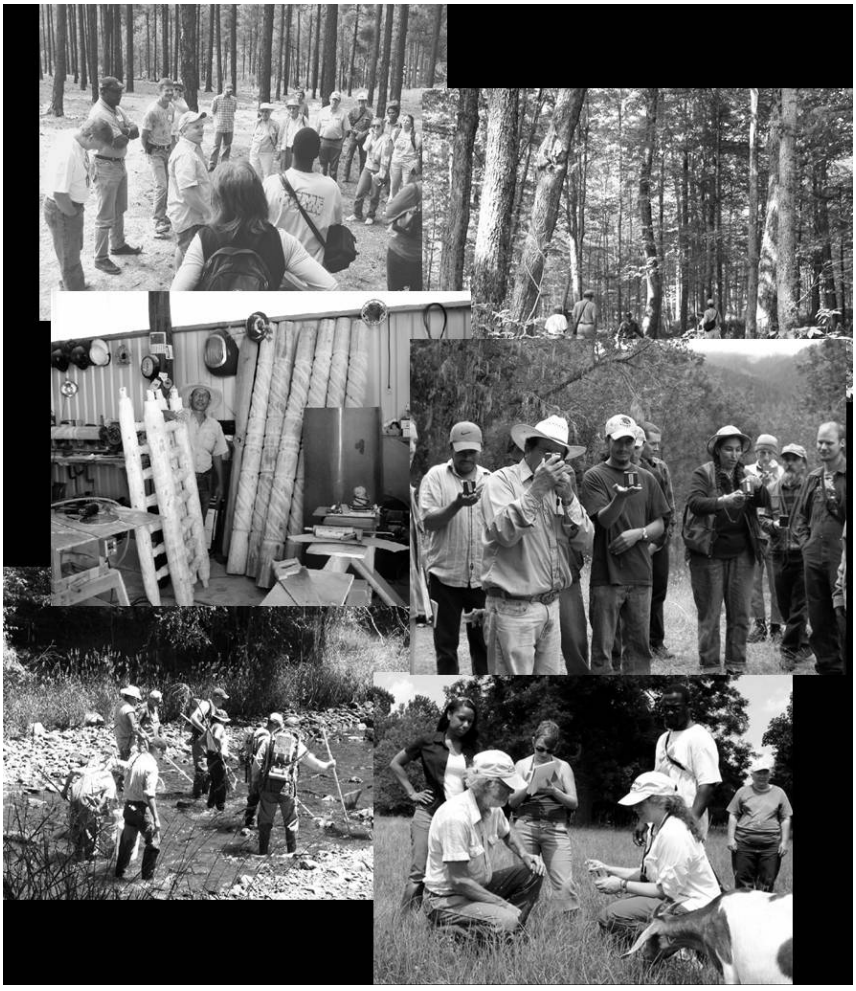
FORD FOUNDATION COMMUNITY-BASED FORESTRY DEMONSTRATION PROGRAM RESEARCH COMPONENT



APPENDICES
DECEMBER 11, 2006

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Appendix B: Institutional Analysis of Community-Based Forestry – Summary of Data

November 28, 2006

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Data for this institutional analysis were derived in part from semi-structured interviews of key individuals involved in the Implementing Partners (IP) of the Ford Foundation's Community-Based Forestry Demonstration program. Additional data were drawn from the site assessments of each IP by the Aspen Institute and annual progress reports from all thirteen IPs.

The key informant semi-structured interviews were coded and analyzed following standard qualitative research analysis procedures[1]. Below are the primary themes by frequency of sources and number of references.

Node Name	Sources	References
Challenge CBF org faces	24	99
Education & outreach	24	67
Community conditions addressed by CBF	23	47
Partnership between organizations	20	56
Local Community	17	42
Develop trust and credibility	17	40
Funding & Economic aspects	17	30
Research	17	23
Incubate spin-off groups and projects	16	69
Forum for community dialogue	14	42
Project management & implementation	13	27
Networks	13	19
Job Training & Employment	10	19
Public Lands & Management Agencies	10	14
Workshops and Demo Projects	9	16
Facilitate meetings	9	14
Policy Dialogue and Influence Policy Implementation	9	13
Informal flexible approach	9	11
Monitoring	8	17
Successes	8	16
Restoration work	8	14

[1] See further Strauss, A. and J. Corbin. 1990. Basics of qualitative research: Grounded theory procedures and techniques. Newbury Park, CA: Sage Publications

Represent Range of Community Interests	8	13
Manage Conflict	8	9
Marketing & Sales	6	17
Landscape Assessment & Inventory	6	11
Core group of participants	5	8
Forest, hay certification	5	8
Value-Added Products	4	7
Environmental conservation or ecosystem focus	4	6
Stewardship Contracting	4	5

The themes can be further interpreted and organized. The top four themes, Challenges CBF Organization Faces, Education and Outreach, Community Conditions, and Partnerships Between Organizations indicate that key informants are most often thinking about and focusing on addressing their organization's needs and meeting the needs of their communities. Much of their efforts are in education and outreach activities, which can range from workshops and presentations to field trips and demonstration projects. This is fundamental awareness-raising. In addition, building partnerships with other organizations is a key strategy to addressing organizational and community needs, and is an acknowledgement that CBF is not something any one organization can do by working alone but requires the expertise, resources, and commitment of several groups working in partnership. These partnerships, in turn, enable community members to access resources beyond their own community, such as grants, contracts, agency and university expertise, and regional, state, and national organizations.

The second five themes, Local Community, Develop Trust and Credibility, Funding and Economic Aspects, Research, and Incubate Spin-Off Groups and Projects encompass action-oriented functions and strategies that establish the IPs as legitimate, credible community-based organizations. IPs constantly need to demonstrate their ability to generate financial resources to initiate new activities and that these activities are based on sound research. Because IPs are generally small and have limited organizational resources, they primarily serve as catalysts of action – once a project is up and running, IPs typically them spin-off to other individuals or groups to carry on rather than manage them.

The third three themes, Forum for Community Dialogue, Project Management and Implementation, and Networks, generally refer to IPs ability to create new spaces for communication and action. Informants use many phrases to describe how they bring together diverse individuals and groups to work on a common objective – finding "zones of agreement" is a phrase used by several informants. As IPs move from dialogue to on-the-ground projects, they have adapted their organizational structures and styles to manage those projects. It is clear that while IPs do spin-off projects, they also manage projects.

The remaining themes encapsulate the diverse activities IPs engage in to bridge gaps in forest stewardship and communities' capacity to create and take advantage of opportunities. Many themes focus on building human capital – workforce and small business skills, and technical knowledge about forest and economic systems. Other

themes focus on building social capital – facilitating meetings among diverse individuals and groups and managing conflict. Still others emphasize on-the-ground efforts, such as demonstration projects, restoration work, assessments, monitoring, contracting, and marketing, branding, and sales of value-added products.

The primary secondary source of data used for the institutional analysis was annual progress reports and other documents produced from the IPs themselves. These were content-analyzed and coded by primary themes. Although self-reported information contains its own biases, this secondary data analysis provided opportunities to triangulate with the primary key informant interview data and analyses. Below are the primary theme and examples of activities and strategies falling under each theme.

ADVOCACY

AFWH	o Federal and National Issues § Section #339 legislation § National Fire Plan: actively testify before congress to ensure workers and communities benefit from NFP legislation. § Testified before Senate Sub-committee on Forests and Public Land Management § Participated in Week in Washington § Participated in harvester effort to stop logging in Baja 58 § Provided community advocacy support to object to the FS use of the herbicide Picloram instead of local hand-pulling labor § Participated in Forest Worker Equity Task Force conference calls and research o Regional § Provided advocacy support to Mexican and Kanjobal salal harvesters in Western Washington § Member of the Bioregional Advisory Committee of the Pacific West Forestry Center o Conferences, workshops, and meetings
DCG	o Worked with Transportation and Parks and Recreation Departments to authorize tree plantings in park spaces, highway medians, and other open areas that are beneficial and appropriate.
FSC	o BBLFP Staff Presentations at Conferences • Provides opportunity for BBLFP to address funding organizations and policy makers about the importance of agroforestry and meat goat production as potential strategies for land retention in the Black Belt.
HFHC	o Reaching out to national interest groups, Congress, and Federal land management agencies o Testimony submitted and delivered to the US House of Representatuves Subcommittee on Forest Health, titled, “Effective community involvement in National Forest Restoraztion and Recreation Efforts: Obstacles and Solutions” o Attended conferences § National Network of Forest Practitioners Annual Meeting (Fairlee, VT) § The National Rural Community Assistance Conference (Stowe, VT)
JBC Makah	
NQW	o Lobbied the FSC and the Certified Forest Products Council to undertake a market study of certified markets in the northeast and to assist NQCFP and other groups with the development of marketing strategies based on good market information. o Lobbying for more state agency focus in the North Quabbin region o Jim has built relationships with the MA Director of Economic Development and was appointed to the Governor’s regional competitiveness council o Lobbying the Mass Office of Travel and Tourism to focus more attention on the North Quabbin area.
Penn	
PLP	o Attend national and regional meetings § Annual Ford cbf meeting - 2 PLP member participated in 2002 meeting § Annual National Network of Forest Practitioners meeting – local environmental leaders attended on behalf of PLP, resulted in new contacts and information beneficial to group
RA	o Forestry Advisory Board - provide strategic input and suggestions; meets 3-4 times a year § Includes growers, harvesters, ODNR staff, OSU Extension staff, NTFP entrepreneurs, and Rural Action members interested in economic development and conservation o Hope to develop Policy Feedback Loops - integrate local community input into national policy development and keep communities in touch with larger policy processes o Following policies that are barriers to the implementation of sustainable development in the region § Focus on problem of ginseng poaching and the lack of meaningful laws as a barrier to NTFP work § Funding cuts for state service forestry as a barrier to RA work § In the exploratory stage, will develop a communication strategy if they decide to move forward o State Policy: Convening meetings to discuss methods for confronting problem of ginseng poaching and considering strategies to craft state-level ginseng policy that is reflective of the growers’ values • Successfully advocated to change the state ginseng harvest date from August 15 to September 1, leading to more sustainable harvesting and less time growers need to actively watch their crops • Committee members attended ODNR open houses to voice their concerns • A member was interviewed on the radio to discuss poaching issues • Fall 2003 – substantial press coverage on ginseng poaching and RA and RAGA’s efforts to bring growers together and find solutions

§ Invited to sit on the State Stewardship Committee, which advises the Division of Forestry on priorities and plans for new programs
• hoping to promote innovative ideas supporting community based forestry
• developed a proposal with the RA Forestry Advisory Board, to use some 'Forest Land Enhancement Program' funding of the Farm Bill for a peer-to-peer landowner engagement model, and presented it to the Division of Forestry
o National Policy: Planning to develop the capacity to take ideas and input from the local area and summarize it to be included in national policy development, focusing on the Farm Bill

Wallowa

o Annual meeting of the National Forests, Counties and Schools Coalition in Reno, NV – asked to speak about collaboration in Wallowa County
o Partnered with American Forests, the Communities Committee of the 7th American Forest Congress, Sustainable Northwest and others to raise concerns about process used to authorize stewardship contracting on public lands and insure appropriate rules and regulations were in place to guide the implementation
o Support the nation wide call for increased USFS allocations to restoration work
o Testified before the US House and Senate during the hearings on the National Fire Plan in March 2001
o Staff members appointed to Governor's Eastside Forest Advisory Panel, serve as Chairman of the Wallowa County Weed Board, and work on regular basis with Wallowa County Natural Resource Advisory Committee
o Participate in the Regional Monitoring Team for Stewardship Pilots
o Member of the Oregon Progress Board
o Member of the Northeast Oregon Community Assessment Workgroup
o Member of the Oregon Office of Energy Steering Committee for a regional biomass assessment
o Federal Level Monitoring of funding for the USFS and its Economic Action Program, authorization of the stewardship contracting authorities, and implementation of the National Fire Plan and Healthy Forest Initiative

WRTC

o Use of VT certified wood by State agencies
§ NWF is in discussions with state agencies to build infrastructure (i.e. rest stops) with Vermont certified wood
• Developed a twenty point list to guide state contracts in utilizing VT certified sources

VFFP

o Cornerstone Project
§ Statewide institutional purchasing initiative
§ Organized by VFF to generate and fulfill institutional demand for locally grown, certified wood
§ Stimulated by success of Bicentennial Hall project and other VFFP projects
§ Large capital-budget institutions sign written commitments for preferential purchasing of local, certified wood for current and future building projects, including:
• Middlebury College
• University of Vermont
• Vermont Buildings and General Services Department
• Fletcher Allen Health Care

CAPACITY BUILDING

AFWH

"…we work hand-in-hand with community leaders, inner-city residents, neighborhood organizations, and small businesses to leverage grassroots participation and bring about creative solutions that redress the effects of pollution and create a higher quality of life for residents" (www.dcgreenworks.org, accessed May 20, 2005).

DCG

o Street Tree Stewardship Program/ D.C. TreeKeepers – neighbors work together to plant trees
o Local employment and training in collaboration with the Shaw Green Team DCG to hire and train local underemployed residents for streetscaping and maintenance in the business and shopping areas of D.C.
o Mathew Henson Earth Conservation Center Project (see education section above)

FSC

HFHC

§ Customer Service - Coordinate sales relationships for members on behalf of Partner businesses
§ Held a meeting with local architects, retailers and others in the wood products supply industry to get feedback on marketing materials and improve the HFHC contact base - receive over 10 requests each quarter for HFHC products
§ Bridge landowners and managers with log and lumber markets
§ HFHC Full Partnership Meeting
§ Developed a HFHC Membership Guidebook to describe Partnership structure and services, and other relevant information for partners
§ Quarterly HFHC newsletter
§ Formed a Governance Committee
§ Formed a Marketing Advisory Group
§ Formed a Monitoring & Verification Advisory Group
§ HFHC Forest Stewardship Council Group Chain of Custody Program - Reduces the cost of FSC-certification to individual businesses by sharing one umbrella certificate
§ Developed a HFHC Wood source tracking program

JBC

Makah

o Work with Consultants to:
§ Determine baseline inventory and impact of harvesting on non-timber forest resources through experimental treatment sites.
§ Conducted forest stand inventories
o Proposed projects (but never completed???)
§ Large-scale medicinal tea production/processing facility
§ Salal Production – research plots (see research section) and training
§ Mushroom inoculation and harvesting enterprise
§ Harvesting, processing and marketing Christmas Greenery
§ Safe and Sustainable foods program/ Community Kitchen
o Infrastructure
§ Acquired and renovated a building at the Tribal Center Complex for the "Makah Community-based Forestry Initiative Building"
§ Has warehouse space available for community to use as a temporary stockpiling and staging area for NTFP products

NQW	o Work with local consultants to assist in developing an appropriate model for small landowner certification in the North Quabbin and to help to develop a marketing strategy for certified North Quabbin Woods products, ecotourism o Marketing and encouraging the utilization of local wood products • Developed website that hosts information about local wood businesses and products, and provides forestry information about the region • Designed logo which is used on all marketing materials and promotional items such as magnets and t-shirts
Penn	o Develop capacity of emerging community based organizations – Landowners Association and Land End Woodlands Club o Demonstration sites - Demos of silva-pasture and agro-forestry activities o Provide Resources to Landowners - site assessments and management plans • Nine were completed in 2002 • Assisted with management plan development for Woodlands Association, who have since conducted prescribed burns • Received request to assist the Ridgeland Association to develop their management plan • Provide resource materials on Best Management Practices and initial heirs property counseling to families that have inherited property o Plan (2004) to establish a database of producers by product type o Facilitate provision of technical and financial assistance o Develop and Follow Management Plans – o Work with Resource Group and Experts to develop and follow management plans to increase income and improve sustainability of holdings
PLP	o Workshops/ Training § Co-sponsored three educational workshops on gas development in the North Fork Valley § PLP held 3 workgroup meetings on the Forest Plan Revision process to learn more about the process and better define PLP's involvement § PLP held two work sessions to review and find ways to integrate Living History and economic data into the GMUG Forest Plan Revision, and then informed the GMUG forest planners. § Hosted a workshop for local loggers on alternative forest product development and marketing § Conducted a workshop with local loggers in 2001 to review opportunities associated with CBF, Planning another workshop for 2003 § Plan to sponsor job creation/ forest worker training (summer 2003) § Hosted a stewardship contracting workshop (May 5, 2003) with local agency personnel and forest workers o Field Trips § UP and PLP jointly sponsored 2 large field trips in 2002 § 2002 – smaller field trip to review restoration project possibilities on the WAPA transmission line. § Sponsored 9 public field trips on the Uncompahgre (2001-2003) o Helped organize peer group learning session on agency contracting; included meeting with USFS leadership team and USFS Chief, Dale Bosworth
RA	o Site Assessments - one-on-one technical assistance to help landowners identify potential sites suitable for growing SFPs o Demonstration Sites established sites with multiple species in cooperation with local growers o Acquired National Center for the Preservation of Medicinal Herbs preserved 60 acres of open space and increased research capacity - (2002) 14 research trials o Identify and support entrepreneurs in the NTFP sector - substantial support to ~50 producers • ~100 growers are developing businesses • Growers in the program have sold over 100 lbs of ginseng (first two years) • Have identified herb markets, best cultivation practices, and support structures for herb growers but have been unable to identify a substantial population of herb grower entrepreneurs. • Connected a local Goldenseal grower with a small manufacturer who was willing to pay $50/lb for organic goldenseal, as opposed to the $17/lb he had been selling it for to a local buyer. o Establish local area in eyes of the NTFP marketplace • Plan to work with RAGA members to form an internal marketing committee, and offer business development assistance through workshops and consultations • Will establish direct marketing connections with domestic herbal practitioners • Working towards developing a brand identity for local products o Field studies program developing in partnership with the three local school districts and Oregon State University o Educational Field Tours to bring decision-makers together on the ground to address public land management issues, including a congressional field tour co-hosted with Sustainable Northwest and an environmental group representatives tour o Public School Programs: WREN, OWL, and HAWK
Wallowa	o Workshops § For Contractors – information on insurance, licenses, etc. § Collaboration Training – held in February 2002 § Multi-party learning on soils and logging issues § International Workshop, October 2000, involving participants from Oregon, Texas, Canada, Mongolia, China, and Zimbabwe § Adult Education o Internal Education - attended "Strategic Perspectives in Non-Profit Management" intensive training session at the Harvard Business School o Educational Camps/ Field Studies - Wallowa Ranch, Chief Joseph Summer Camp, and Swamp Creek Youth Field Study o Oregon Youth Conservation Corps Program o Nature and Heritage Program preparing program for outfitters and guides o Eastern Oregon Small Diameter Fair o Established a Community Planning Process and collaborative socio-economic monitoring system to highlight the socio-economic impact in rural communities of the transition from manufacturing/production base economies to service economies o Applied Pastoral Production Systems - technical and financial support to the International Center for the Advancement of Pastoral Systems for the production of a documentary on the impacts of global markets and government policies on rangeland production systems and cultural heritage
WRTC	o Developed the Hayfork Model/ Mentor Project § Provides direct services to local businesses (incubator businesses) • Assist with grant writing • Provided equipment to the Yurok Tribe • Provided funding for the Nor-El-Muk o Crafters project – combines land stewardship and native crafts o Natural Bridge Project – allows tribe to participate in FS planning for a local sacred site • Given advice to communities of Elk City, Leightonville, Big Valley, and Bonner's Ferry § Six businesses have received direct services (2/29/02 report) § 14 businesses have received training from SBDC (2/29/02 report) § WRTC has directly created or retained 14 jobs § Project will evolve into a Regional Community Forestry Center • Secured a $35k community development block grant to plan the Center o Developed a Value added Center to incorporate value-added hardwoods o Wood Technology Center trains people on equipment by Jefferson State Forest Products; clients/incubator tenants are being recruited by the SBDC o Plan to create a development plan for a National Community Forestry Training Center in partnership with the Aspen Institute o Services to local businesses – administrative, business planning, business management, training, equipment leasing, and linkages to revolving loan funds administered by others

VFFP	o GIS-based and customized forest inventory database tools § Completed GIS map of all VFF parcels § Developed GIS template to use in ownership objectives assessment in forest management planning o Community Mapping § Created natural community maps for all VFF certified parcels § Held a 2-day natural community mapping workshop o Management Planning § Plan to expand (2005) the forest inventory and management planning options for landowners, including better access to high quality, affordable natural community mapping services § Streamlined the FOREX data collection process and developed protocol for using the NED data collection system

Collaboration

AFWH	23 identified groups, organizations, and networks
DCG	o Local Partners - 26 identified: Collaborate with community leaders to develop programs that improve community capacity - activities which improve the physical environment such as planting and caring for street trees o National Partners - 10 partners identified
FSC	o USDA Forest Service o Alabama Forestry Commission o Alabama A&M o Tuskegee University o Southern Food Security Collaborative
HFHC	o Jefferson State Forest Products – worked together to gain Whole Food stores as a customer o Knoll & Company – to prepare media strategy
JBC	14 organizations identified
Makah	o Tribal • Makah Tribal Council Community Advisory Committee – formalized by the Tribal Council to provide input and direction to CBFI • Makah Cultural and Research Center o Non-Tribal - 6 organizations identified (including Heidi Ballard Consulting!)
NQW	15 identified groups and organizations
Penn	o Clemson University o State Forester o Clemson Forestry Extension o South Carolina Forestry Commission o Lawyer providing pro bono work o South Carolina State University 1890 Extension and Rural Business Cooperative Center o USDA Forest Service o USDA Natural Resources Conservation Service o Saint Helena Consumers and Marketing Cooperative
PLP	o American Farmland Trust o Club 20 o USDA Forest Service o Bureau of Land Management o Colorado Division of Wildlife
RA	14 identified groups and organizations - 4 gov't organizations, 3 universities, 7 local, regional, and national NGO's
Wallowa	68 groups and organizations identified -- 3 federal agencies, 7 state agencies, 2 universities, 7 national NGO's, 3 tribal orgs., 5 county gov't organizations, and numerous state and local NGO's and groups
WRTC	o Aspen Institute o Cascade Small Business Development Center o Healthy Forests, Healthy Communities o Jefferson State Forest Products o Jefferson Sustainable Development Initiative o The Lakeview Partnership o Local Schools o National Forest Products Lab o Sustainable Northwest o Shasta College o Trinity Business Incubator o USFS
VFFP	32 groups and organizations identified - 19 local, state, and regional NGO's; 5 national NGO's; 3 educational institutions; 2 federal agencies, 2 state agencies, 1 foundation (besides Ford)

ECONOMIC OPPORTUNITIES

AFWH

o Low-Impact Development and Environmental Design – For-profit raises money for their non-profit work and builds awareness for Green Market development

DCG

o Local Employment - Working to build a pool of well-trained LID inner-city youth to meet growing demand for high-end environmental greening services.
o Mitigate financial risks thru Mini-grant Program with Garden Resources of Washington (GROW) to develop, organize, and advertise urban forestry mini-grants to community groups.
o Enhance Economic Opportunities- Business assistance to locally-owned businesses

FSC

o Business Planning - Working with two woodworkers in Sumter County
o Cooperative Development – Greene-Sumter County Farmers' Market Cooperative and working to create a meat goat producer cooperative
o Demonstration Sites
o Barn Renovation – potential future use as a woodshop, an exhibition of BBLFP projects, and a demonstration site for NTFP drying and processing.

HFHC

o Small Grants Fund Program - Funded by Ford foundation - 5 year grant
§ Provides small grants to HFHC non-profit members for projects related to the partnership, including
• The Forest Stewardship Project – to expand its monitoring and training programs
• Kauffman Wood – to enhance the ability of the Karuk Tribal Design group to manufacture and sell small diameter log furniture through and apprentice program
• The Institute of Sustainable Forestry – will conduct a market feasibility study to assist their Hardwood Industry Cluster
• The Okanogan Community Development Corporation – will conduct a survey of local manufacturers in the value-added sector to gain a better understanding of their business and marketing needs
§ Grantees evaluate their projects and share results with HFHC partners
§ Provides invaluable assistance in terms of research, product prototype development, and marketing support
§ Plan to work to connect businesses with grants, loans, and other funding opportunities
§ Will use the small grants fund to leverage loans from entities such as Shorebank Pacific and Cascadia Revolving Loan Fund to stimulate investment in sustainable businesses

JBC

o Local employment
§ April – July 2003 Fire Season the Community Forest Workers Labor Crew was dispatched 15 times, resulting in ~$110,000 for 8,600 hours of work.
o Provide local Resources
§ Employs three full-time workers
§ ~25% of logs brought in and processed are sold as construction supplies
o JBC encourages small business development in local communities
• Towns of Hurley, Santa Clara, and Bayard, and Grant County
• Grant County Economic Development Coalition for Progress.
• Shop Dog Woodworks and Santa Clara Woodworks
• The Santa Clara Industrial Park - In development since 1999

Makah

o Harvesting, processing and marketing of Christmas greenery – prototype to test the market
o Proposed development of a "Rainforest Herbal Teas" manufacturing Business
o Off-reservation marketing networking project
o Safe and sustainable foods program

NQW

o Certification Marketing Strategy – Developing (2001) a marketing strategy for certified products from the North Quabbin
o Marketing and Brand Development - Provide marketing assistance to wood-related businesses and developed a North Quabbin Woods Logo
o Small Grants Program
• Provide Funding to community partners
• (2003) have given 8 small grants to partner organizations
o Ecotourism Task Force developed an ecotourism marketing strategy
o Plan to increase marketing support offered to graduates of the Guide Program to ensure they receive business as a result of their education

Penn

o Provide small stipends to farmers harvesting indigo
o Developing long-term economic revitalization strategies - based on the sustainable management of forest assets
• 9 landowners are actively engaged
• 6 landowners have shown interest and are identified as good prospects for the CBFI
o Demonstration Forest
• Penn Center has 369 acres of demonstration forest
• Lands End Woodland has 320 acres of forested waterfront property
• Demonstrate Pine Straw, Indigo, Spanish Moss, Wood Products, Goats, and forest management techniques
o Identify and develop local products – to fuel local economy
• Quality pine products targeting the landscaping, farming, crafts, and souvenir markets
• Indigo related products
• Quality Spanish moss products targeting landscaping, crafts, and souvenir markets
• Wood products such as bateau and furniture making, and wood carving
o Plan (2004) to develop brand and label to cooperatively market products

PLP

o Organized Non-Profit – Unc/Com - Provide fiscal management - Facilitates flow of funding with more flexibility and speed, and developed a process of governance and mechanism for accountability, predictability and transparency
o Fills the niche of a CDC
o Develop Community Based Forestry Grant Programs
o Uncompahgre Plateau Project (UPP)/ Collaborative Council resulted in almost $500,000 in treatments (Years 1-3)
o Native Seed Project – a native seed collection program that will evolve into a local growing program and provides local wages to native seed collectors
o Burn Canyon Logger Restoration Monitoring Project - $64,500 was paid to local restoration contractors in 2002
o UP is working with PLP to coordinate an additional $500,000 in local restoration contract work
o Work with community loggers to design and begin demonstrating restoration approaches of different size, scale, elevation, etc. and assess economic costs/benefits
o Plan to develop a marketing strategy to "brand" Uncompahgre products
o Rancher Habitat Demonstration Project/ UP "Cow Reseeding" Project –
o Living History Project – Will provide financial support to Ute Indian component of project if asked
o Restoration Workforce Development and Local Labor Contracting

RA

o Planting Stock Program for low-income individuals to begin the process of growing herbs
§ Offer plant stock for sale to individuals who want to become growers without a loan
§ Will begin offering free ginseng seed to wildcrafters as an incentive for them to replant harvesting sites
§ Fall 2002 – sold 200lbs ginseng seed, 125 lbs black cohosh root, 50 lbs goldenseal root
o Assisted RAGA and other growers with the implementation of a SARE producers Grant
o Collaborated with RAGA on the development of a grant.
o Marketing
§ Brought a RAGA representative to Expo West
§ Developed a high-quality display for trade show booths at Expo East and Expo West
o Financial Support offered to active low-resource entrepreneurs through a flexible loan fund
o Pine Utilization and Job Creation
• Attended Pine marketing steering committee meetings to facilitate the development of a pine producers cooperative to help landowners get better returns on their pine
• Cultivated better relationships with partners and landowners
o Earned Income Strategy to develop to ensure financial stability of the program
§ Offer a consulting or brokering service
§ Expand plant stock program
§ Sell customized maps, Rural Action sustainable forestry gear, SFP books, or SFP calendar
§ Establish an 'endowment' of plantings
o Received Research Grant to Co-host the Appalachian Forest Resource Center

Wallowa

o Pursuing commercial production and sales of roundwood – for structural, fencing, and environmental purposes in the coming year
o Market Based Incentives - Invested in the Joseph Timber Company to convert a mill into a SDW processing facility; seeking new financial partners and investment options; developing marketing materials to secure interest in SDW buildings; generated improved prices for commodities through market research, demonstration projects, and business planning
o Local Employment: Designed and administered over $1 million in contracts to over 30 different local contractors for restoration and stewardship work since 2000; Wallowa Lake Fuel Reduction Project resulted in a contractor hiring 12 people off of unemployment for 10 weeks; Participation of local contractors in Lynx Surveys sponsored by WR
o Developed Major Donors Program with assistance from the Aspen Institute and Pyramid Communications - $50,000 from major donors in 2003
o Secured significant contributions from over 20 different federal, state, and private foundations and grant agencies for forest restoration projects
o For Profit Subsidiary Partnership with the Joseph Timber Company catalyzed the creation of a for profit subsidiary of Wallowa Resources – Wallowa County Community Solutions, Inc.
o Marketing – working with Healthy Forests, Healthy Communities to pursue direct sales relationships between local producers and larger customers
o Facilitated the creation of a small business incubator
o Anchor tenant – Jefferson State Forest Products moved in August 2002 employs 23 local residents (as of June '03)
o Developed profit sharing program
o Trinity Business Incubator (an advisory committee to the WRTC) and WRTC provided machinery to Timber Creek Forest Products for the production of tongue and grooved floor and ceiling decking
o Provided training and digital scanning equipment to local residences with Trinity Business Incubator contracted by local community college but classes held at the Watershed Center
o Two trainees are employed by the watershed center to digitize old research papers from the Pacific Southwest USFS research station
o Trinity Business Incubator has provided training and business assistance to over 20 businesses and individuals and provided 203 hours of counseling since January 1, 2003 (June 30, 2003 report)
§ Employs a crew of 30 (as of December '03)
§ Identify and locate machinery, collaborating with local businesses
§ Hope to build the human resources for the incubator project through partnerships with regional organizations designated to serve Trinity County

WRTC

o Marketing
o Develop Local Assets for local business to start-up and expand their activities; purchase Equipment local businesses can rent for market value; focus on environmental services businesses and value-added processing businesses, with a focus on small diameter wood utilization; flooring production line operating by January 2002; small truck with a self-loader to take products out of the woods
o Assist local Businesses with grant writing, company start-up, Erosion Control Company – WRTC provides waste product from the post and pole machine for him to make wattles which trap sediment
o Fundraising
§ Secured $340,000 HUD money, through the California Community Development Block Grant Program, to construct a 10,000 sqft building to house the business incubator, wood center
§ Secured $50,000 for equipment for the incubator from the Old Growth Diversification Fund through California State Trade and Commerce Agency and the USFS
§ Secured $50,000 from the Forest Products Lab to complete the small scale log sorter and test its design
§ Negotiated a commitment from the Small Business Development Center for them to provide $30,000 worth of business training to incubator clients
§ Negotiated $10,000 per year of funds from the local area Job Training Agency for on-the-job training of employees of incubator clients
§ Negotiated an agreement with the local RC&D for $70,000 to provide the wood source heat system for the incubator and dry-kiln
§ Secured a grant for the Nor-El-Muk tribe of Wintu for NTFP crafts
o Local Employment
§ Thinned 120 acres of public lands for fuel breaks, employing six local people over seven months
§ Assisted several incubator clients create more job positions
§ WRTC employs six local workers on its fuels reduction/ trails crew
§ Assisted workers start two contracting businesses in fuels reduction and wildlife habitat enhancement

VFFP

o Local Employment
§ NWF is working with Island Pond Woodworkers to retain jobs
§ VFF has promoted loggers work for the landowner instead of the mill and active involvement of loggers in the timber sale layout, operation and closure, as well as log grading and scaling
o Ecological Forestry fund established to provide incentives for land base expansion - Funds 26 parcels and 4983.9 acres for inclusion in the VFF-certified pool of well-managed forests (2001)
o Certified Chain of Custody Participant Fund to provide incentive for wood processors to obtain FSC manufacturer certification
o Recruited three community-based portable sawmill operators and a cabinet maker to participate in the cost-share
o Identify new value-added products and marketing opportunities that utilize the existing infrastructure and send more value back to the land and the stewards of the land
o Determined landowners were generally paid twice the local rate in stumpage and good loggers paid up to 1.6 as much
o Generate new value-adding opportunities by increasing the profile of and improving the supply of local sources of certified wood
o Substituting local, certified wood has generated greater economic multiplier impacts in local communities that the status quo
o VFF is considering the creation of a commercial subsidiary where landowners can aggregate, mill, kiln dry, and market their wood products by networking more effectively with existing, local, value-adding businesses

