Research Agenda

The McIntire-Stennis research agenda is divided into two major components: Foundation areas of knowledge and Emerging and Integrative areas of knowledge.

Foundation Areas of Knowledge

The knowledge base for forestry and natural resources management requires attention to several foundation areas of knowledge. Science focused on these areas needs to continue while new and emerging areas of knowledge are investigated. These areas of knowledge were identified in the NRC Report on Forestry Research Capacity and/or the Natural Resource Research and Graduate Education Summit of 2006.

Resource Measurements, Soils and Silviculture

Goal—expand knowledge in the resource management fundamental knowledge areas of resource measurements, soils, and silviculture

Actions and Rationale

1. Continue to make clear that fundamental knowledge in these critical areas of resource management information is needed to solve problems and that the McIntire-Stennis program can support work in these areas.

Fundamental information about the resource, and the soils on which it depends, is critical to understanding how to use the resource for human benefit and to sustain it for future generations. In addition, knowledge critical to how one might manipulate the resource to provide benefits, and the potential consequences of such manipulations, is important for sustaining the resource while using it.

Performance Measures

1. Papers and other outputs from individual research projects
2. Observable evolution in development of measurement technologies, knowledge of soil processes, and silviculture and other applied ecology activities for the sustainability of forests and grasslands.
3. Observable management implementation of knowledge generated by this research.

Ecology and Ecosystem Management

Goal—expand knowledge of forest and grassland ecology and the ecosystem management that is derived from it.

Actions and Rationale

1. Build on the existing knowledge generation that is focused on forest and grassland ecology and the science of ecosystem management.
2. More fully integrated this area of fundamental knowledge with the social and economic sciences.

Many of the resource management problems are complex and/or large scale and demand fundamental understanding of the integrative science of ecology. The solution to these problems has been articulated as large scale, integrated and collaborative management—ecosystem management. Research must continue to provide the knowledge for understanding the basic processes of bio-physical communities and the management options for sustaining these processes, at all scales, over time.

Performance Measures

1. Papers and other outputs from individual research projects
2. Observable evolution in the development of ecological understanding and the evolution of ecosystem management
3. Observable management implementation of knowledge generated by this research.

Policy, Economics, and Social Sciences

Goal—expand knowledge and techniques for institutional and policy analysis, economic forecasting and analysis, and understanding of human values and social processes involved in natural resources management and stewardship.

Actions and Rationale

1. Adapt the theories and methods of the fundamental social sciences to natural resource activities such as outdoor recreation, collaborative planning, environmental education, public participation, and other social processes.
2. More fully integrate this area of fundamental knowledge with the ecological sciences.

Natural resource management and stewardship are fundamentally social processes and thus it is inherent that policy makers, planners, and managers understand how these processes work, what other people think about them, and how outputs of management and stewardship can be measured in relevant social and economic terms. The actions of management and stewardship also effect the lives of individuals and groups and shape cultural development and response, and thus it is incumbent that those developing policy and making decision have information about the consequences of the decisions that are made.

Performance Measures

1. Papers and outputs from individual research projects.
2. Observable development of the techniques and practices of effectively engaging the values and voices of different people in decisions about natural resource management and stewardship.

3. Development of models and techniques for assessing the social, economic, and cultural consequences of implementing natural resource decisions.
4. Development of human value based models of natural resource management and stewardship.

Physical, Engineering, and Material Sciences

Goal—expand knowledge and techniques derived from the physical, engineering, and material sciences in natural resources management operations and in development of material products derived from natural resources.

Actions and Rationale

1. Make and test applications of physical and engineering sciences in natural resource management and operations.
2. Continue to expand the horizons of material science through the use of renewable natural resources.

The physical, engineering, and material sciences are instrumental in being able to effectively utilize natural resources in environmentally and socially sound ways. They are critically important for effective management operations and knowledge of them in basic to developing new and better products. Research must continue on these topics to enable development of environmentally and socially sound management practices and so that new and better products for human use can be developed.

Performance Measures

1. Papers and outputs from individual research projects.
2. Observable advances in developing environmentally friendly management activities.
3. New and better products utilizing renewable natural resources arriving in the market place.

Emerging and Integrative Areas of Knowledge

Several emerging areas of knowledge need to be added to the traditional forestry and natural resource knowledge areas to meet the knowledge and management needs of the future. All of these areas of knowledge were identified by participants at the Natural Resource Research and Graduate Education Summit in 2006.

A New Science of Integration

Goal—develop a new science of integration focused on integrative science for integrated land management

Actions and Rationale

1. Make the desire for research projects on the science of integration explicit to all McIntire-Stennis funding recipients.

2. Require inter-institutional projects to include a significant integration component.

Increasingly natural resource management demands understanding across disciplinary, geographic, and/or administrative boundaries. Particularly landscape level and larger geographic considerations cut across ownership and administrative boundaries, counties, states, and nations, and multiple disciplines. A science that clearly addresses this boundary spanning is needed. Also, given the central places of both social issues and biology in natural resource management, integrating knowledge from these realms and many others is critical to meeting the needs of people through research focused on forests and grasslands.

Performance Measures

1. Number of projects certifying an integration component
2. Synthesis papers that present a science of integration

Ecosystem Services

Goal—greatly expand an understanding of ecosystem services and how they can be produced and managed

Actions and Rationale

1. Place a premium on research that enhances our understanding of ecosystem services and how they can be developed and produced.
2. Devote considerable new funding to the area of ecosystem services.

