

## **Public Education and Extension (Indicator 53)**<sup>1</sup>

***Extent to which institutional framework supports . . . Including the Capacity to Provide for Public Involvement Activities and Public Education, Awareness, and Extension Programs, and Make Available Forest Related Information***

### **Rationale and Interpretation**

A well-informed and knowledgeable citizenry creates a foundation of support for successful sustainable forest management. Such is dependent on access to legal and institutional conditions (capacity) that are capable of promoting organizations and programs considered necessary to inform the public about forest resource sustainability and to subsequently engage the public in decisions regarding resource sustainability. Doing so implies recognition of the huge diversity in citizen information needs (for example, elementary school children, high school students, forest landowners, timber harvesters), the range of avenues by which such information can be communicated (for example, written and electronic media, classroom and field instruction), and the often astonishing number and types of public and private organizations that are able and willing to communicate information about forests (for example, environmental organizations, trade organizations, environmental education foundations, Federal and State extension services) (Roundtable on Sustainable Forestry 1999).

Concepts and principles that are to be identified and addressed are suggested by the indicator. To guide this review, brief definitions of three important concepts set forth by the indicator are provide for *public education and awareness*—access to information enabling the general public (citizenry) to be aware of and take responsible actions regarding concepts of forest sustainability; provide for *extension programs*—access to collection of educational initiatives (and methods) implemented by various partnering organizations seeking to meet the forest sustainability information needs of various audiences (Reed and others 1996); and *make available forest and related information* — access to professionally guided, technical forestry assistance focused on the onsite information needs of individual landowners, managers, and operators (for example, timber harvesters, private woodland owners) (Sampson and DeCoster 1997).

The indicator suggests review of an incredibly broad spectrum of subject material. In order to facilitate the review undertaken here, certain subjects are

---

<sup>1</sup> Prepared by Paul V. Ellefson, Professor (pellefso@umn.edu), and Calder M. Hibbard, Research Specialist (hibb0006@umn.edu), Department of Forest Resources, University of Minnesota. Draft prepared January 2002. Anonymously reviewed and subsequently revised July 2002.

excluded. For example, the indicator refers to providing opportunity for *public involvement activities*, a subject which is not discussed here since the legal and institutional capacity for public involvement in decisionmaking process is addressed in depth by Indicator 50 (opportunities for public participation . . . ). Furthermore, this review does not discuss capacity to educate professional resource managers, a subject which is discussed as part of the information review of subjects within the purview of Indicator 55 (develop and maintain human resource skills . . . ).

Useful data for measuring this indicator are compilations and descriptions of laws and programs at national and subnational levels that promote public education on matters concerning forest sustainability and conservation. From a forest resource perspective, examples of suitable information are full-time-equivalent employees devoted to extension, public education, and environmental education programs; schools (K through 12) with active programs engaging students in education relevant to sustainable forestry; school districts with defined curricular standards for teaching about forest resource sustainability; forest landowners and timber harvesters that attend outreach education programs focused on sustaining forest resources; plans prepared and implemented as a consequence of technical forestry assistance to landowners; and periodicals and Web sites providing information about forest resource sustainability (Roundtable on Sustainable Forestry 1999).

### **Conceptual Background**

An informed citizenry and knowledgeable owners and managers of forests are central components to the sustainability of forest resources. If citizens, owners, and managers are well informed, they in all likelihood will have expectations that are consistent with the sustainability of forest resources and will take actions individually and collectively that are compatible with principles of sustainability. Since the breadth of knowledge about forest resources is enormous, as is the range of potential audiences seeking information about forests, exactly how (in a program sense) to convey information about resource sustainability and to whom such information should be conveyed are significant challenges for educational programs. These challenges become even more pressing when issues are raised over who is the most appropriate organization for conveying information about the sustainability of forest resources.

The recipients (or targets) of educational activities are many and most often very different in their informational needs and how such should be provided.<sup>2</sup> They

---

<sup>2</sup> Environmental educational initiatives are often viewed as originating from two different settings, namely *formal education* and *informal education*. The former occurring in traditional and highly structured educational settings (for example, elementary and secondary schools, colleges, universities) where the educational focus is typically on K-12 educational activities (curriculum development, supplementary educational materials) and on post-secondary educational activities

range from the general public that may have only a passing interest in forest resources, to the landowners that seeks advice about protecting forests from a specific species of destructive insect. Likewise the message can be broadly cast as very general information about who owns forests and why they desire ownership, or as very specific advice on how a timber harvester might best design roads and skid trails for harvest operations. Information can be communicated to intended audiences in a variety of ways, possibly by publications, videos and films, satellite communication, workshops, formal lectures or the like. And educational activities can take place in different settings, including the K through 12 classroom, the distance learning via satellite, and hands-on experience in a demonstration forest. In a broader context, information can be viewed as one of many motivators for action involving forest sustainability. A forest landowner may have information but might lack financial resources (needed is cost-share or tax relief) or may have both information and financing but might not have the ethics necessary to apply practices consistent with principles of forest sustainability (needed is a regulatory initiative).

Educational initiatives involving forest resource sustainability are undertaken by an incredibly diverse set of public and private organizations. Nearly every Federal agency has some responsibility to inform the public or segments thereof about conditions that affect forests. The U.S. Environmental Protection Agency and its efforts to implement the National Environmental Education Act of 1990 is an example, as is the long-standing involvement of the U.S. Department of Agriculture in extension programs guided by highly significant statutes such as the Morrill Act of 1862, the Smith-Lever Act of 1914, and the Renewable Resources Extension Act of 1978. State governments have statutory requirements and programs that often mirror Federal laws and programs in both the breadth of subject material addressed and the number of agencies engaged in conveying such material. A most notable educational and extension partnership involves State governments, local governments, and land grant universities. Private organizations are also brimming with educational programs many of which address forest sustainability. The National Wildlife Federation and the Audubon Society are but two examples of private organizations with strong environmental education initiatives.

Critical to educational efforts aimed at informing citizens, landowners, and managers about principles of forest sustainability is the nature of the message to be conveyed. Since information (by design or ignorance) can be used to further a set of preferred values regarding forest sustainability, many organizations are extremely sensitive to the need to provide "factual" or "Value-neutral" information to audiences.

---

(technical career preparation, pre-service teacher education, professional continuing education). The latter occurring beyond formal education systems (possibly on an ad hoc basis) and oftentimes sponsored by businesses, government agencies, nonprofit organizations, and the media (newspapers, magazines, television, computer networks) (U.S. Environmental Protection Agency 1996).

Their credibility, and in some cases their very existence as an organization, is dependent on avoiding bias (prejudice, one-sidedness) in the information they provide. Not all organizations are driven by such standards. In a pluralistic and democratic society, some private interest groups assume advocacy roles in which they attempt to sway the preferences of others with value-laden information that furthers the interests of their members. By design or accident, the information provided may not be scientifically based, may be incomplete in substance, or may be misleading in the way it's presented. For sure, these organizations are generally free to make their case; information and arguments presented by opposing organizations will usually set the record straight. Again, most organizations seek to present value-neutral information that can be used by the public, landowners, and managers when making individual or collective decisions about forest sustainability.

### **Current Institutional Capacity**

The Nation's institutional capacity to offer educational experiences focused on forest and related resources is represented by the involvement of many different public and private organizations. Unfortunately, a systematic and comprehensive review of the totality of this capacity has never been undertaken. If such were to be accomplished, it would require attention to State, local, and tribal governments; nongovernmental organizations; universities, colleges and schools; Federal government; business, industry, and foundations; and various types of media. The following is but a cursory examination of the capacity represented by some of these organizations.

### **Private Sector Capacity**

Private sector capacity to undertake public education, and extension and technical assistance efforts is extensive. In the broadest sense, more than 80 private organizations (national) claim responsibility for educational initiatives that focus on an often unbelievably wide range of audiences with forest resource messages that are equally broad in substance and method of delivery (Table 1). Likewise, the private sector has the capacity to distribute information about forests via more than 180 different periodicals that in some manner address public and professional interests in the sustainability of forests (Table 2). Internet Web sites offer similar potential.

The extent and intensity of private involvement in educational and technical assistance programs can only at this time be suggested by examples. Although the programs are many in number, most involve partnering between and among various public and private groups that have an interest public education on matters involving forest sustainability. Examples of programs currently being implemented are: *Tree Farm System* (American Forest Foundation; 70,000 properties and 20 million forest acres); *forest owners' associations* (National Woodland Owners Association; 42,000 landowners and 3.4 million forest acres); *industry landowner assistance programs* (approximately 7 million forest acres)(Siegel 1973); *landowner cooperatives*

(approximately 20 cooperatives in Midwest and Northeast); *cross-boundary initiatives* (such as Applegate Partnership [Oregon], Gulf Coastal Ecosystem Partnership [Mississippi], Monadnock Landscape Partnership [New Hampshire and Massachusetts]); *land trusts and conservation easements partnerships* (such as Land Trust Alliance, Trust for Public Land, The Nature Conservancy, Conservation Fund); *stewardship forestry organizations* (such as Institute for Sustainable Forestry [California], Mountain Association for Community Economic Development [Kentucky]); *K-12 student education* (such as Project Learning Tree [since 1980, involved more than 600,000 K-12 educators and more than 40 million students] and Project WILD and Project WET); *National Environmental Education Enhancement Project* (nearly 20 States encouraged and guided by private interest groups partnering with government resource and environmental agencies); *associations and interest groups* (such as North American Association for Environmental Education, National Wildlife Federation [“Backyard Wildlife Habitat” Program], National Audubon Society, Society of American Foresters [“Walk-in-the-Forest” Program], Sierra Club [“Adopt-a-Watershed” Program]), and *foundations* (Pew Charitable Trust, Rockefeller Brothers Fund, American Forest Foundation) (American Forest Foundation 1993, Best and Wayburn 2001, U.S. Environmental Protection Agency 1966, USDA Forest Service 1997).

