capital Center through additional financial support and active involvement of Blacksburg faculty as teachers and advisors,
- provide funding and reward faculty for giving recruiting seminars at other universities,
- ensure that stipend levels for graduate TAs and RAs are competitive on a national level,
- increase the recruitment of doctoral and international students,
- develop the interdisciplinary geospatial and environmental analysis doctoral program including the continued pursuit of additional faculty lines to support this program

- consider participating in other innovative graduate programs that cut across VT disciplines, and
- consider developing a 3+2 (combined BS/MS) program to take advantage of high quality undergraduate students in CNR.

International Programs

This aspect of the College would benefit from:

- greater emphasis in faculty performance expectations for involvement in international-related activities,
- increased efforts to improve coordination and planning of international teaching, research and extension/outreach within CNR,
- taking leadership in addressing university-level programmatic structures that inhibit the coordination of these efforts (e.g., appropriately partitioning overhead return to participating research co-PI's).

The team further notes that administration of the International Programs is provided by a Coordinator position. Although the team is unsure about the functional distinction between such positions as Coordinator, Director and Assistant Dean, we suggest that this important area might be better served by

- assigning more programmatic and budgetary authority to the Coordinator's office.

Extension/Outreach

Although this program is well staffed in traditional and appropriate natural resources areas, the team believes that additional investments in Extension personnel and activities to meet emerging needs in public education would pay valuable dividends in terms of service to Virginia's citizens and resources and in enhancing public support of VT and CNR. Thus, it enthusiastically supports the plans to hire:

- six new district forestry and natural resources agents, and
- an Associate to manage the new Virginia Master Naturalist program.

Moreover, the Geography program currently does not have any faculty formally associated with Extension, although the VirginiaView program (an extramurally-funded remote sensing outreach program) is housed there under the aegis of CNR's Center for Environmental Applications of Remote Sensing. The team therefore recommends:

- that Geography be further integrated into the College's outreach program by engaging with strong extant programs (such as the high-quality Geospatial Extension Program developed by and housed in the Department of Forestry) as well as being duly considered for appropriate roles in new programs as they emerge.

In consideration of the College's growing aquaculture program and growth potential of that industry in Virginia, the team suggests that consideration be given to:

- establishing an Extension aquaculture specialist position.

Further, it strongly encourages:

- joint programming with Virginia State University Extension in RREA and other projects, and

- budgeting of RREA funds away from salaries and toward program activities and also relevant priorities identified in the RREA national strategic plan.

Interdisciplinary and Integrative Collaboration

Throughout this report, the team has emphasized its very positive impression that interdisciplinary programming is being actively encouraged by VT and CNR. Although the College's track record in this regard to be commendable, more can be encouraged and accomplished. In particular, the team recommends that:

- a task force be established to investigate emerging opportunities for interdisciplinary collaboration within the college, the university, and with other institutions and organizations
- this might be organized through a retreat of the administrative team, including the directors of the centers and institutes, and
- the plan should include integrative programming, the admixture of discovery, learning, and engagement to the extent feasible.

Departments

Although the focus of this review was on the College *per se*, the team wishes to offer some brief observations on each of the academic departments, with some suggestions for enhancements.

Fisheries and Wildlife Sciences

The team was impressed by a number of characteristics of the Department. It has attained a high level of extramural funding per FTE, and its research contributions have historically made many important contributions to the science. Its nationally recognized undergraduate curriculum is relevant to current needs. It attracts high quality graduate students from all regions of the U.S. The Department has established interdisciplinary collaboration across campus. A history of successful entrepreneurial activities is reflected in the Conservation Management Institute. However, it is a department on the brink of substantial faculty turnover due to retirements, and its facilities are a constraining influence.

The team suggests that the Department build for its future by:

- developing a plan for the significant turnover in faculty that will soon occur,
- developing a vision and plan for improved space and facilities,
- continuing to build the program in aquaculture,
- maintaining quality instruction in foundation core courses,
- increasing endowment funds by working with its advisory board to identify and engage potential donors, and
- encouraging greater international programming.

The team understands that there has been some discussion about changing the name of the department to something considered to be more attractive to potential students. The team does not have a specific suggestion except to recommend that any new name should clearly represent programmatic thrusts.

