

USDA Forest Service Sponsored:

Outlook Forest Research Dialog

*“Developing Science Responses to Address
Decision Makers’ Future Needs”*

**Summary Report
Science Responses Workshop**

9/28/06

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This project is conducted for the USDA Forest Service by the National Council for Science and the Environment (NCSE) a non-profit, non-advocacy organization with the mission of linking science to the priority needs of decision makers.



Summary

The *Science Responses to Decision Makers' Future Needs Workshop* was held March 7-9, 2006, in Baltimore, MD. This was the second workshop of the USDA Forest Service (USFS) Outlook Forest Research Dialog to engage the broad forest community in building a basis for increased collaboration in research on US forests and forestry.

At the first Outlook workshop in September 2005, a diverse set of decision makers framed an “attainable future” vision for US forests and forestry in 2025. The vision was the basis for anticipating the types of scientific information and tools that will be required to reach that future.

The purpose of this second workshop in March 2006 was to develop science responses to address the decision makers' needs. The “science responses” include new research - plus syntheses of existing knowledge, assessment and analyses, science-based tools, new approaches to research, and communication and outreach activities.

The workshop resulted in 170 proposed science responses to address the future needs of decision makers and move towards ensuring sustainability of the nation's forests. It is important to note that the workshop results do not represent a comprehensive research agenda because many of the suggestions rely on the foundation of on-going research not specifically mentioned in this report.

In reviewing the science responses generated during the workshop, several themes emerged:

- *Managing with Rapid Change*: Future forest research and management activities must be framed in the context of rapidly changing social and ecological systems with increasing disturbance.
- *Collaboration and Governance*: Jurisdictional boundaries with conflicting policies increasingly constrain efforts to manage natural systems, calling for new models of governance and collaboration.
- *Participation and Inclusiveness*: To regain public support, forest decision making must be more participatory and inclusive of diverse human values and viewpoints.
- *Integration*: Enhancing sustainability will require greater integration among technical disciplines and across spatial & temporal scales, jurisdictions, and policy issues.
- *Communication and Marketing*: Increasing public understanding and support of forest research will require developing and effectively marketing messages about the importance of sustainable forests to people's daily lives, such as from ecosystem services.

Participants saw an opportunity to use research to regain the public's trust in forest management, and called for future science endeavors to be much more deliberate about collaboration and applications to decision making and to use the full range of science responses available.

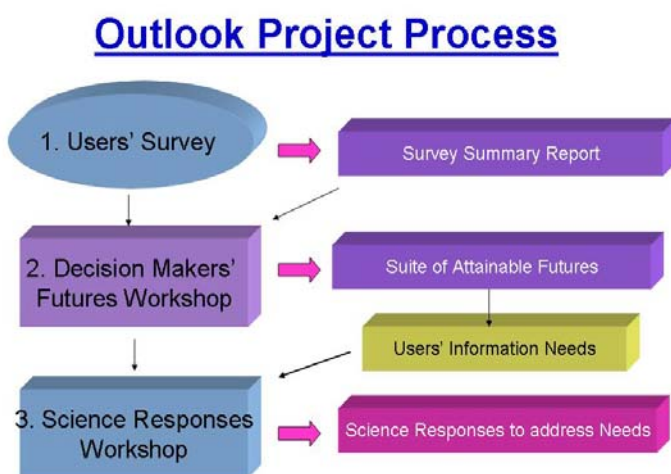
Workshop participants included leading scientists and science managers from federal and state government agencies, the forest products industry, non-governmental organizations, and academic institutions. The Outlook Dialog results provide a rich source of ideas to serve as a basis for identifying new and expanded opportunities for the stakeholders to increase their coordination, collaboration, and partnerships in future research.

I. Outlook Dialog Overview

The goal of the Outlook Dialog is to building a basis for enhancing research coordination, collaboration, and partnership within the forestry community. The project has engaged a range of members of the broad forestry community in both framing decision makers' future needs and identifying the science responses required to serve those needs. The entire process is participatory both to ensure stakeholders' input and to build a shared vision of decision makers needs for research results and the relevant science responses to meet the challenges of managing for a sustainable future.

Given the growing demands and tightening of forestry research funding, the Outlook Dialog has initially focused on how to get the best return on research and development investments in terms of providing useful information for decision makers – including policy makers, managers, and practitioners. Ultimately, for science to assist decision makers' effectively, a broad and robust research enterprise is required. The Outlook process engages the decision maker “clients” of science to collaborate with researchers in addressing their future needs, and thereby helps increase these important clients' support for the broader science enterprise.

The Outlook Dialog uses a futures approach to identify research and development activities that can anticipate the future needs of society. This futures approach is particularly important when considering the increasing rate of change and uncertainty and the long lead times often required to produce useful research results. The project first identified the future needs of decision makers and then defined the science responses required to address those practical needs. This phased approach is important because decision makers and researchers view and value information differently. The information most needed for application by decision makers often is not the same as the priority of information researchers seek to advance the frontiers of science.