EDUCATION

AFWH	o Organize Workshops - Workforce training and certification § Western Washington Harvester training in Spanish § Lomakatsi Restoration training § Indigenous Peoples Project o Foster cross-cultural communication, learning, and economic cooperation between forest workers' and harvesters' communities and agencies to address their common problems and reduce conflict over forest resources.
DCG	o Green Collar Job Training Program o Street Tree Stewardship Program/ D.C. TreeKeepers o Workshops - Over three dozen tree planting, treecare, and LID workshops since 1998. (www.dcgreenworks.org/do, accessed May 20, 2005) o Training Programs – provide training materials, textbooks and equipment for the courses and workshops o Publications o Shaw EcoVillage Project - Worked with Ecodesign Corps, an environmental design and micro-enterprise youth program o LID and Restorative Landscaping 12-week training program - o Mathew Henson Earth Conservation Center Project - Designed a hands-on curriculum for the Americorps sponsored Earth Conservation Eagle Corps' Program (ECC) members. o Youth Environmental Services (YES) training for "at-risk" youth
FSC	o Over 400 landowners participated in trainings, seminars, workshops and demonstrations held at their Rural Training and Research Center in 2002(?) o Summer Camps – held at Rural Training and Research Center for Alabama o Hands-on Workshops o Training Sessions/ Seminars • Heavy Equipment Training Session – 8 participants • Silvopasture fencing training - 43 Participants • Cooperative Development Training Program - agroforestry demonstration management and production • Traditional timber-related opportunities in the forest industry • Non-traditional timber-related opportunities, including Non-Timber Forest Products • Estate Planning Two-day seminar – • Management Plan Development o Demonstration Sites- provides functional show and tell component and minimizes financial risks • Silvopasture demonstration sites • Barn Renovation – potential future use as a woodshop • Rural Training and Research Center (RTRC) Management Plan o Direct technical assistance in response to requests o Publications • Quarterly Newsletter • Brochures • Estate Planning Manual • Booklets – on landowners' rights and responsibilities
HFHC	o Trainings and Workshops § Plan to provide business workshops highlighting the importance of service, illuminating it as a key HFHC competitive advantage, outlining typical customer expectations of service, and developing strategies for fulfilling those expectations § For tradeshows § Include business planning and development, market strategies, and other technical assistance sessions tailored to Partner needs
JBC	o The Southwest Fire Fighting Crew – JBC Developed the idea and trains § GWN hired 10 employees § USDA Forest Service hired 67 employees o Additional training for forest restoration crews to become a Community Forest Workers Labor Crew o Forest Skills Training Program will be established through Western New Mexico University
Makah	o Training • Non-timber forest resource Products – • NTFR Inventory Training o Long-term education/training - Developed formal relationships with educational organizations • Tap into existing NTFP knowledge within community to develop future training programs and project development § Proposed sustainable harvest workshop and networking of Tribal members to promote inter-generational teaching and learning o Ethno-botanical garden at the Makah Cultural and Research Center (MCRC) o Makah CBFI Interpretive Display o Demonstration learning modules for k-12 students o "Sustainable Forestry" Education for Makah Forestry Personnel
NQW	o COVERTS Program – o Skills training for wood-related businesses o Guide Training Program o Workshops - Sponsoring 10-15 workshops/year with average of 14 attendees o Plan (2003) to produce an educational Booklet, "Managing Your Woodlot in the North Quabbin Woods" o Events § Community Forest Discovery Day – spring clean up of local trail network § The Great Northern Tier Geocaching Tournament: North Quabbin Region – fun, educational program on use of gps § Ask a forester – ongoing via email or telephone
Penn	o Land Use and Environmental Education Program - Focuses on land retention, smart growth, community based advocacy, coalition building and planning, o Forums - Workshops and field trips o Participation in Education workshops and conferences o Displays o Courses - Master Tree Farmer Course thru Clemson University o Demonstration Forest o Plan to develop (2004) a training program in conducting nature trail tours – o Organizing a prescribed burning certification course o Building and Maintaining a Library

PLP

o PLP brochure
o Work with Local Schools
o Uncompahgre Plateau Project (UPP)/ Collaborative Council
o Burn Canyon Logger Restoration Monitoring Project
o Hosted a workshop for local loggers on alternative forest product development and marketing
o Training in restoration and contracting
o Field days for fire education
o Work with community loggers to design and begin demonstrating restoration approaches of different size, scale, elevation, etc. and assess economic costs/benefits
o Plan to participate on WAPA
o Plan to sponsor job creation/ forest worker training (summer 2003)
o Plan to participate in contract training session (2003) with National Forest Foundation
o Rancher Habitat Demonstration Project/ UP "Cow Reseeding" Project –
o Living History Project – Have built capacity among the local historical societies to carry out ethno-methodological work
o Restoration Workforce Development and Local Labor Contracting
o The North Fork Project

RA

o Staff Training
o National Center for the Preservation of Medicinal Herbs
o Publication - Brochure, Newsletters, Annual Summaries, Flyers
o Workshops
• Introduction to Herbs Basic Introductory workshops
• More advanced "continuing education" workshops for established growers
• Ginseng Cultivation Workshop
• Mushrooms
• Introduction to Herbs
• Ginseng, Goldenseal, and Pawpaw Workshop
• Ginseng, Goldenseal, and Black Cohosh mini-workshops
• Herb value-adding Workshop
• Southern Ohio Ginseng Conference
• Maple Syrup Workshop
o Professional Development Training on NTFPs - trained dozens of Extension agents, service foresters, and private consulting foresters on initial 2-day training (2002) on Special Forest Products conducted in collaboration with ODNR and OSU extension
o Leadership Development for Growers
o RAGA Activities
o Landowners Conference (LOC) - Held annually
o Site Visits and Assessments
o Welcome Wagon Initiative
o Presentations

Wallowa

WRTC

o Training Programs
§ Continue worker and contractor training through existing projects with BLM and USFS
§ Training program for workers from other communities to learn how to operate the value-added equipment in the Incubator, including the flooring and moulding machinery, and wood shop equipment
§ Trinity Business Incubator provided "Basic 32" fire suppression training, required certification for all USFS firefighters, to 15 local workers
§ Provide job training in fire fighting, digital scanning, and computerized bookkeeping with their training partners at Shasta College
o Internships at the incubator and the Watershed Center to local high school students and recent graduates to help support their families
o Youth Programs: Summer Conservation Camps and School Year Outdoor club
o "Institute" with Shasta College for natural resource education

VFFP

o Educational Programs for landowners about sustainable forestry management and FSC certification
o Workshops/ Symposiums
o Educational Displays
o GIS-based and customized forest inventory database tools
o Education for commercial entities

LEVERAGE MONEY

AFWH

o Ford Foundation Grant
o McKenzie River Gathering Foundation
o Direct Fundraising – letter to larger community

DCG

o Ford Foundation
o National Urban Community Forestry Advisory Council
o Casey Tree Endowment ($50 million endowment to the District of Columbia)
o DC Department of Health, Watershed Protection Division
o National Fish and Wildlife Foundation
o National Tree Trust
o Funding for DC Treekeeper project to offer treecare training and street tree adoption
o Environmental Protection Agency, OAI
o US Forest Service
o D.C. Department of Transportation, Urban Forestry Administration
o D.C. Environmental Health Agency
o EPA Chesapeake Bay Program
o TKF Foundation

FSC	Ford Foundation
HFHC	Ford Foundation
JBC	o Ford Foundation grant to CODC o The Economic Development Administration - $50,000 awarded to SIGRED o USDA - $168,000 to Gila Woodnet o Department of Labor - $100,000 to Western New Mexico University o Small Business Innovation Research grant of $75,000 to Santa Clara Woodworks o A 3-year Collaborative Forest Restoration Grant of $360,000 o Four Corners Sustainable Forestry Initiative Grant o Black Range RC&D obtains loans from the USDA Rural Development's Rural Business-Cooperative Service to then offer as loans to local organizations and projects
Makah	o Ford Foundation o Presbyterian Ministries
NQW	o Ford Foundation o Forest Stewards Guild scholarship for Heyes Forest Products to become chain-of-custody certified o Laird Norton Endowment Foundation – assist in developing certified products marketing system, GIS templates for landowner maps, and certification outreach o Forest Stewardship Council – to support in developing an appropriate model for landowner certifcation
Penn	o Ford Foundation o SRDI $21,000 grant for a vegetable and meat production project o NRCS $10,000 grant
PLP	o Ford Foundation
RA	o Ford Foundation
Wallowa	21 identified organizations -- 5 federal agencies, 5 state agencies, 6 national foundations, 5 state and local organizations and private individuals
WRTC	o Ford Foundation o California Community Development Block Grant Program o Community Development Block grant o Old Growth Diversification Fund o California State Trade and Commerce Agency o USFS o USFS Forest Products Lab o Small Business Development Center o local area Job Training Agency o local RC&D o Trinity County RAC
VFFP	o Ford Foundation o John Merck Fund o Vermont Community Foundation

NETWORKING

AFWH	o Build community-based groups to unite forest workers and harvesters -- Lane County Outreach Project to reach and organize Latino forest workers. o Coordinate Meetings to celebrate diversity and share experiences
DCG	
FSC	o Provide Forum for Landowners and Farmers to meet with State and Federal Organizations, Universities, and Professionals • Workshops and demonstrations facilitate peer learning and cooperation • Estate Planning and Land Retention two-day workshop • Goat Silvopasture project training – brought new and experienced goat farmers together to network and provide assistance to one another. o USFS Outreach is housed at the FSC office – works with state outreach people and FSC to communicate the programs the FS offers to landowners. o State Services o Federal Services o Professionals – attorneys, consulting foresters, estate planners, etc.
HFHC	§ Members include loggers, mills owners, wood products manufacturers, brokers, land managers, retailers, nonprofits, and others dedicated to forest restoration and economic revitalization in rural communities of the Northwest § Plan to grow the Partnership in regional clusters to provide more effective service delivery, vertical integration, and local market development, and to foster regional collaboration • Have developed two solid clusters of HFHC businesses in Wallowa and Klamath-Siskiyou • There are four clusters evolving in Trinity, Okanogan, Western Idaho, and Central Oregon § Coordinate Cross-regional Exchanges § Hire contractors and consultants - Contracted with Green Mountain Woodworks (sold over $38,000 in flooring and made $250,000 of leads and bids for HFHC businesses § Facilitate Peer-to-Peer Learning – Small diameter wood processing, Small business marketing, Workforce training § Facilitate a Business-to-Business exchange § “Vision & Values Statement” (membership contract) has been signed by 25 businesses and non-profit partners (June 30, 2001 report) § Improved access to raw materials consistent with HFHC environmental commitments § Developed a searchable database of available HFHC ‘approved’ raw material from public and private lands to connect businesses with wood sourced in ways that maintain/restore forest health

JBC	o $40,000 from FS for JBC hire their own crew boss and three squat bosses in order to increase the number of fires the Community Forest Workers Labor Crew o Cooperated with the Gila National Forest to complete the NEPA process for the Mill Ecosystem Restoration Project ~140 acres through Gila Woodnet o Proposed a forestry training program with Western New Mexico University and local high schools. o Assisting the Towns of Hurley, Santa Clara, and Bayard, and Grant County in implementing their economic development plan and ordinance. o JBC co-hosted a workshop with the Forest Service at Western New Mexico University to "find zones of agreement among various factions of the communities involved in healthy forest initiatives." o The Nature Conservancy jointly supported a fire restoration ecologist with the Gila National Forest who works with the FS and local communities to identify goals, objectives and strategies to treat fuels and restore ecosystems. o Partnership with the Forest Trust and the Youth Conservation Corps to collect baseline and post-treatment data in JBC restoration sites.
Makah	• Pacific Northwest Research and Harvesters Association - training in sustainable harvesting, processing, and market requirement techniques • Noble Valley Farms – loaned equipment, and provide product and processing guidance. • Jim Freed of Washington State University – to assist in developing markets • Makah Forestry Enterprises – technical support to establish a tracking system for establishing production costs • Makah Department of Forestry provides assistance in developing GIS base maps of the NTFP inventory • Contract with Makah Cultural and Research Center for organizing and facilitating workshops, and developing an ethno-botanical garden • MOU with the Forest Resources Extension Services at Washington State University to provide support and training in marketing, certified food processing, species inventory, and facilitating discussions between the Makah and adjacent land managers, including the Forest Service • Tap into existing NTFP knowledge within community • Conduct workshops to promote inter-generational teaching and learning • Coordinated with Makah Forestry Program and the developers of the Stand-Based Forest Inventory to insure compatibility of databases and protocol of NTFP and timber inventory • Communicate and Collaborate with Adjacent Landowners in the Usual and Accustomed Areas • Agreement with Department of Forestry – for harvesting greenery for Christmas greenery project
NQW	o Meet individually with key people and institutions in the region o FSC – NQCFP became a member o Certified Forest Products Council o SmartWood o Scientific Certifcation Systems o The Community Forestry Resource Center o Massachusetts Family Forests o Vermont Family Forests o Convene Meetings between local woodworkers o Collaboration with Millers River Environmental Center – hosting of NQCFP events at the center o Wrote a proposal and received an Americorps trail crew for a two-week trail construction project o Will identify a committed group of landowners and enable them to take a leadership role in organizing such a group so the NQWCFP efforts can have a lasting impact o Work with COVERTS Cooperators and network of active landowners to organize an informal association for social and educational events o Initiated an agreement with the Athol Bird and Nature Club (ABNC) to manage and host the guide training program at the Millers River Environmental Center
Penn	§ Convene regular meetings of and facilitate exchange between landowners, the Resource Group, and the taskforce § Resource Group – provide targeted outreach and technical assistance § Provide potential facility - for production and marketing of value added forestry food products, including value added meat goat products § Network with state, regional and national rural organization to avoid duplication through shared learning § Involved State Forester § With Clemson University, has begun long-range planning with appropriate landowners § Hire/ work with consultants – Marketing consultant, Landscape Architect, Landscaper
PLP	• Create venues for community and public land agencies to engage in decision-making processes involving public lands • PLP and UP co-sponsored 10 Uncompahgre forest plan revision meetings with the GMUG • PLP members and staff attended five North Fork Valley forest plan revision meetings • BLM and USFS are using the same NEPA document to streamline the NEPA process - Identification of individual project leaders to manage and implement a project team representing several agencies • Difficult bringing community members and agencies together - Community criteria are reflected in watershed setting effort but are considered last by the agency • Organize community members – convene collaborative dialogue • 34 PLP meeting in yrs 2 and 3 - focused on developing and managing different aspects of the demonstration projects • Held 32 Unc/Com meetings in yrs 2 and 3 • PLP leads, convenes, or catalyzes topics of discussion/ action; decide as a group what role to take (educate, be a silent resource, or take the lead). brings information to the table for discussion among participants to gather input into the review/revision of the national forest plan • The North Fork Project – organized residents around maps and focused on specific areas of land and the residents' knowledge of those areas • Sponsored 15 public meetings on the Uncompahgre Restoration Project in communities around the Plateau • Held 62 workgroup meetings to provide community direction, involvement and monitoring to different components of the project (2003) • Helped organize peer group learning session on agency contracting; included meeting with USFS leadership team and USFS Chief, Dale Bosworth • PLP held 3 workgroup meetings on the Forest Plan Revision process to learn more about the process and better define PLP's involvement • Burn Canyon salvage sale and monitoring project – community based monitoring work and negotiations led by PLP enabled this project • Held 34 PLP meeting in yrs 2 and 3 – focused on developing and managing different aspects of the demonstration projects • Provided support to the pilot forest GMUG/County Initiative • Provides 'front end' coordination between local governments and public land management agencies
RA	o Received Research Grant to Co-host the Appalachian Forest Resource Center with SACCO in North Carolina o Conduct workshops- on participatory research, "Jobs in Restoration", and Professional development for foresters o Introduced policy issues for AFRC consideration, focusing on the Farm Bill o Organized a conference on citizen-based monitoring o Coordinated assessment of barriers for NTFP producers o Development of a sustainable forestry cooperative o Established a full Bioregional Advisory Council (BAC) with 12 people from 8 states representing various interests and experiences o NTFP Institutionalization - Partnerships with agencies and natural resource professionals • Hired a Business Facilitator, Tom Brenner, to develop entrepreneurship in Morgan County • Contracted with Steven Foster, a prominent consultant in the natural products industry to explore the potential of goldenseal export to Europe • Meeting with Colin Literski, a successful entrepreneur interested in sourcing Black Cohosh from local producers • Met with John Burns, an exporter of veneer logs to China and other countries, who may be willing to assist with ginseng export to China o The Appalachian Ohio Regional Investment Coalition (AORIC) - Collaboration between ACEnet, The Nature Conservancy, Foundation for Appalachian Ohio, Ohio Arts Council, and others supporting three business facilitators o Partnership with The Nature Conservancy to become partners in developing community-based conservation strategies for the Western

Allegheny Plateau
o Formed and provide support for RAGA – Roots of Appalachia Growers Association - Linked local growers together and helped them form RAGA
• Formed to conduct educational activities, political activities, and research markets, and to establish Appalachian Ohio as a recognized region for producers in the herbal marketplace
o Plan to promote formation of landowner associations to encourage cooperation
o Established cooperative/collaborative relationships with ODNR, the South District Natural Resource Specialist, and OSU Extension
o Ohio Premium Pine Cooperative

Wallowa

o Local/ Regional Networks
• Coordinated a Charitable firewood program
• Partnership included Oregon Department of Human Services, Oregon Department of Forestry, Community Connections, local landowners and loggers, and community volunteers
• Established a Community Planning Process
• Strengthened ties and communications with the Nez Perce Tribe
• Initiated four sub-committees around pressing natural resource issues, which then initiated fieldwork to assess the current situation, reviewed data, and are generating project proposal priorities
§ Formed from a diverse group of citizens and agency representatives
§ Report to the County natural resource advisory committee
• Co-hosted Environmental Groups Tour as part of the peer review process with Hells Canyon Preservation Council
• Coordinated USFS Chief visit to area
• With Wallowa County Natural Resource Advisory Committee
• Coordinated MOU with USFS - ?
• Weed Free Hay Cooperative – assisted in formation of cooperative

WRTC

o Set up a Mutual Assistance Network
§ Plan to set up a training program for workers from other communities to learn how to operate the value-added equipment in the Incubator, including the flooring and molding machinery, and wood shop equipment
§ Plan to continue expanding the Healthy Forest, Healthy Communities marketing network through participation in collaborative workshops in the Pacific West
§ Negotiated an agreement with the area micro-enterprise program to screen and refer incubator clients
o Share experiences with members of federal agencies, interest groups, elected officials, similar rural communities through publications, presentations, and local field tours

VFFP

OUTREACH

AFWH

o Visit worksites and initiate conversations with forest workers to learn about their concerns and working/living conditions
o Outreach Materials
§ Published book summarizing CBOP projects, in Spanish and English
§ Produced video on Alliance activities highlighting workers and harvesters
§ Publish documents to educate workers
§ Newsletters and monthly member updates
§ Video on some of the Alliance's work

DCG

o Hired a Community Outreach Organizer to recruit new stewards and inform people of the DCG programs.
o DCG employs community members as Advisory Neighborhood Council Commissioners to assist with outreach.
o At least 10 newspaper articles featuring D.C. Greenworks and 5 Radio segments aired on WAMU,WTOP, and NPR. (www.dcgreenworks.org/press, May 20, 2205)
o Professional Door hangers, in Spanish and English, advertising the Tree Stewardship Program

FSC

o Member of Alabama Forestry Commission Advisory Outreach Council to improve AFC's outreach to minority and low income landowners.
o BBLFP Staff Presentations at Conferences
• 2002 Professional Agricultural Workers Conference (PAWC)
• 2003 Farmers' Conference
• 2003 "Improving Profitability and Sustainability of Limited Resources Goat Producers Workshop" at Tuskegee University
o Provide Forum for Landowners and Farmers to meet with State and Federal Organizations, Universities, and Professionals
• Workshops and demonstrations facilitate peer learning and cooperation
• Estate Planning and Land Retention two-day workshop
• Goat Silvopasture project training – brought new and experienced goat farmers together to network and provide assistance to one another.
o USFS Outreach is housed at the FSC office – works with state outreach people and FSC to communicate the programs the FS offers to landowners.
o Website for Federation of Southern Cooperatives/ Land Assistance Fund

HFHC

o Quarterly "HFHC Update" newletter
o 'Year in Review' Newletter
o Press Recognition - Articles in 5 major publications
o Web services
o Marketing Materials – made available for use by businesses
o Presentations
o Attended Tradeshows, Expos, and Home shows - 18 identified shows
o Member Services
o Public Relations- Partnered with Jefferson State Forest Products to capitalize on openings of Whole Foods Stores in Seattle and Fresno
o Developed Logos – HFHC members are encouraged to use these to identify and promote their products
o Promotion tool - Portland World Trade Center will be using HFHC flooring and other products
o Organized (?) a Product Design Competition
o Conduct site visits to existing and potential partners

JBC

o Participate in Community Meetings
• Economic Development Committee Meetings – Village of Santa Clara
• Grant County Economic Development Coalition for Progress.
o Tours – Gila Woodnet has held tours and open houses
o Held a Community Development Meeting – (March 2003)
o Website with information on current projects and achievements at www.gcjbc.org
o Directory – developed a directory of local woodworkers
o A prototype wood cabin will be built in the Santa Clara Industrial Park to educate the public on small diameter wood uses.

Makah

o CBFI Committee meetings
o Community Steering Committee
o Publications - Community publications, project related articles and announcements
o Makah Government Open House – CBFI information was made available at this event
o Community Feedback/ Monitoring of CBFI - Informal Feedback from community member
• Community Discussions – (June-November 2002) whether the Tribe should focus on raw commodity products (Salal) or value-added products (edibles or greenery)
o Propose holding a tribal foods fair to link producers with small-scale buyers
o Propose developing a buyer and producer contact list of tribal community and off reservation businesses

NQW

o Organize public tours of local sawmills
o Presentations – at community meetings
o Advisory Panels/ Community Meetings
o Initiated relationships with local private and public foresters
o Woodworkers group
o Community Ecotourism Task Force –
o Held two focus groups (2001) on community forestry
o Landowner Outreach Program
o Landowner Database
o Local Wood Products Display in the lobbies of regional banks and stores, town halls, trade shows, the Massachusetts State House lobby, and the Eastern States Exposition (the Big E)
o Brand Building through Logo development –
o Media - press releases, news articles and features, and photos to the local newspaper
o Developed a North Quabbin Woods website (www.northquabbinwoods.org)
o Plan to hold a Spring Architect weekend (2003 proposal) –
o Events
o Plan to (2003) incorporate forestland into the North Quabbin Woods brand.

Penn

o Part of Resource Group – provide targeted outreach and technical assistance
Collects baseline data through site visits with each landowner
• Assists landowners in developing forest management plans
• Assists identifying and developing vehicles for marketing and product development opportunities
o Landowners Association – Working with a small group of landowners to develop plans and test practices to improve sustainability of and increase income from forest resources
o Hold Membership Meetings –
o Demonstration sites
• Demos of silva-pasture and agro-forestry activities
• Full growing season demonstration of indigo
• Demonstration of a prescribed burn on site after harvesting pine straw
• Meat Goat Demonstration Site
o Assisted in the formation of the Low Country Land Owners Association
o Display of Spanish Moss, indigo and community mapping by youth at the annual Heritage Days celebration
o Co-sponsored/ presented at community education sessions - Reached over 200 people across region, including CBFI landowners

PLP

o Formed the UP Technical Committee
§ Management committee for all entities involved, PLP and the agencies
§ Consists of a representative from each entity, including PLP, who goes back to larger organization for approvals
§ Brings expertise and credentials from different disciplines
§ Reviews project proposals and if all entities agree to the project they pass is on to Unc/Com to analyze funding opportunities and regulations.

o Publications/ media
§ Developed a PLP brochure
§ 6 quarterly publications (2001-2003)
§ Developed a UP Project Website www.UPproject.org

o Developed membership materials
§ principles and guideposts
§ general membership list
§ Committee and workgroup membership lists
§ Organizational charts

o Develop principles of community based forestry to follow
§ Review and revise, if needed, annually

o Demonstration Projects
§ Living History Project –
o Documentation of historical practices and events
o Using oral history to clarify values and provide information to make sense of present and future choices for the UP project and Forest Plan Ammendment
o Has diversified UP project involvement
o Have created a model to use for logger, miner, and other components of the project
o Have built capacity among the local historical societies to carry out ethno-methodological work
o Interviews have provided insight into the needs of ranchers, miners, loggers
o Information is being used to inform related project activities
o Using ethnographic methods, recorded through video and other appropriate media

o Plan to provide start-up resources for another segment to be developed by the Ute Indians.
o Hired Dr. Burns to provide technical assistance and oversight to project
o Developed Living History Video - effective two-way communication tool; placed in local libraries for public and used at conferences
o Plan to set-up a multiple use demonstration tour
§ Rancher Habitat Demonstration Project/ UP "Cow Reseeding" Project –
o Held a worksession with UP and PLP to identify ranches capable of applying new mechanisms like stewardship contracting.
o Worked with AFT and Club 20 to identify additional resources for the Rancher Habitat Demonstration
o Supported Tri-county Ag extension and a team of rangeland specialists in an effort to use cows to reseed burn areas; Example of using livestock for restoration – project is monitored and information shared with land management agencies, ranchers, environmentalists, and general public.
o Incorporating rancher interests to identify and prioritize potential projects using stewardship contracting approaches
o Effort to use cows to reseed burn areas; Example of using livestock for restoration – project is monitored and information shared with land management agencies, ranchers, environmentalists, and general public.
§ Burn Canyon Logger Restoration Monitoring // Logger/economic Development Project
o Plan to coordinate with UP to measure local economic benefit and identify predictable sources of usable restoration products from UP treatments
o Work with community loggers to design and begin demonstrating restoration approaches of different size, scale, elevation, etc. and assess economic costs/benefits
o Participate on WAPA (?)
o Hosted a small logger "un-conference" – over 50 local loggers, mill workers, and agency personnel attended
o Plan to develop a marketing strategy to "brand" Uncompahgre products
o Developed Log/product database to share product information
o Conducted a workshop with local loggers in 2001 to review opportunities associated with CBF, Planning another workshop for 2003
§ Restoration Workforce Development and Local Labor Contracting
o Evolved from the "un-conference" held for local loggers
§ Uncompahgre Plateau Project (UPP)/ Collaborative Council
o Venue for community and public land agencies to engage in decision-making processes involving public lands
o Plans and activities cross private, state and federal boundaries
o Successful in getting public land agencies to work closer together
§ BLM and USFS are using the same NEPA document to streamline the NEPA process
§ Identification of individual project leaders to manage and implement a project team representing several agencies
§ Continued and expanded involvement of agencies with PLP
§ UPP is beginning to receive regional and national attention
§ Developed Native Seed Project – a native seed collection program that will evolve into a local growing program
o Difficult bringing community members and agencies together
§ Community criteria are reflected in watershed setting effort but are considered last by the agency
o Identified and apply new contractual and administrative mechanisms – to make public lands management and restoration more effective and accountable
Jointly develop and sponsor field trips

o Workshops/ Training
§ Co-sponsored three educational workshops on gas development in the North Fork Valley
§ PLP held 3 workgroup meetings on the Forest Plan Revision process to learn more about the process and better define PLP's involvement
§ PLP held two work sessions to review and find ways to integrate Living History and economic data into the GMUG Forest Plan Revision, and then informed the GMUG forest planners.
§ Hosted a workshop for local loggers on alternative forest product development and marketing
§ Conducted a workshop with local loggers in 2001 to review opportunities associated with CBF, Planning another workshop for 2003
§ Plan to sponsor job creation/ forest worker training (summer 2003)
§ Hosted a stewardship contracting workshop (May 5, 2003) with local agency personnel and forest workers
§ Southern Ohio Ginseng Conference – held in 2002 in collaboration with the OSU Extension
§ Hold an Annual Landowners Conference
§ Plant Salvage – coordinated two plant salvage operations in 2001
§ Southeast Ohio Forest Congress
• Convened the meeting – first in Ohio
• Presented the results to almost two dozen leaders in the natural resources community
• Established credibility for RA as a convener of diverse parties
• Increased cooperation with agencies involved
• Led to various activities, including
o Conducting Professional Development training with the Division of Forestry and OSU Extension to train dozens of Extension agents, service foresters, and private consulting foresters on Special Forest Products, resulting in an increased outreach effort
o Developed the Welcome Wagon Initiative in cooperation with OSU Extension – local extension agents compile a list of new landowners and mail postcards to increase awareness of available land management information.

RA

o Brochures - 4
• Newsletters - 3
• Articles - 5 on NTFPs
• Radio
• Ginseng Video – "Sang: the future of farming"
o Demonstration Sites
o Presentations
o Booths and Outreach at Fairs and Events
o Outreach at forestry – focused events
o Professional Development training –
o Marketing
o GIS Information - Have packets for landowners
o Welcome Wagon Initiative
o Participation in Regional and National Forums – contribute to national and international community forestry efforts

o Volunteer Programs/Volunteer Work Program
o Presentations/ Events
o Communications Program - newspaper, brochures and interpretive signs
o Educational Field Tours
o Collaborate with Nez Perce Tribe Salmon Corps Program
o Community Planning Process "Integration Workshop":

Wallowa

o Demonstration Projects of small diameter roundwood grand fir in a structural application, and interpretive signs and a brochure for the Aspen Restoration demonstration site
o Developed Database of 48 contractors on list (2003 report)
o Warm Hearts Warm Homes partnership with Oregon Dept. of Forestry, Community Connections, Human Services, and local residents to provide firewood to disadvantaged families and elderly in Wallowa county
o Reports, Publications, etc.
o Support to Local businesses/ contractors - Recreation Industry and technical support to independent businessmen interested in starting mobile sawmills

WRTC	o Field Tours § For various community and interest groups § To help explain restoration forestry and fuels reduction § To help guide other communities in their quest for income producing activities from forest restoration § Organized a field tour for administrative officials from the US Department of Agriculture and Department of Interior – to encourage them to build a demonstration project similar to Ford's but focused on public land communities to integrate natural resource management and rural re-development
VFFP	o Improve linkages between FSC-certified community-based woodworkers and mills, with community-based forest owners, and with environmentally and socially responsible-minded consumers and institutions o Meet with consulting foresters one-on-one and developed informational folders that describe the role of VFF and their potential niche with the partnership o Provide marketing assistance and information, and organize landowners for them to achieve a better market position o Community-equity land trust parcel pilot with low-income participants o Publications/ Media - In-depth information sharing about the application and benefits of ecological forestry in a variety of media o Vermont Family Forest Website – www.familyforests.org o Vermont WoodNet o Recruit and maintain landowners in the VFF pool of Forest Stewardship Council- certified lands o Recruited four portable sawmill operators for certification cost-sharing to assist them in the process of becoming FSC certified o Met with architects in the early stages of project design and successfully influenced them to design projects that use VFF certified wood and local value-adding services o VFF Forest Steward signs – distributed to VFF certified landowners to place on property o Market to large-volume institutional customers in partnership with the VT Cornerstone Project o Brand development –Family Forest brand o Local market linkages/ Cost-sharing: Identified and utilized mill in Champlain Valley watershed for kiln drying and flooring millwork o Lake Champlain Maritime Museum Gig Projects: Built historical re-creations from local, certified family forests o Middlebury College LaForce Hall Project, Bicentennial Hall Project, and Recycling Center o Flooring Demonstration Project installed in a private residence in Lincoln, VT o Starksboro Town Library: bookcases and display units for the town library o Shelburne Museum's English Barn o Colby Hill Ecological Project: Monitors the biological diversity of 680 acres in Lincoln and Bristol, VT o Presentations on ecologically sustainable, community-based forestry to numerous groups o Displays

RESEARCH

AFWH	o Workforce Assessment project to determine the working conditions of intensive-labor service contract forest workers o Legal information of USFS designated camping and road blockade practices. o Information about the OR labor department, barriers to reliable information on forest labor issues/worker claims, and opportunities for action in these areas. o Information on undocumented workers rights o Land owners and permit/lease fees for floral greens harvesting o List of community services in Olympia – Shelton area of WA o Information on herbicides used in the forest o Developed a legislative issue summaries document for D.C. o Produced a newsletter article and fact sheet on the Service Contract Act o Conducting a socio-economic assessment of the mobile workforce
DCG	o Conducting case studies of neighborhood groups with Commissioner Thomas on the role of urban forestry in community capacity development. o (future?) Plan to work with the ANC Commissioners and Shaw EcoVillage Project to inventory the remaining empty tree pits in Shaw.
FSC	o Feasibility study on starting and operating a meat goat cooperative, including a survey of meat goat producers o Developing an enterprise budget for goat producers in Alabama based on information from the goat and tree demonstration farms o Surveys of landowners o Inventory/ Assessment of Non Timber Forest Products - What can be successfully grown in the area and identify the markets for those products
HFHC	o Workforce Assessment o Annual HFHC member survey o Conducted a study on flooring, paneling, and molding wholesalers, retailers, and distributors in the Pacific Northwest o Investigate target markets o Surveyed HFHC wood manufacturer business members and potential members o Conducted a case study of Green Mountain Woodworks o Conduct research on various markets, including o Market Research – members have access to market research findings and databases (lists of vendors, distributors, product information, and market data) o Developed a Monitoring and Verification System
JBC	o Gila WoodNet was established to conduct research and development of small diameter timber logging, processing, and products. o Western New Mexico University is conducting a community audit and labor skills analysis with the assistance of Pathfinders and SIGRED and $100,000 from the Department of Labor. o Santa Clara Woodworks received a $75,000 Small Business Innovation Research grant to develop a wood chip/ceramic block. o Santa Clara Woodworks received a Small Business Innovation Research grant of $75,000 to develop a wood chip/ceramic block. o Santa Clara Woodworks received a 3-year Collaborative Forest Restoration Grant of $360,000 to pursue round wood utilization. o Collaborative Monitoring Program in partnership with the Forest Trust and the Youth Conservation Corps to gather baseline and post-treatment data in the restoration sites.

