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Abstract.--The North Central Forest Experiment Station is committed to maintaining its role in central hardwoods research. The key to our success, and our most important challenge, is to continue the legacy of conducting productive, meaningful science. Toward that end, we are working to maximize our partnerships with other Stations, universities, State agencies, corporations, and other organizations.

It didn't take much effort on the part of the conference organizers to convince me to participate. Alums always like to return to their alma mater, and that's how I regard Carbondale. I was a project leader at the lab from 1969 to 1974. Those good years bring back many fond memories.

But a more compelling reason brings me back to Carbondale this morning. This conference gives me a forum to express my pride in the accomplishments of our Station scientists and cooperators who conduct central hardwoods research.

When I worked here, we had 5 research projects, 15 to 20 scientists, and an army of technicians and support personnel. Those were days of expansion; big budgets and lots of personnel. It was easy to be a scientist then.

Doing productive science in today's climate of tight budgets is not easy. Yet, despite adverse conditions, our scientists have continued to produce. I'm glad to have the opportunity here to celebrate some impressive research accomplishments and to congratulate the scientists responsible for these accomplishments.

I spent many years in the Forest Service's Washington Office with Bob Buckman, then Deputy Chief for Research. I'll never forget one of Bob's favorite sayings to Staff Directors, Station Directors, or others who came into his office seeking support, solace, or advice about budget problems. "Damn it, don't tell me what

you can't do with the budget you have, tell me what you can do!" Bob used to say.

The work of our scientists today is testimony to what can happen when we avoid the destructive temptation to develop a chip on our collective shoulders bemoaning the resources we don't have, and instead to make the best of what we do have.

So before I go any further, I salute the men and women, at the Station as well as at other research institutions, whose good work under not so ideal conditions has made it possible for us to convene this symposium. They've engaged in PRODUCTIVE SCIENCE, and after all, that is what we're all about. It's too easy to lose sight of this basic foundation of our business. I want you to know that I think the most important mission of my job is to support and encourage productive scientists in as many ways as I can.

I'm proud of our work in black walnut silviculture, protection, genetics, and management. I'm also proud of the accomplishments our scientists have made in hardwood processing, such as basic research involved in understanding the principles of drying. Our scientists in Columbia have created a valuable body of knowledge regarding oak regeneration, critical to the management efforts of National Forest personnel. I'm especially pleased with our exciting technology transfer efforts like the Central Hardwood Notes, which will be coming out soon, and the Walnut Notes, which have just been published.

I'm not only proud, but also very impressed by this record of achievement. It's fair to say this work is the reason our laboratories and scientists in Carbondale and Columbia are considered leaders in the field of central hardwoods research. I want you to know that I'm dedicated to maintaining this record of achievement.

¹Paper presented at the 7th Central Hardwood Forest Conference, Southern Illinois University at Carbondale, March 5-8, 1989.

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With that said, let me mention several topics I'll discuss this morning. First, I'll review North Central's research budget. Budgets are a fact of life in deciding what we do and don't do. Since leaving Carbondale, it seems like a good deal of my time has been devoted to budgeting. I'll talk about our research priorities and the recent organizational changes in our central hardwood research program. Finally, I'll discuss emerging issues in forestry and how the North Central Station is addressing these issues.

Recent Forest Service research budgets, as most of you know, are not a good news story. The budget formulation and development process has become increasingly frustrating during the past decade. After much internal negotiations, our Station proposals, however modified, become part of the total Forest Service research budget. That budget, again after much negotiation, becomes part of the Forest Service budget, then the Department of Agriculture budget, and finally, the President's budget after reductions recommended by the Office of Management and Budget.

The legislative budget process also goes through many iterations to finally produce what during the past 8 years has been additions to most budget line items reduced in the President's budget. However, all restorations have been earmarked for specific programs and specific locations, mostly for high priority programs such as acid rain. In addition, our budget is rarely received on schedule and frequently comes as a continuing resolution late in the fiscal year. If you've ever seen a yo-yo in action, you have a fair idea of our budget process.

The bottom line is Forest Service research budgets have declined. This is true both nationally and at the North Central Station, especially when we allow for inflation and increasing salary costs.

North Central Station employees need to look no further than their own operations to see the effect on our research programs. In 1978, the Station had about 100 scientists and almost 250 permanent full-time employees. Today, a decade later, we have 70 scientists. We are simply not holding our own when it comes to budgets. And all this comes at a time when the cry for scientific knowledge is increasing.