Users' Survey and Decision Makers' Future Needs Workshop: The first step in the Outlook Dialog was a users survey of 50 key decision makers and science leaders to assess their views on the future of US forests and forestry up to 2025 AD. The results of the survey were summarized in a report and then shared in the second step of the Outlook process at the *Decision Makers' Future Needs Workshop* in September, 2005. The workshop participants included leading individuals who use scientific information in making forestry-related

decisions, from federal, state, and local government agencies, the business community, non-governmental organizations, and academic institutions. This diverse set of decision makers and scientists worked together to develop an “attainable future” with elements they envisioned for US forests and forestry. The attainable future then served as the basis for participants to identify

the types of scientific information and tools they thought might be required to reach that future. The detailed results of this workshop are in a report available at www.ncseonline.org/outlook.

Science Responses Workshop: The third step in the Outlook Dialog was the *Science Responses Workshop* (March 7-9, 2006), described in this report. This workshop engaged researchers and managers in framing science responses to address user-defined needs from the first two steps in the Outlook effort. The diverse group of leaders (*See page 23 for List*) participating in the workshop first considered the future needs developed by decision makers. They then developed numerous science responses to address these anticipated needs. It is important to understand that the workshop results do not equate to a comprehensive research agenda because many of the suggestions rely on a foundation of on-going research not specifically identified in this report.

The framework developed in the first year of the Outlook Dialog is intended to help foster collaborative work across all sectors, leading to partnerships and synergies in conducting the nationwide research and development enterprise. Outlook has intentionally not attempted to develop a single prioritized research agenda for all to follow - but rather has framed a set of possible research options serving as a catalyst to facilitate increased understanding, coordination, collaboration and partnerships among individuals and organizations.

Outlook Dialog First Round Timeline

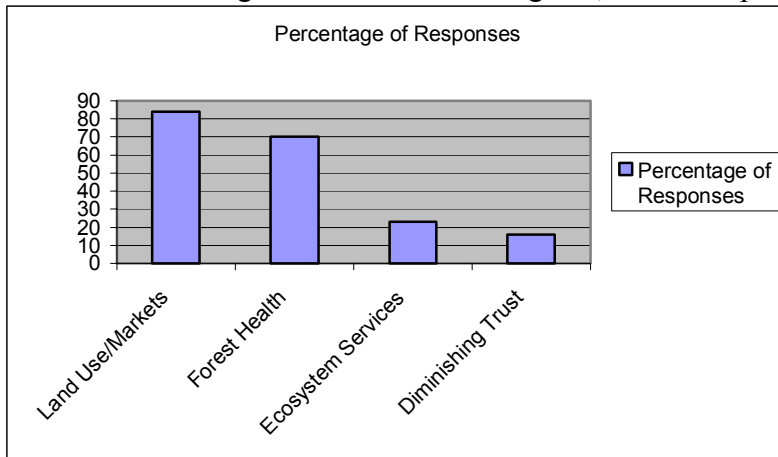
<i>May to July 2005</i>	<i>Survey:</i> Future of US Forests and Forestry
<i>August 2005</i>	<i>Report:</i> Summary of Outlook Survey Findings
<i>Sept. 27-29, 2005</i>	<i>Workshop:</i> Decision Makers' Future Needs
<i>November 2005</i>	<i>Report:</i> Decision Makers' Workshop Results
<i>Jan. 4-6, 2006</i>	National Association of University Forest Resources Programs (NAUFRP, formerly NAPFSC) Summit, "Forest Research for the 21 st Century"
<i>March 7-9, 2006</i>	<i>Workshop:</i> Science Responses to Decision Makers' Future Needs
<i>May 16, 2006</i>	<i>Summary Report:</i> Science Responses Workshop Results

II. Survey Summary

From late April through early July 2005, the NCSE project team interviewed over 50 individuals with strong forestry and natural resource backgrounds. Included in this group were people affiliated with of the USDA Forest Service, conservation organizations, industry, federal, state and local government, and academia. Participants were first given a short questionnaire and then were subsequently interviewed to learn about their survey responses in greater detail. The interview results were then compiled and analyzed. To ensure participants were able to speak freely during the interview, no individual's opinions will be specifically identified. A full summary report of the Outlook survey results is available at www.ncseonline.org/outlook.

From a careful analysis of the interview results, four major, overarching trends were elicited:

- I. Land Use and Global Markets:** The relationships between shifting global markets and land use changes.
- II. Forest Health:** Long term forest health/management issues including fire, invasive species and climate change.
- III. Ecosystem services:** Forests as a source of ecosystem services.
- IV. Diminishing Trust in Forestry Professionals:** A lack of trust of forestry professionals by the general public resulting from the current problems with forest health.



The above chart shows what percentage of interviewees identified each of the four major trends as an important area of concern. Summaries of each of these issue areas, their major drivers, their consequences and options for addressing them, follow below.

What do these four issues—land use and global markets, forest health and management, ecosystem services, and lack of trust in forestry professionals—tell us about the future of U.S. forests? The table below outlines these major themes, their drivers, and their consequences. Two things are clear from the table: the themes are interrelated and in many ways have a cause and effect relationship, and the status quo for the future is not particularly bright for sustainable forestry in the U.S.