Private educational initiatives are also significant elements of various privately sponsored forest certification programs. The intent of the educational element of the latter is to inform private forest landowners about principles of sustainable forest management and to encourage the application of forest management that are consistent with these principles. Various originations sponsor certification programs that are generally similar in the broad standards set forth for forest sustainability yet vary in terms of the specific practices required to meet such standards. Examples of private organizations sponsoring certification programs are the Forest Stewardship Council (Principles and Criteria for Forest Stewardship), American Forest and Paper Association (Sustainable Forestry Initiative), American Forest Foundation (Tree Farm Program), and National Woodland Owners Association (Green Tag Program) (Mater 1999).

Table 1. Private Organizations Engaged in Public Education Activities Involving Forest Resources, 2002

American Fisheries Society	Sierra Club
American Forest and Paper Association	National Association of Environmental Professionals
American Forest Foundation	North American Association for Environmental Education
American Forests	National Association of Conservation Districts
American Rivers	National Association of Professional Forestry Schools and Colleges
American Society of Environmental History	National Association of Resource Conservation & Development Councils
American Society of Landscape Architects	National Environmental Education Training Foundation
American Water Resources Association	National Fish and Wildlife Foundation
Arbor Day Foundation	National Forest Foundation
Association of Consulting Foresters	National Institutes for Water Resources
Association of Ecosystem Research Centers	National Parks and Conservation Association
Association of Environmental and Resource Economics	National Tree Trust
Association of State Wetland Managers	National Wildlife Federation
Blue Mountains Natural Resources Institute	Nature Conservancy
California Association of Resource Conservation Districts	Natural Areas Association
Center for Conservation Biology Network	Natural Resources Defense Council
Chesapeake Bay Foundation	Natural Resources Law Center
Colorado Riparian Association	Natural Resource Leadership Institute
Defenders of Wildlife	New Forests Project
Earth Island Institute	Society of American Foresters
Earth Pledge Foundation	Society for Ecological Restoration
Earthwatch	Society of Environmental Journalists and Environmental Journalism
Ecological Society of America	Society for Range Management
Environmental Defense Fund	Society of Wetland Scientists
Environmental Design Research Association	Soil and Water Conservation Society
Environmental Law Institute	Soil Science Society of America
Forest History Society	Southern Forest-Based Economic Development Council
Forest Landowners Association	Student Conservation Association
Forest Products Society	Tall Timbers Research Station
Forest Resources Systems Institute	Taxpayer Assets Project
Forest Stewardship Council	Temperate Forest Foundation
Friends of the Earth	Trees for the Future
Greenpeace	Trout Unlimited
Hardwood Forestry Fund	Trust for Public Land
Island Resources Foundation	Union of Concerned Scientists
International Association for Landscape Ecology	Water Environmental Federation
Izaak Walton League of America	Watershed Management Council
League of Conservation Voters	Western Forestry and Conservation Association
Liberty Tree Alliance	Wilderness Society
National Audubon Society	Wildlife Management Institute
National Association of Conservation Districts	Wildlife Society
Pesticide Action Network	Woods Hole Research Center
Rainforest Action Network	World Stewardship Institute
Renewable Natural Resources Foundation	
Resource Renewal Institute	
Resources for the Future	
Saving America's Forests	

Source: Various directories, including Butler and Slack 1994, Gayle Group 2002, Malonis 2000, National Wildlife Federation 2001, and Trzyna and others 1996.

Table 2. Selected Periodicals Conveying Information about Use, Management, and Protection of Forest Resources, 2002

<p>Agriculture and Human Values  Agriculture, Ecosystems, and Environment  Agroforestry Systems  American Christmas Tree Journal  American Journal Agricultural Economics  American Review of Public Administration  Appita Journal  Applied Engineering in Agriculture  Applied Geography  Appraisal Journal  Arboricultural Journal  BioCycle  Biodiversity and Conservation  Biomass and Bioenergy  Boston College Environmental Law Review  Brookings Review  Cellulose Chemistry and Technology  Chemosphere  Christmas Trees  Climate Research  Climatic Change  Common Property Resource Digest  Consultant  Contemporary Economic Policy  Crossies  Culture and Agriculture  Ecological Applications  Ecological Modeling  Ecologist  Ecology Law Quarterly  Economic and Political Weekly  Economic Botany  Economic Development &amp; Cultural Change  Economic Geography  Ecosystem Health  Energy  Energy Economics  Engineered Wood Journal  Environment and Behavior  Environment and History  Environment and Planning  Environmental and Resource Economics  Environmental Ethics  Environmental History  Environmental Management  Environmental Science and Policy  Environmental Values  Environmentalist  Evaluation Report  Experimental Agriculture  Farm Management  Forest and Landscape Research  Forest Ecology and Management  Forest Landowner  Forest Log  Forest Magazine  Forest Perspectives  Forest Policy and Economics  Forest Products Journal</p>	<p>Forest Science  Forest, Snow, and Landscape Research  Forestry  Forests, Trees and Livelihoods  Forests, Trees and People Newsletter  Geoforum  Geographical Journal  George Wright Forum  Global Ecology and Biogeography Global  Environmental Change  Grassroots Development  Growth and Change  Human Ecology  Human Organization  Issues in Science and Technology  Journal of ...  Agricultural &amp; Applied Economics  Agricultural &amp; Resource Economics  Agricultural Economics  Anthropological Research  Applied Social Psychology  Arboriculture  Architectural Planning &amp; Research  Arid Environments  Economic Behavior &amp; Organization  Economic Perspectives  Environment and Development  Environmental Economics &amp; Management  Environmental Education  Environmental Management  Environmental Planning &amp; Management  Environmental Psychology  Environmental Systems  Forest Economics  Forest Science  Forestry  Industrial Ecology  Interdisciplinary Economics  Leisure Research  Natural Resources &amp; Life Sciences  Education  Nontimber Forest Products  Park and Recreation Administration  Public Economics  Range Management  Regional Science  Risk and Uncertainty  Rural Development  Rural Studies  Sustainable Forestry  Institute of Wood Science  Travel Research  Tree Sciences  Tropical Forest Products  Tropical Forest Science  Tropical Forestry  World Forest Resource Management  Land and Water Law Review  Land Degradation and Development  Land Economics  Land Use Policy  Landscape and Urban Planning</p>	<p>Landscape Research  Legacy  Leisure  Leisure Sciences  Management Science  Minnesota Forests  Monthly Labor Review  Mountain Research &amp; Development  National Parks  National Woodlands  Natural Areas Journal  Natural Resource Modeling  Natural Resources Forum  Natural Resources Journal  New Forests  News of Forest History  Policy Sciences  Policy Studies Journal  Political Research Quarterly  Polity  Progress in Paper Recycling  Public Administration Review  Public Administration &amp; Development  Pulp and Paper  Pulp and Paper International  Quarterly Journal of Forestry  Range Management &amp; Agroforestry  Rangeland Journal  Rangelands  Regional Science &amp; Urban Economics  Regional Studies  Renewable Energy  Renewable Resources Journal  Resource and Energy Economics  Review of Agricultural Economics  Review of Economics and Statistics  Rural Sociology  Science of the Total Environment  Society and Natural Resources  Socio Economic Planning Sciences  Southern Journal of Applied Forestry  Southern Lumberman  Structural Change &amp; Economic Dynamics  Temperate Agroforester  Tigerpaper  Timber Producer  Tourism Analysis  Tree Farmer  TRI News  Tropical Forest Update  Walnut Council Bulletin  Water Resources Research  Western Journal of Applied Forestry  Women in Natural Resources  Wood and Fiber Science  Wood and Wood Products  Wood Energy News  Wood Technology  Woodland Steward  World Resource Review  World Watch  Yellowstone Science</p>
--	---	--

Source: University of Minnesota 2002.

## **Federal Government Capacity**

Federal agencies have substantial legal authority and institutional capacity to undertake educational programs focused on forest sustainability. At least 19 Federal laws authorize such programs, of which at least 7 appear to be focused primarily on forests (for example, Renewable Resources Extension Act of 1978), while 5 are basically enabling statutes that authorize educational programs in general (for example, first and second Morrill Acts of 1862 and 1890) (Table 3). The other statutes identified here focus primarily on agriculture and conservation education (three) and environmental education generally (for example, National Environmental Education Act of 1990), yet they represent significant potential for encouraging better understanding of the sustainability of forest resources. In retrospect, legal authority for Federal agencies to establish and implement education programs focused on forest resource matters does not appear to be wanting.