Our society continues to demand services arising from stewardship of ecosystems such as carbon sequestration, clean and abundant water flows, visual aesthetics, outdoor recreation, wildlife abundance and diversity, noise abatement, and many other services. As climate continues to change the flow of these and other resources that we have come to expect will be challenged. In addition, a growing human population that is increasingly urban in orientation will likely demand more and more of these services while also demanding more material products. The management and stewardship challenges are apparent in this scenario and research is needed to enable society to effectively deal with the myriad services that it demands from its natural resources.

Performance Measures

1. An increase in the number and variety of research projects focused on ecosystem services.
2. Papers and other research products that enhance our understanding of the ecosystem services and their production, development, and use.
3. Observable integration of management for ecosystem services with management for ecosystem products.

Human Attitudes and Behaviors

Goal—increase understanding of changes in human attitudes and behaviors on the management and stewardship of natural resources

Actions and Rationale

1. Develop projects specifically focused on public values, attitudes and behaviors and how they affect natural resource management and stewardship.
2. Develop and assess techniques for effective engagement of publics in decision processes, collaborative planning and management, and monitoring and assessment of the consequences of natural resource management and stewardship.
3. Increase research on both communications about natural resources and multicultural aspects of natural resources management.

Since natural resource management and stewardship are fundamentally rooted in social values and processes, it is necessary for those engaged in these endeavors to learn about the attitudes and behaviors of those for whom natural resources are being managed and stewarded. In addition, given the participatory democratic desires of the US population, it is important to further develop participatory processes that allow for effective engagement of various publics and the giving of voice to them in decisions about natural resource management and stewardship.

Performance Measures

1. An increase in the number and variety of research projects focused on human attitudes and behaviors.
2. Papers and other outputs from research projects.
3. Observable effective interaction of a wide variety of people in planning and management of natural resources.

Conflict, Uncertainty, and Decision Making

Goal—greater understanding of the issues of conflict and uncertainty in decision making and better means for dealing with them

Actions and Rationale

1. Develop projects specifically focused on the areas of conflict, uncertainty, and decision making.
2. Assess the effectiveness of conflict resolution techniques and how they might be better implemented in natural resource management and stewardship.
3. Increase research on development of decision tools and technologies.

Natural resource decisions often are mired in conflicts and unclear decision processes. Considerable need exists to understand these phenomena and how to better execute them so that natural resource management and stewardship can move forward and the ecosystem services and products required by society can be produced on a sustainable basis.

Performance Measures

1. An increase in the number and variety of research projects focused on conflict, uncertainty, and decision making.
2. Papers and other outputs from research projects.
3. Observable effectiveness in dealing with natural resource conflicts outside of courts of law.
4. Observable use of decision models and techniques that effectively deal with concepts of risk and uncertainty.

New Applications for Forest Products

Goal—to develop new and better uses for forest products

Actions and Rationale

1. Develop and test new wood-based and composite products using wood.
2. Develop and test new pulp and paper processes.
3. Identify, develop, and test non-wood forest products
4. Examine and test methods of product marketing and of assessing and developing trade in forest products.

Myriad products can be produced from forests and many of them are derived from renewable and sustainable resources such as wood. To enhance probabilities for environmental sustainability and to enhance competitiveness of US industries, including wood products and pharmaceuticals, development of new and better forest products is necessary.

Performance Measures

1. Number and type of new wood-based and composite products coming to market.
2. Implementation of new pulp and paper processes.
3. Number and type of non-wood-based forest products coming to market.
4. Enhanced effectiveness of marketing efforts to get forest products into the hands of consumers.
5. Increases in the trade revenue derived from forest products.

Urbanization

Goal—to create and enhance livability of urban places through developing and sustaining urban forest resources

Actions and Rationale

1. Develop projects explicitly focused on urban forest ecosystems and the services provided by them.
2. Develop projects focused on the benefits provided by urban forests and how these benefits can be sustained.
3. Assess how urban forests can be restored, maintained, and enhanced in view of pressures for land development and consequences of disturbances such as air pollution and modified water runoff conditions.

For many years the US population has been predominately urban and now over half of the world's population lives in urban settings and is in the process of strengthening its urban values. The places where these people live are the places of their primary quality of life. Forests are important in sustaining and improving quality of life in these settings by providing ecosystem services, plant and animal diversity, and economic and spiritual opportunity. Thus, it is important for urbanites to learn how forest and the desired benefits from them can be sustained.

Performance Measures

1. Greater use of information about urban forests in urban planning and development.
2. Examples of the benefits of urban forests from multiple locales.
3. Examples of active restoration, enhancement, and sustainability of urban forests and associated benefits from them.

Types of Projects

There are several types of projects that might be incorporated into the McIntire-Stennis Program. The following types are under consideration.

1. Standard projects are usually single institution and single or multiple investigator projects focused on issues of local and/or regional importance.
2. Synthesis and Meta-Analysis projects focused on issues of regional and/or national importance.
3. Research and graduate education enhancement projects.

Multi-institutional Projects

There has been a strong interest advanced by the federal administration in the development of multi-institutional projects for at least part of the McIntire-Stennis Program. There are several ways that multi-institutional research and capacity development could be organized.

1. Regional Projects involving partners in a geographic region
2. Topical Projects drawing relevant partners from across the country
3. Virtual Centers focused either geographically or topically
4. Place-based Centers focused either geographically or topically