Makah

o Inventory and Monitoring of Non-timber Resources (NTR)
o Surveys of local residents
o Timber Stand Inventory
o Coordinated Research with Makah Forestry Program and the developers of the Stand-Based Forest Inventory to insure compatibility of databases and protocol of NTFP and timber inventory
o Propose Joint data collection and NTFP inventory of off-reservation areas
o Marketing Research Program – for traditional foods

NQW

o Survey of Woodworkers - 23 people received the survey, and 15 returned them
o Landowner Database –
o Landowner Survey – sent to 500 randomly selected forest landowners in the North Quabbin
o GIS database of all data available relating to forestry and land conservation in the North Quabbin; will be used to produce regional maps for analysis and community outreach, and maps of parcels for landowners
o Chapter 61 Project – to better understand landowner motivations for owning forestland and assess their interests in cooperating with other landowners in forest management
• Survey of all non-Chapter 61 landowners in collaboration with David Kittredge
• Series of focus groups and follow-up survey of Chapter 61 landowners to test different models of landowner cooperation in collaboration with David Kittredge and Ford Community Forestry Fellow Andrew Finley
o Explore FSC green certification in the North Quabbin
o Plan (2003) to study the flow of wood through local markets - to understand where NQWCFP can affect change
o Research – collaborated with David Kittredge to conduct research relating to North Quabbin landowners

Penn

o Participant Assessment to document project participants' expectations, assets, resources, and constraints
o Researching and compiling information on NTFP Activities:
• Meat goat production and marketing
• Dried indigenous herb processing and marketing
• Shitake and Oyster mushroom cultivation and marketing
• Pinecone and pine straw harvesting
• Research includes optimal harvest times, sustainable yields, packaging methods and product presentation, shipping methods, revenue generation, and identifying/evaluating marketing partners and technical assistance providers.
o Inventory existing conditions – landowners and Resource Group and Project staff will conduct inventory
o Feasibility Research of community land trusts in S.C. and region
o Research Potential opportunities for opening new markets
o Develop organic processing technology
o Demonstration Forest
o Plan to conduct a forest resource survey – to identify existing and potential wooded parcels and document ownership and present uses
o Plan (2004) to research potential business structures – that best fit various long-term business goals

PLP

o Do we understand how economy connects to public lands? - PLP's first major research project
o Developed regional economic data
o Burn Canyon Logger Restoration Monitoring Project - held 62 workgroup meetings to provide community direction, involvement and monitoring to different components of the project (2003)
o Developed community-based monitoring criteria – to evaluate and develop PLP projects
o Developed Evaluation criteria
o Developed project selection criteria
o Participate in and monitor the Forest Plan Revision Process
o Uncompahgre Plateau Project (UPP)/ Collaborative Council - Identify and apply new contractual and administrative mechanisms – to make public lands management and restoration more effective and accountable
o Living History Project
o Rancher Habitat Demonstration Project/ UP "Cow Reseeding" Project
o Developed GIS maps of ranchland and base properties and plan to add agricultural revenues to the GIS maps
o Effort to use cows to reseed burn areas; Example of using livestock for restoration – project is monitored and information shared with land management agencies, ranchers, environmentalists, and general public.
o GIS: Map Assets in targeted communities to get a more complete picture of area, allowing RA to selectively target their efforts
o Feasibility study to determine if a growers' cooperative is worthwhile
o Research Plots
§ 3 herb research plots operated cooperatively with landowners
§ several herb research plots established with Ohio University for more rigorous research
o Assisted RAGA and other growers with the implementation of a SARE producers Grant
§ Developed research trials exploring how different planting techniques and treatments worked
§ Demonstrated forest cultivation to prospective growers
§ Held field days to demonstrate plantings and efficient methods for washing and drying roots
o Rural Action Research and Education Center
§ Research on medicinal herb cultivation
§ Location for meetings, trainings, and will house the Appalachian Forest Resource Center
o Landowner Interest Survey
§ Conducted with Pennsylvania State University
§ To ensure their work is grounded in community interests
§ Provided additional insights into the community and was a good learning experience
§ Reviewed the final report with their Forestry Advisory Board to identify next steps
o Grant Research
• Kellogg Policy Initiative
§ One of several groups in the Central Appalachia Network
§ Selected to carry out a demonstration of how rural networks can be used for policy work on a variety of scales
• National Rural Funders Collaborative
§ Received as part of a group of organizations in Appalachian Ohio
• Co-host the Appalachian Forest Resource Center
o National Center for the Preservation of Medicinal Herbs
§ Increased research capacity
§ Maintaining (2002) 14 research trials

RA

Wallowa

o Community Planning Process/ Upper Joseph Creek Watershed assessment
§ Conducted a household stakeholder survey with Penn State to capture attitude, values, and perceptions held by residents of Wallowa County on Land use planning, natural resource management and economic development issues
§ Conducted forest and rangeland assessments of the Upper Joseph Creek Watershed
§ Completed stream and riparian condition surveys
§ Completed road analysis
§ Updating GIS maps
§ Completed stewardship principles
§ Conduct Landscape Vegetation, Biomass, and socio-economic Assessments

o Socio- economic Monitoring Process
§ hired a summer intern from the Oregon Governor's Office
§ reports the conditions, trends, and impacts of watershed restoration investments on rural communities in Eastern Oregon
§ The socio-economic assessment workgroup is co-sponsoring a proposal to do jobs monitoring of economic and employment impacts of USFS programs
§ WR tracks the economic benefits generated by USFS – through the timber sale program and the success of the contractors working with the USFS, and the service, construction, and supply programs and the amounts won by local contractors

o Demonstration Projects
§ Participated in successful demo of small diameter roundwood grand fir in a structural application, the frame of an informational kiosk at the salt lake city Olympics
§ In partnership with OSU Forest Lab and several private companies – demonstrated potential to treat small diameter woods with environmentally preferred preservatives
§ In process of negotiating a partnership with Forest Concepts LLP to pursue the manufacturing and sales of environmental restoration products from small diameter wood
§ Projects include:
• Aspen Restoration Work
• Playa Enhancement/ Clear Lake Ridge work
• Riparian Vegetation Restoration Work (Bear Gulch and Bird Creek)
• Mechanical Slash Treatment Trial
• Grande Ronde River Noxious Weed work
• Imnaha/ Parks Ditch Water Conservation Project – working with private landowners in the first pilot of Oregon's Conserved Water Statute in the county
• Wallowa Lake Fuels Reduction Project – working with OR Dept. of Forestry, USFS, and private landowners to accomplish fuels reduction objectives around Wallowa County's wildland/urban interface
• Upper Joseph Creek Watershed Assessment
• Wallowa River Project – working with private landowner to restore braided stream conditions
• Hell's Canyon Native Grassland Restoration – working with USFS, Private Ranchers, TNC, Hells Canyon Preservation Council, Tri-county Weed Management Area, Nez Perce Tribe and others to restore native grasses, prevent noxious weeds, and improve forage for wildlife and livestock

o Market Research
§ Pursued range of market research, demonstration trials, and business planning work critical to finding new markets for small diameter logs
• Experimented with selling roundwood directly to a developer in Bend when the Joseph Timber Company mill was open
• Plan to form partnerships between local landowners and local processors to sell SDW directly to end-users
o Help connect suppliers with end users
o Identify key market niche criteria
o Help verify these claims in a cost effective way
§ Work on post and pole, fencing, architectural accents, small roundwood building components, Douglas Fir flooring, pine paneling, and certified wood products
§ Identify new and innovative products for restoration and stewardship byproducts, especially small-diameter timber

o Pilot Projects
§ Local piloting of Stewardship Contracting
• Contributed to broader regional and national considerations of contracting tools in use by USFS and BLM
§ Heritage Expeditions Program
• In partnership with the USFS, local outfitters, and guides
• Designed to assist outfitters and guides in diversifying their products and extending their season
• Seeks to build public appreciation for the cultural and natural history of Wallowa County

o Mechanical Slash Treatment
§ Treatment trial completed on 240 acres using new technology – the Mericrusher
§ Economic analysis indicates the treatment is on average half the cost of other forms
§ Ecological analysis indicates treatment was very effective in reducing fuel loads without excessive soil damage

o Stewardship Contracting
§ Interviewed contractors to determine if they were interested
§ Developed database of contractor experience, expertise, and machinery
§ Used information to effectively convince the USFS that contractors were interested in stewardship contracting but needed assistance in understanding the process

WRTC

o Socio-Economic Tracking: Compared 1990 and 2000 census data – found small towns that lost sawmills in the 90s are losing population, increasing poverty rates, and suffering disproportionately to other towns in region; Restoration work contracted through non-profits goes to local workers and through federal or state goes to larger firms outside area
o Demonstration sites: The incubator and its board will pilot a rural model for e-commerce for local products in partnership with the Cascade Small Business Development Center
o Ecology: Provide assistance to the Nor-El-Muk Tribe of Wintu to help establish baseline information for tribal Stewardship on federal lands within the county
o Research and Development with the National Forest Products Lab and others to discover products and processes compatible with community-scale forest stewardship

VFFP

o Compare forestry-related financial returns to owners of forestland in the VFF certified pool compared to the market norm
o Compare logger wages earned on Certified demonstration projects to regional non-certified industry wage averages
o Assess the volume and value of local certified wood processed in order to expand the proportion of local wood used by FSC members
o Conducted preliminary field assessment of Church Woods at Shelburne Farms with Marc Lapin, an ecologist with the Clay Plain Forest Project, and published a report
o Initiated field research work with Bill Keaton, Associate Professor of Forestry in ecologically sustainable forestry
o Compiled a list of natural communities on VFF lands and developed priorities and strategies for protection
o Examining potential of existing infrastructure to convert standing trees into high quality forest products to send more value to the forest and its stewards
o Colby Hill Ecological Project - Monitors the biological diversity of 680 acres in Lincoln and Bristol, VT
o Gather and report on economic impacts of "plugging the leaks in local economies related to forest products" - less than half the wood harvested locally is currently processed in-state and vice versa
o VFF FOREX Database
o Alternatives for developing a community owned forest

o Community Equity Modeling – provide resources for low-income landowner forest stewardship
o Value-adding Experimentation and Demonstration

SUSTAINABLE RESOURCE MANAGEMENT

AFWH

o Developed restoration principles with environmental organizations

o develop models, structures, and resources for cross-cultural cooperative ecosystem management

DCG

o Create more tree canopy, reduce mowing, create more permeable surfaces
o Develop a lasting culture of greenspace by working at a slow yet consistent pace that ensures the trees receive quality care from an empowered community.

FSC

HFHC

JBC

o Gila WoodNet and Santa Clara Woodworks are developing wood-fiber composites known as Chipcrete, formerly Ceramicrete
o Small diameter wood will also be used to build a gazebo at the park.
o Directory of local woodworkers using small diameter wood
o Local restoration logging and selling small diameter wood
o High quality furniture from small diameter wood for the Nature Conservancy of New Mexico.
o The Fort Bayard Biomass Heating Project - a $750,000 project to install a new heating system, fueled by the forest thinning products brought in by Gila WoodNet, for the entire Ft Bayard facility

Makah

NQW

Penn

o Demonstration Forest
• Penn Center has 369 acres of demonstration forest
• Lands End Woodland has 320 acres of forested waterfront property
• Both provide a living laboratory for the CBFI community-based forestry work
• Demonstrate Pine Straw, Indigo, Spanish Moss, Wood Products, Goats, and forest management techniques

PLP

o Collaborative Council/UP project
§ developed a comprehensive management plan – a biological management plan which includes criteria for selecting demonstration sites
§ Developed a vegetation mosaic plan with interagency staff that will drive early restoration activities on two key watersheds
§ Participating in a joint agency environmental Assessment with BLM and CDOW
o example of different forest restoration approaches PLP is trying
§ Burn Canyon Salvage Project
§ Cow Reseeding project – demonstrates how hoof action improves reseeding success and plant vigor

RA

Wallowa

o Forest Stewardship Programs partnership with Healthy Forests, Healthy Communities Program to explore a broader range of marketing strategies to increase revenue from private landowners and to reward good management
• Six landowners went through SmartWood Scoping in 2000, owners of ~14,000 acres are committed to participating in a certification pilot program designed by WR
o Wildland/Urban Interface Fuels Reduction Projects – Wallowa Lake Fuels Reduction Project
o Sky Bob/ Timber Bridges research and demonstration project - light skyline logging of suppressed stands on steep slopes and timber bridges used to replace culverts blocking fish passage
o Blue Mountain Habitat Restoration funded by Oregon Department of Fish and Wildlife and the Rocky Mountain Elk Foundation - Aspen restoration project
o Community Planning Process
o Stewardship contracting to secure and expand local employment opportunities in forest restoration on public lands
o Haypen II - post-operation fuels and vegetation condition monitoring
o Community Smallwood Solutions Incorporated (CSSI) - produce a variety of post and pole, and watershed restoration products
o Wallowa River Project
o Imnaha/ Parks Ditch Project– converted an open ditch system to an irrigation pipeline to increase efficiency, reduce water river diversion, and increase stream flow
o Bear Gulch Watershed restoration - Improve and conserve critical water points in the area for wildlife and livestock benefit
o The Lower Grande Ronde Noxious Weed program
o Upper Joseph Creek Watershed Assessment
o Restoration Service/ Stewardship Contracts on Public Land
o Aspen Restoration Project - Two private landowners and the USFS are participating in the program
o Clear Lake Ridge Playa Enhancement in collaboration with the USFS, TNC, and the private rancher with a grazing permit for the area
o Bird Creek Riparian Enhancement - Constructed 815' of new livestock enclosures
o Mechanical Slash Treatment trial completed on 240 acres using new technology – the Mericrusher
o Fuels Reduction/ Removing Small diameter wood
§ Completed two fuels reduction planning documents at request of USFS
• A categorical exclusion for a fire management zone along roads in a 1,000 parcel mountain-side subdivision
• Obtained funds for NEPA planning and for some fuels work on public and private land
• Using resources and expertise from the community
• USFS paid for training
§ Began an on-call NEPA team to do the planning for FS fuel breaks and restoration projects
§ Work with private landowners to access the public lands for thinning, as well as to thin private forests
§ Set up a small diameter wood sort utilization yard
o Plan to design a 3-5 year "turn-key" community stewardship contracting proposal to submit to the USFS
§ Will be based on the Trinity Fire Safe Plan for lands around the Hayfork Basin
§ Will analyze the opportunity for paying for fuels reduction work by marketing the small diameter material and the few small saw logs
§ Will include NEPA planning, implementation, data recording, monitoring, and fundraising for the implementation whereby all the USFS needs to do is oversee the community group through to the project's execution

WRTC

o Forest Restoration
§ Thinned 120 acres of public lands for fuel breaks, employing six local people over seven months
§ Participate in local stewardship contracting pilot projects
§ Assist the Rural Schools RAC's in the implementation of projects selected through a collaborative process, with a focus on the reintroduction of fire
§ Work with private landowners to access the public lands for thinning, as well as to thin private forests
§ Set up a small diameter wood sort utilization yard
§ Incorporate value-added hardwoods
§ Arranged to lease a small, low impact machine to create fuel breaks
§ Secured money to hire a crew of six to do fuels reduction work around the community
o 'total use' program
§ Designed and installed a zero emissions wood-fired space heater for the Incubator so wood wastes are used on site for heating the shop space, providing steam to the dry-kiln, and generating energy for on-site use
§ Other useable waste is given to the community for firewood
o Identify areas to become certified and/ or conserved
o Ecological Forestry Fund - erosion control on the Starksboro Town Forest (2001) & Stephen Taylor's woodlot (2001)
o Discovered VT's best known example of a clayplain forest community – an old growth, rare, natural community
o Developed Recommended Forest Management Practices and Monitoring Procedures for forest management practices, and tree and log grading standards and for tracking forest products through the value-adding process

VFFP

o "Chain of Custody"– Developed a toolkit to track logs from the forest to the marketplace; Nine certified companies in 2004
o Certified 6 timber harvesting plans (2001)
o Community Mapping - defines the boundaries of distinct natural communities in a given area of land
o Reviewed proposed timber sale on Middlebury College lands
o Organized and conducted timber sale and sawing for the English Barn at Shelburne Museum
o Provide better access to high quality, affordable natural community mapping services
o VFF assisted with the development of a forest management plan and annual monitoring protocol for the New England Forestry Foundation's Colby Hill Ecological Project

o VFF log aggregation yard and Dry Kiln
o Refined system for tallying log scale and grade - Researched and implemented system for bar coding logs

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o Mechanical Slash Treatment trial completed on 240 acres using new technology – the Mericrusher

WRTC	o Fuels Reduction/ Removing Small diameter wood § Completed two fuels reduction planning documents at request of USFS • A categorical exclusion for a fire management zone along roads in a 1,000 parcel mountain-side subdivision • Obtained funds for NEPA planning and for some fuels work on public and private land • Using resources and expertise from the community • USFS paid for training § Began an on-call NEPA team to do the planning for FS fuel breaks and restoration projects § Work with private landowners to access the public lands for thinning, as well as to thin private forests § Set up a small diameter wood sort utilization yard o Plan to design a 3-5 year "turn-key" community stewardship contracting proposal to submit to the USFS § Will be based on the Trinity Fire Safe Plan for lands around the Hayfork Basin § Will analyze the opportunity for paying for fuels reduction work by marketing the small diameter material and the few small saw logs § Will include NEPA planning, implementation, data recording, monitoring, and fundraising for the implementation whereby all the USFS needs to do is oversee the community group through to the project's execution o Forest Restoration § Thinned 120 acres of public lands for fuel breaks, employing six local people over seven months § Participate in local stewardship contracting pilot projects § Assist the Rural Schools RAC's in the implementation of projects selected through a collaborative process, with a focus on the reintroduction of fire § Work with private landowners to access the public lands for thinning, as well as to thin private forests § Set up a small diameter wood sort utilization yard § Incorporate value-added hardwoods § Arranged to lease a small, low impact machine to create fuel breaks § Secured money to hire a crew of six to do fuels reduction work around the community o 'total use' program § Designed and installed a zero emissions wood-fired space heater for the Incubator so wood wastes are used on site for heating the shop space, providing steam to the dry-kiln, and generating energy for on-site use § Other useable waste is given to the community for firewood
VFFP	o Identify areas to become certified and/ or conserved o Ecological Forestry Fund - erosion control on the Starksboro Town Forest (2001) & Stephen Taylor's woodlot (2001) o Discovered VT's best known example of a clayplain forest community – an old growth, rare, natural community o Developed Recommended Forest Management Practices and Monitoring Procedures for forest management practices, and tree and log grading standards and for tracking forest products through the value-adding process o "Chain of Custody"– Developed a toolkit to track logs from the forest to the marketplace; Nine certified companies in 2004 o Certified 6 timber harvesting plans (2001) o Community Mapping - defines the boundaries of distinct natural communities in a given area of land o Reviewed proposed timber sale on Middlebury College lands o Organized and conducted timber sale and sawing for the English Barn at Shelburne Museum o Provide better access to high quality, affordable natural community mapping services o VFF assisted with the development of a forest management plan and annual monitoring protocol for the New England Forestry Foundation's Colby Hill Ecological Project o VFF log aggregation yard and Dry Kiln o Refined system for tallying log scale and grade - Researched and implemented system for bar coding logs

In sum, the data gathered and analyzed by this project provided ample information from which to describe and understand the diverse organizational structures, styles, and strategies taken by IPs, and provided indicators of how CBF is institutionalizing.

Appendix C: How does CBF generate benefits? Expanding Community Decision-spaces, Resource Access and Equity

November 28, 2006

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Community-based forestry aims to make a difference in peoples' lives. Through CBF, people seek to improve the health of their communities and of the forests that surround them. This investigation set out to examine what benefits result, who among the community enjoys them, and why. In doing so it became clear that it was first necessary to examine a more fundamental question: how does CBF bring about social change? An understanding of *how* CBF generates benefits [2] is required in order to explain the distribution of these benefits among individuals, families and communities.

This Appendix investigates these and related questions in greater depth than the section found in the body of the report, and supplies detailed evidence derived from two case studies. It develops a framework for understanding the dynamics and outcomes (benefits) of CBF, based on the documented experience of the 13 sites participating in the Ford Foundation's Community-based Forestry Demonstration Program (CBFDP), the wider literature, a rich conversation among participants and other researchers in workshop and other settings, and intensive, ethnographic field research at two of those sites. Part I lays out the key questions framing the investigation, develops the framework, derives a model for CBF, and contrasts it with a widely accepted archetype. Parts II and III apply the framework to an analysis of the two case studies: the Jobs and Biodiversity Coalition (NM) and the Federation of Southern Cooperatives (AL). Appendix Y outlines a tool that CBF groups can use to apply the framework to community self-assessment and monitoring.

PART I

An alternative framework for understanding CBF

Introducing the framework

[2] Here 'benefits' include anything that is perceived by some of those affected as an improvement in their own lives, or in the condition of anything that they value (e.g., their community, the forest). Not everyone affected will perceive a given 'social change' (a broader term) as a benefit – there will be some who have compromised, and others may be worse off. However, no benefits (our focus here) can be generated without social change occurring.

There are four hypotheses embedded in the [proposed] alternative framework for understanding community-based forestry. The first asserts that *CBF initiatives will bring about social change when they transform:*

1) *how* decisions about forest management and community development are made and *by whom* (i.e., decision-spaces), and

2) *who* gets access to what resources (e.g., forest, capital, knowledge).

These transformations form the foundational characteristics of CBF efforts. In this way, social change is placed logically prior to environmental change. This holds even if one does not consider a healthy forest to be less important than a healthy community – or even possible without one. The reason is that it is *people* who decide whether and how to cut trees, pave them over, restore them or protect them. It takes people to do any of this work. So, if a change in forest management and forest condition is envisioned, social change will be necessary at some level – local or global, specific or systemic, socio-cultural, political, or socio-economic.

This "decision-space and access" approach contrasts in significant ways with a prominent model of CBF that stresses the balance among its social, ecological and economic components. Widely cited in the literature on community development more broadly, it has been termed the "triple bottom line," or "three-legged stool." It has been persuasively articulated in the analysis of lessons learned from the CBDFP presented in *Growth Rings: Communities and Trees* (Aspen Institute, 2005: 3):

> Community-based forestry derives its fundamental strength and versatility via a three-pronged working framework that honors the mutual interdependence of forest and human communities. Within that framework, each component strategy of community-based forestry – social, ecological and economic – is considered to be equally important.

With the proviso that the balance among the three "legs" be construed as dynamic and adaptive, the "three-legged stool" is the model of the CBF *ideal* as advanced in *Growth Rings,* and indeed in the original call for proposals put out by the Ford Foundation. Embracing this model would suggest the yardstick against which the thirteen project pilot sites should be measured-– to what degree did they simultaneously advance these three, integrated goals?

In fact, an examination of the record of accomplishments of CBF at the pilot sites finds that a number of the initiatives do not match up well to the "three-legged stool" model as an ideal. In that sense, they stretch the boundaries of what is defined by the Ford program as constituting community-based forestry. However, using this framework to analyze the case studies validates much in the performance of these cases, brings into focus different strengths, and suggests a more expansive notion of the definition of CBF.

Explaining the framework

While the interpretation of the "access" element of this CBF framework is straightforward, the notion of "decision-space" requires further discussion. "Decision-space" is defined as a concept with two major aspects: power and process. The first refers to the scope or range of decisions (topics) that individuals and local organizations have the opportunity to participate in making, as well as the range of possible options (outcomes) they have the opportunity to advance. A number of the partners in the CBFDP have found ways to move past deadlock over environmental conflicts and governmental inaction by entering into collaborative processes with federal land-management agencies and others – first proving the success of this approach at the local level, and then successfully advocating for its wider adoption and, in some instances, institutionalization at the policy level. As a result, the voices of CBF organizations and rural community members (including those not associated with, or even opposed to, them) are increasingly shaping resource management decisions on public lands and public policy affecting private lands. Moreover, these voices are not just advocating positions, they are "weaving our own information" -- local knowledge about resources, as well as innovative solutions, into the decision-making process.

This first aspect of decision-space is thus about finding *power*, and finding new ways to share power. Where this requires system change, CBF groups have been part of bringing that transformation about. In the words of one CBDFP leader,

> The people most affected are often the least involved in terms of control and input. Step one is figuring out, or being educated as to what affects your life, and step two is how to gain control of this…. In this movement we've seen a huge shift in ten years -- from no voice, no consideration, to public action and voice.

For some, CBF represents a return to democratic principles,

> When all else fails, fall back on democracy… It's the impulse that started it -- participatory democracy…for me, what's most important is the participation, the understanding of the people affected. Traditional forestry did not take this into account; that's what makes it CBF.

However, particularly where CBF constituents have found themselves to be highly marginalized (e.g., minority landowners and forest workers and harvesters), the emphasis has been not so much as gaining voice and influence in formal arenas, at the proverbial "table," but in developing their own venues first to find their voices, and then to develop a collective vision and voice on particular issues. One CBFDP leader explained from her experience,

> When you start from the position of being marginalized or disenfranchised, and this is built into your organization ethic, you start finding other ways, away from the power and control decision-making model, for accessible participation ... What a lot of groups have done is to find other venues appropriate to what is desired from system. If you look at the participation aspect, groups begin affecting decision-making without even being there. Something else is going on.

This is the second aspect of decision-space, one that was dubbed by CBF project partners as the *process* of "creating space." One workshop participant deemed this to be central to the definition of CBF, which in his view is:

> the process of creating spaces for inclusive listening and dialogue creating holistic strategies to address community issues.

Another participant clarified that before his project could make any attempt to tackle forest management decisions *per se,*

> Basically the first thing we did … we organized. While we were organizing, we kept in mind that we wanted to create a space where people have a voice. What comes first is organizing, it's giving everyone a voice and then you bring them together... You establish the process where everyone can speak up and share ideas.

The third element of the framework concerns which social groups within the community, differentiated by class, race, ethnicity, gender, age, and

other important social markers, have benefited from CBF. It directs us to consider the relationship between *who* among these groups gained access to resources and expanded decision-spaces and *who* gained those benefits.

Hypothesis #2 proposes that *who among community members has gained access to resources and decision-making influence will reflect:*

- *the distribution of power,*
- *cultural values and preferences, and*
- *racial and ethnic dynamics in the community.*

This suggests the further question: are benefits limited to those people? Or do indirect benefits, via economic multiplier effects, ecosystem services, land and population retention, conflict reduction and the like, significantly improve the lot of non-participants? These questions can only be answered empirically in each instance. *Hypothesis #3* suggests that:

> *those who have a role in making decisions and obtain access to the resources to implement them are more likely to benefit* than those who remain on the sidelines.

Traditional powerbrokers seldom, if ever, have initiated community-based forestry efforts. Indeed, CBF initiatives generally arise to address the lack of alternatives open to "ordinary people" in communities marginalized by their distance (geographic and socio-political) from urban centers of power. These conditions are exacerbated as macro- political and economic trends transform rural[3] economies, with the decline of natural resource-based industries, demographic shifts, and the de-funding of government services and functions. Furthermore, although they may have professionals among their members, staff and boards, most CBF organizations are oriented to the concerns of workers, small landowners, and small business people -- all those in a disadvantaged class position.

For these reasons and others, the CBFDP partners uniformly feel themselves and their constituencies to be marginalized. Some express doubt that degrees of marginalization among the marginalized are pertinent, particularly among the more homogenous (white) communities. This may best be left as an empirical question to be examined case-by-case. Even poor rural communities are internally differentiated with respect to power and wealth (especially when non-resident workers are considered), and macroeconomic trends have uneven impacts. This

[3] It should be noted that one of the 13 CBFDP groups, DC Greenworks, is situated in an urban setting. Nonetheless, most elements of this framework would still apply.

argues that CBF groups would do well to conduct a power analysis of the communities in which they operate, and to monitor participation and benefit distribution on an on-going basis (see self-assessment tool in Appendix Y).

Cultural values and preferences influence participation in community-based forestry in ways too numerous to recount. They shape what uses and qualities of forests are valued, what types of livelihood are desired, effective modes of leadership, appropriate ways of expressing oneself and forming decisions in groups, inclinations towards entrepreneurship – the list goes on. Operating within one's cultural in-group will always be the most efficient and comfortable. Hence, even where the intention is to be inclusive, CBF efforts are highly likely to attract participation of primarily members of the same social group(s) that initiated them – unless very self-conscious outreach efforts are made, efforts which inevitably involve taking risks and learning from failures.

In many respects the most salient, and deep, cultural divides are racial (often also associated with ethnicity, language and/or national origin). The issues of race and ethnicity are explosive for many CBF organizations and communities. This is the case for multiple reasons, beginning with the fact that these are fraught issues for American society in general. Beyond this, CBF organizations, whose legitimacy rests on being seen to represent communities in their efforts at self-improvement, would be very vulnerable to accusations of exclusivity. However, while this is an argument for proceeding with care, it is not an argument for avoiding the subject. Although it is not possible to tackle this topic in depth here, suffice it to say, that in the United States even though race, ethnic identity, culture and class intersect in complicated ways, race is a special category, not subsumable under any other form of marginalization.

An alternative model – *Building the CBF House*

This framework for understanding community-based forestry holds that its essential foundation lies in the elements of social transformation -- expanded access to resources and decision-spaces for communities. This stands in contrast to the simultaneous and balanced integration of social, economic, and ecological objectives symbolized in the "stool" model. Some CBF partners feel strongly that the integration of the three objectives is appropriate as an *ideal*, and indeed that it is an essential part of a genuine CBF vision, however long-range the view. Regardless of whether this vision is a requisite feature, the alternative framework provides for the possibility that, as a matter of *strategy*, rather than building all three legs of the "stool" simultaneously, a CBF initiative may choose to tackle

social, economic, and ecological objectives in sequence over time. One way of depicting the latter approach is as a *house*, in which expanded resource access and decision-space provides the foundation. Progress on the most valued and/or feasible of the three objectives is then lain down as the ground floor, before a second objective can be built upon as the second floor, with the third objective added last. The rate of progress from one 'floor' to the next is not predictable, and reaching the top floor may take longer than, for example, the CBFDP five-year project cycle.

As with all models, its illustrative value lies in its simplicity; yet while this simplicity highlights key features, it inevitably obscures others. While co-equal and simultaneous emphasis on all three objectives might be uncommon among CBF efforts, a completely linear, discrete temporal sequence of objectives is probably even more rare. Even groups that wish to complete the ground floor first, are likely to have put up at least a framework for a second and possibly third floor. Moreover, the 'house model' downplays the dynamic interaction and synergistic effects among the three elements (*a.k.a.* floors, legs, or objectives). However, the utility of the house model lies in the degree to which it reflects and elucidates real experience: as described below, for several of the CBFDP partners, the match is a good one.

The Social: ***Equity, Capacity, Resilience, Empowerment***

House or stool, floor or leg, the "social" component of community forestry is the most difficult to define. In many discussions of the "triple bottom line" in the broader field of community development, it is referred to as the "equity" element. Consider three aspects of this multivalent concept: distribution, capacity and empowerment. First, adopting equity as the standard demands that we ask of community-based forestry, not just "has it made the community better-off and distributed the benefits *equally*?," but rather, "has it made the *worst*-off in the community better-off? have those in the most marginal social categories participated? has the level of social inequity decreased, in terms of voice, power, respect, material or other benefit?"

This is a tall order for any social program. No wonder, then that one of the partners expressed the opinion about the CBDFP that, "the equity leg was the shortest."