The actual number and type of Federal programs that represent institutional capacity regarding forest sustainability are extensive (Table 4). At a minimum, there are nearly 120 programs implemented by at least 5 cabinet-level departments or agencies (more than 50 in the Department of Agriculture, 3 in the Department of Commerce, 1 in Department of Energy, more than 10 in the Department of the Interior, and nearly 40 in the U.S. Environmental Protection Agency). All these programs vary in mission, scope, and education delivery vehicle. Even though their selection here is very qualitative, all have some educational element relevant to forest resource sustainability. Some are purely educational and informational (for example, National Agricultural Library or the National Technical Information Service), while others are oriented toward research, development, and promotion (for example, Natural Resources and Sustainable Agricultural Systems program). Some programs are actually combinations of many programs (for example, Forest Taxation Program) and may have multiple objectives ranging from regulation and enforcement to direct onsite resource management. The budgets associated with these programs also have an extensive range (from a few hundred thousand dollars to hundreds of millions of dollars), and they accomplish their mission via various education delivery mechanisms, including the dissemination of technical information, the provision of specialized services, regulatory and directive methods, advisory services and counseling, training and education, and capacity building grants among others. Without question, the Federal educational program landscape of relevance to forest sustainability is very far-reaching and highly inclusive of information needs concerning forest sustainability (Ellefson and others 2001 and 2002).



Protection Agency has made various attempts to do so (U.S. Environmental Protection Agency 1996). As such, describing instructional capacity for educating the public will again require attention to examples (Best and Wayburn 2001, U.S. Environmental Protection Agency 2002, Forest Service 1994 and 1997).

*Natural Resources Conservation Education Program (NRCEP)*. The NRCEP is a joint effort between the Forest Service and National Association of State Foresters. The program seeks to increase awareness, knowledge, and appreciation of natural resources and ecosystems, help develop the critical thinking skills needed to recognize the complexity of resource issues and make realistic choices, and encourage individual responsibility for conserving natural resources and using them wisely. NRCEP funds are used mainly to work with partners to jointly fund conservation education projects throughout the United States. A national program implemented locally, NRCEP funds environmental education projects, strengthens partnerships between funded organizations, and collaborates on local projects. Other sponsors and partners include the U.S. Environmental Protection Agency, National Environmental Education Training Foundation, National Forest Foundation, American Forest Foundation, several agencies within the Department of Interior, the Natural Resource Conservation Service, and a host of local and State organizations.

*Project Learning Tree (PLT)*. A national not-for-profit environmental education program funded by State boards of education, private companies, professional associations, individual donations, and State and Federal agencies. Seeks to improve (by educational means) public understanding of natural resource issues to promote public participation in decisionmaking processes involving natural resources. PLT educationally engages more than 50,000 teachers each year based in partnership with the U.S. Environmental Protection Agency and the National Environmental Education Advancement Project. Complementary to PLT is Project WET (focus on water and related resources) and Project WILD (focus on wildlife conservation; since inception in 1980, has engaged more than 600,000 educators and more than 40 million students). Although all three projects relate to natural resource issues, PLT more directly focuses upon forests.

Table 4. Federal Agency Programs Containing Educational Elements Relevant to Forest Resources by Agency, 2001

<u>DEPARTMENT OF AGRICULTURE</u>		<u>ENVIRONMENTAL PROTECTION AGENCY</u>
<p><b>Agricultural Research Service</b>            -National Agricultural Library            -Natural Resources &amp; Sustainable Agricultural Systems            -Office of Pest Management Policy            -Pasture Systems and Watershed            -Water Management Research Laboratory  <b>Animal and Plant Health Inspection Service</b>            -Aquaculture            -Wildlife Services  <b>Cooperative State Research, Education, and Extension Service</b>            -Cooperative Extension Service            -Extension Indian Reservation Program            -Forest Products Research, Education, and Extension            -Hispanic-Serving Education Grants Program            -Invasive Species Program-Multicultural Scholars Program            -Renewable Resources Extension Program-Secondary Agricultural Education Challenge Grants            -Small Farm Program            -Sustainable Agriculture Research &amp; Education Program            -Tribal Colleges Endowment Fund            -Tribal Colleges Education Equity Grants Program            -Water Quality Program            -Wildlife and Fisheries Program  <b>Economic Research Service</b>            -Agricultural and Rural Economic Research  <b>Farm Service Agency</b>            -Aerial Photography Field Office            -Conservation Reserve Program            -Conservation Reserve Enhancement Program  <b>Foreign Agricultural Service</b>            -Emerging Markets Program            -Export Assistance Program            -Market Access Program  <b>Forest Service</b>            -Agroforestry Program            -Cooperative Forest Health Protection Program            -Forest Products Conservation and Recycling Program            -Forest Stewardship Program            -Forest Taxation Program            -National Forest: Dependent Rural Communities            -Northwest Economic Adjustment Initiative            -Research and Development Programs            -Rural Development, Forestry and Communities            -State Fire Assistance            -Stewardship Incentives Program            -Volunteer Fire Assistance Program            -Wildlife Management &amp; Education Programs</p>	<p><b>National Agricultural Statistics Service</b>            -Agricultural Statistics Reports  <b>Natural Resource Conservation Service</b>            -Conservation of Private Grazing Land Initiative            -Conservation Technical Assistance            -Environmental Quality Incentives Program            -Forestry Incentives Program            -Great Plains Conservation            -Resource Conservation and Development            -Snow Survey and Water Supply Forecasting            -Soil Survey            -Soil and Water Conservation            -Water Bank Program            -Watershed Protection and Flood Prevention            -Watershed Surveys and Planning            -Wildlife Habitat Incentives Program</p> <p><u>DEPARTMENT OF COMMERCE</u></p> <p><b>International Trade Administration</b>            -Forest Products and Building Materials Division  <b>National Oceanic and Atmospheric Administration</b>            -National Weather Service  <b>Technology Administration</b>            -National Technical Information Service</p> <p><u>DEPARTMENT OF ENERGY</u></p> <p><b>Office of Energy Research</b>            -Office of Scientific &amp; Technical Information</p> <p><u>DEPARTMENT OF THE INTERIOR</u></p> <p><b>Bureau of Indian Affairs</b>            -Endangered Species on Indian Lands            -Environmental Management: Indian Programs            -Forestry on Indian Lands            -Water Resources on Indian Lands            -Fish and Wildlife Service  <b>Fish and Wildlife Service</b>            -Conservation law Enforcement Training Assistance            -Wildlife Restoration            -Migratory Bird Banding &amp; Data Analysis  <b>Geologic Survey</b>            - National Cooperative Geologic Mapping Program            -Upper Mississippi River System Monitoring  <b>National Park Service</b>            -National Landmarks Program            -Rivers, Trails, and Conservation Assistance</p>	<p><b>Office of the Administrator</b>            -Common Sense Initiative            -Environmental Education Grants            -Environmental Education and Training Program            -Project XL            -Small Business Ombudsmen            -Small Business Regulatory Enforcement Programs  <b>Office of Air and Radiation</b>            -Agstar Program            -Air Information Center            -Air Toxics Program            -Climate Change Research            -Climate Protection Programs            -Mobile Sources Program            -Particulate Matter Programs  <b>Office of Children's Health Protection</b>            -Children's Health Protection  <b>Office of Environmental Education</b>            -National Environmental Education Act  <b>Office of Environmental Information</b>            -EMPACT (Community Tracking Program)            -EMAP ( Monitoring and Assessment Program)  <b>Office of Prevention, Pesticides, and Toxic Substances</b>            -Community Right to Know            -Design for the Environment            -Pesticide Applicator Certification and Training            -Pesticide Registration            -Pesticide Reregistration            -Pesticide Residue Tolerance Reassessments  <b>Office of Research and Development</b>            -Environmental Technology Verification            -Exploratory Grants Program            -Human Health Research            -Science to Achieve Results Fellowship Program  <b>Office of Solid Waste and Emergency Response</b>            -Hazardous Substance Research            -Resource Conservation &amp; Recovery Act Programs            -Risk Management Program  <b>Office of Water</b>            -Clean Water Action Plan Related Research            -Coastal Environmental Monitoring            -Great Lakes Program            -Gulf of Mexico Program            -Lake Champlain Basin Program            -Long Island Sound Study -NPDES (Pollutant Discharge Permitting Program)            -Rural Water Technical Assistance            -Safe Drinking Water Research</p>

*North American Association for Environmental Education (NAAEE)*. A consortium program funded by the U.S. Environmental Protection Agency (approximately \$2 million annually) and coordinated with a wide range of public and private organizations. The association focuses on information dissemination, education reform and innovation through training, and the expansion of partnerships. The consortium is an active sponsor of projects such as the National Conservation Training Center, North American Association for Environmental Educators, National Project Water Education for Teachers (WET) Project, and the North American Association for Environmental Education.

*Environmental Education Outreach Program (EEOP)*. Administered by the Forest Service, EEOP is a summer environmental education program taught by student interns. The program's major objectives are to meet with youth from diverse ethnic and socioeconomic backgrounds, to identify their concerns and knowledge about natural resources and the environment, expose young people from inner-city areas to information about the environment, natural resources, and careers in natural resources, and identify appropriate approaches for outreach to and education of youth of diverse ethnic, socioeconomic, and geographic backgrounds.