Participants almost universally see a decline in the area of forest in the U.S., a decline in U.S. market competitiveness, and decline in management on the forests that remain, due largely to increasing parcelization and fragmentation and rapidly spreading urbanization. These trends inevitably lead to a decline in the ecosystem services forests provide, including clean water, just as populations are beginning to grow in rural communities and water quality is becoming a bigger issue.

As poor market competitiveness reduces the funds available for land management on both public and private lands, threats by invasive species and fire will increase, exacerbating an already significant problem with forest health. Continued threats from wildfire, water quality issues, and the decline in health of public lands are likely to continue to shake the public's already fragile confidence in forest professionals and further threaten funds for research and education.

The table below summarizes the major themes to emerge from the survey, as well as the associated drivers and consequences of those trends:

Major Themes	Changing land use, parcelization/ fragmentation, Population growth, less competitive U.S. timber markets	Forest health, invasive species management, climate change	Increasing recognition of Ecosystem services including water quality and quantity as an important benefit of forests.	Lack of trust of forestry professionals and their ability to manage the land
Drivers	More people wanting to live outside of cities; more competitive land values for development than for timber; rapidly expanding urban areas; increasing imports of cheaper wood from overseas	Legacy of poor forest management practices are having consequences of increased fire and invasives today. Continued lack of good fire management on western forests.	Decline in water quality and quantity. A greater understanding of the services forests can provide. Poor markets for traditional commodities.	Poor management and lack of collaboration between managers and local land owners leads to mistrust. Declining investment in forestry education
Consequences	Loss of forest area and wildlife habitat, leading to less biodiversity; declining ecosystem services; continued decline of U.S. timber markets	Continued decline of forest health. Increased risk of catastrophic fire and exotic invasions. Loss of ecosystem services.	Potential for new markets developing, especially as demand for clean water increases and timber competitiveness decreases.	Lack of public support for management of lands, making improvement of forest health difficult. Declining number of qualified foresters.

III. Science Responses Workshop Results

Participants in the *Science Responses Workshop* developed over 300 proposed options to address the decision makers’ future needs. After the meeting, the Outlook project team condensed these to 170 responses by eliminating redundancy and combining related suggestions to yield the list presented in **Table 1**, beginning on page 10 of this report.

The sciences responses were developed and organized in alignment with the seven elements of the Attainable Future envisioned by decision makers’ at the first Outlook workshop.

The seven elements of the attainable future for US forests and forestry in 2025 AD are:

- I. Sustainability –Vision:** The overarching theme. Sustainability is the basic building block on which all of the other themes are built. Here, decision makers focused on a vision of the US as a sustainability leader and what information is needed to reach that goal.
- II. Healthy Working Forests – Vision:** Forests are soundly managed and forest restoration efforts are widespread. Healthy forests served as a proxy for sound forest management and education of the public about forest management to improve the consistency of forest policy.
- III. Competitiveness – Vision:** The US forest industry is stable and viable. This element includes the needs required to revitalize and maintain a competitive US forest products industry.
- IV. Biofuels and Bio-Products – Vision:** Biofuels contribute significantly to US energy self sufficiency. Development of a wide array of forest based bio-technology products.
- V. Public Engagement – Vision:** Decision makers expressed a desire for greater public engagement in and understanding of forest policy and identified needs relative to meeting this goal.
- VI. Collaboration – Vision:** Greater cooperation between agencies and with the public on forest issues. Needs in this element focused on social science questions on the mechanics of collaboration.
- VII. Leadership – Vision:** Foresters have reasserted their leadership role in the community and are trusted by the public. Education of the public and of forest professionals and the commitment to long-term research are included in this element.

Participants in the Science Responses Workshop first discussed the decision makers’ attainable future visions and their anticipated needs to understand the decision makers’ intent. Participants were encouraged to suggest research options not only for the initial needs identified by the decision makers, but also other needs which they felt were necessary to assist decision makers in reaching the attainable future. The workshop defined “science responses” very broadly, to include not only traditional research, but also other science-based activities to help achieve the decision makers’ vision of forests and forestry in 2025. Suggested science responses include:

- **New research** to address decision makers’ needs.
- **Assessment and analyses** of existing information.
- **Syntheses** of existing data and knowledge.
- **Science-based tools** to meet decision makers’ needs, such as applications-oriented models.
- **New processes and approaches** for research to link with decision making.
- **Communication, outreach, and educational** activities to address decision makers’ needs.

As shown in the following table, more than 50% of the participants' suggested responses were in areas other than traditional research:

Science Responses by Type		
<i>Percent of Responses</i>	<i>Response Category</i>	<i>Number of Responses</i>
48%	Research	82
15%	Assessment and analyses	26
15%	Science-based tools	25
14%	New approaches	23
4%	Communication and outreach	8
4%	Syntheses of existing information	6
100%	Total	170

The fact that less than half the suggestions were for new research indicates that meeting decision makers' future needs to ensure sustainability will require a broad array of science activities.

In framing their science responses, participants were encouraged to consider the biological, economic, and social aspects of the needs identified by decision makers. Consistent with the call for more integrated approaches, almost half of the more than 170 science responses were interdisciplinary, integrating across traditional research areas.