Progress towards this objective begins to seem more feasible and, arguably, community forestry may be found better suited to the task, when the notion of social equity is broadened to incorporate the second

aspect of equity: community capacity (or broader yet, to community resilience). A community's capacity (comprised of its physical resources, individual skills, and collective ability to work together) is an indispensable building block of community-based forestry. It is necessary to pull CBF off, and inevitably must be built up before reaching the point where it is ready to do so. Applying enhanced community capacity to CBF activities and objectives generates social and economic benefits that have the potential of reducing inequity. Enhanced community capacity helps build more resilient communities, i.e., communities that are better equipped to adapt to shocks and respond to opportunities. As one workshop participant put it resilience, or in her words, "sustainability … requires sharing resources… peace requires social equity."

On the other hand, the notion of community capacity is not subsumable under equity. The skills and resources that enhance a community's capacity to act need not be equally distributed among members, nor will all residents and their interests be represented in the institutions that build up a community's organizational capacity. For the purposes of this analysis, the emphasis is on equity as the third, "social" component or objective of the community forestry triad, for several reasons. First, it is clearly part and parcel of addressing the question "who benefits?"

In addition, research results provide some support for the final *hypothesis (#4):*

> *In order to reduce inequity, community-based organizations must make equity an explicit target to which they hold themselves accountable.*

When community capacity or resilience is the goal, marginalized groups are often left out, as, for example, when entrepreneurial opportunity or training is offered to whomever comes forward, with no targeted outreach, extra support or culturally appropriate adaptation to enable inclusion of disadvantaged populations. A workshop participant made the point forcefully,

> Once you get the ecology and economy floors built, you don't naturally progress to the third floor [equity]… yah, it may take longer than the project, but if it's not in the blueprint, not part of the vision, you'll never get there.

Can equity be achieved by the passive redistribution of benefit towards an "equal" state? Or, does it necessitate *empowerment*, such that the beneficiaries determine what needs will be met and how? Addressing this third aspect of

empowerment brings us back full circle to decision-spaces and access to resources. In applying this framework, this aspect of equity is considered *first,* as a foundational issue that precedes the discussion of distributional outcomes and capacity development.

Applying the model(s)

How can CBF groups apply the framework developed in this report section? Which model should be applied, and how?

No one model should be used as *the* yardstick for evaluating community-based forestry. In fact, if the 'CBF stool' is viewed as an *ideal*, or long-term *goal*, and the 'CBF house' is understood to model the *process*, or particular *strategies*, they become perfectly compatible, and there is no need to argue for one over the other.

One workshop participant suggested an excellent and eminently practical concept that blends the two models. He proposed thinking of the three elements of CBF – ecology, economy, eq uity -- as *axes* along which progress can be visualized. This makes it easy to understand community-based forestry organizations as occupying a *spectrum* of possible positions mapped in three-dimensions (or, if more elements are added, in multi-dimensional space). Such an understanding removes the implication that if the results of a CBF initiative don't fall along the balanced trajectory (a line at 45 degrees to each axis), "*it's not really community forestry.*"

We have, however, argued, that the foundation *is* an essential element of community-based forestry.

In order to accomplish social change (and thereby also reach ecological goals), CBF transforms:

- *who* gets access to resources, and
- *how* decisions about forest management and community development are made and by *whom* (i.e., it creates or augments decision-spaces)

Methods: the Case Studies

The main text of this report explains how the research questions for the whole research team were generated and iteratively refined by interacting with those representatives from all thirteen sites who attended the periodic Ford-sponsored meetings and associated training workshops. While this method can be described as participatory, it should be specified who was doing the participating. At the beginning and end stages, that is, when the specific research questions were decided upon, and then again at the final workshop when we critiqued, amended and appended to the draft report and analysis, the participants were the leaders and selected members of the community-based organizations that received the Ford funding. This did not, and could not feasibly, include a cross-section of the communities themselves.

The most substantial period of the research, however, was conducted in the communities. I spent a total of two months in the field, one month at each of the two sites comprised of three visits at each over course of three years (2004-6). I conducted individual or small group interviews with over 27 people at each site, including staff and members of the Federation and JBC, a range of other community members, agency employees, local officials, consultants, and members of other community-based organizations. I visited farms in Alabama and the mill site and woodworking shops in New Mexico. I also attended meetings of the JBC and Federation, as well as unrelated community events.

Using Microsoft Word, I created a topical index of my fieldnotes, in the process transcribing a significant portion of them. These were searched and sorted by subject and respondent simply by using the Table function.

Several meetings were called specifically for me to develop my research plan and objectives and, subsequently, to present the preliminary findings. Wherever possible, I incorporated into the final report the feedback I received on those occasions, as well as in response to the circulation of the draft report by email. Dialogue by email proved a useful mode for discussion and source for gathering and verifying information. I also reviewed published literature as well as documents produced by the Federation, the JBC, and the Aspen Institute (the managing partner) for the Ford Foundation, as well as for public circulation.

It has been an immense privilege to have participated in this research. I am very grateful to the many individuals -- Federation staff and JBC members, community members, workshop participants, the Extended Research Advisory Team, and my fellow researchers, for being so generous with their time, information and insights. I am also grateful to the Ford Foundation for funding not only this research, but also the overall Community-based Forestry Demonstration Program.

Results

The evidence and findings from the two case studies are presented sequentially: first the JBC (Part II), followed by the Federation (Part III). Each case study first outlines the political-economic, socio-cultural and environmental context. The investigation then considers how the two CBF organizations laid the foundation for community-based forestry by gaining access to resources and a role in decision-making about them, and for whom they did so. In subsequently assessing the social (equity), economic and ecological benefits generated, we consider to what extent these outcomes fit the "three-legged stool" vs. "house" model of community-based forestry. The evidence from each case is used to evaluate the four hypotheses generated in the introduction.

PART II

Case study Analysis:

The Jobs and Biodiversity Coalition

The Jobs and Biodiversity Coalition came together in Grant County, New Mexico, under highly polarized conditions. Its home base, the village of Santa Clara, borders on the vast, rugged, remote and spectacular Gila National Forest. During the preceding years of conflict, environmental organizations faced off against the Forest Service and extractive industry. Beginning in the late 1980s they began to deploy appeals and litigation and eventually brought active forest management to a standstill. Further hampered by its own lack of funding, by the mid-90s the Forest Service was effectively forced to cut off access to the forest for contractors, choking off the local supply of wood.

JBC is organized around the primary goal of, in the words of a co-founder, "low impact forest restoration that yields wood that is used to optimize job creation and economic development." In order to realize this vision, the first challenge the JBC faced was gaining access to the forest. It thus has taken the sequential, house-building approach to CBF: first establish the foundation by gaining access to resources. It did so by forging a new decision-space, a precedent-setting

collaboration that found the key to unlock the forest gate, and by winning the Ford Foundation grant (among others), which provided the start-up capital. This enabled them to lay the ecological ground floor through forest restoration, which produces by-products (wood) that feed small businesses that primarily serve local markets, thus building a sustainable local economy. When a founding partner of the coalition dropped out, the JBC was left with no strategy to erect the 'equity' floor. Results thus far tend to corroborate the hypothesis that this CBF project will not make a significant impact on social inequity. However, there is ample evidence that it has benefited the community as a whole.

The context

Extending north from ninety miles of the border in Southwestern New Mexico, Grant County is one of the least densely populated in the United States.[4] Almost half the population live in an urbanized area, comprised of Silver City (population 10, 545 in 2000) and the adjacent 'mining district,' including the nearly 2,000 residents of the village of Santa Clara. Up until 1870, when a silver boom sent Euro-Americans flowing into the area, it had been thinly populated by Apache tribes and small-scale Mexican miners.

Political-economic

Despite its rural nature and geographic isolation, Grant County has been tightly linked to the global political economic by its historic and on-going dependence on the mining industry. Silver was displaced by copper as its economic base with the founding of the first copper mine in 1910. Today the Phelps Dodge Corporation (the second-largest global producer of copper) operates two mines and a smelter in the county, although it is in the process of shutting down the smelter and one of the mines. Recently the company declared its intention to close the remaining mine, whose yawning maw (one of the world's largest open-pit operations) years ago swallowed the birthplace of many of the district's old-timers.

King Copper has led Grant County's economy through the bumpy ride typical of single-commodity dependence. Phelps-Dodge and its predecessors shed workers on a periodic basis, with the last round of massive lay-offs bringing the county-wide unemployment rate up to 14% in 2003. In late 2001, while the CBF project was just getting underway, worldwide copper prices dropped to 100-year lows, subsequently rebounding to the highest level ever by the end of the project in 2005. Unemployment at that time was still relatively high at 8.3%, as the company has come to rely on insecure contract work, reportedly importing an

[4] 7.8 persons/square mile (U.S. Census, 2000)

increasing number of workers from outside the county. Despite the fact that unions have been pushed out, the legacy of their struggle (chronicled in the classic film, *Salt of the Earth*) remains in the form of relatively high wages in the mines. Thus, locals describe a workforce that was raised with the expectation of working for the company, and which will sit out layoffs, waiting for its call. A few local commentators recently remarked that this attitude has begun to shift as a result of the company's increasing reliance on short-term contract work with little-to-no benefits and no severance pay.

In 1960 through the late 1980s, the mining sector generally employed more than 30 percent of those working in the county. Thereafter this rate began to fall, dipping to slightly over 9 percent in 1999. Nonetheless, Phelps Dodge remains the largest employer in the county, followed by the school system and other government agencies (Penn, 2002). Although it is continually contesting them, the local taxes paid by the company are the mainstay of the county budget.

As the mining sector has shed high-paying jobs, the service sector has grown, adding low-wage employment. The beauty of the landscape and the recreation opportunities it affords have attracted tourism and a growing influx of retirees; trends which have not added many jobs or much tax revenue. While a state university and regional hospital provide some employment, manufacturing activity is minimal.

The traditional land and natural resource-based sectors of agriculture and forestry employ just under 5 percent of the county workforce. Competitive forces and drought have reduced the minor importance of cattle ranching, which still depends on grazing allotments on the National Forest. Other than employment by the U.S. Forest Service, there are very few forestry or timber-related jobs in Grant. Outside of the JBC, there are generally three (sometimes up to five) local thinning contractors operating; they are working with small, often temporary crews, doing mostly "cut and chip," or "pile and burn" jobs.

The last local sawmill out of the few that operated in the southern part of the forest shut down in the early 1980s when the supply of large-diameter logs was cut off by unfavorable macro trends in the industry and environmental litigation. However, the impact of declining timber sales and mill closures was muted by the industry's small share in the local economy. In contrast, the impact was much harsher just to the north in Catron County, where a much larger mill closed its gates. However, the confrontational atmosphere seeped back south.

As a consequence of these trends, after an extended period of relatively high earnings that lasted until 1982, per capita income declined fairly dramatically compared to the rest of the U.S., reaching 62% of the national average in 1999.

That year 15% of Grant County families were living in poverty (U.S. Census 2000). In 2002-2003, 57% of public school students county-wide received free or reduced-price lunches, that number rising to 75% in the mining district (Grant County Community Health Council Profile, 2004).

Socio-cultural

Almost half the residents of Grant County are of Hispanic/Latino origin, and a slightly smaller percentage are non-Hispanic whites. Hispanic families are concentrated in lower income areas, the mining district in particular; for example in Santa Clara they formed 84% of the population in 2000 (US Census). About one-third of county residents speak Spanish at home, with one-tenth reporting they speak English "less than very well" (GCCHC Profile, 2004). Most Hispanics have lived in the region for multiple generations, dating the arrival of their families to the influx of Mexican labor drawn to the mines, particularly in the early part of this century[5].

As the previous statistics indicate, social conditions are not uniform across the county, nor among social groups. Poverty is more prevalent not only in Hispanic areas, but also among the 39% of households headed by women, affecting 26% of those families (GCCHC Profile, 2004). On average, the population of citizens over 65 is becoming better off as it swells with the arrival of wealthy retirees. At the same time, school enrollments are falling as young families leave the county. The disaffection and hopelessness felt by a segment of the youth is illustrated by a grim statistic: the suicide rate (48 per 100,000) for older teens in Grant County is more than double the state average.

Community perceptions

Statistics do a limited job of registering the strain of social change among the people.

> Santa Clara used to be called Central because it's in the center of the mining district. We used to be on main highway, then the upgrade passed it by, and things began to go down.... We used to have a hardware store, a dry goods store, 2 liquor stores… [Now there's just one *tienda*].
>
> We're struggling… we're all so isolated here… wealthy people are moving in ... Native people are going to find it hard to survive here. Young families are moving away. The school age population is dropping because of the cost of

[5] Note the contrast with the much longer-term presence of "land grant" holding *Hispanos* in Northern New Mexico.

> living going up and layoffs… Those retired people are not interested in supporting the schools.

During this time of social flux, one thing that has not changed is the balance of power -- at least not in the minds of the research participants who volunteered an opinion on the matter.[6]

> It's still a company town.
>
> Phelps Dodge is like an octopus… They run [a local economic development organization], the university, the Health Council…
>
> For some of the high school faculty the schools are caretakers until kids get old enough to work in the mines, and then the mines will take care of them.
>
> [The local economic development organization] has done nothing… the community has no faith in them and doesn't want to deal with them. They were started by PD because PD doesn't want to see any industry come in that would pay a competing wage. They just want to sustain the old boy's club, the *padron* system… people who go against PD have a way of disappearing… PD doesn't want to see any economic development because it would have to compete for workers.

The legacy of the "*padron* mentality," or patron-client relationships, as inculcated in the mines, was cited to explain a range of social behaviors, from the subservience of some Hispanic workers to the way in which patronage runs the political system from the governor on down.

The close-linked nature of the power elite is indicated by the positions held by one influential couple. At the time of the project, he (the Chamber of Commerce's 2005 Man of the Year) was the lobbyist for Phelps Dodge and the chairman of the Board of Regents for the Western New Mexico University, the Grant County Community Health Council and the community economic development organization. She was the executive director of the Council and served on the board of the hospital.

This couple, along with one state senator, the local congressman, and two out of three County Commissioners are all Hispanic. The fact that ethnic divisions are

[6] These were mostly, but not exclusively, members of the SW Hispanic Roundtable, a Grant County-based voluntary association, currently in the process of applying for non-profit status.

multiple, and do not map simply onto class and power divisions received eloquent testimony,

> Just because we have Hispanic representatives doesn't mean there's equity… or even a greater possibility of equity… because there's divisions within the divisions… Senator A. supports legislation that is consistently pro-PD… that's how they maintain their political power…. The issues for low-income people aren't being addressed by anyone…it's like an embarrassment… we don't talk about the down under…

At the opposite end of the power spectrum, community members are concerned about the apparent formation of an underclass that sees no way out.

> Only about 50% go to college. We keep the other 50% that can't go to a higher level. They've got no jobs, but they are not recorded as unemployed. WMNU can't educate these kids… it doesn't do tech training… we have a meth problem, and gangs are moving into the area and exploiting these kids. We don't teach them how to work.

Environmental

The diverse physical landscape of the county extends from thick forest in the north to semi-arid desert in the south. The Gila National Forest includes approximately 3.5 million acres, comprising about half of the total land in the county. Ponderosa pine dominates the forest cover, which is interspersed with piñon-juniper stands and clusters of hardwood species. Over the last century heavy livestock grazing, widespread logging, and fire suppression (probably exacerbated by climate change) have led to current environmental problems: the loss of soil moisture and nutrient availability; decreased resiliency of trees and increased mortality of old-growth; a high density of small diameter trees; and, as a consequence, an increase in the severity and size of fires. The threat (and periodic reality) of catastrophic wildfire has become the burning environmental issue for the Forest Service, environmental groups, and the community alike

The CBF Demonstration Project

In 1999, the executive director of the Cooperative Ownership and Development Corporation (CODC), a local nonprofit, applied for the first phase of the Ford Foundation's Community-based Forestry Demonstration Program (CBFDP), a one-year planning grant for developing a proposal for the full five-year grant. During that year, several conversations about potential collaborations among local parties gelled in response to the grant opportunity to form the Jobs and Biodiversity Coalition. In order to supplement its focus on community

development with a partner with ecological expertise, the CODC brought in the Center for Biological Diversity (CBD), a locally-based, regionally influential environmental organization. The CBD had been engaged in efforts to initiate forest restoration work with the US Forest Service and Gila WoodNet, a local non-profit dedicated to researching and implementing methods to remove and utilize the small-diameter trees that are the by-products of restoration. These core partners brought in a suite of others[7], all of whom were united by a common interest to implement a CBF project. Beyond this, the JBC has never formed a formal organization; rather the coalition defines its "members" as those who share this purpose, attend its meetings, and join in project activities.

The project got off to a rocky start, as explained in a 2004 "Site Assessment" produced by the Aspen Institute, the "Managing Partner" enlisted by Ford to support the CBFDP grantees:

> Early on, most of the JBC members were not fully aware of the overall goals and orientation of the CBF demonstration program and said they had little opportunity to learn about them. The reasons given for this included the fact that only CODC had been involved in developing the community component of the grant proposal, the CODC executive director involved in writing the proposal left the organization soon after the grant was approved, and CODC, who had primary contact with the Ford Foundation, did not effectively communicate Ford's expectations to the rest of the coalition. Concerns about CODC's lack of accountability, management, and staff capacity [arose]… By November 2002 … CODC withdrew from the coalition.

With strong support from the Managing Partner, the JBC survived its institutional birthing pains, and went on to attempt to implement the six strategies it described in project documents, namely:

1) develop and train forest restoration crews to work in the forest;
2) complete the sort yard for primary processing of small diameter wood;
3) foster and encourage small business development in Grant County, NM with a focus on the Village of Santa Clara;

[7] Initial members of JBC included: CODC/Tierra Alta Wood Products, Gila WoodNet, Center for Biological Diversity, The Nature Conservancy, USFS Gila National Forest, Southwest Forest Alliance, Upper Gila Watershed Alliance, The Town of Silver City. Those who later joined the coalition include: The Silver City Grant County Economic Development Corporation (SIGRED), Small Business Development Center (SBDC), Kenney Consultants, the Village of Santa Clara, Black Range RC&D, and a few other individuals.

4) develop and support a mechanism for responding to the large quantities of small diameter wood that will be generated over the next year;
5) build community understanding and support; and
6) establish an ecosystem management/ monitoring piece that will enhance and restore the forested ecosystem in cooperation with the Forest Service.

What sort of outcomes have they achieved? Did the JBC's efforts to implement community-based forestry bring about lasting social change? Rather than attempt a detailed impact analysis, our hypothesis (#1) directs us to investigate whether, and how, CBF has changed:

1) who has a role in making what decisions how about forest management and community development, and how
2) who gets access to what resources.

The hypothesis holds further that if we find significant changes of this fundamental nature, CBF has a foundation to build on, and we would expect to see significant social change begin to evolve. The evidence we present below largely validates this claim.

Decision-spaces

At the inception of the CBF project in 1999, there was essentially no access to the Gila National Forest for the purpose of cutting trees (other than a few cords of firewood). Those gates were slammed shut. The situation had arisen due to a combination of factors: shifts in the timber industry in response to globalization and mechanization, sapped Forest Service budgets, and the oft-implemented threat of litigation by environmental groups. Prominent among the latter had been the Center for Biological Diversity, a JBC member. Conversations about remedying this situation had led the nascent JBC to premise its project on obtaining access to the National Forest to remove small-diameter timber. It took over two years of concerted effort before the JBC was able to pry open the rusty gates of the Forest and to restart the flow of wood in Grant County.

Power and Process

In order to achieve this breakthrough, it was necessary for the JBC to insert itself into the decision-making process of the Forest Service. In essence it had to create a new *decision space*, with two elements, namely *power,* referring to the content and degree of influence, and *process*, the creation of new spaces, or opportunities and modes of community input. In this instance, the latter proved the key. The

opportunity to gain in power and exercise influence over an expanded range of topics *followed from* the creation of a new way of making decisions with a new role for (elements of) the community.

The effort to find a way in to unlock the stalemated Forest Service decision-making machinery had been initiated by the three key founding members before the JBC was formed. A courageous local environmentalist (CBD), the enterprising owner of a small. local wood-based business (Santa Clara Woodworks), and an open-minded District Ranger (USFS) were able to find what has since become their mantra -- the "zone of agreement." How you find that zone, they discerned, is by focusing on an on-the-ground, in-the-forest, small-scale project.

> *Start with a project, not a grand plan, and leave aside other issues, about which you can agree to disagree.*

This way, even mutually antagonistic groups can find common ground. As one member put it,

> *Once we got into the forest, it was astounding how much we agreed on which trees should be cut. Immediately, our zone of agreement, and trust level, went up ten times!*

Having agreed on a restoration-based prescription for a small sale on the Gila was the first step. The next step was to neutralize the external opposition. Here it took the willingness of the environmentalist member of the trio to "lay his reputation on the line;" his credibility with local and national environmentalists

was such that they agreed if he endorsed the forest practices proposed by JBC, they would not appeal in the courts. As one of his partners in JBC explained,

> Rather than "prying open the rusty gates," it was more like defining the door… only certain things would fit in the door, and you have to know how to fit… We had to ask the enviros to help define the door… the prescription – that was the shape of the door. We had to ask the enviros for the OK, because it used to be that you have to jump through the enviro hoop before you could do anything.

It proved insufficient, however, to have carved out a new decision-space and achieved agreement. The subsequent step necessary to gain access to the trees was to shepherd the sale through the NEPA (National Environmental Policy Act) process. To do this not only required bureaucratic skill and persistence, it required capital, since the Forest Service had none available to fund the requisite studies. The JBC, which had acquired access to capital through the Ford project, was able to step in.

This pattern has persisted past the end of the Ford project,[8] in which the JBC gains a seat at the decision-making table at least in part because it has funds to contribute (as well as the capacity to do the work); the JBC subsequently pays for the actual forest restoration work by funding the NEPA process and/or its work in the woods out of its own grants. "Bringing money to the table" has enabled the JBC not only to gain access to the forest (contracts with the Forest Service), but also to influence the type of forest management that occurs (small-scale, utilization-oriented extraction rather than large-scale burning and chipping), and to retain and use the wood it removes (permitted only under grant-funded agreements).

[8] E.g., with its current federally funded, state-granted Community Forestry Restoration Program award.

This sort of decision space, in which government agencies engage with multiple parties in a joint process of forming decisions based on a combination of pragmatism and trust has been celebrated as "collaboration" in current discourse and endorsed in federal land management policy.[9] *Moving from a bureaucratic decision-making process in which "public comment" and appeals were the only entrées for external input, to a collaborative one in which local parties not only participate with the Forest Service in coming up with management decisions, but are regularly consulted by them, constitutes a tremendous achievement. While JBC's effort was not the first example of collaboration, it was an early and prominent one that had a major impact on both attitudes and policy. In the words of JBC members:*

From an environmental educator:

> It's hard to measure these sorts of things, how it changes people's attitudes… the payback is years down the line… we're just so excited to have the diversity of … lumber person, and … the environmental person… that's so important in a polarized community. It makes the Forest Service listen; it gets their attention… and it's not just lip service… once you break through and achieve genuine respect and cooperation, it changes the whole equation … they really respect these guys… even [the one] who had been suing them…

[9] Note that ultimate decision-making *authorit*y remains with the Forest Service, as legally required of a federal agency. Nor have agency procedures and culture altered to such a degree that community-based collaboratives are allowed to run the show. The degree of power ceded is quite limited; however, if as in this example, community groups are able to line up funding, support and a plan for getting work done that serves agency objectives as well as its own, then its decision-making influence can be decisive.

From a Forest Service partner:

What is also important is a change in attitude…agency and non-agency… How much has this project contributed to it? To me there's been a huge change …

From two founders:

I think that has changed a lot… not who's making the decisions exactly… we all make them together now, because we are wanting to accomplish the same things…Five-to-ten years ago [our environmentalist partner] would have wanted to shut down the Forest, but nothing like that is being talked about today… there's been change in the Forest Service, but there are still some who would revolt if they thought that the enviros were making the decisions…but that's wearing away…

The Forest Service has gotten over its fear. Collaboration is the first thing they think of, instead of the last.

[We played a] huge role in turning the conservation community towards restoration – even if they don't trust the Forest Service, or community-based forestry, it's worked for them.

The Forest Supervisor credits the JBC with making a national impact:

The JBC changed a lot of attitudes, changed a lot of minds... this has had repercussions across the Forest Service, not just in other districts, but across the region and the country… because people inside and outside the Forest Service could see what's happened – that work is going forward without appeals... thinning is happening, wood is coming off… I've given talks around the country on our experiences with collaboration…

We have been able to shift policy to provide for a greater local role, greater voice for communities… to have line officers better able to work with communities …

Members of the JBC, and the example provided by their experience, have been influential in a number of policy arenas, e.g., New Mexico's Biomass Task Force and the

Western Governor's Association. The latter in particular has had a significant role in generating policy for public lands management. JBC members helped write the language and currently serve on the Technical Advisory Committee of the federally legislated, state-run Community Forestry Restoration Program (CFRP). Through the Ford CBFDP, the JBC has made alliances with other public lands-based community forestry groups. Their joint efforts have been influential in the institution of collaborative process in several federal policies, for example stewardship contracting, travel management planning, and community wildfire protection plans. One of the JBC principals assesses the basis for making national impact,

> I think we are getting over the hump of the Forest Service thinking we're too small… the Fire guys [at USFS] had thought of us in competitors but now [through the experience of working with us on the assessment] they see the advantages… [the Supervisor] is gung ho… this assessment is getting a lot of attention because it is the first of its kind using LandFire [a new computer model]… this will really allow us to scale up… We have a particularly good opportunity here because the Gila is known nationally as a leader in fire management.. this is more than just a local opportunity, it's getting national exposure…

Who participates?

While the beneficial impact of this new way of making decisions on forest management has been widespread, the participation in the decision space created was much more narrow. JBC members have defended the limited range of participation by contending that they could not have succeeded under the bureaucratic and conflict-ridden conditions prevailing if they had diluted their focus even slightly. The coalition has stayed unstructured and ad hoc *and has resisted incorporating in any way or developing by-laws. Their attitude is, "Why change what's working?" While meetings are open, they are not advertised. They have chosen for the most part to avoid holding public meetings, for example, because they have witnessed that such occasions tend to bring out ideological stances and lead to more conflict, not progress. In their experience, when they held an open-ended public meeting, although they managed to steer clear of conflict-laden topics, it generated expectations they were unprepared to meet: "A lot of great ideas but no wherewithal to implement. They thought we were going to do it, but of course we couldn't." Instead, they have limited their engagement to those "with a direct stake" in the project – in effect those interested in the work in the woods, the wood processing and product development, and/or all the preparatory work and negotiation necessary to make those things happen. This way they are able to "stay focused on their goal – ecological restoration - without anyone else trying to take the group in a different direction." The intent was,*

> If people came with a direct stake in the ecological part and then the jobs, then we could probably make enough progress to have something to show the community, and then hopefully grow it with the community.

A late-joining member explained,

> JBC is an odd duck. It's informal. That's been its key to success…. that allowed them to limit input in the beginning. Starting off with a project on the ground enabled them to reach the zone of agreement. If it had been opened up to community input, to community design at the start, we'd still be talking. What do we do where? Whose relatives would be hired?, etc… and there'd be 14 committees, because every time they'd reach an impasse, they'd form a committee to study it! People respect results, and then, when they start seeing them, they're ready to join in.

Yet, even as their accomplishments have become visible, participation has not broadened. While a local sportsman and several members of the Hispanic community and have attended a number of meetings, only one persisted in his involvement (a Hispanic Forest Service retiree employed by the project). As a result, they have stuck with the same core group of people – a group that can draw on years of personal experience to take a "sophisticated approach" to working with the Forest Service, supplemented by a few members with complementary expertise. Thus, without intending to be exclusive, the JBC have effectively limited access to the decision space they have opened up to those with narrowly focused interests and access to specialized knowledge, a group that is largely comprised of well-educated Anglo males with a decade or more of related experience under their belts.

This observation recalls hypothesis #2 -- that the distribution of *who* among community members gets to shape decisions and gain resources under CBF will reflect the distribution of power, cultural values and preferences, and racial and ethnic dynamics in the community. A full discussion of the complexities of these variables as they function in Grant County deserves more attention than there is scope for here. However, a brief discussion would be useful, with the proviso that it is necessarily oversimplified.

By virtue of being well-educated, Anglo, male and holding specialized knowledge and experience, the JBC decision-makers occupy a powerful position in the local social order relative to the majority of local citizens. However, none of them are members of the power elite described above. Rather, they have parlayed their social status and specialized knowledge, together with membership in social networks (amongst environmentalists, for example), access to capital, hard work, some good ideas, and perseverance in relationship-building and negotiation into a relatively and newly powerful position in decision-making *vis à vis* federal land management agencies. They acquired power (or enhanced influence) through participation in the very process of collaborative decision-making (i.e., the decision space) that they helped develop.

Ethnicity, race and culture are closely inter-related in ways that cannot be disentangled in analyzing southwestern New Mexican society. The dominant marker of social difference: Anglo vs. Hispanic, is cross-cut by manifold distinctions of culture, race/indigeneity, place of origin, family history, intermarriage, education, and class, among others. Cultural differences are singled out by most commentators as the salient reason for the low level of participation by Hispanics and low-income residents (most of whom are Hispanic). Most apparent among these are different interests in the forest (on which more below), values which do not correspond to the clearly defined and non-negotiable objectives of the JBC. At the wood-products end of the project, a lack of entrepreneurial experience, confidence and outlook was cited as an obstacle. Lack of information has played a role as well, since although with the encouragement, if not prodding, of Ford's Managing Partner, the JBC did make efforts at community outreach, the project has maintained a low-profile in the community, so low that most are unaware of the opportunity to become involved.

Yet beyond this, some JBC members acknowledge that there may be exclusionary factors operating of which they are not aware: "There's a very basic cultural gulf that's very hard to see," remarked one. Another felt that "They put up their own barriers, making their own assumptions that we don't want them to come." In contrast, some Hispanic residents of the county who had some limited engagement with the JBC remarked that it would take an explicit invitation, rather than a "come if you want to" attitude to attract Hispanic participation. One commented further,

> If you convey you're coming to tell me how to do things… of course they don't come to your meetings. Instead, you should take the attitude: 'what can you teach me?' Not 'I know it all, you know nothing.'

While the JBC may be unaware of (and possibly unconcerned with) some of the cultural barriers that limit participation in its own deliberations, as discussed, the organization has been instrumental in opening doors at the Forest Service that others could walk through of their own accord. A new culture of collaboration (albeit one which has not been universally adopted throughout agency ranks) could provide opportunities for wider community input. However, the path the JBC has pioneered is not one that most others are equipped to follow. As one member recounted,

> The unrecognized element was access was dependent on taking a very sophisticated approach… one that the poor person or Hispanic wouldn't have …I don't know how [they] would manage… you have to have the attitude 'We own the forest…The Forest Service works for us.'

Should the JBC take it upon itself to attempt to redress these culturally and structurally built-in obstacles to equitable participation in decisions about forest management on public lands? One community member faulted the JBC for maintaining its own single-minded focus at the expense of maintaining the status quo, for example, for not "taking on the institutionalized racism at the Forest Service." It seems clear that truly opening up decision spaces and access to resources would require a deeper level of social transformation than the JBC aims, or is equipped, to pursue.

Nonetheless, recent indications are that the JBC may be able to play a brokering role in providing (circumscribed) opportunities for wider community input to decision-making. The JBC is currently part of a "small group with technical expertise" collaborating with the Forest Service on a landscape scale assessment. This process will identify priorities for forest treatment over a 300,000 acre area within about fifty miles of Santa Clara. After the first area has been identified, there will be a wider "collaborative process to develop a detailed design… We will identify stakeholders to approach and invite them to participate… We'll take recommendations out to various groups, including, for example, SHRT [the Southwest Hispanic Roundtable]." While this falls short of creating an inclusive and egalitarian decision space, it marks significant progress in that direction over the previous process characterized by discord and deadlock.

Access to Resources

The dedicated and persistent efforts of the JBC unlocked the forest gate, providing access to contract work and the woody biomass removed in the course of forest restoration. In addition to JBC member Gila WoodNet, at any given time there are two to four small thinning outfits operating on the national forest

and, periodically, on private lands. The wood they extract constitutes a resource for local businesses and consumers.

Many of the contractors produce firewood, a locally valued commodity that some lower income people have found difficult to obtain or afford. Some contractors leave it in place free for those able to collect it; GWN aims to be able to sell firewood year round, at the same reasonable price it is currently offering when available. Firewood is but one of the products coming off of the integrated processing line that GWN has been assembling incrementally by stretching grant dollars through some creative sourcing and re-tooling of used parts. In addition they produce logs (for vigas, cabins, trusses and pallets), wood for furniture, slabs for fencing, chips for landscaping, and compost from waste.
These products provide the inputs for nine other small businesses,[10] all located in Santa Clara. Together these businesses (including GWN) employ 20 or more people, thus providing the community with access to much-needed jobs.