Tight budgets and mounting costs have forced us to closely examine our programs and our priorities. If I can leave you with one thought this morning, I hope it's that the North Central Station cannot meet the forestry research needs of this region alone. We simply don't have the resources to tackle the great array of questions involved with the diverse resources in the North Central Region. It has always been important, but in today's economic environment it is critical that we maximize our partnerships; our cooperative relations with other Stations,

universities, State DNR's, individual corporations, and other interested groups. No one likes reduced budgets. But I prefer to look at the positive side. Tighter dollars will motivate us to foster better ties with our research clientele.

Congress and the Washington Office recognize the need to look for outside funding sources to supplement federal dollars. They're encouraging us to do this very thing through cooperation and partnerships with non-federal organizations. One example is the research challenge cost-share program. In this program federal research dollars are matched to non-federal research dollars made available to study a particular problem. The aim is to make the most of federal research dollars. This year \$500,000 has been made available, providing we can obtain matching funds. Another \$500,000 has been proposed in the Reagan budget for next year. We don't know if President Bush will modify that.

The Station has responded to this incentive. This year we submitted 26 proposals for almost \$500,000. We haven't heard yet which proposals have been accepted, but of course, we hope to get a healthy share of this money dedicated to research at the North Central Station. This is a new experience for us, but it is an opportunity for both the federal and private sectors to strengthen our research effort.

We must continue to be aggressive and imaginative in strengthening existing ties and in establishing new relationships. This is an important part of getting the job done. We value the cooperative relations we currently have with SIU, the University of Missouri, the Black Walnut Council, the University of Illinois, and the University of Wisconsin, to name just a few. I see this as the norm in years ahead.

What are the research priorities at the North Central Station? Much of the North Central Station's territory lies within the central hardwood region. Central hardwoods research has always been a major research emphasis at the North Central Station, and it will continue to be.

Our three central hardwood research projects involve 11 scientists based at two locations. We have two projects at Carbondale: the Central Hardwood Physiology and Genetics project led by Jerry Van Sambeek, and the Hardwood Processing unit led by John Phelps. Our other central hardwood research project is based in Columbia. That project, Central Hardwoods Silviculture and Ecology, is led by Steve Shifley. Combined, this research consumes 27 percent of the Station's total timber management research budget, 13 percent of our total Station budget, and 16 percent of our cadre of scientists.

Considering the diversity in our programs, these numbers show that central hardwoods rank

high in terms of North Central's research programs. This is especially true when we consider that other programs such as Forest Survey, which we are striving to get on a 10-year cycle, consume 1/5 of our resources. I think it's also important to note that our Forest Survey project and our Station's economic studies apply directly to the central hardwood region.

I'd like to discuss research priority setting in a broader context. I'm often asked, "What are your research priorities?" for any number of topics. Unfortunately, priority setting is not a simple, straightforward process.

At least four factors influence what we do. (1.) National research priorities established by the President through our Washington Office and by Congress. (2.) Local research needs, as described by both private and public resource managers. (3.) Budgets. As I alluded to earlier, Congress is becoming increasingly activist. They use earmarking and specific budget allocations to implement their own agendas. As I mentioned, our budgets are given to us already broken down by budget line items, and any restorations are made to specific locations. We have a little flexibility to reallocate funds, but not much. (4.) Scientist skills and research equipment, to a lesser extent. Our research is determined somewhat by the skills and inclinations of our scientists, although we can manage our work force to minimize this to some extent.

The process of how any one or a combination of these factors determines specific programs differs by Station, project, budget year, and Congress.

Each of our three projects is working on priority problems identified by us and a number of user groups, such as the Hardwoods Research Council. I value highly the advice and suggestions made by these outside groups, and I look forward to working with them in the future. An analysis of the research problems and an assessment of our resources led us to restructure our Carbondale and Columbia efforts. With planned retirements, termination of a unit in St. Paul, and salary savings through reductions in our technician work force, we feel we are focusing our very limited resources in Carbondale and Columbia.

We've tried to eliminate any overlap in our timber management research. We also have tried to give each unit a clearer mission. The work at Carbondale will focus on plantations and on the fine hardwoods. The work at Columbia will deal with natural stands and with a more holistic, multi-functional approach to central hardwood ecosystems. We think this split will make us more responsive to user needs and better position our Station to compete for TMR dollars. We welcome support to strengthen the programs at both locations.

Before I shift gears, let me review. Declining budgets have forced us to examine our programs, make a lot of difficult choices, and to seek productive partnerships with our clients. Despite tight budgets and many research demands, we will continue to expend a significant amount of our Station's resources on central hardwoods. The recent reorganization of the central hardwoods research program will make us more efficient and competitive for research dollars.