*Environmental Education Grants Program (EEGP)*. Administered by the U.S. Environmental Protection Agency's Office of Environmental Education, the program provides grants for purposes of enhance the public's awareness, knowledge, and skills to make informed decisions that affect environmental quality. Since 1992, the office has received between \$2 and \$3 million in grant funding per year and has awarded about 1,700 grants (mostly to K-12 school programs), many of which focus on forest and related resources (for example, California – Friends of Urban Forests; Forest Wildlife Information Center – Pennsylvania; Project Learning Tree – New Hampshire; Meet the Wilderness — Colorado; Natural Resources Education Council – North Carolina). In addition to EEGP, the office also administers the National Environmental Education and Training Foundation (NEETF), which encourages public-private partnerships to support environmental education initiatives (annually awards challenge grants [\$5,000 to \$40,000 each grant]) (U.S. Environmental Protection Agency 2002).

The focus of many public environmental education organizations is the development and distribution of classroom-ready teaching aids. Many of the latter are monitored for balance and scientific accuracy by the National Project for Excellence in Environmental Education. Examples of organizations or projects providing these educational resources are the National WET Project (<http://www.montana.edu/wwwwet>), Project Wild (<http://www.projectwild.org>), Groundwater Foundation (<http://www.groundwater.org>), and Project Learning Tree (PLT) (<http://www.plt.org>). Some Federal agencies also provide classroom teaching aids (for example, wetlands curriculum and guides provided by the Office of Water, U.S. Environmental Protection Agency).

### **Extension Initiatives**

The Smith-Lever Act of 1914 created the Extension Service and facilitated land-grant colleges to “extend” information to all citizens of a State through the cooperative efforts of local, State, and Federal governments (Sampson and DeCoster 1997). The partnership was formally designed the Agricultural Extension Service (later changed to Cooperative Extension Service so as to better reflect the collective setting of institutions engaged in extension). The cooperating units of government work to combine their resources in support university-based extension programs, one programmatic area that embraces *natural resources and environmental management* – including forest resources. Historically, the design and implementation of extension programs have been heavily influenced by a culture of focusing on the long-term information needs of clients (knowledge needed to solve problems); providing unbiased, credible information; avoiding making decisions for clients (generating alternatives and explaining consequences); engaging in policy education (avoiding formulation and implementation); pursuing flexibility to meet individual client needs (avoid ridged curricula); and delivering information through well-qualified experts. This cultural setting is a basis for expressing extension’s typical roles, namely problem-solving education, research implementation, technology transfer, building human capacity, and seeking feedback on research needs (Reed and others 1997).

National legal authority for implementing extension forestry programs is rooted in the Morrill Act (1862 and 1890), Hatch Act (1887), Smith-Lever Act (1914), and the Renewable Resources Extension Act (1978). The forestry extension programs authorized by these laws are administered (coordinated) nationally by the USDA Cooperative State Research, Education and Extension Service (CSREES). Recognizing the disparate program objectives of extension and the many agencies seeking to accomplish these objectives, the latter promote extensive partnering opportunities among a wide variety of public and private organizations (for example, Forest Service, USDA Natural Resources Conservation Service, USDI Fish and Wildlife Service, U.S. Environmental Protection Agency, State foresters, rural conservation districts, forest landowner associations, and various environmental interest groups) (Biles 1996, Hamilton and Biles 1998, Reed and others 1997, and USDA Cooperative State Research, Education and Extension Service 2000).

A principle funding mechanism for supporting forestry, range, recreation, wildlife and wood products extension is the Renewable Resources Extension Act (RREA) of 1978. In 1999, RREA was funded at a level of about \$3 million (States leveraged an additional 900 percent with funding and in-kind services) and provided support for more than 711 extension staff years, distributed among major program components as follows: forest land – 42 percent, rangeland – 12, fish and wildlife – 23, outdoor recreation – 4, and environmental and public policy – 19 (Table 5). Focusing only on the forest land program component, the extension efforts were focused on forest production activities (36 percent of extension staff years), environmental quality concerns (16 percent), utilization of forest products (22 percent), environmental education (16 percent), and continuing education of resource professionals (10 percent) (Table 5). Similar information is available for major regions of the United States. As for information about the areas of expertise offered by extension foresters, the following topics and distribution levels were reported for 1996 (approximate date) by 545 extension foresters (allowed to list up to three areas of expertise) (Reed and others 1997):

- *Forest management* -- 33 percent area of expertise.
- *Wood products, natural resource stewardship, urban and community forestry* -- 10 percent are of expertise.
- *Timber harvesting, economics and policy, wildlife and fisheries, watersheds, agroforestry, environmental and youth education, forest health and protections, Christmas trees, windbreaks, range management* – Less than 5 percent.
- *Wood energy, maple syrup production, forest fire prevention* – Less than 1 percent.

Table 5. Renewable Resources Extension Staffing, by Region, Program Component, and National Program Objective, 1999

Region and Program Component	National Program Objective (extension staff years)					Total
	Production	Environmental Quality	Utilization	Environmental Education	Continuing Education	
<b>NORTH</b>						
Forest Land	32.3	19.9	23.9	18.5	10.4	105.0
Rangeland	3.0	4.2	4.0	2.4	1.7	15.3
Fish & Wildlife	9.1	14.6	1.5	22.8	11.3	59.3
Outdoor Recreation	1.4	2.8	4.0	3.9	3.1	15.2
Environmental & Public Policy	10.8	19.3	3.6	22.8	9.6	66.1
Total	56.6	60.8	37.0	70.4	36.1	260.9
<b>SOUTH</b>						
Forest Land	49.4	16.3	23.0	16.9	12.6	118.2
Rangeland	7.5	2.1	0.3	0.4	0.2	10.5
Fish & Wildlife	18.5	8.4	7.3	13.3	3.5	51.0
Outdoor Recreation	1.5	2.8	2.7	5.6	1.7	14.3
Environmental & Public Policy	3.8	12.0	3.2	9.8	4.6	33.4
Total	80.7	41.6	36.5	46.0	22.6	227.4
<b>WEST</b>						
Forest Land	26.6	10.3	20.1	10.9	6.4	74.3
Rangeland	22.8	6.4	6.8	17.5	3.6	57.1
Fish & Wildlife	19.3	13.5	2.2	13.6	1.9	50.5
Outdoor Recreation	0.6	0.0	3.4	0.1	0.3	4.4
Environmental & Public Policy	4.8	10.6	5.8	13.6	2.1	36.9
Total	74.1	40.8	38.3	55.7	14.3	223.2
<b>NATIONAL TOTALS</b>						
Forest Land	108.3	46.5	67.0	46.3	29.4	297.5
Rangeland	33.3	12.7	11.1	20.3	5.5	82.9
Fish & Wildlife	46.9	36.5	11.0	49.7	16.7	160.8
Outdoor Recreation	3.5	5.6	10.1	9.6	5.1	33.9
Environmental & Public Policy	19.4	41.9	12.6	46.2	16.3	136.4
Total	211.4	143.2	118.8	172.1	73.0	711.4

Source: USDA Cooperative State Research, Education and Extension Service 2000.

## Technical Assistance

Federal agencies have legal and institutional capacity to provide technical assistance on matters involving forest resources, although the implementing focus of most technical assistance is with State forestry agencies. As commonly defined, technical assistance refers to onsite assistance (such as forest land management advice) provided by technical professionals (such as forest resource professionals). The agencies that provide such assistance are often the same agencies that provide public education and extension services. Examples of Federal technical assistance programs are as follows (Best and Wayburn 2001, National Research Council 1998, Sampson and DeCoster 1997, U.S. Environmental Protection Agency 1997, USDA Natural Resource Conservation Service 2002):

- *Forest Stewardship Program* – provide planning and management technical assistance. Administered by the Forest Service and State forestry agencies.
- *Resource Conservation and Development Program* – provide for technical assistance. Administered by the USDA Natural Resource Conservation Service and the USDA Farm Service Agency.
- *Conservation Planning* – provide technical assistance. Administered by the USDA Natural Resource Conservation Service and local conservation districts.
- *Conservation Technical Assistance Program* – provide technical and planning assistance on resource conservation practices. Administered by the USDA Natural Resource Conservation Service.
- *Cooperative Forestry Assistance Program* – provides technical assistance to State forestry agencies. Administered by the Forest Service.
- *Pollution Prevention Technical Assistance Program* – provides technical assistance to help businesses and State agencies enhance pollution prevention programs. Administered by the Office of Pollution Prevention and Toxic, U. E. Environmental Protection Agency.
- *Environmental Pollution Technical Assistance Programs* – provide technical assistance on wide range of environmental topics. Administered by the U.S. Environmental Protection Agency (for example, Office of Science Policy, National Center for Environmental Assessment, National Risk Management Research Center).

## **State and Local Government Capacity**

Information about State legal and institutional capacity to engage in public education, extension activities and technical assistance has not been comprehensively assessed, although modest efforts to do so have been undertaken (for example, Ellefson and others 1995). In many cases, Federal and State education and technical assistance programs are tightly partnered, a condition that makes separate identification of State and Federal emphasis and investments in these programs quite difficult. A classic example is the long-standing partnership between Federal, State, and local governments engaged in the implementation of extension programs.