Receiving a prestigious grant, with the capacity-building and connections that came along with it, has enhanced the credibility and status of the JBC and provided it with a track record and the often-required matching funds to leverage additional capital. In addition to the $635,000 from the Ford Foundation, members of the coalition have been able to leverage over two million dollars in eleven different grants from state and federal sources in a little over five years[12].

A significant portion of this funding has been invested in infrastructure, in developing and producing low-impact logging equipment and a wood sort yard including some specialized processing machinery. The facilities of the yard and machinery are located at the "Santa Clara Industrial Park." Access to these forms of fixed capital has been made available to the other small start-up businesses previously mentioned, with the door left open for others with initiative to enter.

Another resource JBC has brought to the community is knowledge and information. The coalition consulted with leading forest ecologists on determining the most appropriate forest restoration prescriptions, calling a academics, agency staff and practitioners to a workshop, and producing a journal article. They have generated and shared information on grant sources, grant-

[10] GWN's products also serve as inputs to its many customers, many of which are also businesses. See more on the nine businesses "incubated" under CBF projects below.
[12] These include four CFRP, two Economic Action Program, two Four Corners Sustainable Forests Partnership, one Environmental Protection Agency, and two Small Business Innovative Research grants. All are federally funded, although some are managed and allocated at the regional or state level.

writing, equipment design, product development and markets. The forest operations and processing crews have received on-the-job training. The small businesses have received informal business incubation services from coalition partner GWN and have networked with each other to problem-solve and improve their products. In partnership with the Forest Service, the JBC supported three years of the Southwest Firefighters (SWFF) program, training a total of 92 youth (of whom 23 earned college credits). In the final phase of the Ford project, funds went to the Gila Conservation and Education Center to train and lead students from a local charter school in ecological monitoring on forest restoration sites. Subsequently, the JBC has dedicated a portion of their most recent CFRP grant to fund the GCEC to continue the monitoring work and to develop an environmental curriculum for the schools.

Limits to Access

Pre-existing limits to resource access have constrained the impact of the community forestry project. Outside of the grant money won by JBC members and a few local contractors, financial capital, or access to credit, is very hard to come by for potential start-up businesses in forest operations, wood processing and wood product manufacturing[13].

Access to markets remains an on-going challenge, due, among other factors, to the limited size of local markets and high transportation costs to larger, urban markets. Some have pointed out the lack of market development efforts as a weakness of the project, but opinions on the subject differ.[15] Most significantly, the crucial, large-scale market for biomass, which had been a lynchpin of the JBC's plan to utilize the heaps of low-value woody material coming out of the restoration work, has yet to materialize (although they have so far adapted successfully to its absence).

The JBC had been instrumental in getting state legislation passed that was intended to fund the installation of a biomass-fueled heating plant at the government-run hospital at Fort Bayard, in the heart of the mining district. The issue subsequently became highly politicized, resulting in a decision by the governor to move the facility to a new site, while retaining the plan to install a

[13] A CBF project with a stronger community development component might attempt to tackle this, perhaps by linking up with partners suited to the challenge. The Black Range Resource Conservation District (a JBC member), for example, has proposed establishing a revolving loan fund.

[15] GWN has a policy that it is wise to focus on product development and production capacity *first*, and develop consumer base through word of mouth, before launching a marketing campaign. Moreover, their emphasis is on developing a self-sufficient *local* economy that relies neither on imports nor exports.

biomass boiler at the old site. At this writing, the bid for the boiler has yet to go out, so it is unknown if the fuel specifications will match what JBC can offer. There is potential for installing a similar plant at the new facility, but the process for making those design decisions has become opaque: both old and new facilities will be run by a major corporation, and the former, broad-based Fort Bayard Task Force has been replaced by a new committee, whose members, according to some, have been "hand-picked by PD."

Although a few years ago the JBC did hold several public meetings to inform the community about options at Fort Bayard, it has not sustained the effort to keep the public informed and to garner their support. In the opinion of the Managing Partner, according to their Site Assessment,

> The ability to influence state and local politics that will potentially impact JBC's work requires relationships, community support, and a certain level of access to the political process. JBC's decision to focus exclusively on its restoration objectives early on in the project may have impeded its ability to lay the foundation for the necessary community support to counter some of the political forces they face.

What do they want access to?

While the JBC could have constructed a more inclusive decision space, the expansion in resource access has not been limited to its members. The JBC's actions have expanded local access to resources, in particular to forest contracting, raw materials, project capital, jobs, information and training. However, not only do some sectors of the community lack the wherewithal to take up these opportunities, some may be looking for different sorts of access. In other words, *preferences* are among the cultural factors that influence who gains access to resources and decision-making power (hypothesis #2). Opportunities mat not be pursued unless they match not only interests, but inclinations.

Interviews with Hispanic residents of the county revealed a strong interest in access to the forest. Many individuals spoke with feeling about their childhood memories of hunting, fishing, camping, and picnicking, activities they still engage in with their families, although less frequently. A few still gather piñon and, several elder women collect medicinal herbs from the forest.

One Hispanic respondent remarked, "My childhood was in the forest." Another explained, "Hispanics have a close affinity for the forest" and went on to relate how it was the site for "rites of passage," father-son bonding, family traditions, and "the only form of vacation for poor people." Clearly, the forest is full of meaning, a place where cultural identity is formed and reproduced. However, while the concern for forest health and the need to "clean up" the forest is widely shared, the interest in working in forest restoration is not widespread ("the mines pay better"). Nonetheless, a number of community members expressed excitement about the potential of the forest to support community economic development in other ways.

> One of the last resources we have in this area is the forest. If we respect it, nurture it, and utilize it could be the key … We could groom our forest trails, clean up the underbrush – it would [lead to] a lot of projects. …We should promote out forest, make it a tourist attraction… We should look at the forest as an investment which will go back to the community…

At the same time community members, long-resident Hispanic families in particular, are very concerned about how their access to the forest is being cut off by Forest Service policies and the advent of wealth retirees who put up homes on the forest margins. They are outraged at the move by the Forest Service to selectively close roads and restrict access by all-terrain vehicles. They mourn the days of free access to the forest.

> Now I don't recognize people around here... [retirees] fly in and out on their airplanes. I used to be able to ride my horse all the way up the river, now I run into 'No Trespassing signs" everywhere."

> People are moving in because they like what Grant County has to offer, and then as soon as they get here, they want to change things…[Retirees] don't contribute to the economy… They are buying 20-40 acres near the forest – then they put on a padlock… *We are being locked out of the forest*.

The fact that the JBC is neither attempting to address these access issues nor is well-suited to do so is no grounds for condemnation. Nonetheless, as emerged in an open meeting held for this research, there are areas of overlapping interest between the JBC and the wider community. Were the JBC to engage in more active outreach and dialogue, some points of joint action and/or mutual support could still be identified and pursued (e.g., advocacy for the biomass plant, youth programs, revitalization of the Santa Clara business district).

Outcomes

The opening premise of this research was that if community-based forestry expanded access to resources and participation in decision-making (decision spaces) about forest management and community development, it would bring about social change (hypothesis #1). We have ascertained that the Jobs and Biodiversity Coalition succeeded in putting the two crucial pre-conditions, or mechanisms, in place. What positive social outcomes have resulted?

First, the transformation of the formerly deadlocked and exclusive decision space around forest management and the opening up of access to resources constitute tremendous social benefits in themselves. They are the fundamental social changes necessary to generate more tangible benefits. These can be classified according to the triad of goals (or outcomes) that are posited as essential characteristics in the 'three-legged stool' model of CBF: namely ecology, economy and equity. A brief consideration of the JBC case in these terms will enable an assessment of the degree to which it measures up to this ideal.

Ecology

It is beyond the scope of this research to assess the ecological impact of the JBC's work. Suffice it to say that GWN has to date treated 400 acres on the Gila National Forest, to which may be added the several hundred acres thinned by other contractors whose work was made possible by the cessation of environmental appeals the JBC was crucial in bringing about. The prescriptions they have followed are geared to return the forest to the natural fire regime, based on the latest scientific research. While it will take years of monitoring and analysis to make a definitive determination, it is likely that these interventions are ecologically beneficial, and it is even more likely that they are reducing the risk of catastrophic wildfire. The social benefit thus extends beyond enhancing the values of biological diversity and healthy ecosystem functioning (crucial to the water regime as well), to the very immediate value of preserving homes and watersheds and avoiding the tremendous costs of fighting fires (a considerable economic benefit).

While a relatively small area of forest has been restored thus far, the rate of work is accelerating. The rest of the 1,400 acre Mill Project (the site of the initial CBF project) is "NEPA-ready," and the 300,000 acre Signal Peak landscape assessment will identify 3 – 7,000 priority, feasibly treatable acres in each of 10 – 20, 000 acre blocks. Actual treatment will proceed contingent upon funding – but the infrastructure and skilled workforce are there to accomplish it. A wider community is benefiting from the restoration work through the monitoring and education efforts led by the Gila Conservation and Education Center.

Economy

Assessing the total economic impact of the JBC's activities would be a complex and uncertain endeavor (see the Seidl paper for a cost-benefit analysis of other CBFDP cases). Our present objective is simply to lay out the nature and scope of the economic benefits generated, and, in the subsequent section, to discuss how they have been distributed.

Some of the more intangible outcomes of the forest restoration work accomplished and enabled by the JBC have an economic dimension. How do you measure the benefit of the forest (and adjacent homes) not burning down?[16] Another, more modest intangible benefit with an economic price tag ($31,000 in this case) is the grant-funded design, development and construction by Santa Clara Woodworks of a pavilion out of small diameter timber in a park centrally located in Santa Clara. This is part of an economic (and community-spirit) revival plan that includes a small-diameter building for a town *mercado*, which, if the funding comes through, will house local shops and woodworks. The installation of a biomass generator, at Fort Bayard or other locations, represents another potential boon, contingent in this instance on politics. Not only would this save on energy costs (and fossil fuel consumption), it would generate more economic activity locally – jobs, revenues and taxes.

The 'access to resources' section above enumerated many resources crucial to economic development that have been sourced, starting with raw material inputs for local businesses and consumers (i.e., wood products). Access to capital has opened up not only through grants obtained by GWN and other forest restoration/thinning contractors and product developers, but also through grant spending. For example, Santa Clara Woodworks, a JBC partner and one-man shop, subsidizes the nascent small businesses with which it collaborates by paying them out of grants, sometimes more than their work will earn. In addition, project monies have been invested in research and development and in infrastructure – the sortyard and various pieces of machinery and equipment, which have been made accessible to local businesses in the Santa Clara Industrial Park. Gila WoodNet, in particular has been very inventive about making the dollars stretch. By their own account,

> We're trying to build a $6-8 million dollar business, we're doing it off of $2 million, and we're operating! I don't know how we're doing it!

[16] Technically it should be balanced against the economic activity generated when the forest *does* burn. However, [recent studies have indicated CITE??] that much of the associated hiring and spending are exported from the county.

Profit is not an adequate metric for assessing the economic impact of CBF. If grant income were not included, none of the associated businesses would yet be making a profit. At one level this does not concern the JBC, as the following snippets of conversation among members indicates,

> In a healthy rural economy, nobody is making a big profit...
>
> Yes, that's what we're after. This is a new model to replace the old, capitalist model that got us into trouble in the first place…
>
> I feel strongly that we need to exclude economic considerations from decisions about what we do on the ground.

Yet,

> The outlook is not to have grant money paying for anything, with the [products of] forest treatment covering everything… we're on the cusp of having businesses paying for themselves. We're hoping to drive the cost of forest treatment to zero by paying enough for the wood…

The vision is to build a largely self-sufficient, sustainable local economy:

> Our goal is treat 400 acres per year and market all the [by-products] in Grant County.

Despite the newness and small scale of the businesses enabled and aided by the CBF projects, JBC members stress their disproportionate importance given the context in the mining district, which is nearly barren of economic activity. Ten small, entrepreneurial businesses or partnerships have sprung up in association with the JBC. Gila WoodNet, the non-profit entity that does most of the forest restoration and wood-processing work arising out of the grants received by JBC and partners, pre-dated the Ford CBFDP project. Its revenues (sales and forest production only) reached $261,468 last year. The next largest outfit on the Santa Clara Industrial Park, Santa Clara Woodworks, produced $167,500 in revenue. The other enterprises include a sawmill run by a Mexican businessman and seven one-person businesses that collaborate with (and/or receive some support services from) Santa Clara Woodworks. Of the latter, two make artisanal furniture, while the others produce technological innovations, from an erosion control device to log cabin kits to specialized "center-line" (roundwood construction) machinery.

Various multipliers[17] can be applied to the sales volume to assess the net economic effect of these businesses on the local economy. In addition, seven percent gross receipts tax is paid not only on sales, but also on all grant monies, with 1.8% going to the village of Santa Clara.[18] Another benefit JBC members stress is the value added to the locally-available raw materials; they estimate that 10-20% of the end products of forest restoration go into products with high value-added content.

> The value of a lineal foot of log GWN produces as firewood is 19 cents, for trusses it's 8 dollars…The real benefit is the 19 cents to 8 bucks… even though I'm not making money, I'm [generating] economic activity, which means jobs.

As the name of the coalition indicates, the most socially important economic multiplier it creates is jobs. In addition to the employment the JBC indirectly stimulated by re-opening work in the woods to other contractors, its efforts are responsible for typically 7-8 jobs with Gila WoodNet (amounting to a payroll of $169,064 last year), 4 with the Mexican exporter, 3 plus in furniture, and 6 with Santa Clara Woodworks and other collaborators (including the proprietors). The wages range from $8-20 per hour ($10/hour is considered "very good "locally: the mines pay considerably more[19], Walmart less)[20].

Another initiative of the JBC that generates employment and training is the Southwest Forest Fighters program. Initiated by the Forest Service, when it began to "fizzle out" for lack of funds and attention, in 2003 the JBC hired a coordinator out of project funds for the next three years. The training the participants receive not only qualifies them to be called out on firefighting or camp crews on Forest Service fires, it covers more broadly applicable forestry skills as well. While the 92 youth that were trained received pay and summer work on fires, for the most part the intended transition to year-round employment hasn't been successful. The total volume of thinning contracts on Forest Service hasn't been adequate to support many local teams. Moreover, "some private contractors don't like hiring from this pool, because we've got

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[17] There is not yet an empirical basis for selecting one multiplier value over another (figures ranging from 1.7 to 7 have been proposed). One element of the latest CFRP grant to a JBC partner is to conduct an economic analysis to try to determine a real value for the economic multiplier operating locally.

[18] To assess a net contribution, this figure should be balanced against the value of services the government provides to these businesses.

[19] … or they once did. The gap is narrowing. The GWN manager, who once had a skilled position with Phelps Dodge, makes the following comparison: "GWN's current average wage is $14.38/hr., and is expected to rise soon as 3 employees are coming up on increases. When PD asked me to come back for a job interview when the mine reopened, their offer was a little over $15/hr. sans benefits (much less than I was paid previously)."

[20] A number of the entrepreneurs remarked that if not for the high cost of workmen's compensation, both wages and the number employed would be substantially higher.

some juvenile delinquents." However, four did get hired as "seasonals" by the Forest Service. The coordinator is working with Western New Mexico University to offer more advanced training, so that local people can receive the certification necessary to lead firefighting teams, and beyond that to qualify for jobs at a professionalizing Forest Service.

Equity -- Who benefits?

The introduction discussed three ways social equity can be advanced, each indicating different ways of measuring or assessing the social impacts of community forestry. First, if equity means equal sharing of advantages, then we would look to see if the benefits generated by CBF were shared equally, or, alternatively if they reduced *in*equity by making the worst-off better-off. Second, if equity is produced by the distribution of the *capacity* to generate benefit or overcome obstacles, we would look to see if the capacities of community institutions or disadvantaged individuals had been enhanced. Finally, if equity can only be achieved when the marginalized empower themselves, then we would seek evidence that these groups had obtained more power to control the terms of social change and grasp means of improving their lives.

Putting the last first, brings us back full circle to the question we initially posed, whether CBF transforms who makes decisions how and who gets access to what resources. Indeed, we argued that this is the way CBF brings about social change; it is the foundation upon which social, economic and ecological outcomes may be built. We demonstrated that the JBC's community forestry efforts did transform decision-spaces and open up access to resources. To *whom*? We predicted (hypothesis #2) that this would reflect the distribution of power in the community, cultural values and preferences, and racial and ethnic dynamics. As we discussed above, although the key players who gained decision-making influence and access to resources are members of the broad class of the socially advantaged (mostly white, middle class, middle-aged males), they are not members of the local power elite, nor have they used their new influence only to advance their own interests.

Any positive social outcomes experienced at the community (rather than individual) level would counter the prediction that the benefits of CBF will be restricted exclusively to those who personally gain resource access and decision-space (hypothesis #3). A number of community-wide advances have already been mentioned: decreased risk of catastrophic fire, other forest ecosystem services, the multiplier effects of new economic activity, and the transformation of an atmosphere of entrenched conflict to one in which cooperation across interest groups is possible. Beyond this, the JBC example and role in policy-setting have benefited the nation.

The following are the data available to assess equity in terms of the distribution of direct individual benefits of CBF:

	Male	Female	White	Hispanic	Gender & ethnicity unknown
Business ownership[21]	8	1	8	1	
Employment (partial)[22]	10	2	5	7	2
Training (partial)[23]	89	15	52	52	

While no further disaggregated data were available, observation suggests that the business owners are predominantly 'middle-aged,' with a few in the 25 – 35 year old range. While several might be described as 'middle class,' most are low-income and have no significant personal savings upon which to draw. Almost all of the workers are youthful, and from working class backgrounds. Apparently, opportunity is not restricted, although in order redress inequity directly it would have to be skewed in favor of marginalized groups.

Although youth have not taken a leadership role in the JBC, they appear to be taking advantage of the work, training and business opportunities developed. This is consistent with employment patterns in the field, reflecting the nature of the work, much of it physical labor out of doors, the relatively low level of formal education required, and low barriers to entry more generally.

By the same token that the work culture associated with work in the woods and wood-processing attracts and accommodates youth, it is highly biased against women. While women are not entirely absent from managerial levels, their presence is very limited (e.g., the Forest Supervisor, a local District Ranger, two members of the JBC, and one businessperson collaborating with GWN are women). While women have leadership positions in the wider community, they "don't have driving roles" in CBF, according to JBC members. Even though Hispanic women recalled participating in family hunting and camping

[21] These are the businesses that process wood coming off the JBC's projects, and that have also received support from JBC members, either by using grant-funded infrastructure developed and installed by them and/ or other support services. Business and employment created indirectly through opportunities opened up to other contractors and NGOs are not included. "Ownership" also includes co-ownership. Owners are not included in employment figures.

[22] These figures include only those employed by the nine businesses referenced around 7/06. While none of these jobs is guaranteed, and the numbers fluctuate, all but one or two are full time. Seasonal and employment gained under the SWFF program see below), is not listed here.

[23] The figures for the Southwest Firefighters (SWFF) program are close approximations. The exact figures are unavailable, because the ethnicity and gender of returnees were not specified. To these numbers were added the students trained for the second round of ecological monitoring (10 whites, 2 Hispanics; 7 boys, 5 girls). This information was unavailable for the first round of monitoring, as well as for past employees of GWN and the other businesses.

expeditions, like most Anglo women, they are reportedly "generally not interested in jobs in the woods." While these cultural factors would have made it challenging for the JBC to have promoted women's greater participation and benefit had they tried, they have never raised nor recognized gender as an issue. Partly as a result, this research also did not focus on this critical social variable. The historic male domination of forest management, the way gender intersects with ethnicity, class, interest group and other identities, these and other factors would make a gender analysis challenging, but nonetheless valuable.

Class and the ethnicity-race-culture complex are closely associated in Grant County. The preponderance of the working class and low-income segment of the county is Hispanic. In attracting participation from this social sector, the JBC faces a number of dilemmas. Community members spoke of the clear potential community benefit they feel could be realized through the right kind of job creation.

> Traditionally Hispanics do blue collar work … if we just focus on white collar jobs they [youth] will just mill around and be picked up by gangs. So what do we have as resources? The forest and our youth. We need to develop blue-collar jobs in the woods and the JBC is an opportunity. This is a chance to employ our people in ways that suit them with respect and dignity and the proper cultural context, but with respect and dignity for the forest too.[24]

On the other hand, the number of jobs the JBC could foster in the first years of its efforts has been limited by its slow start due to the many obstacles discussed above. Without demonstrating direct economic benefit, it is difficult to attract community interest and support; without community awareness, you don't get community participation. JBC members also feel there are some cultural barriers to Hispanic participation: the cultural gap with Anglo officials, managers and owners, the lack of a "culture of work in the woods," and lack of experience with and appetite for entrepreneurship.

Others counter that the role of an organization aimed at community-based development is precisely to address such lack of experience, outlook and skills with capacity-building interventions. Here is where the second aspect of equity outlined above comes into play -- the distribution of the *capacity* to generate benefit or overcome obstacles. This lay outside the focus area, philosophical outlook and skill-set of the principals of the JBC. As one of its founders explained,

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[24] This individual was interviewed by the author, but this particular quote is taken from the Site Assessment report prepared by the Aspen Institute.

> There are two approaches to resolving equity issues. One is to create opportunities… we've done that tremendously…but if nobody steps forward… perhaps due to cultural issues? I don't know… The second is to provide direct assistance… but you can't teach entrepreneurship. … [Many Hispanics] they have jobs they like – they just need more stability.

A professional who worked with the coalition remarked,

> JBC's focus is so tight, its scope is so limited. Their attitude is: if someone wants to do something, OK do it. We'll support it. But they have to have the capacity to do it already.

However, within the self-defined scope in which the JBC operates, its capacity-building efforts are worthy of acknowledgement. It has provided business and product development support to a limited set of start-ups, as well as training in forest restoration, wood processing, firefighting, and ecological monitoring. In addition, the JBC has collaborated with other contractors and organizations in raising and managing grants. In particular, rather than applying directly itself, the JBC has chosen to support a local watershed organization in obtaining two recent forest restoration grants that are part of its program. The same grants also support the Gila Conservation and Education Center in funding and building local capacity for community-based monitoring and environmental education. Moreover, over the long haul, the coalition hopes to foster a shift in attitude and values that they believe will contribute to community resilience,

> We really are creating a new *culture* of community forestry. It's going to take a couple of generations…I hope our legacy is one of stewardship… of forest restoration" instead of commodity production.

Any consideration of the limitations of the JBC's impact in terms of equity and community capacity should be viewed in light of the somewhat tangled history of how the coalition approached the social 'leg' of the community-forestry 'stool' as conceived by the Ford Foundation. Significantly, the organization that developed the original project concept and which took responsibility for its 'equity leg,' left it hanging when it withdrew from the coalition. Left with no implementor for that component, the "community development piece" as they call it, at the urging of the Managing Partner, the JBC hired a coordinator, to whom they transferred this responsibility. This individual set about pursuing a grass-roots, politically-oriented organizing project with a longer-range goal of engaging the Hispanic community in community forestry. However, for complex reasons, the work of this coordinator proceeded largely independently of the other partners, and the connection to the core forest restoration work was

never successfully made. Consequently, this effort also fell, or was cut, short (depending on one's perspective).

The Managing Partner concluded that the JBC had come up short in engaging the community and addressing equity (and so, by implication, in succeeding in CBF). Their site assessment concluded:

> There was a disconnect between the Ford Foundation's commitment to community engagement and the reality of the JBC project. Because JBC was conceptualized and implemented as a forest restoration project, the ties between the social and ecological components of the project were tenuous, and to some extent, forced.
>
> While JBC has engaged a community of interest, the central tenet of the CBF program's definition of community involves the broad base of local residents where the initiative is located, with particular attention to those with least access to resources and to those who have been historically disenfranchised from access…

The tension between the assessment of their efforts by the Managing Partner, and by implication the funder, and their own, positive assessment of their endeavors has left members of the JBC feeling frustrated, misunderstood and unappreciated. As one principal articulated,

> I've heard a couple times… well, you guys are a great forest restoration effort [but] you're not a community effort or group... I think the key thing in my mind that's problematic is what are the criteria? how do you define benefits? I think they're way too narrow… And I also think that it's arguable at least for the purposes of the Ford program that the... measure is just too limited in time and breadth…This stuff takes, we're finding 10, maybe 15 years and we're looking at a 5 year program. We're just starting to see …whether they're the right benefits or not, we're just staring to see this stuff come to fruition…

Notwithstanding the above-listed benefits (distributional, capacity-building and empowering) that members of the community, including marginalized groups, received from participating in the JBC's community forestry work, it has not thus far substantially advanced social equity. Minimally, as one associate of the project asserted, "All groups have to have buy-in… and ownership of the project. If you don't get buy-in, then they won't know if they've been benefited." By and

large, most Hispanic and low-income residents of the county do not know that they have been benefited by the CBF project. This finding would tend to confirm the final hypothesis (#4) proposed in the introduction: *in order to reduce inequity, community-based organizations must make equity an explicit target* and hold themselves accountable to it.

Thus, the 'equity' leg of the community-based forestry 'stool' is still shorter than the others. However, do we then conclude, that the JBC's endeavors are but a wobbly exemplar of community-based forestry, if indeed they qualify as such? Or, do we find that the JBC is engaged in progressively constructing a CBF 'house'? We have shown how the coalition laid a solid foundation by expanding resource access and decision-space and has made substantial progress in erecting the ecological and economic floors. It is arguable that the very qualities that made it successful in these efforts, its single-minded focus on forest restoration and utilization of the by-products, also ill suit it for tackling social inequity. Nonetheless, the potential is there for the third floor to be built up over the years – although the JBC may not be the organization best equipped to undertake this part of the job. Perhaps what is called for is a wider collaborative construction effort, with grassroots community development organizations joining the crew.

CONCLUSION

Investigation of the track-record of the JBC confirms the first hypothesis embedded in the framework we have developed for understanding community-based forestry. It has expanded decision spaces and access to resources for the community and has thereby brought about social change. The distribution of power, cultural values and preferences, and racial and ethnic dynamics in the community does largely predict *who* among community members has gained access to resources and decision-making influence (hypothesis #2), and this group is quite circumscribed. However, the benefits that flow from this transformation, while skewed toward this group (hypothesis #3), do extend beyond it to the wider community, and indeed the nation. Yet, because equity was not made an explicit target of the CBF effort, it did not make much impact in reducing social inequity (hypothesis #4).

The great contribution of the Jobs and Biodiversity Coalition clearly rests in its validation of hypothesis #1, which this framework takes as the foundational principle of community-based forestry. Contrary to the critique that the JBC was lacking in community engagement, its community-base has been essential to its success. Although its roots in the Grant County "community" may not spread wide, they go deep. Because the principals are deeply rooted in the locality, they contribute local (and regional) knowledge – knowledge of the forest, the Forest Service, local and regional environmentalist groups, local business and more.

Crucially, they also display the commitment to sticking out a long and bumpy road.

> *It's a slow process, with a lot of false starts. You have to start small and stay the course. That's why this community control stuff is so critical, because of the need for long- term commitment.*

PART III

Case study Analysis:

Federation of Southern Cooperatives

[To be completed…]

Appendix D: A Practical Self-Analysis Tool for Applying the Decision-space/Access/Equity Framework

November 28, 2006

Melanie Hughes McDermott, Rutgers University

You measure what you value.

You value what you measure.

Not all that is valuable can be measured.

If community-based forestry aims to improve the health of their communities and of the forests that surround them, how will CBF organizations know when they have begun to move towards achieving these goals? How can they make mid-course corrections when progress slows or reverses? If CBF aims to improve people's lives, how will they know *whose* lives have benefited, and who among the community has been left out?

From planning, to monitoring and evaluation, to adaptive management, it is essential for CBF to identify and track progress towards clearly stated goals by identifying and tracking indicators or benchmarks of change in valued conditions and processes. All organizations do this informally to a degree, but, it can be very valuable for them to engage in formal monitoring and to *use* this information in formal evaluation and action planning (adaptive management). Monitoring, beginning with understanding baseline conditions, provides the material for the self-analysis that is so vital to a learning organization.

The preceding sections of the report and the appendices on monitoring provide a strong rationale for monitoring generally. They document and analyze the experience of several of the CBDFP sites with ecological monitoring, which tracks forest and ecosystem health. Briefer mention is made of socio-economic monitoring, which tracks changes in the material conditions and quality of life. The guidelines outlined below can be used as a schematic for socio-economic monitoring, or as a complimentary set of questions to enhance on-going monitoring.

Simple searches on the internet will reveal a number of published and web-based guides and manuals, some specific for community-based forestry or natural

resource management, others on socio-economic monitoring and multi-party monitoring more generally, as well as the development of "criteria and indicators." The selection of indicators is particularly challenging. As the opening quote indicates, it may be very difficult or impossible to identify quantitative, or even direct qualitative measures, of some very important values, particularly those inhering at the community level.

The development and tracking of indicators for individual and household level benefits, even those that can be easily quantified, also requires care. If there is any interest in answering the *"who benefits?"* question, if diversity of participation and equitable distribution of benefits are CBF goals,[26] then it will be essential to collect *socially-differentiated* data. This means, wherever feasible, recording the gender, age, race or ethnicity, and/or other significant social characteristics of those participating in and affected by CBF activities.

The following presents the outline of a self-analysis and monitoring tool for CBF organizations that puts the framework and concepts of the Decision-space/Access/Equity framework developed in Appendix X into practice. The point is not to require organizations to conduct their planning in the new terms of 'decision-spaces' and 'resources' -- terms that might be foreign to their way of thinking. Rather, it may be useful for CBF participants to reflect upon the goals and practical strategies they have already developed, and to see how they map onto these categories. A CBF group could evaluate its existing monitoring scheme in terms of this framework, and consider modifying it to incorporate elements from it that might be missing from the current scheme.

(Note that many of these steps are easier said than done. The accuracy of the final analysis, diagram or set of indicators is not as important as the thought and dialogue that goes into the making of them and the experience of watching them unfold – that is where the real learning comes in.)

Schematic steps for self-analysis by CBF groups:

Ideally, at the onset of the CBF program or project (later if need be), the implementing group should:

- Conduct a power analysis of the community.

[26] This would be all the more true where combating inequity or promoting empowerment are also CBF goals. These goals, however, would require additional indicators beyond distributional measures.

This involves identifying various social groupings within the community, differentiating by class, race, ethnic identity, gender, age, occupational group or other locally significant variables (e.g., old-timers vs. recent arrivals; former loggers or millworkers; seasonally resident/mobile; undocumented immigration status). Once the social categories with particular salience to CBF have been identified these become the social categories, or variables, that should be routinely tracked in all the subsequent steps. (Note that the list of social variables will need to be relatively short or data management can get out of hand). The challenge of the power analysis is to map conceptually the power relations among these groups within the community and beyond.

This step can be integrated with other processes, such as "community asset mapping" [27] in which the resources and capabilities of social groups and local institutions are mapped out, or "situation mapping," [28] in which threats, assets and strategies to achieving CBF goals are diagrammed. Explicit attention to power and social differentiation enhances the value of these and other approaches.

- Set goals, develop strategies, and identify indicators or benchmarks to expand decision-spaces (if indeed this is a CBF goal). The indicators should track *who* participates not only in CBF activities, but in decision-making about them within the group, as well as decisions made in collaboration with outside groups (e.g., government agencies). The list of participants should be differentiated by the social categories identified in the first step.

- Set goals, develop strategies, and identify indicators or benchmarks to expand access to resources. The indicators should track who (differentiated) gains access to what resources.

- Set targets, develop strategies, and identify indicators or benchmarks for each axis of progress: ecological, economic, and equity. (The group may wish to split out community capacity as a fourth axis. Many more axes could be added as time, resources, and interest allow.)

Over time, the CBF group should:

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[27] See, for example, Kretzmann, J.P., & McKnight, J.L. 1993. *Building communities from the inside out: A path toward finding and mobilizing a community's assets*. Chicago: ACTA Publications.

[28] Ecosystem Management Initiative. 2004. *Measuring Progress: An Evaluation Guide for Ecosystem and Community-Based Projects*. Ann Arbor: School of Natural Resources and the Environment, University of Michigan. Available at: www.snre.umich.edu/emi/evaluation.

- Monitors progress along all indicators;

- Plots progress along each of the axes in terms of the distance advanced towards the respective targets.

For quantitative indicators, progress can be expressed as a percentage of the target; for qualitative measures, this will require subjective judgments. Again, the final "graphs" are not as important as the awareness, thought process and discussion that go into making them.

- Evaluate: periodically analyze and discuss the results of the monitoring.

Give explicit consideration to which social groups seem to have gained opportunities to voice their concerns and perspectives, to have gained roles in decision-making or access to resources, to participate in CBF activities, and to receive direct or indirect benefits. Who is being left out?

- Evaluate and plan: periodically modify activities and re-think goals, strategies and indicators based on the analysis and discussion of monitoring results.

How can social groups or particular organizations or parties that have been left out (or have chosen not to participate) be brought into the discussion? If they are interested, are there ways to extend participation and benefits?