Science Responses by Discipline		
<i>Percent of Responses</i>	<i>Response Category</i>	<i>Number of Responses</i>
45%	Integrated	77
25%	Social	43
19%	Economic	32
11%	Biological	18
100%	Total	170

The compilation of science responses shown in **Table 1** is organized by type of science response for each of the seven attainable future vision elements; the table also indicates the four disciplinary categories from the table above.

Major Themes

Considering the science responses as a whole, several overarching themes were identified:

- *Managing with Rapid Change*: Future forest research and management activities must be framed in the context of rapidly changing social and ecological systems with increasing disturbance.
- *Collaboration and Governance*: Jurisdictional boundaries with conflicting policies increasingly constrain efforts to manage natural systems, calling for new models of governance and collaboration.

- *Participation and Inclusiveness*: To regain public support, forest decision making must be more participatory and inclusive of diverse human values and viewpoints.
- *Integration*: Enhancing sustainability will require greater integration among technical disciplines and across spatial & temporal scales, jurisdictions, and policy issues.
- *Communication and Marketing*: Increasing public understanding and support of forest research will require developing and effectively marketing messages about the importance of sustainable forests to people's daily lives, such as from ecosystem services.

In addition, the implications of evolving and globalizing markets for forest products and services, and the relationships between human values and nature interactions also figured prominently in the science responses. Participants' strongly identified the need for more social science research and social/cultural understanding as key barriers to attaining sustainability.

Participants repeatedly cited the need for future science endeavors to be much more deliberate about collaboration and decision making, and to use the full range of scientific responses available, from new research to outreach, emphasizing marketing of both forests and forestry research.

During the wrap-up session, some participants expressed concern that research on some forest-dependent topics – non-timber forest products (NTFPs), forest productivity, and recreation – may have been overshadowed by responses to address rapid change. Participants also noted that the US currently has a comparative advantage in forest and natural resource education and research through our universities, and that future research plans should strive to sustain that advantage.

A key question initially raised by the decision makers also engaged the science response workshop participants: *“How can forestry professionals successfully engage the public in meaningful ways to foster public participation and build the political will to bring the desired attainable future to reality?”*

Participants saw an opportunity to use research to regain the public's trust in forest management and create a compelling vision of forests' value to people's lives. They called upon the forest research community to both broaden and unify its efforts through disciplinary integration and to implement new approaches for increasing support for forests and sustaining collaboration.

Next Steps

Participants were asked one final question: *“What are the next steps in the continuing dialog to build a stronger basis for increasing coordination, collaboration, and partnerships on the science responses to address decision makers' future needs?”*

Given the diversity and complexity of the 170 science responses from the workshop, participants suggested that the next step should be to convene a “focus group” to process the responses and identify major clusters of suggestions as they relate to taking action on the responses. This focus group of Outlook participants also would propose approaches for acting upon the major science responses and then share those and other ideas for collaboration with the broader forest-related community. A larger stakeholder meeting could be conducted to discuss and refine the focus

group's proposed strategies and begin to engage in defining the details of possible coordination and partnership in research. This suggestion met with wide support from the group.

Another recommendation was to integrate science more at all levels across disciplines. One strategy suggested was to establish networks of forest science practitioners to promote integrated forest sustainability science. This could include an integrated sustainability research forum that met at various interdisciplinary conferences such as the International Studies Association and the International Society of Research Management. The Pacific Northwest adaptive management systems were offered as a model. Participants also supported the development of place-based research networks integrating environmental, economic, and social research around recognizable and well-loved places such as the Great Lakes, the Chesapeake Bay, and Yellowstone.

Acknowledging that forest research has minimal visibility in other sciences or other science agencies, a coalition to market the forestry message beyond the Department of Agriculture was suggested. Partnerships with organizations such as Habitat for Humanity – working with them to build functional green spaces for every (50) houses, for example – were also put forward.

The Outlook Dialog provides stakeholders an opportunity to collaborate with the goal of building a common vision of research priorities and shared approaches, enabling research to assist decision makers in reaching a more sustainable future for US forests and forestry.

The Forest Service has engaged NCSE in a cooperative agreement to take Outlook Dialog the next step, as suggested by the stakeholders, and convene a focus group to process the 170 science responses to decision makers' needs and identify clusters for further action by the stakeholder community.

Table 1: Science Responses

What follows are the 170 science responses from the *Science Responses to Decision Makers' Needs Workshop*. They are categorized by type of response – *new research, assessment and analyses, science-based tools, new approaches, syntheses of existing knowledge, and communication and outreach activities* – within the framework of the seven elements of the attainable future developed by decision makers. The table describes the vision for each element, and also cites disciplinary categories. As suggested by the workshop participants, a needed next step is to have scientists and decision makers work together to identify major clusters of suggestions as they relate to taking collaborative action on the responses.

