

## **Equipping Future Natural Resource Scientists**

A summary of Ideas from the NAUFRP Summit: Defining Strategic Directions and Rebuilding Capacity – January 4-6, 2006 – NCTC – Shepherdstown, WV

Societal interests and economic changes in forests, both domestically and globally, are bringing about fundamental changes in how the forest is viewed and utilized. These changes dictate that our approaches to PhD training, essential to future generations of professors, researchers, and program managers, be reevaluated.

***Major Skills and Qualities of Future Natural Resource Scientists*** – Maintenance of depth and technical competency in a particular area of emphasis remains a key component in the skill set of future PhDs. However, layered on top of technical competency are a number of major skills and attributes that are essential for scientific inquiry and to serving the needs of society in a more effective manner. What is missing from a lot of PhD programs today is the determination of how science fits into policy decisions to produce solutions; therefore, the *ability to view issues, problems, opportunities, and solutions in a holistic manner* will be crucial to furthering society needs. This will require an *ability to understand other specializations and apply better analytical thinking and problem solving skills in a larger context*. Equally important will be the *ability to communicate effectively through a broad range of media and to a variety of audiences (science-based and non-science-based) as well as the ability to listen actively to these different groups*. The future scientist must also *exhibit significant leadership skills through mentoring, ethical practice, social responsibility, and most importantly through a broad and far reaching sense of scientific vision and cultural contexts*.

***Other Skills and Qualities of Future Natural Resource Scientists*** – Because of the growing complexity of issues and problems, *strong skills in quantitative and qualitative analyses of complex data and trend sets* will be required. The future scientist will need to have a *cultural sensitivity as well as a true global perspective founded on both pedagogical and real world experience*. Included with this needs to be a *greater awareness of the impact of their research and scholarly efforts on society*. *Collaborative skills with some knowledge of conflict resolution* must be enhanced. A *commitment to life long learning and a willingness to adapt to the changes in research emphases* after their PhD will be more the rule than the exception in the careers for the next generation of scientists.

***Changes Needed in Higher Education Programs in Natural Resource Fields*** – Current academics must reevaluate how tightly the PhD should be defined especially in view of the need to move to training programs that provide and encourage both cross and interdisciplinary disciplinary instruction that extends to joint programs among universities and agencies. To make this change, it will be essential that the mentoring skills of current faculty be updated through advanced training and that the reward systems be restructured to encourage a healthy balance between traditional discipline and interdisciplinary capacity. Currently, many training programs are biased toward training new professors without any real consideration given to the other professions that need

scientists with a terminal degree. The creation of alternative tracks needs to be considered depending on the ultimate goal of the student, and those individuals that will seek employment as professors need to be given better training in the skills required to be an effective teacher and mentor. Likewise, existing professors need to be brought up to speed in these critical areas so that they can provide an updated role model for the students they are training. Faculty sabbatical programs should put more emphasis on gaining or updating practical experience in the field or with other agencies in order to keep both research and pedagogy in step with current needs and practices. Likewise, consideration should be given to the inclusion of mini-sabbaticals or formal internships in doctoral programs to provide the student an opportunity to apply skills and test concepts outside academia. Students also need to be better trained to work in the team environment. This might include such innovations as jointly conducted research projects and shared authorship on dissertations and journal publications.

Putting more emphasis on research opportunities for undergraduates combined with more aggressive K-12 outreach programs will help to fill the pipeline to supply future students. At the same time, we must again seek to diversify our graduate programs with students from other cultures, disciplines, and countries to embolden students and faculty's knowledge of how cultures and science interact. We must find ways to overcome post 9/11 policies and impediments that have severely reduced the numbers of international students studying in the U.S. Serious consideration should also be given to building an appropriate international experience into the training of domestic graduate students and the reinstatement of foreign language skill requirements should be discussed. Finally, and very importantly, we must find new ways to fund doctoral students so that they can have the flexibility needed to have a more diverse and robust experience, while at the same time acquiring the training and producing the research products that assure their success as well as the success of their parent program. These are all formidable challenges, but challenges that we must address.

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### ***Major Skills and Qualities of Future Natural Resource Scientists***

- *Maintenance of depth and technical competency in a particular area of emphasis*
- *View issues, problems, opportunities, and solutions in a holistic manner*
- *Understand other specializations and apply better analytical thinking and problem solving skills in a larger context.*
- *Communicate effectively through a broad range of media and to a variety of audiences (science-based and non-science-based) as well as the ability to listen actively to these different groups.*
- *Exhibit significant leadership skills through mentoring, ethical practice, social responsibility, and most importantly through a broad and far reaching sense of scientific vision and cultural contexts.*
- *Strong skills in quantitative and qualitative analyses of complex data and trend sets*
- *A cultural sensitivity, as well as a true global perspective, founded on both pedagogical and real world experience*
- *A greater awareness of the impact of their research and scholarly efforts on society*
- *Enhancement of collaborative skills with some knowledge of conflict resolution*
- *A commitment to life long learning and a willingness to adapt to the changes in research emphases after their PhD*