Appendix E: Recreating Communities, Opportunities and Benefits: Case Studies of Alliance of Forest Workers & Harvesters and the Watershed Research & Training Center

November 29, 2006

Victoria E. Sturtevant, Southern Oregon University

By reinventing relationships among people and with the landscape, community based forestry organizations create benefits for people and their families. Ford CBF group leaders define benefits in myriad ways, including improved quality of life (for individuals, families and community); improved forest accessibility; protection of community and property; job creation (both durability and duration); increased social assets; remaining in the community; land retention; education and training; choices, opportunity and hope; social harmony and cohesion, identity and social esteem, and community resilience, social capital and civic responsibility.[29] Clearly, benefits are more than income, a conventional measure. This paper represents an effort to better understand the qualitative dimensions of benefit through case studies of two very different Ford IPs, The Watershed Research and Training Center (WRTC) and Alliance of Forest Workers and Harvesters (AFWH). It examines the process by which these two Implementing Partners (IPs) create community capacity, forge economic opportunities and engage members in their organizational strategies – in other words, how they create benefits to their members and communities. These organizations fall at opposite ends of the continuum of IPs in many ways – one is a place-based organization and the other a membership organization; one seeks to preserve identity and family legacy, the other builds common identity among its culturally diverse members. Yet both groups work with a community of workers marginalized by political-economic forces and both espouse the links between social justice, economic rights and environmental health. Both are creating quality work in the woods that benefits workers, their communities and forests.

This paper concludes with an approach for assessing the success of these CBF organizations at building community capacity, arguing that it is a more holistic approach for viewing benefits. Communities provide "mediating institutions" and concrete "social moorings" which connect individuals to more abstract and distant institutions such as the federal government and corporations and concrete resources such as forests (Lee and Field 2005, p.2). The local ranger district and mill serve as examples of social moorings, as do pilot stewardship projects and training programs. Community organizations and processes work at the human scale and address a range of individual needs; they provide leadership, embody practical knowledge and encourage mutuality. They bridge the gap between what they learn to be community member needs and rights and the institutions which have disempowered the community.

[29] List complied by Melanie Hughes McDermott

METHODOLOGY

This research is based on interviews with individuals recommended by directors of the sites, participation at meetings and analysis of documents and reports. The goal is not to evaluate whether organizations are effective at meeting their stated goals, but rather to gather qualitative data about peoples' perceptions of social benefits – how their lives have improved. This is not a description of community based forestry as it is modeled in the literature, but as it is constructed by participants in these two unique organizations.

Data to document the changes in peoples' lives are difficult to find and summarize – units of analysis, measures and time lags create challenges. How does one operationalize hope and sense of worth? The literature is replete with studies measuring quality of life and community well-being, but good indicators are rare and may not truly represent social reality. Secondary data, alone, can not capture either the context or impact of these organizations. Members of the Alliance live throughout the region and move often; some are undocumented and do not appear in official statistics. Some census data for Hayfork, as a "designated place" and census tract, are available, but mostly at the county level where Weaverville, the county seat and largest place, masks smaller places. Secondary data does help "triangulate," however, providing another sources of information, as did other reports and reference material.

ALLIANCE OF FOREST WORKERS AND HARVESTERS
(co-authored with Erin Halcomb, Alliance member and researcher)

Background

Beverly Brown, founder of the Jefferson Center, long argued that forest workers and harvesters – especially low income, invisible forest workers – have been marginalized by the United States political-economy, including federal land management agencies, anti-labor business practices, and even the community based forestry movement, itself. She suggested that the conditions of all forest workers – local and migrant, full-year and part-year, Anglo and non-Anglo – are inextricably connected. All workers must be included in organizations that promote social justice, economic rights and environmental health; otherwise, competition will play various workers against one another and the forest workforce with the lowest wages, and the least rights, will drag down the efforts of community-based forestry (Beverly Brown, Jefferson Center bulletin 2, 2001).

The Alliance of Forest Workers and Harvesters (AFWH) rises to the challenge of creating community and opportunity to all who labor in the woods.[30] They provide membership and advocacy to all forest workers including: the mobile workforce, Native Americans gathering nontimber forest products on their tribal land, and Anglo back-to-

[30] The Alliance was created by a group of workers who originally belonged to Bev's organization, The Jefferson Center. Alliance board members distinguish between their organization and Bev's on the basis that it is not only for forest workers, but run by forest workers – calloused hands that touch the earth.

landers. Members of the Alliance are bound by the tenet that exploitation of workers and exploitation of land is intricately interwoven. AFWH serves workers by providing information on everything from ecological principles to labor rights. In exchange, the Alliance gains knowledge of worker and harvester concerns, ideas and solutions. The Alliance shares these grassroots discussions in local, regional and national arenas. Therefore, the AFWH provides a critical feedback loop on social, economic, and environmental justice within the forests of the Pacific Northwest.

But what we have in common is we work on the ground. We touch the earth. We work with ecosystems. We work with natural resources and a lot of us have been exploited by industrial forestry or practices or policies that are in place. I think that's a big thing we have in common. (Marko)

There's the traveling community and the local community; and we claim that it's not the big hairy issue that most community based forestry people make it. They're all harvesters. You get them together at a table and they'll work it out. It's not a big deal– the problem is how you harvest, and you want the people harvesting who harvest right. It doesn't matter what their ethnic background is or where their home base is. (Susan)

The mobile or "contingent" workforce labors in the woods primarily as temporary employees of a contractor. They are hired when needed, when nature and economics allow, moving where work is available and employing what skills are in demand. They are part of a large geographically and occupationally flexible workforce. Mobile workers adapt to meet forest management and restoration needs; many are undocumented or guest workers, bringing their experience in the woods from other countries. Their skills are essential to service the forest - hence "forest service workers." Ecosystem restoration skills are often labor intensive, and encompass: thinning and felling (timber falling), tree planting, small fuels reduction and brushing (controlling brush vegetation), slash burning, weed control, road maintenance, riparian and stream restoration, and technical survey work.

Fire fighting and harvesting nontimber forest product (floral greens, herbs, mushrooms and seed) also employ mobile workers. Many fire fighters perform other forest work during winter and spring. The Alliance does not address fire fighting because it is highly regulated, but does focus on harvester issues. Harvesters intertwine with forest service labor in many ways. They possess unique issues because their work conditions relate to federal land management policy and the political economy of labor at a different scale. [get some help from Heidi or Alliance or Eric and Katy's book chapter to discuss these issues]

Refining and developing skills give woods workers greater opportunities like working for good contractors, becoming an independent contractor, or gaining job variety. A strategy for staying in the forest for longer periods of time than a typical short-term contract is to participate in a range of activities such as: mushroom picking in the fall, brushing in the winter and survey work in the spring. An ideal work year would not consist of only high rate, physical labor. The tremendous range of skills and jobs, in addition to the cultural

and ethnic backgrounds, makes it difficult to categorize the forest workforce. However, many forest workers share a common love of working in the woods. They interact with the forest on a daily basis and impact the forest in multiple ways. They are proud of their work, both because of the physical challenge and the contribution they make to the environment.

There's just something wonderful about being in the woods and people who do it can't do anything else. It's kind of, people are offered, some people jumped at the offers. And some people, when so much of the logging went down, and they said well do you want to go be retrained some people just said, "Oh shoot me now." So it's a community of people who choose to do that kind of thing - and really some people because of lack of education and such do it because they don't feel like they have any other option. There's some of that too. And same with some of the nontimber forest products. Some of the immigrants don't feel like they have any other options. Of course a lot work is something you can do even if you don't speak English, and that's an extreme advantage for some people. They may be extremely bright; they just don't speak English for one reason or another. And not only if you do speak English you don't have to be literate because there's no reading and writing. You know so there's some of that too. It's an opportunity for some people of very diminished opportunities. So there is a diverse community. (Cece)

As "ecosystem services" gain recognition as a forest value equal to, if not more important than, timber products, the demand for "forest service workers" will grow. Both federal agencies rely on outsourcing due to budget cuts and administrative mandates. Industrial forestry hires workers on short-term contracts because of the uncertainty of timber supply and markets. Forest work contracts are let by the government and industry – often in boom and bust spurts over seasons and over administrations. In the early days of the National Fire Plan, (and in some places, survey work on Northwest Forest Plan), thinning contracts (and species survey work) were abundant. Now, as budgets tighten and agency performance measures focus on acres treated, forest service work contracts have diminished. Contracts have also changed to more equipment-intensive work (e.g., slashbusters that are owned and/or operated by a single contractor).

Technical surveys tap into a different pool of forestry workers. These workers often have either educational backgrounds or history in the woods. Surveys include monitoring and inventory. Biophysical monitoring collects data from established plots like rare plants and animals, or timber characteristics such as: size, height, age, density, and vigor.
This work requires knowledge of plant species and of technical measuring equipment. Many surveyors are independent contractors that may dabble in labor intensive work, like planting trees, when survey work is scarce. Survey work is desirable. It provides a change of pace - from hiking up hills with gas and chainsaws to manipulate vegetation – to hiking up hills with field guides, GPS units, and measurements tools to observe and record nature. Survey work is funded by federal agencies, or few industrial or non-industrial landowners. Private consulting firms (often small, headed by a Registered Professional Forester) or NGOs (such as Lomakatsi or land trust organizations) hire very

small crews, if anyone, to do this specialized and skilled work. Timber companies rely mostly on their own salaried technical workers.

Contractors, including non-profits, scramble for work. They often look at least a year ahead, and spend weeks writing project proposals that then may be scrapped by the land management agencies. They must stay current with contracting mechanisms and requirements. Contractors are required to be licensed, bonded, and in compliance with federal employment laws. Contractors compete in a tight field. They win contracts by providing the most work for the lowest price – accomplishing this by low labor wages. Often the lowest bidders are centralized in urban places, such as Redding, CA. Here, they possess ready access to agency offices. The contractor spends time meeting with contracting officers, searching for the contracts via the internet, and writing proposals. Little time is spent in the field. For hiring crews and accomplishing project prescriptions, the contractor relies heavily on crew bosses. Crew bosses must also comply with labor laws. Yet, enforcement of working conditions is infrequent. The contractor's low bid often motivates the crew boss to cut corners. This may entail no breaks, no overtime pay, or a severe work pace.

Centralized contractors seldom witness the worker exploitation connected to their contracts. And contracting officers, in their urban agency office, remain disconnected too. Inspectors are sent to ensure project specifications are fulfilled. Tasked with monitoring the ground work (e.g., meeting thinning prescriptions or adequacy of tree planting), not the worker's conditions (e.g., access to water, safe equipment and adequate breaks), the inspector surveys the work site. Abuse may not be obvious, or may be overlooked. Communication barriers also insulate agency personnel from exploitation. The inspector meets with the crew boss to discuss progress, and may never communicate with another worker. Unfortunately scenarios exist where the inspectors acknowledge and perpetuate abuse, and there is suspicion (and informal evidence) of bribery of federal inspectors by crew bosses.

Monitoring of contractors falls on the workers. Through word of mouth, they caution against bad contractors and crew bosses. Immigrant workers, however, have less access to this information, are less likely to have the luxury of choosing their jobs, and are more vulnerable to abuse and threats. Foremen[31] are a link in the chain of command, usually working their way up the crew. Sadly, foremen are made to push workers too hard – contractors reportedly teach foreman how to abuse workers – and immigrant foremen are expected to mistreat their compadres.

I didn't want to abuse people when I was a foreman – now I can't get a job. Everyone knows me – knows I'm good to workers. But as a foreman, I have to make money from them, steal from workers or get fired. (testimony at Alliance meeting, January 2006).

[31] Large organizations, principal employers of non-Anglos but less often Anglo workers, have a number of crews on the ground, headed by a foreman. The hierarchy is contractor, crew boss, subcontractor and foreman.

Aside from seasonal work and low pay (see Table 1 and Table 2 for Oregon figures) Alliance members share myriad working condition grievances. A primary concern is the lack of safety caused by too fast a work pace. This complaint has been communicated by both Hispanics and Anglos on crews with Hispanics. Inadequate equipment also tops the grievance list. Tuning a saw is time lost time in terms of a low bid. And workers fear retaliation if they ask for breaks or better equipment:

Foremen tell workers they only get paid when they work – so they don't take breaks to eat or use the bathroom. (testimony at Alliance membership meeting, October, 2005)

There are some supervisors out there who demand that you do work in the forest, but they don't want to provide the right equipment. They demand that you do a lot of work, but they don't want to give you a file for the chain [to sharpen chainsaw]. We are working for the next three months for a contractor who is like that. He demands us to work – working hard, working long – but the equipment is poor or so bad that we kill ourselves just trying to get the work done because this guy is so irresponsible. Even though we try to tell him, he retaliates by being rude or threatening, that kind of stuff. There are some companies that actually do provide all the equipment and stuff. (translated by Enrique at annual membership meeting, Crescent, 2005).

Body is working so fast that you don't realize you are injured – it's sometimes days later. (testimony, January meeting 2006)

Heavy lifting, inclement weather and poor training contribute to on the job injuries, which are common. Workers are concerned not only about unsafe conditions leading to injuries, but the lack of treatment when workers are hurt. Workers who have made it to the hospital protest that translators don't adequately report their pain level or doctors' diagnoses; doctors may assert that it is an old injury. *You're in a very bad way but they don't want to pay; don't want to help you.* Ignoring injuries is a cost-saving measure. Contractor and subcontractors don't want to lose crew time or have their Workers' Compensation insurance rates increase. When crew members are unable to work because of an injury or illness, they don't receive sick time and risk losing their position on the crew: *they just throw you in the trash.* One Alliance member reported that when he, as foreman, was unable to work because of illness, his crew was not paid for their work.

An objection of both Anglo and non-Anglo workers is the long transportation time to the work sites. Few companies pay for travel time which can be as much as 6 hrs. per day. Anglos, often organized in smaller crews, drive their personal vehicles to the job site. They are neither reimbursed for their travel time nor their gas expenses. Contractors that provide transportation for larger crews avoid vehicle maintenance as another cost saving measure. Often drivers are impaired by sleep deprivation or substances such as meth or alcohol. If distances to the job are too far for commuting, crews camp out, *We sleep in fields; we are so far away we don't have the capacity to take care of a person if he is injured* (testimony, Alliance Meeting).

As already mentioned, workers who attempt to report their concerns to foremen, supervisors or authorities risk humiliation, retaliation and threats. They are intimidated – even by their own who have moved up the ranks – and told they'll be pulled off the crew, or reported to INS. Recent raids of workplaces of families (including McDonalds) make the threats of deportation real, so they are silent, afraid to call attention to themselves. The personal pain of abuse is mentioned frequently at Alliance meetings, such as in the statement, *Better to receive a blow than be hurt by words.*

Immigrant forest workers connected to the Alliance choose to work in the woods, despite the abuse and safety issues, because it provides them the opportunity to earn more money than other options open to them. Some are compelled also by a deeper value – a restoration ethic and connection to the forests – and bring a family legacy of work in the woods, and skills, such as the multigenerational family of Alliance members from Mexico. Family members suffer indirectly the abuses of their workers. The most obvious is the loss of a worker to death or permanent injury (as reported by Knudsen, often from crummy accidents); more invisible, but common, is substance abuse. Workers reported passing the bottle of Tequila while driving back from the job in the crummy. *How do you support your family if you are drunk when you come home?* Another reported the strain of leaving his young family for months at a time in order to find work. *When I drove off in the truck my son [three years old] said, "Daddy doesn't love me."*

Other than at Alliance meetings (and recently at Congressional hearings and Week in Washington where Alliance members have spoken) members are isolated and silent. At work they are dispersed with a disquieting sense of exclusion. There is little reason to trust organizations and institutions, given the disrespect, corruption and neglect most workers are subjected to. And language and literacy differences "mute" them and expand the distance from those who could help them.

We need to speak, have someone listen to us. Most of us who work in the forest are Hispanic – how can I tell you, I'm a Mexican or Spanish speaker. Because of the pressure of our poverty and debts we have to pay for coming over the border and money we send to our families, we have to work. But we have to put that aside and open our mouths – say what's happening to us. ….Residents can talk, we need to work together. (Alliance meeting testimony)

Although much of the recent writing and testimony on forest worker issues has focused on non-Anglos, Anglos are an important, though diminishing and less visible, part of the workforce. Human interest stories such as Knudsen's Sacramento Bee articles have brought to light abuses of immigrants and guest workers; but Anglos feel their dwindling numbers represent a tragedy to both the workforce and the forest. Although Alliance members share concerns with non-Anglos and agree that "raising the bar" of compensation and working conditions benefits all workers, many Anglo workers feel pushed off federal lands by a number of factors shaping the demographics of the forest workforce. Agencies have been outsourcing what had been good, often seasonal, jobs; compounded by the federal low bid contracting system, outsourcing lowers the quality of training and compensation and attracts immigrants seeking work. Large, non-Anglo

crews work for contractors with federal contracts worth millions of dollars; in contrast, small Anglo crews work on private land doing restoration and hazardous fuel reduction work. They distinguish themselves from industrial forestry workers; they say they are driven by a strong restoration ethic and sustained by attachment to place and forest work, not financial remuneration.

Issues facing the forest worker membership of the Alliance give us a glimpse into the condition of mobile (and some community-based) forest workers of all backgrounds and places. Nontimber forest product (NTFP) workers and gatherers share some of these concerns, particularly dispersal and distrust. NTFP gatherers in the Pacific Northwest are from Native American, Latino, Southeast Asian or low- and middle-income European-American communities. They gather chanterelle and matsutake mushrooms, bear grass and salal, hazel and willow branches and roots, ferns, huckleberries and blackberries, acorns, pinecones, and many medicinal herbs. Gatherers concerns include sustainability, pesticides and herbicides, and management issues such as burning and timber harvesting. The Alliance brings together these disparate cultures and manner of forest workers to understand one another and create relationships, empowers them to learn about themselves and the natural world, and provides a unified voice.

Goals

I describe the Alliance as an organization that breaks through cultural and ethnic barriers by bringing it down to the ground level of what we're all doing and how it affects our lives. And an organization that's looking for equality and looking to help its membership. (Cece)

The mission statement of the Alliance says it is a multicultural organization promoting social, environmental and economic justice. Its goals are to:

- *Share and provide information and education*
- *Encourage participation in decision-making processes that affect our work and lives*
- *Be mutually supportive and respectful of forest workers' and harvesters' cultures, communities and individuals, and foster communication among all*
- *Promote the understanding of each others' struggles and issues throughout the Pacific West.*

The Alliance is a membership organization which serves as an ally to individual workers seeking to change the conditions of their lives and find common ground through building a sustainable forest. Its members work in three states, Oregon, California and Washington; recently membership programs and outreach efforts have focused on Southern Oregon and Northern California. The Alliance is an advocacy organization which ties individuals into networks involving organizations such as those managed by the National Network of Forest Practitioners, the Collaborative Learning Circle and the Seventh Generation Fund.

When you're out there in sideways rain on a terrible 90-degree slope it's miserable for everybody. And what happens when you do that, and you work out there and you overcome this horrible slope there's a bond that you're all out there together between the white logger, the Latino tree planter, and the South East Asian harvester you're all out there. You're out in the elements and that's bonding. Pretty much in rain gear everybody's the same. You can't tell and you're judged on what you do. Not on who you are … Its one of those things where what you do is what you get. It's not like the rest of the world where stock brokers make money and they don't do a god damned thing and stuff like that. People actually have to produce, and you get to actually produce, even if you're cutting trees you're doing something that's actually in the world. And that's a great satisfaction, and there are people no matter how bright they are that will always want to do real stuff in the real world. I mean it's so real. So that's the community. And you've got all ends – people who think they have no option and people who would never choose to have another option. (Cece)

Strategies

Grassroots Organizing

You can only create ecosystem change from the bottom up and that it can only be maintained by the people who are occupying that space. Take it as an act of faith that workers can have an effect – so start at the bottom, give them strength and give them credit. (Susan)

If the members want something and they call the Alliance they're going to get some support somehow. The Alliance doesn't always know what the members want so when the members express what they want they're [Alliance] pretty good at following through and try to figure out how to get that to the members. (Marko)

The Alliance organizes broadly around issues identified as important by members, soliciting their opinions and representing them. Alliance membership meetings provide a space where members can freely share concerns, priorities and goals without feeling fear of recrimination or exploitation. It considers itself a partner to these workers; because it recognizes workers' labor and interests are often expropriated for others' gains. It works to protect rather than coopt them.[32]

Community is created through finding others who share not only an understanding of one another, but a common sense of oppression or injustice. The Alliance funds community based organizing projects (CBOPs) and joins other organizations in grant applications. But the Alliance does not view itself as a "funder" or an "organization" in the sense that

[32]The Alliance Board feels somewhat fragmented from the community forestry movement, believing others do not accomplish the difficult work of bringing together diverse individuals and empowering them. Other groups may speak for forest workers and ask Alliance members to speak as "tokens" for these other groups or networks, but the Alliance does not feel their members are respected or compensated by these groups. They attribute some of this to differences in organizational culture among the groups; some more truly grassroots and others more focused on gaining resources and access to those in power.

many non-profits do. In the non-profit organization or NGO world directors focus their energy on relations with other organizations, funders, and sometimes their critics. The Alliance prefers to spend its energy on members' (workers and harvesters) issues rather responding to other organizations and their issues. The Board feels that the Alliance is different from other organizations because it concentrates on commonalities across interest groups and ethnicities. This engages all stakeholders in developing place-based, issue-based solutions.

For the Alliance, community forestry is grounded in sustainable forest practices and worker rights. They see social justice, human rights and immigration issues as important and related, but choose not to let these larger issues dominate the dialogue. They keep the focus directly on worker and harvester issues; for instance, concern that federal inspectors sent to monitor working conditions or contract work might report undocumented workers would cloud the issue because inspecting contractors and working conditions is necessary for all workers (and the land). Blaming migrant workers for accepting low pay and undercutting local workers' pay or status is renounced as being divisive and counterproductive.

Alliance is for people who identify as a forest worker and want to be a member. We're going to benefit everybody who works in the woods whether they want us to or not you know what I mean. But we're going to base it more, and be the voice more, of people who join us and identify. (Cece)

Learning and Training

Well I'd say it's a diversified group that wants to create better rights or working education for the forest and for the people because the more educated the people are about the forest the more healthy the forest would be or will be – plus it enhances the workers and that's how I see it. (Wayne)

And I want to see a way that some one can upgrade their skills and stay in the woods from [age] 20 to you know spend their whole career in the woods. (Cece)

The Alliance asserts the position that forest workers deserve respect, recognition and just compensation for their technical ability, hard work and experience essential for forest sustainability. Workers need advanced skills in ecosystem approaches to restoration forestry including: 'thinning with brains,' species identification, forest stand densities and canopy cover assessment, and wildlife habitat development. The Alliance promotes a stewardship ethic among its membership and provides opportunities to share and create knowledge through its newsletter, workshops, Community Based Organizing Projects (CBOPs), and on-the-job learning such as working on the Lomakatsi crew and monitoring projects.

The Alliance also educates federal land management agency personnel and others who interact with forest workers and harvesters. They work to enhance cultural competency and understanding of the connection between worker and forest conditions, as well as the

impact of management activities on forest products, such as mushrooms. The Alliance provides opportunities for dialogue with forest workers and gatherers in order that peoples' attitudes and behaviors can change. It provides information about agency policies or interpretations which could improve conditions, such as the need for federal contracting mechanisms to reflect the fact that low bid does not always mean the most cost-effective or most valuable option.

The Alliance uses a form of popular education[33] in its membership meetings and regional work forums. Popular education works on the premise that people, regardless of their education, gain through experience complex and detailed knowledge of their communities and workplaces. This knowledge is shared through dialogue – individuals telling stories and sharing experiences. Peers can then relate these stories to their own experiences, reflect on the broader societal and structural context, and suggest ways of addressing their conditions and mobilizing their communities. This sharing allows the Alliance to effectively work with highly vulnerable, distrustful communities who have been excluded and question their ability to contribute to social change. This kind of education is a time consuming and lengthy process; and outcomes may be apparent immediately, but not always.

My point is that that exposure strengthens, because the members, they're not like members of a baseball fan club, they're members because they want to see social change. They want to work towards something better. So, they're open to those differences and they're open to expanding their limited world view. We've all got a limited world view. That's pretty much a gift, when you go to a meeting and they got headphone sets on … (Marko).

Monitoring

They go out and they travel together and they, in an experiential anecdotal manner keep track of the level disturbance that's going on; the nature of the harvest that year. They talk to people in the forest about if they're harvesting right, talk to them about it if they're not. They will take people out and get them oriented in the forest. They collect harvester concerns and either act on them themselves or bring them to the coordinator person. (Susan)

Monitoring serves a number of purposes for the Alliance – it puts experienced harvesters committed to sustainable practices, and conflict resolution, among gathers. This creates peace in the forest. Monitoring connects harvesters with knowledge and regulations. It encourages others, including the federal agencies, to adopt new practices. It collects harvesters' concerns and advocates for them, and it creates job opportunities. Monitoring gives people at the grass roots level the ability to collect and own data about the landscape. The mushroom harvesters who received training with Richard Hart's students in Lakeview serve as an example. After training, they gathered baseline data. Then they

[33] The Highlander Center in Tennessee is best known for organizing in Appalachia through this mode of education; Bev's vision of the Jefferson Center was a PNW Highlander.

compiled a notebook of mushrooms found along transects in the Illinois Valley. This guide was then shared with harvesters throughout the region.

Mushroom monitors are experienced and knowledgeable pickers; some, such as Cambodians and Anglos, have been commercial pickers and work to protect both mushroom fields and worker rights (e.g., supporting a pickers' strike to bring up the price paid by buyers). Native American monitors are protecting their cultural resources. They share with pickers the need to harvest sustainably, and help federal agencies patrol for proper use and permits. The Alliance hopes to engage more harvesters and other stakeholders in monitoring, and to further conversations with the Forest Service regarding the impact of timber harvesting on mushroom fields, and the success of hand picking vs. herbicide spraying on knapweed. The Alliance believes that monitoring enhances the definitions, indicators, and awareness of resource sustainability.

You're taking the knowledge of the mushroom monitor and are coupling it with a scientific process and all of a sudden, you can ask questions that nobody's been able to ask, but you just worked out a way to. (Susan)

Networking, collaborating and advocacy

Part of my goals is around the empowerment of workers and being a link between, when everything went south in the woods in terms of all this conflict between environmentalists and timber interests … my vision was that we, the workers were the middle ground. This was before the Alliance and Ford and that was a goal, I wanted to be part of that solution part of that middle ground, being part of the solution to all of this gridlock and this you know. So the Alliance accomplishment is helping that, being a party to that middle ground. (Cece)

The Alliance works on multiple levels in multiple arenas. It utilizes different approaches and tactics to address similar structural problems. The Alliance depends upon networking to accomplish this, reaching across its membership in various places according to their issues; and with other organizations which connect members to other workers and gatherers, policy makers and resource people. For instance, NNFP meetings (and Week in Washington) are important to Alliance membership. In turn, the Alliance provides woods workers for NNFP efforts and provides leadership for NNFP committees. The Alliance networks with other groups to make available to harvesters their resources and ideas, such as sharing Trinity Alps Botanicals' best management practices for herb gathering. TheAlliance uses networks extensively to get as much information to people as they can; networks help them reach across the region and cultural groups.

Partners help with legal assistance and legislative work necessary for outreach and advocacy work, such as resistance to a new federal program –Appropriations Act H.R. 3423, section 339, Forest Botanical Products – which would change the permitting process, and cost for NTFPs in confusing, unjust and prohibitively expensive ways for gatherers. Fact sheets on this legislation were prepared, in cooperation with the NNFP NTFP working group, and distributed through harvester networks.

The Alliance recognizes the need for partnerships with higher education institutions. Although not all have been fruitful, Cass Moseley (Ecosystem Workforce Program at University of Oregon) has brought knowledge of federal agency contracting mechanisms, workforce trends, and issues related to the mobile work force. She analyzed data generated by forest worker interviews in Southern Oregon, conducted by the Alliance Outreach Team. The outreach workers depended on networks of forest workers for access to interviewees. Cass and Cece (AFWH board member) presented testimony regarding workers' pay and conditions at a Congressional hearing facilitated by the Rural Voices Conservation Coalition (RVCC), a CBF network.

A very integrated network and it's everything from environmental issues to worker issues to procuring work to skill building like the biophysical monitoring workshop that the CLC put on. (Marko)

Creating community through diversity

Creating community without community of place promotes the cultural pride; there's multicultural stuff happening in the woods …but it's so well diffused in the forest that you don't even know of it, but [the Alliance] is a place where people of different cultures can be together without any [conflict] and they have a bond, and they do, that's not the issue because everybody's talking about mushrooms. They're all mushroom harvesters, you know talking about commercial harvesting it doesn't come up that one is brown, and one's yellow or red. (Cece)

The Alliance's fundamental goal is to integrate and honor all ways to use and create a healthy forest; they build community among diverse ethnicities and interests through finding commonalities across individuals representing different kinds of forest work. The Alliance helps its members see the bigger picture - the underlying causes of their personal issues. It finds common threads through what might look like disparate interests such as herbicide spraying which affects harvesters, basket makers and the sprayers.[34]

It empowers you to learn – to hone in to the natural world. (Erin) Through slogans like "we're all green" and "fellowship of the raincoat" the Alliance reminds members of their common concerns and forges a community identity.

The Alliance weaves together a unified worker voice and channels it up to the decision makers and the policy arena. At the regional level, an example of success working with the federal agencies was the outcome of conversations between mushroom monitors and USFS Rangers. In central and coastal Oregon and Northern California issues ranged from camping restrictions, closed areas, season length, permit cost, illegal picking, logging in mushroom fields, and law enforcement relations. Many of these conversations took place over extended periods of time and in different locations, but the voice from the Alliance was unified.

[34] The Workforce Assessment was another example of work sponsored by the Alliance which results in greater understanding of common issues and provides information to take to policy makers.

I think they just all have some sense of commonality, an understanding of you've got a lot more power if you work together, and for me the belief that you build ecosystem balance from the bottom up. In reality the balance and health of the whole superstructure rests on the backs of the people at the bottom, and they need to be given that credit and honored for that. And they need to be empowered to form a healthy base. There is strength in numbers and if you're poor and you're small there's zero strength if you don't get together. (Susan)

Improved Lives and Livelihoods

As a membership-based organization, the Alliance improves the lives of forest workers and their families through 1) providing spaces for empowerment and unified voice 2) offering training and work opportunities and 3) creating community, in places or through networks of common interests.

It contributes to our lives by expanding our experience of human beings and the land; it contributes by giving us more knowledge on policy issues education. Knowledge is power. It gives us more knowledge, you know as a member you don't have to look at those things but a lot of us do (Marco)

Empowered, unified voice

It helps its membership by empowering us, giving us hope, you know knowing that we have people working for us, thinking about us, looking out for us. …They've chosen to focus on people who've come into their lives and they've helped my life out. They're a voice. They're a really important voice and they need to keep going. Alliance is looking out for workers who don't have much representation in the woods when it comes to Asian mushroom pickers to Latino forest workers. They haven't forgotten about the white folks either, but there are some really pressing issues out there when it comes to people of color. (Marko)

The Alliance defines empowerment as gaining equal access to decision-making, implementation of those decisions, and amassing resources required for that implementation – information and education, money, partnerships and opportunities for policy advocacy. Empowerment is apparent. The organization allows members such as forest workers and mushroom monitors and gatherers to control their projects and speak for themselves.

The Alliance has made the painstaking efforts to address the consequences of worker exploitation for both communities and forests. They have taken the time, built the trust, hired the translators and created the space for workers and harvesters to share their legitimate concerns. The Alliance has created new opportunities for participating in advocacy networks and going to Washington DC to speak with those in positions to change policy and conditions.

Members participate in the work, outreach and decision making of the organization. This is no easy feat since membership and board (which is representative of membership) are dispersed throughout the region. Projects take place in local communities but are coordinated and supported by the central office. For instance, outreach workers (Braulio and Crystal) were trained and equipped by an accomplished organizer who works in Portland (Enrique) to empower the Latino forest worker community in Medford, Oregon. Together, they identified a community garden and Christmas wreath production as potential opportunities for their community. The Alliance then employed its network to find resources needed to realize these ideas.

In sum, the Alliance makes it possible for membership to have more control over the condition of their lives, whether in the forest, in their communities or with their families. They get this through: creating spaces to share experiences and to organize, listening and crafting a unified voice, and engendering hope and expectation that support is available when and where membership requests it.

Best Value is finally coming in to play and that was like 5 years ago. So anyways just talking about these issues is starting. You got to keep repeating it. That's what I always do. So I think the Alliance is actually one of the more important organizations in the circuit because it's all from the ground up, right at that starting right up there at the D.C. level they can hear what we start down here building blocks up to it. (Wayne)

There are phrases that we made up that are now being used in initial legislation. Mobile workforce, we made up the term mobile workforce and now three years later I see it in a bill. And so we have had some, but I still wonder if it's just semantics I mean did we just change the way they talk? I'm not real clear, but you've got to have patience that we've actually improved working peoples lives. But we have one thing we have accomplished, is that we, when we started we were the invisible workforce, and now more and more people actually know that we are there and what they do. … I think that that's something that we won, there's a benefit to forest workers and the Alliance, too, in that we're a force to be reckoned with (Jude).