State educational and technical assistance programs offered to private forest landowners for purposes of encouraging forest sustainability in 1992 existed in virtually all States and focused on nearly all types of major forestry activity that would benefit from such programs (Table 6). For the most part these programs were implemented by agencies with a long tradition in forestry (for example, State forestry agencies, land grant universities), although State wildlife management agencies in all 50 States reported (in 1985) offering education and technical assistance opportunities to private forest land owners interested in State government management of wildlife and fish habitat associated with forests (Wigley and Melchioors 1987). Viewed from a broader context of State government, 12 cabinet-level units of State government and 58 subcabinet level units (first tier) implemented programs that in 2000 provided information about forest resource management to private landowners. Six governing or advisory bodies of State government were also so engaged. In three States, extension is combined with a State forestry agency that also offers onsite technical assistance to landowners (Ellefson and others 2001, 2002).

Cooperative extension service programs are an integral part of the educational matrix that exists in all States (Biles 2001). In 2001, staff persons assigned forest and related extension service responsibilities averaged 7.8 per State, although such ranged from 1 person each in 9 States (for example, Montana, Kansas, New Jersey) to as many as 35 persons each in some States (Oregon) (Table 7). States with a relatively large representation of persons officially engaged in extension activities are Oregon (35), Minnesota (21), Washington (20), Pennsylvania (19), New Hampshire (17), and Kentucky (15) (a word of caution – these numbers are not full-time staff equivalents; rather they are simply the number of people reported to have an official role, however large or small, in a State's extension service program). As for staff years (or full-time equivalents) devoted to extension activities focused specifically on forest land (and supported by the Renewable Resources Extension Act), the average per State is six full-time equivalents (Table 8). Again, the intensity varies considerably among States. Notable on the high-end of effort is California (39.8 staff years), Mississippi (22.0), Georgia (20.5), North Carolina (19.6), and Missouri (15.3), while at the other extreme is Connecticut (0.0 staff years), Delaware (0.1), New Mexico (0.2),

Table 6. State Government Education and Technical Assistance Programs Promoting Best Forest Practice Standards on Private Forests by Forestry Activity, Region, and Type of Program, 1992

Major Forestry Activity and Type of Program	Number of States in Region Having Program Type									
	North-East	Lake States	Mid-Atlantic	Mid-Continent	South-East	South Central	Great Plains	Rocky Mountain	West	Total
<b>Protect Water Quality</b> Educational Programs Technical Assistance	6	3	6	5	5	5	5	5	6	46
	6	3	7	5	5	5	5	6	5	47
<b>Promote Reforestation</b> Educational Programs Technical Assistance	6	3	6	5	6	5	4	5	6	46
	6	3	6	5	6	5	5	6	4	46
<b>Improve Timber Harvesting Methods</b> Educational Programs Technical Assistance	6	3	6	5	5	4	5	5	6	45
	6	3	7	5	6	5	5	6	4	47
<b>Protect from Wildfire, Insects and Diseases</b> Educational Programs Technical Assistance	6	3	6	5	5	5	5	6	6	47
	6	3	7	4	6	5	4	6	6	48
<b>Protect Wildlife &amp; Endangered Species</b> Educational Programs Technical Assistance	6	3	7	5	6	5	4	5	5	46
	5	3	6	5	6	5	5	5	4	45
<b>Enhance Recreation &amp; Aesthetic Qualities</b> Educational Programs Technical Assistance	6	3	6	4	5	5	4	5	3	42
	6	3	7	5	5	5	5	6	3	45

Note: Regional groupings of States are Northeast -- CT, ME, MA, NH, RI, VT; Lake States -- MI, MN, WI; Mid-Atlantic -- DE, MD, NJ, NY, PA, VA, WV; Mid-Continent -- IL, IN, KT, MO, OH; Southeast -- AL, FL, GA, MS, NC, SC; South Central -- AR, LA, OK, TN, TX; Great Plains -- IA, KS, NB, ND, SD; Rocky Mountain -- AZ, CO, MT, NM, UT, WY; West -- AK, CA, HI, ID, NV, OR, WA.

Source: Ellefson and others 1995.

Table 7. Forest Resource and Related Extension Service Staff, by State and Number of Staff, 2001

State	Extension Staff Represented	State	Extension Staff Represented
Alabama	7	Montana	3
Alaska	1	Nebraska	7
Arizona	1	Nevada	6
Arkansas	12	New Hampshire	17
California	11	New Jersey	1
Colorado	2	New Mexico	7
Connecticut	2	New York	10
Delaware	3	North Carolina	13
Florida	8	North Dakota	1
Georgia	9	Ohio	10
Hawaii	9	Oklahoma	5
Idaho	4	Oregon	35
Illinois	1	Pennsylvania	19
Indiana	9	Rhode Island	3
Iowa	3	South Carolina	13
Kansas	1	South Dakota	1
Kentucky	15	Tennessee	9
Louisiana	9	Texas	5
Maine	1	Utah	4
Maryland	4	Vermont	4
Massachusetts	2	Virginia	15
Michigan	11	Washington	20
Minnesota	21	West Virginia	3
Mississippi	12	Wisconsin	11
Missouri	2	Wyoming	7

Source: Biles 2001. Note: Total staff representing extension is 389. "Extension staff represented" is not comparable to "full-time extension staff years."

Table 8. Forest Land Component Staff of Renewable Resources Extension Act (RREA) Program by State and National Program Objective, 1999

State	National Program Objective (RREA staff years)					Total
	Production	Environmental Quality	Utilization	Environmental Education	Continuing Education	
Alabama	2.5	2.0	1.0	3.0	1.3	9.8
Alaska	0.4	0.1	0.4	0.4	0.2	1.5
Arizona	0.2	1.0	0.2	0.3	0.0	1.7
Arkansas	1.5	0.5	0.8	0.5	0.8	4.1
California	16.0	3.8	13.1	6.9	0.0	39.8
Colorado	0.2	0.1	0.0	0.0	0.2	0.5
Connecticut	0.0	0.0	0.0	0.0	0.0	0.0
Delaware	0.0	0.0	0.0	0.0	0.1	0.1
Florida	1.0	1.0	0.4	1.0	0.0	3.4
Georgia	5.0	5.5	7.0	1.0	2.0	20.5
Hawaii	0.7	0.3	0.0	0.2	0.0	1.2
Idaho	1.5	1.0	0.6	0.8	0.8	4.7
Illinois	0.3	0.4	0.1	1.0	0.8	2.6
Indiana	1.6	0.4	0.8	0.0	2.3	4.7
Iowa	1.0	0.0	0.0	0.9	0.0	1.9
Kansas	0.5	1.0	1.0	1.0	0.1	3.6
Kentucky	2.7	0.2	2.8	1.0	1.5	8.2
Louisiana	5.0	0.0	2.0	0.0	2.3	9.3
Maine	1.0	0.5	1.0	1.0	1.0	4.5
Maryland	0.8	0.8	0.5	0.1	0.5	2.7
Massachusetts	0.1	0.3	0.1	0.1	0.3	0.9
Michigan	2.0	1.5	1.5	2.5	0.0	7.5
Minnesota	0.3	1.3	1.0	0.6	0.7	3.9
Mississippi	16.0	3.0	1.0	1.0	1.0	22.0
Missouri	5.0	3.2	3.2	3.0	0.9	15.3
Montana	0.9	0.9	0.9	0.2	0.4	3.3
Nebraska	0.0	0.8	1.8	0.8	0.0	3.4
Nevada	0.0	0.3	0.0	0.1	0.2	0.6
New Hampshire	3.4	2.3	0.8	2.0	1.0	9.5
New Jersey	1.7	0.1	0.0	0.0	0.2	2.0
New Mexico	0.0	0.2	0.0	0.0	0.0	0.2
New York	3.0	0.8	1.7	0.8	0.7	7.0
North Carolina	5.0	3.0	4.0	5.6	2.0	19.6
North Dakota	0.2	0.3	0.1	0.2	0.2	1.0
Ohio	3.3	0.5	2.7	0.0	0.0	6.5
Oklahoma	0.9	0.2	0.3	0.3	0.0	1.7
Oregon	4.6	1.0	3.9	1.0	2.0	12.5
Pennsylvania	1.8	1.8	1.1	1.0	0.7	6.4
Rhode Island	0.2	2.0	0.2	1.5	0.3	4.2
South Carolina	5.0	0.5	0.5	0.5	0.2	6.7
South Dakota	0.2	0.3	0.5	0.2	0.1	1.3
Tennessee	1.0	0.1	0.5	1.0	0.5	3.1
Texas	1.2	0.0	1.0	0.5	0.0	2.7
Utah	0.5	0.5	0.0	0.0	1.0	2.0
Vermont	1.0	0.0	0.8	1.0	0.2	3.0
Virginia	2.6	0.4	1.7	1.5	1.0	7.2
Washington	1.6	1.1	1.0	1.0	1.6	6.3
West Virginia	1.5	0.6	2.0	1.0	0.3	5.4
Wisconsin	1.5	0.6	2.0	1.0	0.3	5.4
Wyoming	3.5	1.5	3.0	0.0	0.0	8.0
Average per State	2.2	0.9	1.3	0.9	0.6	6.0

Note: "RREA" is the Forest and Rangeland Renewable Resources Extension Act.