	Integrated Science Response	Biological Science Response	Economic Science Response	Social Science Response
Attainable Future Vision I – Sustainability: US forests are a model of management; national policy and leadership support sustainable forests. Managers and conservationists agree about sustainable practices, and US central policies include a sustainable economy and environment.				
A. New research to address decision makers' needs.				
1. Define baseline data, acceptable levels of variation, and thresholds for assessing progress toward sustainability, determining what can serve as leading indicators, and to understand what happens if actions aren't taken.	X			
2. Make functional relationships – biological, sociological – the foundation of sustainability metrics. Determine ways to measure ecosystem structure and function changes in dynamic systems.	X			
3. Develop means to measure impacts in the context of scale, from ecosystem to landscape to governance unit, e.g. city, state, region, national.		X		
4. Research methods for reaching consensus, especially across jurisdictions, on what we learn about sustainability at different scales.				X
B. Science-based tools to meet decision makers' needs, such as applications-oriented models.				
1. Develop and use forecasting methods that anticipate sustainability threats and tools such as ROI that explain tradeoffs, along with dynamic optimization approaches to identify management strategies that will achieve desired end points.			X	
C. New processes and approaches for research to be linked with decision making.				
1. Define processes for deciding who selects metrics, on what theoretical basis, and reflecting the multiple valuations and perceptions of sustainability held by society.				X
2. Given the linkages between measured variables and human values, incorporate participatory research to ensure adequate perspectives on sustainability, and decide explicitly whose values count in conflicting situations. Show how sustainability interrelates to national/international security.				X
D. Communication, outreach, and educational activities to address decision makers' needs.				
1. Communicate about forests for the future, conveying images of what forests for the future might be like.		X		

Attainable Future Vision II – Healthy Working Forests: Education results in public understanding of forest management, ecosystem services, and urban forests. Policies foster heterogeneous, multi-use adaptive landscapes, watershed-level land use planning increases. Endangered and ecologically important forests have been mapped and protected, and forest restoration is on-going.	Integrated Science Response	Biological Science Response	Economic Science Response	Social Science Response
A. New research to address decision makers' needs.	X			
1. Determine what can best be provided based on humans and ecosystems, showing comparative advantages along an ecosystem services gradient; consider well-designed demonstration projects targeted to user groups.	X			
2. Research how to incorporate ecosystem management practices and considerations into planning practices and land use permitting and zoning, including allocation of conservation zones within managed forest landscapes.	X			
3. Integrate sciences for integrated management approaches and expand information base on ecological and social interactions of management practices. Research management practices within marketplace to determine what people will and will not accept.	X			
4. Explore the human dimensions of easements – attitudes, values, motivation for site purchases and management, e.g. recreation, privacy, legacy, a place for children – and compare to full range of incentives to reach sustainability, including economic motivations.	X			
5. Develop a better understanding of easements in landscapes with mixed land uses.	X			
6. Develop and demonstrate landscape design principles, broadening beyond ecological principles to incorporate such things as public tolerance for irreversible loss and cultural gathering space in the landscape. Determine social and political processes necessary for deciding desired landscape composition.	X			
7. Identify landscape-specific indicators of sustainability.	X			
8. Determine commensurability of conclusions reached at different assessment scales; develop and enhance aggregation techniques and tools that allow scalability across geospatial and temporal dimensions in assessments.	X			
9. Understand globalization's influence on US culture and resource use, including land use changes occurring as a result of population dynamics and related social justice issues.	X			
10. Research risk-based approaches for choosing among possible management options to decide which intervention is appropriate at varying spatial scales, matching scale of response to scale of stress.		X		
11. Develop a better understanding of extreme events as drivers of ecological systems, identifying chains of effects and adaptive management actions that might be effective within change scenarios.		X		
12. Identify attributes of forests at risk, including factor interactions such as drought, insects, disease, pollution, etc. and land use context, urban to wildlands; quantify costs, benefits, and tradeoffs. Distinguish enhanced risk from aggregate risk.			X	
13. Develop the science to support credible carbon accounting systems.			X	
14. Refine methods and metrics for quantifying ecosystem service tradeoffs, e.g. restricted recreation on public water supply lands.			X	
15. Use ROI approaches to test different goals, and examine effectiveness at different intensities of effort.			X	
16. Understand the market structure for easements as an emergent market for an ecosystem service; identify information deficits.			X	