Training and work

We're doing something actual in the way of benefiting people real tangibly. In other words, we're helping them access training and work. The success is that we can do what they said they wanted (in Medford). Helped them get started.… They really helped them get something started. Their small group is getting much bigger and they love the work and we feel really good about that (Susan).

CBOPs can involve training which results in jobs, sometimes working for the trainers. Nearly a dozen Alliance members (living in Medford) have been employed by Lomakatsi doing local forest restoration work. They appreciate the quality of the work experience, and the opportunity to return home every night. Another CBOP gathered Hupa tribe members of all ages to share local traditional knowledge of native plants and to produce

products for both subsistence and local markets. The CATTS projects provided advanced forestry skills, including designing and implementing prescriptions, cruising timber and writing participating agreements.

Well I think that, the concrete things like actually providing training or access to work are the most important things to people. You know how, in terms of their work is access to it and being good at and opportunities to get better, and make more money. Because by and large nobody loves their work more than I do, but we all work for money, I mean for a living and there are very few people if given the opportunity that would. I'd probably do the same thing I do but not as much. So you want to be good at it. (Cece)

The empowerment that's going on the ownership, by the time they get all this, the snow had fallen, they couldn't go back to the transect. The season had ended. They went over to the coast. And the mushroom monitors are so excited about the pictures. Why are they so excited? I think it because they spell ownership. There's something about this process that can be owned by ordinary people. (Susan)

Community and Peace in the Woods

Well, it's helping people get focused to find their commonality, and giving them a structure in which to work together and come together and have common goals and work towards them and feel their personal power. (Susan)

The Alliance has bridged diverse ethnicities and cultures by emphasizing the common goals of: empowerment and justice for workers who are caring for forests and seeking to provide sustainable natural resources for cultural and economic use. It serves as a node of a network, facilitating communication between groups that normally don't have the chance to communicate with one another. Workers' opportunities to shape forest management and policy have been limited and will continue to be, given their dispersal and invisibility; through the Alliance members can participate in community and engage in dialogue at multiple levels – local, regional and national. Unions are not seen as a viable option for gaining forest workers rights, and coops are probably not feasible given the culturally diverse and mobile workforce, although the idea has floated up at Alliance meetings. In other words, the Alliance creates community that supports workers and gathers where none exists.

One source of community among dispersed and diverse Alliance members is their commitment to the forest – a shared ethic of stewardship provides a common identity that cuts across differences. A common sense of oppression and exclusion is another source of commonality, but "being green" is more positive and links to the pride in hard work, skill and endurance of forest workers and gatherers.

Before our organization, you know there was some there was not place for people to say "we're all green." People still want us to be. They want us to be red or brown or yellow or white and we say not we're green and you can't stop us from being green and I think that's a benefit to people, because then you get to get over being scared of each other. Particularly, you know, I would say that the dominant colored people - the white people -

are really scared because with the people particularly with the immigrants and stuff, there can be a lot of misunderstandings. There's a focus on how much you have in common as opposed to how much you have, actually when you keep the focus on the forestry stuff. (Cece)

WATERSHED RESEARCH AND TRAINING CENTER
(research assisted by Auricia Tama-Sweet)

It is about resolving, it's about peace, about finding ways to the future – it's a real pragmatic, survivalist approach that isn't driven by any philosophy except those basic human things about how do we take care of our families and each other and create a sense of community so we can trust in ourselves and each other. (Lynn Jungwirth)

Background

Poverty, unemployment and environmental degradation in forest regions may be better explained by a disconnection from forest resources, rather than simply by an over reliance on them. (Danks 2000 – Unasylva)

The town of Hayfork sits in a valley encircled by forested mountains. Winding down the road from the State highway that connects Redding to the coast via Weaverville one is struck by the area's beauty and isolation. For decades, the major source of livelihood in both the region and community has been timber and in 1996 when SPI turned off the switch at its Hayfork sawmill, an eerie silence lay over the community. During the census period of 1990-2000, Hayfork's population declined from 2600 to 2300 and no doubt the decline would have been greater but for peoples' strong attachment to this place -- its landscape, way of life and family legacies. A bulk of the population lost was families with children, as parents sought jobs elsewhere; others have stayed, but leave during the day to work elsewhere in the region. The loss of these workers was felt throughout the community, for instance Little League struggled to find coaches and the Volunteer Fire force got dangerously thin.

The Hayfork sawmill, employing 150 people when it shut down, did so for a number of reasons -- decreasing local log supply, need for retooling to use smaller-diameter logs, transportation costs, age of the mill and excess processing capacity elsewhere in the state. Throughout the region layoffs were widespread as mills mechanized, rode a downturn in the national timber demand in the early 80's, and then faced a shortage of logs from public land after listing of the spotted owl and the Northwest Forest Plan in the mid 90's. Trinity County was especially hard-hit by these industrial and policy changes because of its economic dependence on timber (greater than 30% of wage and salary employment is in this sector) and its predominance by federal land (70 percent is management by federal agencies, primarily the USFS). Industrial timberland is controlled by companies outside

the county, as well – therefore the region's economy has been based on forest assets over which it has little control.

And it's not called community forestry because what we envisioned is a community institutionalizing its capacity to interact with the federal agencies. It's called community forestry because it is that fundamental thing about a human community … that lives in the forest. That is important, and our need to have all those people who were controlling us from the outside become part of a community that cared about the forest. To create a sense of community with them and us and each other. (Lynn Jungwirth)

The major institutions influencing the fate of Hayfork and Trinity County have failed the local people. Post-industrial society's shift from extraction to service economies, uncoupling of products and resources, and concentration of capital nearly devastated the natural-resource based economy of Hayfork. Increasing public sentiment in favor of environmental regulation and environmentalism as an identity movement fueled the "timber wars" that tore the community apart – for instance, school kids in science classes were gathering stream samples that could put their fathers out of work and school plays were portraying loggers as destroying the woods. The NWFP shifted the focus of federal management from timber to ecosystem management and Hayfork was designated an Adaptive Management Area where watershed assessment and innovative forest management would be accomplished in cooperation with local communities. However, the AMA promises weren't kept and contracts and timber sales on Trinity National Forest lands have gone to large companies from outside the community. These larger companies bid low on projects by using subcontractors who exploit migrants and others who work for low pay, and transport employees and equipment from job to job. Small-scale companies, such as those predominantly found in forest communities, can't compete. And timber off the Forest goes to buyers outside the County who choose where to mill wood and whom to employ – seldom locally as timber processing facilities and contractors are now centralized in non-forest cities.

Some equity (wealth gained through selling homes in urban areas) and amenity (clean air, water, beauty, and recreation) migrants settle in Hayfork, but less than some other forest communities, no doubt because of the distance from airports and other services desired by urban refugees. Newcomers' are not readily apparent in town as they build in the surrounding forests; many are retirees and they do not appear to contribute to or value the sense of community vital to Hayfork's resilience. Additionally, newcomers bring a "king's woods" (Penn State Report) attitude towards the natural resources on their land, denying access for hunting, fishing, and gathering which many long-time residents and their families had enjoyed and depended upon in the past.

We've always been poor here but we were working poor. (Kusel report) The official census count of people living under the poverty line in Hayfork in 2000 is 23% (down from 30% in 1990); perhaps more telling is the 76% of Hayfork elementary school students in the free and reduced lunch program (52% in 1989). Whatever the statistics say, a new kind of poverty has come to Hayfork since the mill and woods shut down. An increasing number of families have turned to welfare – a trap of dependency for local

people who in the past had turned to family and one another during cyclical down periods typical of natural resource economies. In addition, new welfare-dependent families have been attracted to Hayfork's affordable housing and accepting community. (Penn State report). Much of the poverty in Hayfork is first generational and still responsive to intervention; however, a decade of living on assistance or worrying about the next pay check has taken a toll on individuals, as evidenced by increased drug addiction and child abuse in the community.

Because many working families have been forced to leave and few youth return after leaving, few new businesses are moving in or emerging, with the exception of some "mom and pop" establishments. A challenge for community economic development is developing entrepreneurial talent and confidence – and matching future work opportunities to the skills and interests of local people.

I mean, these people around here are amazing. You know, they're self sufficient....It's just that, what I'm understanding, working with this crew, is nobody wants to make a decision. You know, they know what needs to be done. In addition, people are still not used to feeling stable and safe economically. I think it's economic and the cultural that goes along with the economic. (Alex Cousins)

Goals

We didn't set out to change the world; we set out to change our communities. (Lynn Jungwirth)

The stated goal of WRTC as a Ford demonstration project was to create an incubator of a natural resource related business with the outcome of a higher quality of life for the workers and families of Hayfork and Trinity County. A related goal was to maintain the forest management and restoration capacity of the valley, therefore the Ford Project was designed with both a focus on forest services – restoration, fuels reduction and fire breaks, and forest product value-added manufacturing – creating jobs and providing value to the outputs of forest management. (WRTC Progress Report to Ford)

Strategies

"If WRTC just focused on economic impacts then WRTC could bring in a call center to create jobs, if WRTC just focused on forest health then the restoration work could be done by non-locals and if WRTC just focused on the community WRTC would spend lots of time talking and never get to job creation. WRTC needed to work on all parts of this at once to be able to engage the community in their exploration of job opportunities that contribute to forest health." (Lynn Jungwirth – Site Assessment)

Comprehensive array of efforts

Whatever jobs you can create, you create those. However you can help, you help. (Lynn Jungwirth – interview)

WRTC succeeds through demonstrated accomplishment – doing things on the ground, in schools and in the community. A diverse array of projects reconnect people to one another, to outside resources, and to the forest through training and education, research and contracting, work and recreation. WRTC gains support from regional and political organizations through trying and testing new ideas – gathering information and monitoring results.

WRTC serves as an umbrella or central clearinghouse for community organizations and emerging non profits – it provides grant writing assistance, staffing and office space, when necessary. The director describes WRTC as a "docking station" for various organizations and resources – linking together interests, information and innovation. It builds partnerships with the USFS management and research, regional universities and professors, local, state and federal government, businesses and business networks, environmental groups and environmental networks, and other communities and community-based forestry organizations.

WRTC has consciously developed its own capacity as a step to building community capacity. It has hired local people, building their skills to be more effective in creating positive, effective change in the community. The center serves as a hub for information and provides sense that things are happening. When they moved to a new location (between the library and sheriff's department) people commented that now there are cars in the parking lot. The office is frequented by visitors from other countries and states, Congressional staffers, professors and students -- but also local people eager to have their cars towed, camp kids calling parents for rides, and babies and dogs of staff and visitors. The Watershed Center is not only about training and research – it is a community center.

Learning, Research and Training

Teaching a more holistic view of the forest and ecosystem…you know, communities, populations, things like that. We always trained our crews, and one thing we told them from the start…you are used to doing it one way, but our objectives here are to leave the condition better in some ways than we found it. (Roger Jaegel)

WRTC works on the premise, and has evidence to support it, that people love to learn. Local residents have traditional knowledge about the forests and their inhabitants, and they like to share that information. The Watershed Training program curriculum started with that knowledge of the watershed, expanded and formalized it. WRTC took the Northwest Forest Plan's emphasis on ecosystem management at face value and developed a number of strategies for creating a local economy based on ecosystem management, or forest restoration: retraining woods workers, designing new harvest methods and machinery, inventing new products from forests and creating new markets, and finally, stimulating business development in order to add value locally through establishing an incubator. They gathered information about the community and the

forests and where no data exists, they found those who could get it, trained and hired local residents to collect it, and shared it with anyone who can use it. Their goal was to provide information and resources to those who could most benefit and give back to community and forests.

Through linkages to education and research institutions – visits from university classes, grad students and professors eager to learn about innovative forest management, exchanges and dissemination of information from USFS Research Stations, accreditation of teachers to provide college credit for local classes, and programs that take local high school students to regional universities – the WRTC serves as a hub of a learning network.

Collaboration and advocacy

We've been disciplined in our politics to not be partisan, to not aim for conflict, to not be a special interest group. … We are going to use soft advocacy because this has to be a cultural change that is absorbed into our culture. We don't want a separate culture that fights with this culture. (Lynn Jungwirth)

Participants in the WRTC had to learn to collaborate, sometimes with those who most distrust and malign them. They found common ground through collaborative planning, field tours and monitoring – and regional networks and initiatives. Their goal was to link health of forest to health of the community, drawing together those interested only in the forest with community leaders most concerned about the wellbeing of their residents. To WRTC, it is a given that the community's best interests are those of the forest – they have to take care of the forest. They work to align this value with others' value sets and policies which often exclude local residents.

The WRTC has collaborative projects at every level. It was "hatched" through the Trinity Bioregional Group which became overwhelmed by power and control battles and dissolved. The Trinity County Resource Advisory Committee (pre-cursor to the RAC) worked on a number of issues along with forestry such as water policy and dams. The Fire Safe Council is a county-wide collaboration among volunteer fire chiefs, Resource Conservation District, California Department of Forestry, and USFS; currently WRTC is leading stewardship projects (fuel reduction on private and public lands) in the Post Mountain area. WRTC works at the national level advocating for Secure Rural Schools and Economic Action Programs (EAPs) and at the local level on the county Regional Action Committee (RAC) which focuses on erosion and wildfire (complementing the Fire Safe Council). And it participates in regional networks such as Healthy Forests Healthy Communities (Sustainable Northwest), National Forest Restoration Collaborative, and Rural Voices for Conservation Coalition.

Who else tried to say, "wait, wait, wait, wait, wait – you're not right, you're not wrong, you're not right, you're not wrong, we all have a little bit of the truth, let's come together and see if we can work together on this because what we're doing isn't working for you

and it isn't working for us? You're mad, you're mad." And so who was doing that? Nobody was doing that. (Lynn Jungwirth)

Monitoring – ecological and socio-economic

There is a lot of emphasis on ecological outcomes here. Our job is to help people see the socio-economic outcomes we are getting. They could see [i.e. literally, on the ground] the ecological outcomes (Lynn Jungwirth – ecological team visit)

WRTC helps to document and reveal the connection of local well being to natural resources.
[hope to write this with Cecilia or will use various reports] See also ecological monitoring report.

Don't you think it is ironic that the people who are asking for monitoring – building learning monitoring systems – are those who are accused of destroying the environment: the loggers and ranchers?

Empowered Community

Hayfork is Hayfork and we can change all we want but let's keep in mind the people that have lived here, for, you know, three generations. And they have a right to not have to defend who they are and what they are. They have a right to live their life as they've lived, and if we're going to make changes, be considerate of that. I feel that very strongly. (Alex Cousins)

The Watershed Center respects the culture and family legacies of Hayfork; employees serve as ambassadors among community members. They help people identify what they need and can do, and facilitate it. The Watershed Center nurtures economic development and entrepreneurship through the incubator, through education and training programs and through mentoring on the job. By serving as a model and attracting outside attention, WRTC brings in new resources and readily incorporates them into ongoing local efforts – the "docking station" continues to expand as it feeds other efforts and creates policy changes. The driving force of this energy is not a quest for power; it is to create community opportunities attractive to local youth and working people. Building relationships in key places – in the community, in organizational networks and in Washington DC – has been necessary to creating opportunities for an empowered community.

Improved Lives and Livelihoods

People, they're able to clothe their kids. They a have shoes on their feet now. I mean, there was a time when a big problem was kids coming to school without shoes. Now people can feed and clothe their children without relying on assistance, which doesn't

give you the same feeling of self worth. And people have a totally different feeling about themselves now and you see it in them. It's amazing. (Diana Burke)

Strong families make strong communities, and that's why it's community forestry. It isn't community forestry because it's about the community organizing and having a voice. It's about them [community members] as the driving, formative, informing value for the work that we do. It is empowered by community, which is different from empowering community. (Lynn Jungwirth)

The previous section discusses the Watershed Center's holistic strategies for recreating community. In this section we discuss the "spokes" of the docking station -- the entities created by the Watershed in regards to the impacts on individuals, families, and the community. But since these entities are integrated we include some discussion of their success at filling the gaps in institutions upon which these families depend. Ecological benefits, institutional and policy change – although integral to social benefits – will be discussed elsewhere, although it is worth noting that these various achievements create a synergistic and multiplying effect upon one another.

The Watershed Center

And its, you know, it's my community. I was born in Hyampom. This is where I want to live, and I get a chance to work here and have an effect on what happens and not just go to work everyday. I mean, I can tell you that I wouldn't be here if it wasn't for the Watershed Center. (Alex Cousins)

Perhaps the number of people employed at the center is not as important as the kind of work they are inspired to do. In the past couple of years, a nucleus of young adults has returned to work full time on community, forest and policy projects. They have the satisfaction of effecting positive, systemic change in their community. They can afford to stay in the place which they love, derive meaning from their work, and maintain a decent quality of life.

Staff members enjoy the variety of projects, the learning and support which sets them up for success, and the large scale effects of their work in the community. The WRTC is a progressive and supportive environment; the passion and encouragement staff feel from their director is contagious as she creates an environment which helps employees identify and take steps needed, knowing they're on their own, but resources will be there when needed. Individual commitment to the WRTC's vision carries over to mutual support of one other, so there is a great sense of teamwork on projects. And WRTC value their learning web, not only at the Center but through regional and national groups and conferences.

The flexibility of the WC is important to its employees. For instance, an employee has been able to spend part of the winter in Mexico for the past few years, another was given time off for medical treatment, and another works Sunday through Thursday in order to spend Friday with her husband who works out of town. The employee who had to take

time off for surgeries and recovery time stated, *they couldn't have been better. It's amazing. It makes you glad to be an employee with them.*

If you're not thinking about changing something in the future than this probably isn't the place [for you because] that's the nature of this organization, you know, it's not just you come to work and you do your job and then you go home. (Alex Cousins)

Incubator and Jefferson State Forest Products

Once the steel started going up and everything, and they saw that it was real and you saw it start to turn around and the same people that talked to me and told me, you know, how bogus it was, they came up and said, "well, do you think there'd be a job there for me?" ...So it was really exciting to see it change like that, so now it's a good thing. (Diana Burke)

WRTC created a small business incubator to facilitate the development of forest-based businesses. Its client list numbers 128 and over 30 who have received assistance are now in operation (mostly equipment operators, construction services and tree fallers, but also various other services and small retail businesses). The incubator, sometimes in partnership with the local community college, offers courses that provide business skills, and staff helps write business plans and get financing with the Trinity county business loan program. Diana (staff) reports, "It's been a real learning process and it's taken a long time," both for her and the community. As she says, "it's taken several years to get them to the point where they're actually being proactive now." For instance, a man who worked in the forest for most of his life has now opened his own shop to repair equipment. "He's had to look outside of the box" and see new possibilities and with help, he has made those distant visions a current reality.

Jefferson State Forest Products was the first tenant of the incubator building (business incubator services works out of a storefront near the old Watershed Center office) and is nearing its time limit of occupancy. When Jefferson State moves from the incubator, a new client is ready (will manufacture fire protection equipment) and anticipates employing 15, planning to expand to 50. The incubator hopes to replicate this 5 times, and if they do they will have replaced all the jobs that left when the mills closed.

Whole Foods has a product seen by tens of thousands of people – we have a sense of pride in creating this things that's going out in the word from little Hayfork. (employee)

Jefferson State Forest Products moved into the incubator in August 2002, and currently employs 38 and now is the largest private employer in Hayfork. Over the years a total of 88 people have been employed: 27 women, 61 men and 86% within the US Department of Labor targeted low income range. Many are employees are connected as extended family members. Young and older workers cooperate in production teams, they receive training in a number of areas, and those with demonstrated achievement can move up the ranks quickly – of the 5 team leaders in manufacturing, 4 are in their 20's and 30's. Employees participate in a profit sharing program, 401K retirement and optional group

health insurance. Although wages might not compare to those during boom times in the mill and woods, opportunities for advancement and perceived sense of value provide a quality of work experience which employees appreciate. Most importantly, the stability and security give them peace of mind and hope for the future, and their 401K funds give them access to capital. *And after going through a period where you didn't have a job, I mean, it just makes them tremendously happy to show up at 8:00, go home at 4:00 and you know, have that paycheck on Friday. Because this kind of security has been so long coming, people want to work for a paycheck, and they're happy with that. (Diana Burke)*

Jefferson State Forest Products has improved peoples' well being. *To see the change in them overall is amazing*. (Diana Burke) Many reported they had previously driven "clunkers" and couldn't count on getting places. Now they can afford decent cars or trucks and they report their increased status in the community. Others emphasize they feel less stress as they don't have to worry about the next job, next paycheck. One said he was eating better, many reported they are getting better health and dental care, and others said they had savings accounts for the first time in their lives. Another appreciated that he earned enough for his wife to stay at home with young daughters. Many mentioned they could get loans or mortgages for the first time; one single mom of four said her job kept her from losing their house; others reported they could move out of their parents' or children's homes. *Like I said, having the roof over their head, knowing that the job is going to be there. It's not here today, gone tomorrow. You know, and being able to take care of your family has contributed to people's sense of worth and security.* When asked about future plans or careers, everyone responded they had no intention of leaving JSFP. They stay because of their job satisfaction; also, this is only job in town, *nothing else to do, we would have to leave Hayfork, and then only earn minimum wage*. *(employees)*

Jefferson State Forest Products contributes to a sense of community at work. Production teams are encouraged to share ideas for improvement with one another and management; they feel they contribute to the success of the business. On the floor they have a sense of family; they don't feel they are individuals doing a job. Fourth of July parties and Thanksgiving events tell employees they are valuable and help development relationships beyond work. *They let you know you are appreciated. (employee)*

Jefferson State Forest Products contributes to the Hayfork community. As the largest employer in town, the most obvious contribution is the 2M$ (check) payroll contributed to the local economy. Also, many employees and community members mentioned the wood scraps given away for kindling as many heat their homes with wood (people back up trailers and fill them; employees take it home, and others box it up and give it to people in need). Scrap lumber is also provided for the community theater, other community projects and for employee's home projects. And JSFP products – wooden trays and bowls – are donated as prizes to a local equestrian event that attracts participants from throughout North America. JSFP also is mindful of their potential impact on local businesses, for instance, they gave their businesses to a local recycling outfit that is just getting started.

Another important community contribution mentioned by the school superintendent is *it keeps kids in town because their parents have income and they can live here. These are kids [with] parents who are not deadwood. These are people that want to work. … And there isn't heavy turn over because they're supporting quite a group of workers, and then in turn they support a lot of things in the community." (David Shoemaker)*

"We've all grown up together – we've built this business." (employee)

Filling Gaps

And so I think you have to look at what we're doing as – there were two gaps, there was a gap in governance but there was a gap in the soul of this community. So it was a spiritual quest at the same time. I know people don't want to talk about it, but it is. (Lynn Jungwirth)

The WRTC has built capacity to address gaps through supporting other organizations such as HATS (Hayfork Action Team which works on community development, downtown revitalization and tourism related activities), Nor-El-Muk Tribe, Senior Citizens Center, Hayfork Swimming Pool, and numerous youth programs through the schools and summer camp. WRTC also actively contributes (sometimes in a leadership role) to community efforts which interface with the forests such as Adopt-a-Watershed, Fires Safe Councils and Post Mountain Fire Plan. And it has launched campaigns to clean local streams and remove old cars. Because youth often signify (and suffer from) gaps, they will be the focus of this section.

There used to be 1500 kids in the district, and when the mills closed overnight, those that had to get up and go got up and went, and we were left with a very large pool of poverty type people. I've even had to train my staff in how kids in poverty learn differently than other kids. Like, they only live in the moment, and so do the parents, and most of our kids are kids-- neither parent has the same name, every year it seems like things change on who's the guardian and who isn't. (Dave Shoemaker – Superintendent)

Youth programs were a process of trial and error, starting with summer camp "*where we got to know the kids within the camp and then we recognized the gaps, we recognized what was lacking, and slowly we started trying to fill in those gaps...so it all kind of evolved. I think each program built on itself*." (Melissa Jessee) The youth camp and outdoor program offer free transportation, food, equipment and gear in order to fill gaps for kids who come from families on some kind of governmental assistance and qualify for the school lunch program. … *because the camp is estimated to cost about $800 per student without the WC grants, its fair to say that these kids wouldn't have these opportunities without the WC. (Melissa Jessee)*

The summer camp and adventure club are meant to expose kids to the forest, develop their leadership skills, empower them, give them experiences of teamwork, and offers a chance to become proud of where they're from, all the while trying to encourage them to build healthy lives and make positive choices. Youth programs help kids in a holistic, multi-dimensional way. *They're also gaining life management skills, learning to be*

responsible, learning to be accountable, learning that if they're there for work they might as well work hard and be proud of what they're doing. At the WRTC staff recognize that *We need to play a part in helping kids prepare for their future...we're trying to help kids create choices for themselves instead of having choices made for them.* The college mentoring program takes kids to tour campus colleges, see housing, get financial aid presentations by college staff, and get presentations about the application process. It also offers a wide range of campus tours, including junior colleges, state colleges, and private schools.

Melissa notes that *the program as a whole makes a difference...they've become involved and participate …they can feel a sense of pride and ownership and stewardship for where they live.* She has noticed that kids who do get engaged with WRTC programs become more curious and it's opened doors for them, *and I think it also helps build their self esteem, which you know, it all goes around, it's a circle.* In a town the size of Hayfork, individual kids and their interests can be identified and reached while they might be overlooked in a larger place.

They don't care. They've made that patently clear. What happens to the children in this community they don't give a shit about? The environmentalists, the timber industry, the agency. So that's our responsibility to care about that and to see how we can get this to work so the children in this community and old people can be taken care of. Because if you can't take care of your old people and children, then what the hell are you? You're not a community. (Lynn Jungwirth)

Reconnecting the economy to public land

…see how the relationship between the community and the agency has changed because of the Watershed Center and how much more they focus on what local people need to have done and want to do. Sure they have their timber program and they'll go do that, but that's because that's National policy and they can't affect that. They get their timber targets and they get their budget and they live within that world. But shaping their program around protecting the community; doing stewardship contract, trying to figure out how to shape contracts so that people can get work, how to work with local partners … to go out and talk to people and change the level of the dialogue and the level of involvement. To upfront the public participation in the front of NEPA instead of in the back – that's a huge change. (Lynn Jungwirth)

It didn't take off in terms of doing a very large program. I mean, what we'd hoped, that if we could develop markets for this material, provide jobs, get value-added products, all of that could stimulate the economy, and also help the fuels situation, help the community-at-risk situation…I mean there were a lot of positives coming out this…we were actually utilizing material that had a negative value…so we were taking a waste material and turning it into jobs, and product that actually provided markets in the economy... (Roger Jaegel)

The woods worker trainings were offered in partnership with Shasta Community College, Trinity Occupational Training and USFS so that trainees could get college credit for their work. Over 3 years, from 1995 to 1998, a total of 50 unemployed and dislocated workers received certification upon completion of the Ecosystem Management Technician Training Program. WRTC has hired 12 of the program graduates in different capacities and nine Northern California counties used this training as a model. Most of the graduates found work but it has been seasonal or short-term, although one graduate went on to Chico State and is running a watershed program for the BLM in Siskiyou County. The anticipated jobs from ecosystem as prescribed in the Northwest Forest Plan did not materialize in Shasta-Trinity National Forest because insufficient funds were authorized and larger contracts are now being offered and going to larger companies. Over the following years WRTC continued training 20 people per year, helping some crew members' transition to businesses in habitat improvement and fuels reduction funded by National Fire Plan. The training program ended abruptly in 2000 when the forest supervisor's office and the regional office decided to end it. WRTC transitioned into semi-permanent crews for fuels reduction, trails work, and technical assistance to other communities.

The Watershed is a benefit to all the people who work here because they are able to stay here where they want to be. They aren't here for the job, but the job allows them to be here. …It's been a good thing for me – the Watershed. (member of woods crew)

We set out to help our communities … I supposed if you looked at where you could actually see our influence, it would be more around the lives of the individuals and families in our communities. The institutional arrangements and the energy we are able to self organize in our communities around other issues. (Lynn Jungwirth)

CONCLUSION: BUILDING COMMUNITY CAPACITY

Community capacity has been defined as the "elements of peoples' day-to-day relationships, conditioned and constrained by economic and political practices that are important determinants of the quality of their lives, if not also of communities' healthy functioning" (Labonte and Laverack 2001 p. 112). The concept community capacity represents a range of elements and relationships; it is both a means to achieving the goals of the IPs, and an outcome, itself. As organizations, WRTC and AFWH provide leadership, resources, programs and advocacy which allow membership – as individuals, as tribes and ethnicities, as occupational groups, as social change groups, and as community groups– to create social capital and social cohesion. WRTC and AFWH also address social forces which limit the ability of their members to control and improve their lives.

Community capacity should not be equated with program capacity or success, but it facilitates the program's ability to provide a mediating link between individuals and their social and forest environments. Concerns related to community capacity are relevant to the success of the IP organizations. Nine domains of community capacity defined to understand organizational influences upon community (Labonte and Laverack 2001) are

employed here. They are not intended as an evaluation template or summary of "best practices" of creating community capacity, but instead as another way of understand the connection between these organizations and their communities.

The nine domains are 1) improves stakeholder participation; 2) develops local leadership; 3) builds empowering organizational structures; 4) increases problem assessment capacities; 5) improves resource mobilization 6) strengthens links to other organizations and people; 7) enhances stakeholder ability to 'ask why'; 8) increases stakeholder control over program management; and 9) creates an equitable relationship with outside agents.

Participation increases individuals' sense of efficacy and may lead to collective action which can improve quality of life and working conditions. WRTC provided specific opportunities for participation through employment, camps and community-wide initiatives. AFWH provided inclusive participation to a wide range of forest workers, providing a sense of empowerment and collective voice. Some activities, such as CBOPs and trainings were more focused, as were opportunities through networks with other organizations.

Leadership – vision, entrepreneurship, patience, persuasion and pragmatism – and mentoring of new leadership is central to WRTC. WRTC has a core of strong leaders; AFWH has a range of leadership types, some more powerful in their command of knowledge and skills about forests and social change, others inviting trust and respect through interpersonal and intercultural skills and facilitation. Because leaders of AFWH are wary of power wielding they see in other organizations, they work to foster leadership in multicultural harvester and forest worker communities rather than seek the power leadership positions might afford them.

Organizational structures differ for the two groups. With its "docking station" structure, WRTC links existing organizations with others within the community, or in the region, and creates new ones in order to address issues and share resources. WRTC supports other organizations through fund raising, facilitation and networks. Some community-based AFWH organizational structures are enduring, such as the Medford and Crescent Lake projects; others are more fluid and grassroots-initiated, such as those supported by CBOPs. Without a single community base, AFWH depends on partnerships and networks for much of its organizational structure, contributing membership and support to other organizations, such as Lomakatsi and NNFP.

Problem assessment and analysis – identification of problems, solutions to problems and potential actions – are important for forest communities to understand socio-economic transformations and ecological conditions. Socio-economic monitoring reminds WRTC of its mission and challenges, and is a litmus test of its success. Socioeconomic data identifying workforce issues and potential actions have been collected by AFWH outreach workers and analyzed by the director of the Workforce Program at the University of Oregon. Ecological data provide assessments of ecosystem conditions as well as effectiveness of forest management innovations and best practices offered by both organizations.

It is not only important for communities to identify their issues and social problems, but also to "**ask why**?" or assess the social, political, economic forces and power arrangements which connect the issues. WRTC provides opportunities for individuals – from school children to woods workers – to assess their options and connections to forests; it enables organizations such as the Post Mountain Fire Council to develop stewardship and fire protection strategies. By definition and practice, WRTC is a learning organization. Similarly, AFWH draws together its diverse membership through identifying common socio-economic and political forces which connect them. It brings together, educations and empowers individuals interested in social change.

Isolated forest communities need organizations to help **mobilize resources**; external resources can be catalytic for individuals within the community. "It was raining money and we had no buckets." WRTC was created in part to serve as a vehicle for receiving government funds for communities hit by changes in federal forest policy. Outside funding invests in local people and leverages local knowledge, labor and entrepreneurship. Some programs focus on the community's most recognized asset – its youth. In its worker rights advocacy AFWH mobilizes resources ordinarily unavailable to marginalized people, provides them a voice and increased sense of efficacy and access to social networks. Because AFWH is focused on meeting membership needs, rather than building organizational strength, it has more challenges mobilizing resources. Its unique organizational scope and mission falls outside of most outside funding programs.

Linkages with other people and organizations, through partnerships, coalitions and networks, assist communities in mobilizing resources and addressing issues. Through linkages, geographically isolated forest communities gain strength and visibility. Early on, WRTC recognized it needed to link with those who could help effect change – both within and outside the region. AFWH is well linked to a number of worker and multicultural networks; it also creates links among people through its membership meetings, its CBOPs and training programs, and mushroom monitoring projects.