Source: USDA Cooperative State Research, Education and Extension Service 2000.

Table 9. State Environmental Education Programs, by State and by Type of Program Structure, Program, and Funding, 1998

State	Components of Program Structure			Major Administrative Components Established (Office, Board, Center, Committee)	Program Funding Sources Established (Trust Fund, General State Revenue)
	K-12 Environmental Instruction Required	Environmental Instruction Master Plan Prepared	Environmental Education Curriculum Guide Prepared		
Alabama				!	!
Alaska				!	
Arizona				!	!
Arkansas	!	!	!	!	!
California	!		!	!	!
Colorado		!		!	!
Connecticut				!	!
Delaware				!	
Florida				!	!
Georgia	!			!	
Hawaii			!	!	!
Idaho				!	
Illinois	!			!	
Indiana				!	!
Iowa	!			!	!
Kansas			!	!	
Kentucky		!		!	!
Louisiana	!		!	!	
Maine				!	
Maryland	!			!	!
Massachusetts		!	!	!	!
Michigan				!	
Minnesota		!	!	!	!
Mississippi				!	
Missouri				!	!
Montana				!	!
Nebraska				!	
Nevada	!		!	!	
New Hampshire				!	
New Jersey		!		!	
New Mexico				!	
New York			!	!	
North Carolina		!		!	!
North Dakota				!	
Ohio	!		!	!	!
Oklahoma				!	
Oregon				!	!
Pennsylvania	!	!		!	!
Rhode Island				!	
South Carolina				!	!
South Dakota				!	
Tennessee				!	
Texas				!	!
Utah				!	
Vermont				!	
Virginia				!	
Washington	!	!	!	!	!
West Virginia		!	!	!	
Wisconsin	!			!	!
Wyoming			!	!	

Source: Ruskey and others 2001, and U.S. Environmental Protection Agency 1996.

and Colorado (0.5). From a national program objective perspective, State full-time equivalent emphasis of extension is primarily on forest production (average 2.2 full-time equivalents per State) and utilization (1.3 full-time equivalents) (Table 8) (USDA Cooperative State Research, Education and Extension Service 2000).

State governments also implement a variety of K-12 environmental education programs that often include requirements leading to a better understanding of forests and related resources. In 1998, nearly all States had a statewide administrative structure (office, board, center, committee) that fostered environmental education; most benefited from some reasonably stable source of funding (Ruskey and other 2001) (Table 9). However, in only 12 States is K-12 environmental instruction required (by law or administrative policy) and where such is the case, most States have subsequently developed a master environmental education plan and a suggested environmental education curriculum (Table 9). Typical of State mandated initiatives are those occurring in Wisconsin (environmental education law enacted in 1990 and patterned, in part, after the Council of State Government's "Model State Environmental Education Law") where there exists a State environmental education coordinating board, environmental education grants program, State environmental education centers, and mandatory environmental literacy assessment of students and teachers (Council of State Governments 1993). Other States have developed sophisticated supporting systems for teachers. An example is Michigan's "EE-Link" (developed and administered by the University of Michigan, supported by the U.S. Environmental Protection Agency) that allows educators to gain internet access to environmental information, including organized instructional materials (U.S. Environmental Protection Agency 1996).

### **Summary of Conditions**

Forestry and related public and private organizations in the United States have a long history of providing information about the use, management, and protection of forests.

Efforts to provide such information is motivated by a desire to heighten the public's awareness of forest sustainability principles and to acquaint citizens with the potential of forests to enhance their economic and social well-being. In light of the background and current conditions presented above, the following observations are made about the identification and measurement of activities involving the development and transfer of information concerning forest sustainability:

- Information about forest resources is enormous in quantity and breadth, as is the range of potential audiences seeking such information. As new information about forests evolves (via formal research activities or everyday experiences), the task of packaging and disseminating information to an ever-growing assemblage of interests is increasingly challenging (to the point of becoming mind boggling).

- Information about forests can be communicated in a variety of ways, depending on the audience of interest and the outcomes desired. The consequences of this diversity are educational initiatives that range from the highly structured curriculum implemented in elementary and secondary schools to the more dispersed public-affairs approaches focused on changing or reinforcing opinions of the general public (which often has but a passing interest in forests).

- Organizations responsible for communicating information about forest sustainability are many in number and diverse in mission and program responsibilities, although the intensity with which they engage in educational activities varies widely within and between public and private sectors (some have information transfer as only part of their missions). At times, certain organizations (for example, private advocacy groups) are prone to bias and one-sidedness in the information they convey. Such is to be expected in a pluralistic and democratic society where advocacy plays an important role in the development of forest resource policies and programs.

- Extensive partnering occurs among and between public and private organizations that are responsible for educational initiatives involving forest sustainability. Notable examples are the extension service which involves Federal, State and local partnering in the financing and delivery of extension services and the U.S. Environmental Protection Agency's extensive partnering with State organizations on matters involving the educational facets of environmental quality (water, air, wetlands, hazardous wastes).

- Educational programs are extensively co-mingled with a variety of other types of programs that seek to promote the application of management principles commonly associated with forest sustainability (programs such as technical assistance, fiscal incentives, tax relief, and regulatory actions). Implementation of education programs in manners that complement other types of programs often leads to more efficient accomplishment of overall forest sustainability goals and objectives.

- Private sector capacity to undertake public education and extension and technical assistance efforts is extensive. This diversity is extremely large as is reflected by the more than 80 private national organizations that claim responsibility for educational initiatives focused on forest sustainability. Privately sponsored forest certification programs have important implications for education involving matters of forest sustainability.

- Federal Government agencies implement a wide range of education programs focused on forest sustainability and have extensive legal and institutional capacity to do so (at least 19 Federal laws authorizing such, notable being the Renewable Resources Extension Act of 1978 and the National Environmental Education Act of 1990). This capacity is exercised via programs involving public education generally, extension service programs, and one-on-one technical assistance initiatives. In recent years, growth in extension service initiatives administered by the U.S. Department of Agriculture has been modest whereas new authorities have significantly expanded the capacity of the U.S. Environmental Protection Agency to undertake environmental education (often involving forest sustainability matters).

- State government agencies have substantial legal and institutional capacity to carry-out educational programs. In many cases these programs are tightly partnered with Federal programs, an example of which is the extension service that engages the educational abilities of approximately six full-time equivalent staff years per State. In recent years, State governments have initiated a variety of K-12 environmental education programs, many of which are relevant to better understanding of forest sustainability principles.

### **Issues and Trends**

The literature identifies a number of major issues and trends involving extension and public education as related to the forest sustainability and conservation (Bennett 1995, Ellefson and Hibbard 2002, Ellefson and others 2001 and 2002, Extension Service 1994, Hamilton and Biles 1998, Hubbard and Dangerfield 1998, Lierman and Kulich 1987, Megalos and Payne 1995, National Research Council 1998, Reed and others 1997, Rivera 1996, Ruskey and others 2001, Sampson and DeCoster 1997, U.S. Environmental Protection Agency 1996, Forest Service 2002).

- Organizations involved in the development and implementation of educational programs having implications for forest sustainability have increased considerably in number and strength. Although such has permitted opportunity to serve more and larger audiences, it has also posed challenges to program coordination (concerns over inter-organizational rivalries, especially in an era of program downsizing) and to presentation of integrated messages regarding forest sustainability (concern over focus on a single forest or environmental value, which poses significant challenges to coordination within and between organizations and to confusion among client groups that hear mixed messages). Addressing these challenges is aggravated by the information advocacy roles assumed by some organizations.

- New technologies available for communicating information continue to transform the way in which information about forest sustainability is communicated (for example, distance delivery technologies). Organizations responsible for educational initiatives are increasingly challenged to seek out and subsequently adopt new technologies and to use them to their fullest potential.

- Client groups seeking information about forest sustainability are becoming increasingly diverse and are seeking information that is more in tune with their cultural and ethnic experiences and background. Organizations responsible for educational initiatives are increasingly challenged to meet these increasingly diverse information needs. Such is a reality in a world where successful programs depend on good marketing skills based on a sound understanding of the audiences to be served.

- Subject material considered relevant to forest sustainability is growing in breadth. Clients groups are increasingly seeking a broader range of information concerning the use, management, and protection of forest environments generally. Such a trend is not disowning the importance of communicating information about certain features of forests and forest uses (for example, timber production), rather it is simply acknowledgment of the growing breadth of interests in forests and the information such interests are seeking.

- Although the number of organizations providing information about forest sustainability are increasing, they are quite mixed in terms of their ability to provide timely, high-quality, value-neutral information about forest sustainability. For public and private providers of information, significant challenges to be faced in the future will be to broaden the sources from which they draw information and to carefully monitor the quality of information provided by such sources.

- Evaluating the efficiency and effectiveness of educational programs is becoming increasingly important to organizations that are responsible for educational programs. Although evaluations are often hampered by the diffuse and long-term nature of the benefits delivered by investments in education and extension (difficult to track benefits), the pressure to evaluate programs is likely to become even greater as competition for financial resources increases in both the public and private sector. Especially troubling is the modest scale at which many education and technical assistance programs are implemented (willing participants often exceed supply).