6. Research incentives and mechanisms needed to streamline approval processes while building in monitoring tools.	X			
7. Expansive research program on the working of the global economy.	X			
8. Develop data and analysis tools needed for a market based approach, determining government's role, factors that would make the market function, and the time duration of the carbon value.	X			
9. Reconcile national and international data systems.	X			
10. Develop and market "green" business models and new sustainable and alternative products, e.g. bio-based polymers.	X			
11. Explore methods to maximize capability of WWF, e.g. Google earth.	X			
12. Research law and law-making by extra-governmental bodies that incorporate values of sustainable labor, equitable environmental rules, etc.	X			
13. Research products to determine those that are optimally tradable.	X			
14. Research how to limit the spread of invasive species that ride on tradable products.	X			
15. Demonstrate through research how ecosystem services could be profitable and 'good' for ecosystem processes and functions.	X			
16. Recognizing that US environmental safeguards are a strength, determine how to build upon these strengths.	X			
17. Develop guidelines for disaster resistant communities and infrastructure.	X			
18. Determine optimal balance and density of urban and rural communities, including definition and criteria of optimal.	X			
19. Develop data and models that incorporate effects of disturbance and environmental change on carbon fluxes and stocks, assessing the precision of the source/sink and other models, including inputs and outputs.		X		
20. Increase understanding of scale as a factor for ecosystems, and develop tools for monitoring biological health.		X		
21. Research how to value alternative uses of a given land or landscape and the implications and options for land allocation, including a definition of "efficient" land use.			X	
22. Research alternative wood and ecosystem products/services, comparative market value, and relative value for timber and NTFPs.			X	
23. Determine mechanisms to identify and promote high value niche markets built around local value-added industries.			X	
24. Research how to move product supply from centralized to decentralized markets, e.g. energy production.			X	
25. Research processes to improve manufacturing efficiency.			X	
26. Develop a science based framework that outlines economic benefits vs. risk involved in participating in carbon accounting.			X	
27. Conduct comparative research on "in-situ" forest management for multifunctional forests, e.g. explore how productive capacity is maintained under conditions of intensive local use.			X	
28. Explore opportunities for portable mills and other small-scale enterprises.			X	
29. Conduct research on effects of current patent law rules, especially as it relates to university scientists creating commercially valuable "knowledge, process, or product."			X	
30. Conduct research and policy analysis on rules of and potential for internationally based production and trade incentives that promote sustainable international trade, rethinking work across national jurisdictions and the governance design that would allow this.			X	
31. Develop techniques for valuing all ecosystem services, and decision support tools to facilitate trade-off decisions.			X	

5. Incorporate in-depth local cultural understanding into decisions.	X				
6. Engage IUFRO working groups in transnational competitiveness efforts.	X				
7. Broaden FIA to include participatory processes.	X				
8. Define the set of stakeholders (relates to definition of vision term).					X
E. Syntheses of existing data and knowledge.					
1. Conduct an in-depth synthesis on existing knowledge and science application approaches to deliver research products in a timely manner.	X				
Attainable Future Vision IV – Biofuels and Bioproducts: Significant shift to forest-based biofuels has occurred as US fosters energy self-sufficiency; US policy targeting reduction of fossil fuel use stabilizes green house gas concentrations. New forest product uses are emerging.					
A. New research to address decision makers' needs.					
1. Explore and test options for producing different kinds of energy for different uses at the household, community, and regional levels, e.g. photovoltaics in Morocco.	X				
2. Research conversion process, economics, market potential, environmental and social impacts of using lignin for fuel.	X				
3. Research energy crop alternatives to determine the better one to use in different situations.	X				
4. Research improved methods for biofuel development and utilization, and forecast reliability of biofuel supply at varying scales.				X	
5. Explore the potential for shifting some subsidies from oil products to non oil based energy products to offset costs of initial development and introduction.				X	
6. Research societal perceptions and behaviors toward alternative energy sources and implications of perceptions and behaviors.					X
B. Assessment and analyses of existing information.					
1. Evaluate the potential for biofuels as viable alternatives to petroleum fuels, including the social and ecological conditions that make extraction acceptable, such as poverty alleviation in rural communities. Assess what other environmental problems can be solved at the same time.	X				
2. Conduct policy analysis to compare options for government incentives given economic, social, and ecological trade offs of biofuels development.	X				
3. Assess value-added opportunities related to biofuels, such as the collection handling methods for forest residuals.					X
C. Science-based tools to meet decision makers' needs, such as applications-oriented models.					
1. Model forests and plantations using adequate data to develop a valuation of environmental tradeoffs and methods for assessing complete life cycle costs.	X				

	X					
2. Develop mobile processing plants, using demonstration projects to assess feasibility.	X					
<p>Attainable Future Element V – Public Engagement: Greater public involvement occurs at all levels because natural disasters have promoted involvement and people have increased access to information sources. Conservation education thrives; curricular changes include holistic, ecosystem based approaches emphasizing human health/environment interdependency.</p>						Social Science Response
<p>A. New research to address decision makers' needs.</p>						Economic Science Response
1. Conduct socioeconomic research to understand stakeholder needs, concerns, perspectives, and drivers, including what motivates urbanites to seek out natural settings.	X				X	
2. Research incentives for individuals such as forest managers and organizations to embrace public engagement strategies, including training and professional development.						
3. Research what people think they know about forests, the accuracy of that knowledge, and how it varies among groups; Fred Norbury is looking at the baseline of what people know and how it varies.						X
4. Research the age group for which conservation education efforts garner the greatest return on investment, and how to sustain the adoption of conservation/sustainability curricula in the face of competing education demands.						X
5. Research how to build trust across conflicting parties' dividing lines, learning from international peace negotiations.						X
<p>B. Assessment and analyses of existing information.</p>						
1. Use the understanding gained through assessments to learn to predict the reactions we may get to actions.						X
2. Explore the role of credibility in public interactions and how the natural resource professional community can establish and improve our credibility and standing. Identify champions who can deliver forest messages.						X
<p>C. Science-based tools to meet decision makers' needs, such as applications-oriented models.</p>						
1. Conduct content analysis to develop a better sense of the dialogue ongoing in the public arena on resource use and conservation issues; learn how to listen to different voices and create engagement based on scientific principles and public perspective.	X					
2. Develop and test model college curricula to build capacity in young resource professionals and learning institutions to foster sustainability.						X
3. Create programs that develop urban natural settings to connect urbanites with natural resources, helping people understand how ecosystems work and engaging them to act on this new understanding.						X
<p>D. New processes and approaches for research to be linked with decision making.</p>						
1. Design efficient public involvement processes and technologies that respect the time people have to participate; understand the implication of various approaches on degrees of access and extent of representation.	X					
2. Recognize the need for longer funding cycles to better enable the involvement of academia.						X
3. Emphasize participatory research with questions that incorporate diverse public values - culturally, ethnically, by gender, class, age.						X