I'd like to talk about emerging research needs and how they relate to traditional long-term studies. Forest Service research has maintained continuous research plots, on growth and yield, for example, for longer than some of the famous European forests. Most of these plots, found on our experimental forests, are invaluable.

We're committed to maintaining them. Again, budgets might not allow us to expand these studies, and we may be forced to convert some research plots to demonstration areas if we can't justify usefulness. But for most of these studies a maintenance, bare-bone level of support is usually possible, even after the hard choices are made. To survive the close inspection tight budgets demand, such studies must be able to demonstrate productive, tangible results.

In fact, productive research is really the key to our success at the broadest level. The best way to foster support of our programs is to produce high quality research that makes a difference--that is needed and will be used by our clientele.

In a similar vein, if we want to be "in the loop" on emerging issues, we've got to be poised and ready as an organization to respond quickly and effectively to emerging issues.

What are these issues? Such things as global climate change, including the effects of atmospheric deposition; water quality; economic opportunities through new forest products; threatened and endangered species; and catastrophic forest fires.

How do we prepare to respond? We examine how our current research might be applied, or modified, to become pertinent to these concerns. We look for new partnerships, and added financial support, with groups concerned about these same problems. We keep our programs flexible. Our scientists no longer have the luxury of spending entire careers on one very narrow subject area. Today, we must be willing and able to re-focus our research orientation to respond to changing needs. Research at both the Carbondale and Columbia labs should be aware and sensitive to local and regional issues of this sort.

An important part of "productive research" is technology transfer. We've simply got to commit ourselves as scientists to ensuring that

what we learn through our work is communicated to natural resource professionals.

I think we've done a pretty good job of technology transfer. The Walnut Notes and Central Hardwood Notes I mentioned before represent state-of-the-art information.

I'm particularly proud of the effort, creativity, and innovation that have gone into these publications. More than 50 years of research results and experience from natural resource professionals and researchers have been condensed into these for use by natural resource managers. Forest Service retiree and former boss Bry Clark deserves much credit for the Central Hardwood Notes. Authors include scientists from universities, government agencies, and industry. I think these publications will become required reading for any professional manager, and the looseleaf format will enable us to update the information they contain.

We're also putting the finishing touches on a walnut demonstration area. When completed this summer, this site outside of Carbondale will give managers a view of different silvicultural practices related to black walnuts.

We value our association with user group organizations, partly because these associations are an excellent way to transfer research information. We hope to maintain and strengthen our ties with groups like the Hardwood Research Council and the Walnut Council.

Finally, workshops and symposiums like this are an important way to discuss and publicize our research results, and seek the support we need to forge ahead. I want to thank the organizers of this symposium. I know it takes a great deal of effort and time to organize this. George Rink, and all the other members of the organizing committee, thank you.

These technology transfer efforts can also make our clients familiar with existing research information that applies to current issues. For example, we have a great body of knowledge on oak management and oak regeneration. Yet National Forest personnel in this area are really struggling with the issue of oak management and clearcutting.

It's easy to say we already know how to regenerate oak. It's harder to take this information and apply it to their management situations. We all know that National Forest personnel and other land managers don't manage in a biological isolation chamber. Economic, social, and political pressures often demand less than biologically optimum management practices. I think technology transfer efforts must recognize these pressures. We need to look at how our information can be applied to their situation.

But again, at risk of repeating myself too often, these technology efforts are based on the assumption that our research results in new information, new and improved ways of doing business that make a difference.

Let me sum up by giving you my vision of where the research at the North Central Station is going. We will continue to try to fill existing technical gaps in our knowledge. Answers to some of these questions will come from basic, fundamental research. Other problems will dictate applied work. Both facets are addressed at Carbondale and Columbia. We will do more cooperative research. Our programs, to survive and gain support, must become more flexible, more able to change to respond to emerging issues, like global warming. This demands that our scientists be able to switch gears occasionally. The nature of funding our work makes the attribute of flexibility even more important. Our work will come under closer scrutiny by legislators, research clients, and the general public. The best support we can obtain is the testimony of pleased clients.

To survive, to even thrive in this climate, our work must become increasingly productive and of demonstrated value. We have to continue to work hard in our laboratories. But as importantly, we must work harder in the public arena, and in our efforts to apply our research information in ways that make our research information contribute to solving management problems and concerns.

If we do this, we'll be better poised to meet the challenges of the future.