- Educational initiatives in K-12 are increasingly important places to expose students to a better understanding of forest sustainability. However, the ability to do so is often deterred by yet settled debates over integrating the latter into existing lessons (history, science, social studies) versus presentation of environmental and related subject material in separate and distinct blocks or courses. The trend is toward the latter.

- Nongovernmental organizations are increasingly making their presence known as leaders in the field of environmental education and are increasingly devoting attention to matters involving forest sustainability. Especially important are State environmental education associations and councils which seek to strengthen State capacity for effective environmental education. Presently, 45 States have environmental education associations.

## **Information Adequacy**

### **Specification**

The diversity in form and function of extension, educational, and technical assistance programs raises many questions about the information required to adequately assess educational conditions considered necessary to forest sustainability and conservation. Educational programs are carried out in many different ways by a wide array of organizations, conditions that make it very difficult to paint an understandable picture of the Nation's capacity to promote principles of forest sustainability via educational activities. Such a context suggests a number of information concerns that need to be addressed. For example (and from a strategic perspective), there is a pressing need for information about:

- *Status and condition of education initiatives* – magnitude and extent of current and planned investments in educational programs.
- *Need for investment in new or existing educational programs* – identification of desired objectives and assessment of educational program investments needed to accomplish them.
- *Processes by which information is communicated* – determinations of adequacy, assessment of needed investments, identification of financial sources, designation of responsibility for implementation.
- *Effectiveness and efficiency of educational investments* – relationship between desired conditions of forest sustainability and type and level of educational program.
- *Knowledge and information networks* – communication and information flow between users and providers of information.

- *Regional and national influences on educational initiatives* – in contrast to local conditions, influence of broader geographic forest conditions, population structure, type and mix of client groups, research and development resources.
- *Regional and international comparisons* – determination of educational deficiencies, focusing of public and private investments, learning experiences for improving program efficiency.

Information about education and extension considered important to forest sustainability and conservation has received very limited attention by public and private organizations. Notable providers are certain Federal agencies (for example, USDA Cooperative State Research, Education and Extension Service), most of which focus only on programs for which they are directly responsible. In 1999, the National Association of State foresters (1999) sought a better understanding of State forestry agency information concerning educational initiatives. The association reported that 34 States had access to such information while 66 had no data on the subject. Of the 34 States with information, 7 indicated an abundant amount of information, 18 sufficient information, and the remainder had some but generally very little amounts of information. As for the quality of information, 11 States reported it was excellent, 19 adequate, and the remainder reported poor quality information.

Although certainly not exhaustive, the following are more specific directions which might prove useful in the search to better understand the institutional capacity for and the role of extension and education in forest sustainability and conservation.

- *Measurement Information* — Information about which variables and how they should be measured so as to accurately portray conditions involving extension, education and technical assistance programs has not been assembled (What indicators should be measured and subsequently compiled [for example, number of persons contacted, forest area under management, number and type of management actions taken]? How often are these indicators to be measured? Are there special indicators and measurement needs associated with different type of educational programs or for public versus private programs? What are appropriate indicators of indispensable educational efforts [for example, reforestation undertaken, species habitats protected, continuation of employment]?).

- *Extent of Activity Information* — Information about education, extension, and technical assistance is often scattered and uneven among public and private collecting organizations, the result of which is information that lacks local, regional, and national consistency (What are the legal requirements for investing in educational programs at various geographic levels and by various organizations? How are these requirements changing over time [if at all]? Are there differences in requirements at different levels of government? Is there consistency across these requirements? What is the status of local efforts to encourage investment in education and extension programs? What is the condition of private education, extension and technical

assistance programs and the extent of private investment in such programs? Are current compilations describing these programs useful for guiding policy and program direction?).

- *Responsible Organization Information* — Information about what private and public organizations are actively engaged in the development and implementation of education, extension, and technical assistance programs has not been assembled except in a very modest way (What government agencies, and at what levels, are responsible and engaged in these programs [for example, Forest Service, U.S. Environmental Protection Agency, USDA Cooperative State Research, Education, and Extension Service, State and local governments, industrial forest land owners]? What legal authority assigns them responsibility and is such authority being accurately interpreted? Should certain government levels be responsible for providing certain types of educational programs [State governments] for certain forest landowners [nonindustrial private forests]? Is there a standard for the educational efforts of various organizations, or are organizations working at cross-purposes, diminishing public confidence in the information being provided? Do public and private organizations engaging in educational activities have similar or differing goals and objectives that foster or hinder needed investment in education programs important to forest sustainability? Are there organizational patterns in the public and private sector that, if known and publicized, would enhance overall investment in education [alternatives to extension leadership by universities and technical assistance leadership by State forestry agencies]?)

- *Coordination Information* – Information about requirements to coordinate development and implementation of education, extension, and technical assistance programs among and between various levels of government and various private concerns has not been assembled (What conflicts exist between the various entities engaged in developing and carrying out educational programs? How might they be productively resolved? What are requirements for coordination? Do they allow for cross-sectoral, coordinated planning and review [for example, with programs involving fiscal incentives, tax incentives, regulatory requirements]? Do they ensure that the cumulative results of local, State, and regionally implemented educational, extension and technical assistance programs will lead to outcomes consistent with national requirements and vice versa? Do they allow incorporation of ad hoc code educational activities occurring at various times and undertaken by various levels of government?).

- *Investment and Incentive Information* – Information about resources devoted to education, extension, and technical assistance has not been comprehensively assembled except in some very limited cases (What is the magnitude of investment in public and private education focused on forest sustainability? Is there an appropriate level of investment in these programs and, if so, what standards should determination of this level [percent of landowners contacted, number of K-12 students provided educational kits]? Are there legal and administrative processes for allocating

resources to education focused on forest sustainability [are they sufficient]? Are there provisions [legally or fiscally] for encouraging development of educational programs, especially encouraging consideration of the multiresource aspects of forest resources?).

- *Effectiveness Information* — Information about the effectiveness of various types and levels of educational, extension, and technical assistance programs put forth to accomplish sustainable forestry interests has not been compiled, except in some very limited cases (Are there legal or administrative requirements to determine efficiency and effectiveness of educational and related programs? What are appropriate measures of success? What is the efficiency of educational programs generally relative to other policy tools available for accomplishing principles of forest sustainability? Are there more effective approaches to organizing and administering educational and extension programs [alternatives to land-grant university leadership, alternatives to State forestry agency leadership]? Are some organizations more effective in developing educational messages regarding forest sustainability [why?]. What communication methods are best for what messages for what audiences?).

- *Procedure and Specification information* – Information about how standards and procedures for the development and implementation of educational, extension and technical assistance programs has not been assembled (Do current statutory requirements prescribe procedures for developing educational programs and the materials communicated by such programs [K-12 curriculum packets]? Is such in a detailed format or in a broad framework giving deference to administrators, educators and land managers? Is the full intent of the existing laws that require education and related programs expressed in current rules and administrative procedures? Do national requirements for educational programs allow for regional and subregional development of programs consistent with regional interests? Do requirements specify the need for leadership in their development? Do they give guidance to such leadership? Is there any coordination among organizations in the development of educational materials?).

## **Recommendations**

The ability to influence forest sustainability will depend a great deal on consistent, long-term investments in education, extension, and technical assistance programs as suggested by Indicator 53. In order to improve understanding of the legal and institutional setting within which such will occur, there are a variety of information voids that need to be addressed (many described directly above). In order to suitably deal with them, the following actions would seem appropriate.

- *Comprehensive Periodic Reviews.* Conduct periodic and comprehensive reviews of current institutional capacity (and associated authorities) that give direction and resources to educational, extension, and technical assistance programs considered necessary for forest sustainability. Guided by the above suggested information deficiencies, the reviews should give special attention to the collection of information about the type and extent of educational programs, organizations responsible for ensuring appropriate levels of investment in educational programs, and the long-term appropriateness and effectiveness of these programs. This information should be gathered to the extent it occurs at Federal, State, and local levels of government. In addition, a systematic review of private sector capability to undertake educational programs relevant to forest sustainability should also be initiated.

- *Responsibility for Conducting Reviews.* Assign responsibility for conducting reviews (on a continuous basis) of educational, extension, and technical assistance activities to a specific (current or new) administrative unit located within a Federal agency (USDA Cooperative State Research, Education, and Extension Service's Natural Resources and Environmental Management Unit, Forest Service's State and Private Forestry or Research and Development, U.S. Environmental Protection Agency's Office of Environmental Education), a college or university, or other nonprofit organization (for example, National Association of State Foresters, National Association of Professional Forestry Schools and Colleges). This responsibility should be assigned to an organization that has a proven track record in addressing the complexities of educational, extension and technical assistance programs as relevant to forest sustainability.

- *Devote Resources to Reviews.* Invest in the review sufficient resources as are necessary to provide the type and quantity of information necessary to dramatically improve understanding of current abilities to plan, construct and maintain educational, extension, and technical assistance initiatives considered important to sustainable forestry.