4. Use visioning technologies rather than quantitative approaches to get at relative values and preferences, to learn why people think the way they do. Quantitative information can be applied to inform policy.						X
E. Communication, outreach, and educational activities to address decision makers' needs.						
1. Conduct market research and segmentation on how to "sell" forests, developing a clear and compelling message that <i>forests matter</i> , addressing public learning styles and acknowledging the tradeoff between scientists' comfort level and what people are willing and able to hear, e.g., on Chesapeake Bay. "No hors d'oeuvres were harmed in the making of this lawn."						X
Attainable Future Element VI – Collaboration: The public is aware of the wide array of forests values, and forest managers manage for multiple values because multiple perspectives influence decisions. People are trained to work effectively and manage conflicting priorities. Social science-based approaches are used by foresters who are open to broader interactions with other disciplines.						
A. New research to address decision makers' needs.						
1. Research and analyze the ethics of collaboration versus competition and isolation, with new models of collaboration to address institutional barriers.	X					
2. Research collaborative process effectiveness – when it works, the time and financial costs, ethics and regulations, and long-term viability, then develop and distribute models for achieving goals through collaboration, and a road map for collaboration viability, such as how to collaboratively identify and implement strategies and tactics, with special emphasis on community partnerships, scientific collaborations, and public/private joint efforts.	X					
3. Research international cooperation in governance policies, incentives, and subsidies for production systems and services. Research emerging forms of government and how this impacts collaborative success.	X					
4. Research sustainable funding mechanisms to support collaboration, with support for transaction costs.				X		
5. Conduct organizational analysis of agencies, business, and municipalities to identify characteristics supporting or inhibiting collaboration; research new processes and approaches for developing institutional capacity for change; and assess the leadership skills needed for inter-institutional management.						X
B. Assessment and analyses of existing information.						
1. Analyze financial accounting and reporting rules and intellectual property rules to understand how they affect inter-agency accountability, resource sharing, multi-party contracts team, etc.					X	
C. Science-based tools to meet decision makers' needs, such as applications-oriented models.						
1. Develop alternative models for supporting collaboration and collaborative research in a low funding environment.	X					
D. New processes and approaches for research to be linked with decision making.						
1. Agree that the goal is for people to advance sustainability by learning how to manage the planet collaboratively in a time of rapid change, clear demonstrating how it benefits society; collaboration is not an end unto itself.	X					

2. Embed social and biological monitoring into research project implementation; develop incentives and opportunities for non-scientists to collaborate/participate in research and new process to identify community-based approaches to resource management.	X				
3. Consider moving toward joint ownership of research and development products that fosters mutual investment by clients and researchers.		X			
4. Implement collaborative approaches to develop research priorities, fund and implement research, and move it into application, with clarity on issues and products desired. Emphasize regional efforts, to meet needs at regional scale.				X	
5. Conduct workshops on quantitative and qualitative social science methods to facilitate interdisciplinary research.					X
Attainable Future Vision VII – Leadership: Forest management and stewardship leadership has grown at all levels; the forestry profession attracts creative, innovative, and entrepreneurial young people. A sustained commitment to long-term research exists because research leaders have agreed upon roles and priority areas for research and development; a competitive proposal process is rooted in a shared vision for the Nation’s forests.					
A. New research to address decision makers’ needs.					
1. Determine the characteristics of leadership desired at all levels of the forestry professions, step forward, and start taking risks.					X
2. Research how forestry currently builds leadership, what undermines the building of that leadership, and changes to foster leadership from the ground up, including revisions in undergraduate and mid-career education programs to incorporate collaborative, customer-focused, application-oriented research programs.					X
3. Research the culture of ranger districts in communities, looking at why district rangers are not as connected to the community as they used to be, and increase capacity and incentives to link districts to local leaders.					X
4. Understand how cultures come together and the implications of culture clashes as urbanites move to rural and wildland-urban interface environments.					X
5. Research how to connect people in urban environments with the land.					X
6. Research public knowledge and concern about forests and implications for forestry professionals trying to regain public confidence.					X
B. New processes and approaches for research to be linked with decision making.					
1. Identify means of “collaborating” with a public that, as a manager, you will never see and with whom you will never interact, e.g., the one million members of the public” who commented on the Tongass Forest Plan revision.					X
C. Syntheses of existing data and knowledge.					
1. Synthesize current leadership development opportunities and act on them.					X
D. Communication, outreach, and educational activities to address decision makers’ needs.					
1. Communicate to create new credibility for the profession and thus greater support for R&D through one or more of the following:					
a. Develop visions of what forests and forestry do that will captivate society’s imagination and build a bond.					
b. Market green and open space, clean air, and clean water as derived from forests and important to the health and happiness of people. Consider expanding “forestry” to “natural resources” professions, and “forests’ movement to “green,” or “the	X				