Forestry

The Department has a well-deserved national reputation in teaching, research and outreach reflecting the high quality of the faculty and balanced programmatic scope. It is dedicated to retaining its traditional fields of excellence while launching important new initiatives in biotechnology, geospatial and environmental analysis and water resources in keeping with the University cluster concept. Recent undergraduate curricular changes demonstrate the Department's continuing commitment to quality teaching. The faculty is fully engaged, collegial and supportive of the land-grant mission. It is clear that the quality of the faculty is a departmental strength. Challenges to this faculty are posed by the trends of falling undergraduate enrollments, relatively flat extramural research funding, and resources needed for launching new initiatives.

The team thinks the Department would benefit by considering that:

- Ownership patterns and objectives for forest lands are changing rapidly. The Department could continue to broaden its instruction, research and outreach programs to reach all audiences, working in all types of forests being managed for all objectives.
- There is need to develop strategies, specific targets and quantitative measures of outcomes to increase undergraduate enrollment to improve student-based metrics expressed on a per FTE basis.
- There is also need to develop specific metrics, targets and measures of outcomes that meet the VT and CNR goals for increasing external grants in all areas of instruction, research, and extension/outreach to improve the Department's funding metrics.

Geography

The Department is composed of excellent tenured leaders and mentors and new energetic untenured faculty who have enthusiastically embraced their transition into CNR. Faculty members are dedicated teachers whose excellence in teaching has resulted in multiple prestigious awards. They are strongly committed to international research and experiences for students. The Department supports a large and growing number of undergraduate majors and teaches core courses that serve a large number of graduate and undergraduate students throughout VT and thus, increases VT's global literacy. Geography by nature is multi-disciplinary, therefore, the Department's faculty easily find multiple linkages across campus. Geography brings a social and cultural component into CNR that is becoming more important to developing well rounded graduates and research programs. Its strengths in the geospatial Sciences, such as GIS and remote sensing, enhance student enrollments, collaborative research opportunities and the College's ability to attract PhD students.

The team's recommendations for fully incorporating the Department into the CNR and promoting its development include:

- add a minimum of two faculty to create critical mass and allow for the formation of a doctoral program in Geospatial and Environmental Analysis and to redistribute the heavy teaching loads
- rapidly establish the interdisciplinary PhD in Geospatial and Environmental Analysis to allow Geography faculty to serve as major advisors for doctoral students
- augment the current small operating budget with CNR funds and by aggressively pursuing endowments

- work with CNR to develop a space use plan to address the needs of the rapidly growing department, and
- aggressively pursue the necessary resources for establishing a highly respected Meteorology baccalaureate degree program.

Wood Science and Forest Products

This department is one of larger ones of its kind in the country, and like its sister CNR departments, enjoys a strong national and international reputation. It has particular strengths in wood processing and chemistry, and has a growing program in packaging. Its research and extension faculty are responsive to needs of the wood industry. Undergraduate students choose from among five specialty areas in the curriculum. Because relatively few new students have chosen the major upon matriculation, the Department maintains a strong on-campus recruitment effort, aimed primarily at the Undecided students. The Department has a good record of collaboration within VT, especially with agricultural and engineering interests, and also with such agencies as the U.S. Forest Service. Its recent strategic planning process lays the groundwork for a bright future.

The team believes the Department should be especially encouraged to:

- participate in the cluster hire in Biomaterials to strengthen and complement current research pursuits,
- seek additional directions for SEMI funding,
- respond to challenges in research funding for applied science through interdisciplinary and non-traditional sources, and
- continue to pursue greater student enrollment through creative recruiting in high schools and community colleges.

VI. ACKNOWLEDGMENTS

The review team expresses sincere appreciation for the gracious “Hokie” hospitality extended to us, and for the great interest expressed by everyone who participated in our meetings. Our gratitude is extended to Dean Kelly and his administrative team in the College, and to other VT administrators who met with us. The College and departments provided us with voluminous and well-prepared documentation, fine accommodations at The Inn at Virginia Tech, local transportation, and a busy but realistic work schedule. The College’s faculty, staff, undergraduate and graduate students, cooperators and stakeholders all provided frank and insightful responses to our questions and requests for information and clarification. Throughout our visit, we were impressed by the enthusiasm, collegial atmosphere, and desire to improve and strengthen the College by all who interacted with us.

The team is especially appreciative of Dr. Bob Bush’s efforts in helping to assemble our group and the written materials, and coordinating and adjusting the site visit agenda. Dr. David Wm. Smith made particularly important contributions by joining the Team on several occasions “after hours” to provide historical insights and answer a great number and variety of questions. We recognize and appreciate the major investment of time, resources, and commitment by the College in preparing for this review. We hope that the review report will

be useful in charting the future course of the College and its constituent units, and of Virginia Tech for serving the people and natural resources of Virginia.