## Indicator Appropriateness

### Indicator Definition

Unclear definition of certain activities specified by Indicator 53 is troublesome from an information gathering perspective. Especially vexing is the elusiveness of the indicator's major descriptive words and phrases, namely "public involvement," "public education," and "make available forest related information." These words and phrases supposedly are clear in definition and grounded in an agreed to set of concepts and principles that serve as a useful guide to information gathering efforts. For this indicator, such is not always the case as is highlighted by the need to set forth definitions earlier in this review.

Also unsettling to information gathering activities involving Indicator 53 is the potential for duplication that exists with other indicators. Determining exactly what is to be included under the incredibly large umbrella of "education" (which seems to of generic interest to the indicator) is difficult. For example, information about public involvement seems to be woefully out of place (belongs in Indicator 50 . . . public participation); public education as a focus for information gathering seems to be an incredibly broad target of interest (many, many types of public education exist); ignoring information about many, many technical assistance programs associated with forest sustainability seems quite short-sighted; and passing over specific acknowledgment of formal education of resource professionals (which rightly should be addressed in Indicator 55) appears as a deficiency.

The usefulness of the indicator could be improved if it were better defined and more appropriately focused. As has been suggested elsewhere (Roundtable on Sustainable Forestry 1999), the wording of Indicator 53 should be changed to a form such as "*provides for educational activities focused on various segments of the citizenry and the general public.*" Reference to extension programs, technical assistance, professional education, and public involvement should be moved to other more appropriate indicators.

### Cross-Cutting Conditions

The breadth of subject material suggested by Indicator 53 poses a number of crossing-cutting problems (alluded to above), most of which could be avoided if the indicator focused strictly on educational initiatives directed at the general public (citizenry). Indicators 50 (opportunities for public participation), 55 (develop human resource skills), and 51 (encourages best practice codes) seem to have a great amount of overlap with Indicator 53. Both Indicators 50 and 53 indicate analysis of public involvement activities while Indicator 55 suggests a number of educational issues that overlap with Indicator 53. Other indicators which may have additional overlap or relationships with indicator 53 include Indicator 39 (level of expenditure on research and development, and education), Indicator 44 (employment), Indicator 57

(enforcement), Indicator 58 (investment and taxation policies), 60 and 62 (information availability and scope).

### Literature Cited

American Forest Foundation. 1993. Environmental Education Activity Guides: Pre K8. Washington, DC.

Bennett, C. 1995. Targeting Outcomes of Extension Programs (TOP): An Integrated Approach to Planning and Evaluating. In: *Education and Communication Applications in Natural Resource Management* by W. Hubbard (ed.). Pg. 137-139. Georgia Center for Continuing Education. Athens, GA.

Best, C., and L. A. Wayburn. 2001. *American's Private Forests: Status and Stewardship*. Island Press. Covelo, CA.

Biles, L. E. 1996. Education Perspective: Nonindustrial Private Forests. In: *Nonindustrial Private Forests: Learning from the Past, Prospects for the Future* by M. J. Baughman (ed.). Pg.28-33. MN Extension Service. St. Paul, MN.

Biles, L. E. 2001. Cooperative Extension Service Personnel in Forest Management and Wood Products: A Directory. USDA Cooperative State Research and Extension Service. Washington, DC.

Butler, G. S., and J. D. Slack 1994. *U.S. Educational Policy Interest Groups: Institutional Profiles*. Greenwood Press. Westport, CT.

Council of State Governments. 1993. Model State Environmental Education Law. Center for the Environment. Lexington, KY.

Ellefson, P. V., A. S. Cheng, and R. S. Moulton. 1995. *Regulation of Private Forestry Practices by State Governments*. Station Bulletin 605-1995. MN Agricultural Experiment Station. St. Paul, MN.

Ellefson, P. V., R. J. Moulton, and M. A. Kilgore. 2001. Programs and Organizations Affecting the Use, Management, and Protection of Forests: An Assessment of Agencies Located Across the Organizational Landscape of State Governments. Department of Forest Resources. University of Minnesota. St. Paul, MN.

Ellefson, P. V., R. J. Moulton, and M. A. Kilgore. 2002. An Assessment of State Agencies that Affect Forests. *Journal of Forestry* 100(6):35-42.

Ellefson, P. V., and C. Hibbard. 2002. Federal and State Roles in Implementing Policies and Programs Focused on Forest Sustainability: An Assessment of Current and Future Conditions. Department of Forest Resources. University of Minnesota. St. Paul, MN. (forthcoming).

Extension Service. 1994. *Shaping the Future: A Strategic Plan for natural Resources and Environmental Management Education*. U.S. Department of Agriculture. Washington, DC.

Gayle Group. 2002. *Encyclopedia of Associations: 2001*. Gayle Group Publishers. Detroit, MI.

Hamilton, R. A., and L. E. Biles. 1998. Forestry Extension in the United States. In: *Extension Forestry: Bridging the Gap Between Research and Application* by J. E. Johnson (ed). Pg. 56-66. Virginia Polytechnic Institute and State University. Blacksburg, VA.

Hubbard, W. G. and C. W. Dangerfield. 1998. Understanding and Overcoming Forestry Technology Transfer Barriers in the U.S. In: *Extension Forestry: Bridging the Gap Between Research and Application* by J. E. Johnson (ed). Pg. 67-78. Virginia Polytechnic Institute and State University. Blacksburg, VA.

Lierman, W., and J. Kulich. 1987. *Adult Education Challenges of the 1990s*. Croom Helm Publishers. New York, NY.

Malonis, J. A. 2000. *Encyclopedia of Business*. Gale Group. Detroit, MI.

Mater, C. M. 1999. *Understanding Forest Certification: Answers to Key Questions*. Pinchot Institute for Conservation. Washington, DC.

Megalos, M., and S. Payne. 1995. Electronic Delivery of Environmental Materials: Reaching New Audiences Via the Internet. In: *Education and Communication Applications in Natural Resource Management* by W. Hubbard (ed.). Pg. 26-34. Georgia Center for Continuing Education. Athens, GA.

National Association of State Foresters. 1999. *First Approximation Assessment Report*. Washington, DC.

National Research Council. 1998. *Forested Landscapes in Perspective: Prospects and Opportunities for Sustainable Management of America's Nonfederal Forests*. National Academy Press. Washington, DC.

National Wildlife Federation. 2001. *Conservation Directory: 2001 Guide to Worldwide Environmental Organizations*. Washington, DC.

Reed, A. S., J. J. Garland, and L. E. Biles. 1997. Extension Forestry Organizational Processes, Programs and policies. In: *Approaches to Extension in Forestry: Experiences and Future Developments* by R. Hubner and R. Beck. IUFRO Publication No. 1. Working Party Extension (S6.06-03). Vienna, Austria.

Rivera, W. M. 1996. Agricultural Extension in Transition Worldwide: Structural, Financial and managerial Strategies for Improving Agricultural Extension. *Public Administration Development* 16:151-161.

Roundtable on Sustainable Forestry. 1999. Criterion Level Summary: Indicators 48-59 Criteria Technical Committee (CTC). Washington, DC.

Ruskey, A., R. Wilke, and T. Beasley. 2001. A Survey of the Status of State-Level Environmental Education in the United States: 1998 Update. *Journal of Environmental Education* 32 (4): 4-14.

Sampson, R. N., and L. A. DeCoster. 1997. *Public Programs for Private Forestry: Reader on Programs and Options*. American Forests. Washington, DC.

Siegel, W. C. 1973. Long-Term Contracts for Forest Land and Timber in the South. Research paper SO-87. Southern Research Station. Forest Service. New Orleans, LA.

Trzyna, T. C., E. Margold, and J. K. Osborn. 1996. World Environmental Organizations. Earthscan Publications. London, England.

University of Minnesota 2002. Social Sciences in Forestry: A Bibliography. <http://forestry.lib.umn.edu/bib/ssif-journals.html>. Forestry Library. St. Paul, MN.

U.S. Environmental Protection Agency. 1996. Report Assessing Environmental Education in the U.S. and the Implementation of the National Environmental Education Act of 1990. National Environmental Education Advisory Council. Washington, DC.

U.S. Environmental Protection Agency. 1997. Technical Assistance Directory. EPA/600/K-97/001. Office of Research and Development. Washington, DC.

U.S. Environmental Protection Agency. 2002. Environmental Education Grants Program: 1997-2001. Office of Environmental Education. Washington, DC.

USDA Cooperative State Research, Education and Extension Service 2000. Renewable Resources Education: Report to Congress on the 1996-2000 Renewable Resources Extension Program. Washington, DC.

USDA Forest Service 1994. Natural Resource Conservation Education: Education and Conservation Partners for a Brighter Tomorrow. FS-550. Washington, DC.

USDA Forest Service. 1997. Report of the United States on the Criteria and Indicators for the Sustainable Management of Temperate and Boreal Forests. Washington, DC.

USDA Forest Service. 2002. The Process Predicament: How Statutory, Regulatory and Administrative Factors Affect National Forest Management. Washington, DC.

USDA Natural Resource Conservation Service. 2002. Conservation Programs. <http://www.nhq.nrcs.usda.gov/PROGRAMS.htm>. Washington, DC.

Wigley, T. B, and M. A. Melchiors. 1987. State Wildlife Management Programs for Private Lands. *Wildlife Society Bulletin* 15:580-584.