<p>environment.”</p> <ul style="list-style-type: none"> c. Quell the debates between different sectors – universities, government, extension, academia, etc. – and put up a united, non-partisan front. d. Bombard the public with clear, precise messages that they will understand, e.g. Smokey the Bear messages, “Imagine a world without toilet paper”; develop a coalition to fund and produce ads. e. Develop smooth, high-gloss sound bites of deep science, e.g., Discovery Channel, and emphasize the value of long-term research. f. Get community members into the woods using archeological-style ‘digs.’ g. Identify “champions of the forests” – celebrities with knowledge of forests and forestry issues and ability to rally the public. 				
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APPENDIX A: Participant List: Science Responses Workshop

NOTE: Participants were drawn from a diverse set of organizations, with USFS personnel at about 30% to ensure broad stakeholder representation and ownership of the results

	Name	Organization	State
<u>USFS</u>	Sue Conard	USDA Forest Service	DC
	Bov Eav	USDA Forest Service	DC
	Rich Guldin	USDA Forest Service	DC
	Ron Nielson	USDA Forest Service	OR
	Fred Norbury	USDA Forest Service	DC
	Jim Reaves	USDA Forest Service	DC
	Tom Schmidt	USDA Forest Service	MN
	David Wear	USDA Forest Service	NC
<u>Academic</u>	Perry Brown	University of Montana	MT
	John Carlson	Penn State University	PA
	Steve Daley Laursen	University of Idaho	ID
	Patrick Reid	University of Arizona	AZ
	Margaret Shannon	SUNY at Buffalo	NY
	Lisa Wainger	University of Maryland	MD
	Kathleen Wolf	University of Washington	WA
<u>Industry</u>	Nick Chappell	Potlatch	AS
	Eric Vance	National Council for Air and Stream Improvement	NC
<u>NGOs</u>	Eric Jones	Institute for Culture and Ecology	OR
	Ajit Krishnaswamy	National Network of Forest Practitioners	RI
	John Wiens	The Nature Conservancy	DC
<u>Other</u>	Bill Hubbard	University of Georgia Extension	GA
	Larry Kotchman	State Forester, North Dakota	ND
<u>Sponsor</u>	Ann Bartuska	Deputy Chief R&D, USDA Forest Service	
<u>Workshop Team</u>	Chris Bernabo	Outlook Project Leader - NCSE	
	Tracy Calizon	Recorder – USDA Forest Service	
	Jessica Call	Recorder – USDA Forest Service	
	Michelle Harvey	Facilitator/Science Writer – MautheHarvey & Co.	
	Aaron Lien	Project Coordinator – NCSE	
	Nancy Walters	Facilitator – USDA Forest Service	
	Robert Van Brunt	Project Staff – NCSE	

Decision Makers Future Needs Workshop

September 27-29, 2006

Participant List

	Name	Organization	State
<u>USFS</u>			
	1 Debbie Chavez	USDA Forest Service	CA
	2 Jim Golden	USDA Forest Service	OR
	3 Ron Neilsen	USDA Forest Service	OR
	4 Jim Sanders	USDA Forest Service	
	5 Jim Sedell	USFS Pacific Southwest Research Station	CA
<u>Academic</u>			
	1 Don De Hayes	University of Vermont, School of Forestry	VT
	2 Verna Fowler	College of the Menominee Nation	WI
	3 Lloyd Irland	Yale School of Forestry	ME
	4 Steve Daley Laursen	University of Idaho, College of Natural Resources	ID
	5 Patricia Layton	Clemson University, Department of Forest Resources	SC
	6 Susan Stafford	University of Minnesota, College of Natural Resources	MN
<u>Industry</u>			
	1 Steve Lovett	American Forest & Paper Association	DC
	2 Alan Lucier	National Council for Air and Stream Improvement	NC
<u>NGOs</u>			
	1 William Ginn	The Nature Conservancy	ME
	2 Ajit Krishnaswamy	National Network of Forest Practitioners	RI
	3 Katie Lynch	Institute for Culture and Ecology	OR
<u>Other/State</u>			
	1 Jim Brown	Jim Brown Consulting Forestry	OR
	2 David DeYoe	Ontario Board of Forestry	Canada
	3 Alec Giffen	Maine Forest Service	ME
	4 Ross Whaley	Adirondack Park Agency	NY
<u>Observers</u>			
	1 Ann Bartuska	USDA Forest Service	DC
	2 Jim Gooder	USFS North Central Research Station	MN
<u>Workshop Team</u>			
	Chris Bernabo	Outlook Project Leader - NCSE	
	Tracy Calizon	Recorder - USDA Forest Service	
	Jessica Call	Recorder - USDA Forest Service	
	Michelle Harvey	Facilitator - MautheHarvey & Co.	
	Aaron Lien	Project Coordinator - NCSE	
	Nancy Walters	Facilitator - USDA Forest Service	