For community-based programs, **outside agents** provide an important link between communities and external resources, such as funding and policy makers. They are especially important for launching new programs and helping organizations create momentum and recognition. Federal policy and land management agencies are important players for forest communities connected to federal lands, enabling or crippling community well-being. WRTC, well aware of the importance of outside agents, works to include groups such as land management agencies as part of the community and brings together outside interest groups to find common ground. Outside agents are more difficult to incorporate into the AFWH community, in part because it is not place-based and culturally diverse. Disparities in power and "cultural literacy" between outside agents and AFWH membership can create misunderstandings and mistrust.

Effective **program management** depends on clearly defined roles, responsibilities and management. In a sense, this domain links back to the first one, participation, as it entails devolution of power in order that community members can responsibly participate.

WRTC endeavors to create community projects which empower individuals and the community to create benefit to themselves and one another. Giving ownership to a community dominated by outside interests and with few autonomous institutions is a challenge; a strong board and a few community leaders, such as the school superintendent, provide community support. AFWH has finally found organizational management which is trusted and compatible with board and membership expectations. In the non-profit organization world, directors' energy goes into relations with other organizations, funders, and sometimes their critics; AFWH would prefer to spend its energy on membership issues.

These different domains help describe the role IPs might play in enhancing community capacity as a stated part of their mission of connecting individuals to forest assets, or as a parallel process with their efforts to respond to local community or membership base. The different social contexts, organizational dynamics and cultural dimensions of these two groups are evident in the different domains of community capacity building. As a membership organization, AFWH is especially strong in participation and linkages; as a community-based organization, WRTC is able to leverage outside resources and agents. Both emphasize problem assessment and they differ in their program structure and management. Including more IPs in this analysis will further our understanding how community-based forestry organizations benefit individuals and their families by building community.

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Table 1. Seasonality – monthly employment in forest services.
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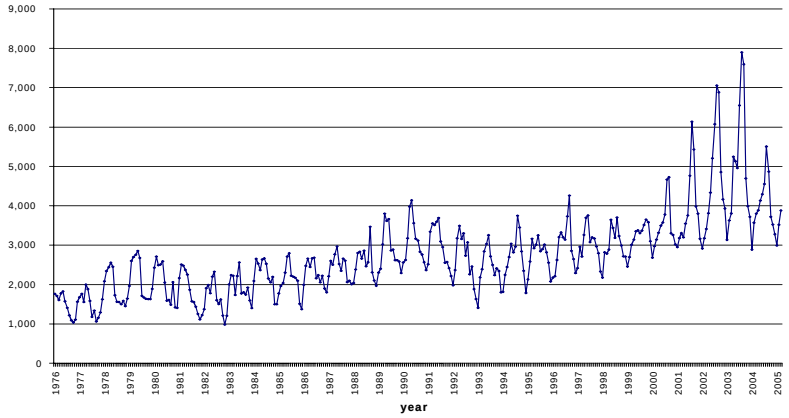
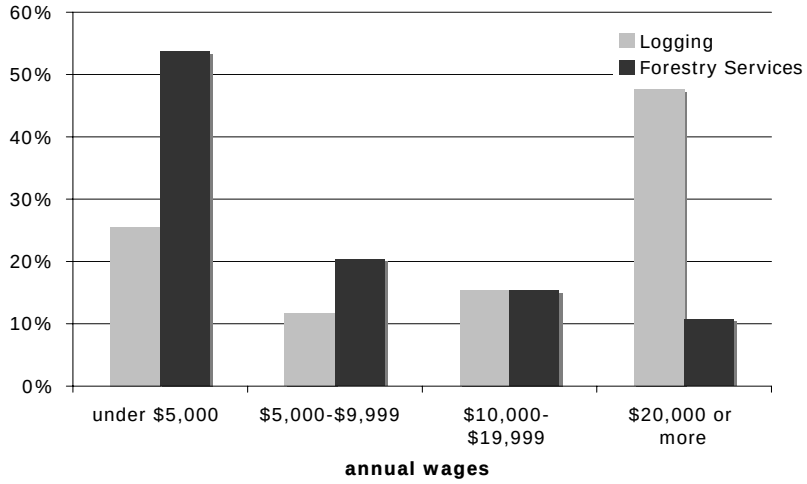


Table 2. Annual Wages of Forestry Services Workers and Loggers, Oregon, 2003.
(Cass Moseley Congressional Testimony 2006)



Appendix F: Ecological Stewardship in Community-Based Forestry in the USA: Lessons from the Ford Foundation Community-Based Forestry Demonstration Program

November 29, 2006

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INTRODUCTION

> *Community-based forestry builds on the assumption that people closest to and most dependent on forest resources are competent and knowledgeable about forest and resource management, and have a right and a responsibility to manage forests carefully. As forest resources become local assets … rural communities increase their resilience and their capacity to add value, improve livelihoods, and retain a sense of belonging with the land.* (Jeff Campbell, Foreword to *Growth Rings* 2005, p. vii).

Members of forest communities across the country are reasserting their role as stewards of our nation's forests. Seeking to reverse past practices which have degraded and fragmented forest landscapes, community organizations are taking responsibility for tending the land in order to restore both forest ecosystems and the communities which depend upon them. These new organizations, fifteen of them supported and networked into the Ford Foundation as Community-Based Forestry (CBF) Demonstration Project, are creating new institutional arrangements. These new arrangements not only allow local stewards to employ new techniques and technology in forest management and restoration, but also to participate more fully in decisions and policies regarding how the land is used.

In this study, we use an inclusive definition of stewardship which incorporates information gathering and knowledge generation about the forest, planning for forest use and conservation, on-the-ground implementation of management activities, and monitoring and adaptive management to learn from actions on the ground. Also included in our discussion of stewardship are the diverse ways in which the organizations participating in the Ford Demonstration Project (hereafter called CBF groups) engage communities in learning about the land, about forest work, and about each other. Stewardship is guided by a combination of science, experiential knowledge, wisdom and a strong land ethic. In this study we explore the various ways the CBF groups accessed, developed and integrated these essential elements of stewardship. We did this by studying the various collective processes through which community-based forestry organizations and affiliated community members learn about forest conditions and apply their knowledge to forest management. In particular we were interested in the social and

ecological objectives and outcomes of monitoring and similar civic science and training activities.

The process of stewardship, and of monitoring as a means of learning about the effectiveness of stewardship activities, is as important as its outcome, and CBF organizations create a number of different spaces for this process. They move forest resource management from a top-down regulatory model to community-based stewardship that engages citizens and experts in dialogue and learning about the complex and uncertain relationships within ecosystems, and the relationship between environmental policy and economic development. Kai Lee sees collaborative or "civic" science as the "gyroscope" that brings balance to the conflict among interest groups:

> Managing large ecosystems should rely not merely on science, but on civic science; it should be irreducibly public in the way responsibilities are exercised, intrinsically technical, and open to learning from errors and profiting from successes.... Civic science is a political activity; its spirit and value depend upon the players, who make up, modify, implement, and perhaps subvert the rules. (Lee 1993:161-2).

CBF organizations create opportunities for civic science in order to connect resource users, environmentalists and resource managers, and increase capacity for social learning, local responsiveness and accountability to both environment and community. Civic science and civic environmentalism work best with a diversity and equity of participants. Diversity of values and perspectives provides flexibility and openness to new information and events; equity increases access and empowerment for those most put at risk by resource management decisions. Shutkin defines civic environmentalism as "the civic capacity of communities to engage in effective environmental problem solving, and the relationship between the civic life of communities and environmental conditions." (2000, p. 15) Civic environmentalism allows communities to partner with government and other environmental organizations in collaborative stewardship; it builds political, social and economic capacities to create place-based solutions to environmental problems.

Several questions guided our initial field research. We sought to understand:

- The ecological goals of CBFs and whether they reflected a different or unique understanding of community-forest relationships.
- The strategies used by CBFs to pursue their ecological objectives and how they differ from conventional resource management.
- The processes by which CBFs measure their impacts and learn from their actions on the land and the factors which advance or impede monitoring and adaptive management.
- How monitoring by CBFs is different from conventional agency public involvement or consultation.

METHODS

Through semi-structured interviews, document reviews, field trips, and participation in group meetings and monitoring workshops, we constructed a set of case studies of CBF stewardship and monitoring efforts. This research takes a qualitative "grounded theory" approach to understanding the role of CBFs in ecological stewardship and monitoring. We began our fieldwork without strong hypotheses, but rather a set of propositions and guiding questions, and expected to develop and test hypotheses as we learned about each group individually and all the groups collectively. We test emergent hypotheses by 1) cross-checking our data for contradictory evidence, 2) engaging in a dialogue with the CBFs regarding our preliminary findings, and 3) gathering additional data if needed to confirm or reject our hypothesis. To the extent possible, we used a collaborative inquiry approach, in which we sent our draft interview questions to the CBFs in advance and asked that they suggest whom we should meet and talk with during our visits.

- Research focuses on seven Ford CBFs who indicated interest in the ecological stewardship & monitoring research theme:
    - Alliance of Forest Workers and Harvesters (AFWH)
    - Federation of Southern Cooperatives Black Belt Legacy Forestry Project (FSC/BBLFP)
    - Jobs and Biodiversity Coalition (JBC)
    - Public Lands Partnership (PLP)
    - Wallowa Resources (WR)
    - Watershed Research and Training Center (WRTC)
    - Vermont Family Forests (VFF)
- We use qualitative data gathering approaches involving:
    - visits to stewardship and monitoring project sites
    - interviews with CBF and agency staff, NGOs, and community members
    - participant observation at CBF meetings, monitoring trips, field tours etc.
    - review of project documents (e.g. sample inventories, assessments, monitoring protocols, data and reports, management plans, etc.)
- We utilized qualitative data analysis using inductive and deductive coding of interview transcripts, project documents and field notes

RESULTS

Ecological Settings of Community-based Forestry Groups

The 7 CBF groups studied were embedded in diverse ecological settings and experienced a wide range of ecological stresses and challenges. With the exception of JBC, which focused exclusively on the SW Ponderosa Pine forests, most of the groups worked in a variety of forest and sometimes rangeland community types (Table 1), including aspen groves (WR), piñon-juniper woodlands and sagebrush grasslands (PLP), riparian habitats (WR, WRTC), Palouse prairie (WR), and oak savannah (WRTC, AFWH). For the 5 groups located in the Western USA, dry conifer forests were often the dominant community type and a major focus of CBF stewardship activities. Both VFF, in Vermont, and FSC, in Alabama, worked in areas that included a mixture of conifer and hardwood forests, either in the same forest type (e.g. northern mixed conifer and

hardwood forest in Vermont), or in adjacent types (e.g. southern pine forests and hardwood bottomland forests in Alabama).

All 5 Western groups (WR, PLP, JBC, WRTC, AFWH) worked in systems transformed by altered fire regimes, especially in forest types at lower elevations and on drier sites. Landscape fragmentation and the resulting loss or degradation of habitat threatened ecosystems surrounding CBF groups in Alabama, Vermont, Oregon, and Colorado. Increasing populations of invasive, non-native plant species put biodiversity and native plant communities at risk in many areas and were of particular concern to WR, PLP and AFWH. Poor logging and sometimes reforestation practices, past or present, imperiled water quality and soil stability at several of the study sites, as did increasing unmanaged recreation on public lands in some areas.

Despite these threats, most of the groups studied also had significant natural assets. For example, the mixed conifer and hardwood forests of Vermont, where not converted to another land use, were largely intact and resilient, and did not require intensive management to restore ecological structure and function. Similarly, the remaining native forests in Alabama, though scarce, were high in species richness and endemism. WR, WRTC, and AFWH work in productive, diverse, and often resilient ecosystems, and WR's landscape encompassed several large areas of intact, un-fragmented habitat in public and private ownership.

Social Settings

The social contexts in which the studied groups operate are as diverse as their ecological settings. Four western community-based groups (PLP, WRTC, JBC, WR) are highly dependent upon public lands and face restricted access to their forest assets, increased threat of wildfire, and departing timber industry. Another western group, AFWH, also connected to federal lands, advocates for a wide-spread, culturally diverse membership of forest workers and gatherers. In the East, two community-based groups (FSC and VFF) work with family forest owners to reinforce investment in their land. The common goal for all groups is to create learning communities which together can better address a complex array of forest health and forest livelihood issues.

Most communities experienced polarization caused by conflicting values regarding whether and how forests should be managed, and who should be doing it. In western public lands communities, political stalemates discredited local voices and endangered both forests and economies linked to them. "My science, your science" debates among competing interest groups fractured communities. For instance, in one community, parents fought against teaching "environmental science" in science class at local schools, and in this way education joined government as distrusted institutions which could "shut down" their woods.

Poverty, isolation and disenfranchisement from major institutions are shared experiences for many living in forest communities, whether western logging families or southern Black farmers. At the same time, forest communities attract "amenity migrants" drawn to rural, small town life, or return migrants whose family legacy includes forested lands.

CBF attempts to create the spaces for community members with a range of knowledge about the forest to learn together and understand one another's connection to the forests. CBF works to build bridges between interest groups, including those who do not consider themselves members of the community. *"To have all those people who were controlling us from the outside [federal and state agencies, environmental groups, and timber industry] become part of a community that cared about the forest. To create a sense of community with them and us and each other." (WRTC)*

Stewardship Defined by CBF Groups

We approached our research with a broad conception of stewardship. The CBF group participants we interviewed shared with us their perspectives, which often emphasized the interdependent relationship between forests and human communities.

There are so many variants on what that means. Simply enough from our perspective its preserve and in the east restore wildlife habitat for all species of forest wildlife, indigenous. Its water quality improvement and protection depending on the particular water body it comes from and the watersheds we're working in. Of course its long-term forest productivity, meaning basically just that we're not removing more than the forest would care to yield. (VFF)

The goal is to keep healthy forests and keep the communities viable that surround them and establish some kind of management regime so that we can keep these forest ecosystems vibrant and not stagnant and it's going to burn up if we don't. (WRTC)

Instead of having a vision and getting everyone to go that way, they get everybody together and say, what can we try and then maybe from all those mistakes we made, something will precipitate out that we can say, this is good, everybody can agree on it. (WRTC)

For many, stewardship involves the community and local culture – it is a demonstrated commitment to leave a better place for others to enjoy and work, to provide economic support and products for family and community, to support cultural uses, and to be recognized for caretaking of land and family. "*The whole feeling of being a steward is being part of something that connects people, part of the community." (VFF)* Some CBF organization members reported that teaching stewardship to land owners required skills in social organizing – to be sustainable it had to be more than ad hoc forestry, and had to be integrated in social, economic and ecological ways.

CBF groups seek to maintain the forest management and production capacity they believe their forests need, and they also welcome multiple ways of working in the woods. Ecological restoration, species and habitat surveys, and ecotourism offer new employment options; gathering non timber forest products, grazing and Native American traditions are longstanding ways of making a living from the forest. Weed management, erosion control and wildfire mitigation are also important roles for local stewards and provide work for local people. Ecological monitoring, a key aspect of stewardship, plays

a role in understanding the effectiveness and impacts of some of these uses and interventions.

Social and Ecological Objectives of Stewardship

It was much bigger than ecological monitoring (WRTC).

People are becoming more disconnected from the land. To bring them to the land and have a vital relationship and interest in the land is a large task (VFF).

It's empowering local communities – communities of place or communities of interest –to do work that fits in with the Alliance mission, but to do it locally, to do it on the ground and do it to build capacity rather than … send their staff person into a local community to help. This makes the local community a partner of the Alliance to do whatever needs to be done, whether it's monitoring or a workshop or a training, or a meeting its more on the ground. (AFWH)

Different CBF groups place different priorities on social, economic, and ecological goals, but we found that in practice they are integrated in a holistic way (cf. Melanie McDermott's appendix) . To encourage and reward new silvicultural practices on private lands, some groups used certification or market mechanisms to insure standards were met, others used peer training in both stewardship and marketing. On public lands, demonstration projects, and the monitoring of their effectiveness, addressed stakeholder concerns but also provided job training. The ecological conditions and community context of each group informed and shaped its stewardship objectives. Most of the groups we studied were formed initially to address social and economic issues in their communities, although all groups emphasized the interconnections between the well-being of forests and human communities.

Articulated socio-economic objectives (Table 2) for CBF groups' ecological stewardship programs and activities include:

1. Create a meaningful role for local voice and experience in scientific discourse and decision-making
2. Create local knowledge about forest complexity, restoration and management best practices
3. Address conflicting values about forest management with trusted data credible to all parties and safe spaces for people to discuss meanings and implications of data
4. Bridge multiple organizations with natural resource information and concerns
5. Develop technical skills and value-added markets to recreate and improve the link between local livelihoods and sustainable forests.

A sampling of participants in CBF groups articulating their stewardship objectives follows:

Another thing we have in common is that we want a better life for ourselves, better wages, better working conditions, we want to feel better about the of work we do. (AFWH)

Through the co-op we can intervene and help people get back to natural resources. Cooperatives are team efforts, they share peoples' success. One voice speaking for the people through (the) cooperative and principles it stands for. (FSC)

We will get into arguments about this all the time, you know what we are really doing in my opinion is trying to evaluate the effectiveness of the Forest Service prescription. (PLP)

The ecological objectives of the 7 CBF groups we studied varied widely, but the following were common to many of the groups:

1. Restore ecological processes such as natural fire and flood regimes, and reduce risk of catastrophic wildfire.
2. Prevent land conversion and fragmentation of native ecosystems and working landscapes.
3. Protect and restore wildlife or fish habitat or special resources (e.g. non-timber forest products (NTFPs)
4. Promote good stewardship on private and public lands.
5. Improve understanding of the complexity and natural variation of ecosystems through monitoring and adaptive management.

Taken together, these objectives reflect a different vision of forest-community relationships than has often been seen in typical management plans drafted by public land management agencies or consulting foresters. In particular, the emphases on landscape-scale planning and conservation, ecological restoration, and on collective and adaptive learning from the forest set apart CBFs from other management and environmental groups. Monitoring is as much about inclusive social process as environmental outcomes; it provides a common language for understanding ecological processes and systems. Recognizing that forests depend on knowledgeable and skilled people who in turn seek a sustainable forest for its flow of assets upon which they depend, CBFs foster monitoring which empirically documents and clearly demonstrates the importance of that link.

Stewardship Strategies and Outcomes

The CBF groups used a wide range of strategies to pursue their stewardship goals. The logic model in Figure 1 illustrates in general how CBF strategies led to short- and medium-term outcomes, which in turn indirectly and directly affected long-term ecological health and resilience, and CBF capacity for adaptive management. Importantly, the strategies used and the outcomes achieved were often intimately intertwined; in many cases, CBF groups' activities can be considered strategies designed to achieve goals in the future. Several examples are provided below to illustrate the connection between a CBF group's strategies and the resulting short, medium and long-term outcomes.

Stewardship Strategies

The major strategies for environmental change employed by CBFs included a broad range of education and outreach activities, both formal and informal; workforce training and development; facilitation of collaborative processes; technical assistance; project implementation; and provision of funding to other groups or partners through contracting, mini-grants, and grant-writing assistance (Figure 1 and Table 3). These activities in turn affected participants' knowledge of forest ecology and management, their access to information and resources, the relationships among participants, their attitudes, and often their attachment to place and to community (Figure 1).

Education, Outreach and Training

But in reality what we're doing is educating a core group of people from the community in forestry issues in a very real way. A wide group, not just the environmental community, but the business community, the government community. Because we're doing that, everybody's learning how difficult it is, how right Forest Service often is, where there are problems, and we're getting a better idea of what needs to be done in the future. (PLP)

Education and training were key strategies used by several CBF groups. For example, WRTC developed and implemented an extensive Stewardship Training Program for local "out of work loggers" and other community members. This program cumulatively trained over 50 people to conduct ecological inventories and assessments for the US Forest Service and Bureau of Land Management, as well as other ecosystem restoration activities for both agencies. The training program resulted in improved ecosystem knowledge and job skills of many local community members, as well as strengthened relationships between the community, WRTC and the public lands agencies. At the same time, those ecosystem restoration activities are concrete on-the-ground outcomes that will likely lead to improved ecosystem health in the long-term.

Similarly, FSC relied heavily on informal education strategies to connect with local landowners via one-on-one outreach visits, peer-to-peer learning networks of landowners, and land management workshops. These activities focused on educating landowners about the ecological and potential economic value of their land, as well as effective land management practices. This resulted in the landowners seeing their land in a new way, and improved their knowledge and land management skills.

We bring a lot to the table when we go to work with them. We learn a lot from them. I learn a couple of things from the Chaves and then take it to the next farm. That is my satisfaction – that is the part of my job I enjoy. Helping them. Each of them has their own story but it always comes back to the same thing. Their own land. …People are familiar with things, they know how to survive and make money doing those things. We add a little bit more into that – talking about pine straw, hopefully people will start thinking about it more and wanting to do something about it. That is how we start a new initiative, talk about it with people, bringing people who are doing it (FSC)

These knowledge and attitude changes are important short-term outcomes, but they were also the precursors to the more than a dozen formal management plans that were subsequently developed by these landowners and FSC staff. Implementation of these management plans will likely improve forest stewardship and ecological health in the region. Hence, FSC worked toward their ecological stewardship goals not by implementing vegetation treatments or other land management projects, but by strategically using educational and outreach activities to build trust with landowners historically ignored by land management institutions.

Facilitating Collaborative Partnerships and Networks

Having a conversation about monitoring and having people say, here is a framework for how to grapple with it has been very useful for us. We've been waiting for people to say, here's how to think about this, because we did not know how to think about it. I mean, we knew some things. (WRTC)

Another important set of strategies that CBFs used to work toward their ecological stewardship objectives was actively facilitating collaborations between organizations and individuals to achieve common goals. For example, WRTC held dozens of meetings over a year to bring together local residents and the US Forest Service to develop a Community Fire Plan as part of the Post Mountain Collaborative Stewardship Project. WRTC staff helped facilitate meetings and workshops that have led to the Plan and its incremental implementation of fuels thinning treatments on both private land and neighboring National Forest units. Similarly, WR facilitated coordination around weed monitoring and control by bringing together the USFS weed coordinator, the Nature Conservancy Stewardship Coordinator for the region, and local landowners to share information and discuss treatment strategies. While it is too soon to know the outcomes of the weed control treatments they are using, this kind of coordination is likely to play an important role in weed control at the watershed scale. AFWH also used facilitation and network-building as key strategies for working toward improved forest stewardship. They not only directly facilitated meetings between ethnically and culturally diverse forest workers, but also provided mini-grants for forest worker groups to meet with US Forest Service personnel about harvesting of non-timber forest products like mushrooms and floral greens. This strategic networking has the potential to improve forest management by connecting traditionally-marginalized resource users to public land managers. In all these cases, while facilitation of partnerships was used as a tool or strategy to achieve an end (on the ground projects), the process of working with a variety of organizations and individuals resulted in stronger relationships between the participants and increased trust and credibility in the CBF group. As one leader so well articulated the challenges of building trust with multiple stakeholders:

This kind of monitoring with your skirts up is new … trying to make it as absolutely transparent and accessible as you can do it … what people reveal about what they are grappling with and trying to figure out a framework so you can talk about how you set the objectives. (WRTC)

Stewardship Outcomes: On-the-Ground Projects and Improved Land Management
In many cases, the groundwork laid by CBF groups in the form of education and workforce training, technical assistance, and facilitating collaborative partnerships resulted in on-the-ground land management projects. CBFs were engaged in the whole spectrum of stewardship activities from conducting resource inventories and assessments; to management planning at the stand, watershed and forest scales; to implementing forest, watershed and rangeland restoration; sustainable timber harvesting (via certification standards in some cases), weed control, and grazing management projects; to monitoring management implementation and effectiveness (Table 3).

Several of the CBF groups in the Western states have focused their ecological goals on forest ecosystem restoration with respect to historical fire regimes and fuel loads. The policy of fire suppression on National Forests over the last century has created dangerously high fuel loads that can and do allow catastrophic, stand-replacing fires to sweep through the regions in which the CBF groups are located. Hence, on-the-ground treatment of forest stands with varying fuels reduction (forest thinning) methods is both a strategy as well as an important ecological outcome of many CBF groups' work. The WRTC completed a 39 acre thinning project (called the Chopsticks area) on the Trinity National Forest, JBC completed a 68 acre thinning restoration project (called the Mill Site) on the Gila National Forest, WR has completed a 115 thinning project on the Upper Joseph Creek Watershed, and PLP completed a salvage logging project on the Burn Canyon site. These forest thinning projects will contribute directly to improved forest health and ecological resilience in those areas based on current scientific understanding.

Inventory, assessment and monitoring projects implemented by CBF groups can also be categorized as both important strategic tools employed by CBFs to achieve their stewardship goals, as well concrete medium-term outcomes. Multi-party or collaborative monitoring projects are often the results of careful facilitation, collaborative processes and trust-building, and reflect a financial and institutional commitment to learning about the land and tracking the effects of management activities on the system. For example, the successful implementation of the Upper Joseph Creek Watershed Assessment (UJCWA) represented a major milestone for WR as the culmination of months of meetings between ranchers and other land owners, USFS scientists and managers. On the other hand, the information collected and the relationships formed during the implementation of a monitoring project can also be a strategy used by a CBF group to gather vital information and bring several parties to the table to improve land management. For example, UJCWA, including the information and the collaborative networks it entailed, formed the basis for an extensive series of projects implemented on that watershed by the Forest Service. The Forest Service essentially saw it as a list of priority areas that needed work in the area. A further detailed discussion of CBF groups' monitoring projects can be found in later sections of this paper.

It was really neat to see what had come about of the collaborative process of this. The entire county seems to be sort of, you know, pretty much on the same page. Not everybody, you know, is agreeing with everybody else, but there's enough agreement and

enough common ground and commonality to know what is out there, if one has done all their research and shared all their experiences and answers, and I thought that really it's a great basis from which to start to do a lot of these projects. (WR)

Although many of the groups studied have been in existence for a relatively short time, and none is older than 13 years, short-term on-the-ground impacts were present and measurable (Table 3). These included reduced fuel loads, improved stand structure and regeneration, improved riparian function and wildlife habitat, habitat protection, revegetation, and control of invasive species. The long-term effectiveness of recent and current stewardship activities will only be known if well-designed long-term monitoring is implemented.

The Role of Ecological Assessment and Monitoring in Stewardship by CBF Organizations

Ecological inventory and assessment

Inventory and assessment are key steps in the process of natural resource management planning and stewardship. An inventory characterizes the current amount, condition, and location of a natural resource. Inventories and assessments carried out by the studied CBF groups varied in scale and focus from species-specific surveys, to inventories of invasive plants and non-timber forest products, to ecological community mapping and stand assessment at the scale of an individual parcel of land, to watershed-scale integrated ecological assessments. All the studied CBF organizations were involved in one or more types of formal ecological inventory or assessment (Table 4). We highlight several examples here to illustrate the range of inventory and assessment activities the Ford CBF groups undertook.

VFF holds workshops to train members (including individual landowners and town and college forest managers) to conduct assessments of their land through natural community mapping, a method for describing units of vegetation, soils, animals, and ecological processes as they appear across the landscape. Areas can be ranked according to their ecological significance for conservation and VFF encourages mapping as part of the forest management process. Usually carried out by VFF staff or a consulting ecologist on a contract basis, natural community mapping helps the landowner learn about the distinct forest and other vegetation communities on their land, the typical process of vegetation change over time (succession) in each, and how different types respond to various harvest and management practices. Natural community mapping also lets landowners know if their land contains a rare plant community or an excellent example of a particular community type. For example, VFF natural community mapping identified one of the few remaining intact examples of the Valley Clayplain Forest, and was instrumental in conserving the land on which it occurred.

At a very different spatial scale, and covering both public and private lands, WR facilitated a collaborative, watershed-scale ecological assessment of the Upper Joseph Creek Watershed, including forested communities, riparian areas, and rangelands within the watershed. This assessment provided the basis for collaborative identification and

prioritization of restoration projects and other management activities within the watershed, primarily on Forest Service lands. It also helped the 70+ participants forge a shared understanding of the ecological dynamics of the watershed and its management history, while providing a basis for future decision-making. This effort was unusual in its spatial extent and depth of analysis, as well as the collaborative and cross-jurisdictional process employed. PLP played a key role in a similar, landscape-scale watershed assessment carried out as part of the Uncomphagre Plateau Project. Both of these efforts illustrate the role of CBFs in facilitating or catalyzing large-scale, cross-boundary, integrated and collaborative ecological assessments. These kinds of assessments are essential to successful adaptive ecosystem management at a landscape scale.

Several CBFs conducted inventories of and research on the harvest of non-timber forest products (NTFPs), which are understory plants and other organisms harvested from the forest for cultural, medicinal or commercial use and often a low priority for forest managers. NTFP provide livelihoods for many communities served by CBF groups, and some species play an important role in ecosystem functioning, hence, assessing their extent and impacts of harvest contributes to both livelihoods and improved forest management. For example, the AFWH contributed technical and financial assistance to mushroom harvesters in Oregon who conducted compliance monitoring of harvest methods used. This led to plans for effectiveness monitoring projects to examine the impacts of harvesting using these methods. FSC coordinated an oral history project to gather local residents' knowledge of the ecology and uses of NTFPs in the Southeast in order to target species and products that might be useful to promote economic development in the region. WRTC facilitated and funded an inventory of NTFPs in the Trinity-Shasta National Forest conducted by a university scientist and local harvesters to determine the extent of several sensitive or rare plant species used as medicinals. They further conducted research on different harvest methods for several medicinal plants in the area. This monitoring and research on NTFPs, while small scale-for the most part, is an important component of the work of CBF groups that include marginalized or underserved communities often overlooked.

Types of monitoring

We define monitoring as observation and documentation of changes over time in ecological or social attributes as they relate to management objectives. Many individuals and organizations conduct informal monitoring on a nearly constant basis. Formal monitoring differs from informal tracking of changes in that particular indicators are observed or measured, their status is formally recorded and documented, and the data are gathered for the specific purpose of assessing progress towards management goals. Formal monitoring may include both qualitative observations and quantitative measurements. Some CBF organizations monitor both social and ecological changes. This section focuses on ecological monitoring carried out by the groups we studied.

Within the category of "ecological monitoring," we distinguish among several different types of monitoring that the study CBFs carried out. Table 4 summarizes the various monitoring projects carried out by all the CBF groups we studied. Here, we provide a definition and one example of each type of monitoring we observed. Implementation

(sometimes called compliance) monitoring assesses whether management activities were carried out as prescribed. For example, VFF used a checklist to determine whether timber harvests on VFF-certified properties were carried out according to certification standards. The checklist included specifications for water bar and skid trail construction, among other things, and was designed with the assumption that if the listed practices were followed, soil and water conditions would be protected or improved. This form of monitoring does not reveal whether resource objectives such as improved water quality were met, but it provides important information on how management activities were implemented. Implementation monitoring is important because it can provide explanatory information to help interpret observed changes in ecological conditions.

CBF organizations used effectiveness monitoring to determine whether they were meeting their ecological stewardship objectives. For example, WR wanted to see if fencing aspen groves to exclude large herbivores such as cattle and deer would improve aspen regeneration and song bird habitat. The group built fences around aspen stands using several different kinds of fencing material and monitored the fenced stands. They found that fencing was an effective tool for aspen restoration, but that some types of fences were more effective than others, and some actually harmed birds.

A final kind of monitoring used by the studied CBF organizations was validation or verification monitoring. CBFs used validation monitoring to test hypotheses about ecological processes or the impacts of different management activities. This kind of monitoring was designed to speed learning and improve knowledge about how an ecosystem works and to help identify efficiently the most effective management strategies. WRTC used validation monitoring when they designed the "Chopsticks" thinning project to test the effects on soil conditions of different slash treatments. From this project WRTC learned that piling slash caused more damage to soils than other slash treatments or using a yarder. WRTC has used this information to design subsequent thinning projects in ways that minimize undesirable soil impacts.

Socio-economic monitoring, though not a focus of this research, was incorporated in the overall monitoring process by some of the CBF groups studied. This integrated monitoring deepens the understanding of how policy and practice affects communities, workers and the land – and how they are related. For instance, AFWH sponsors assessments which allow forest workers and harvesters gain understanding of worker and forest conditions and seek change. The WRTC office wall, covered with charts and graphs demonstrating local socio-economic consequences of the restructured timber industry and federal policy, serves as a daily reminder for the staff of their mission, as well as a litmus test of their success.

A lot of people have been doing studies about reduction in timber harvest, it was easy to quantify and pull that information, but people were trying to articulate that in larger policy venues, the impact it was having on the community, but no one was pulling the data together. (WR)

Many of the studied CBF groups also did some type of process monitoring. For example, WR held a meeting on the UJCWA and documented the lessons learned from the collaborative assessment process. Similarly, PLP convened several learning meetings to discuss learning from its restoration and monitoring projects. These discussions encompassed both the monitoring and restoration planning processes and the ecological knowledge that resulted. The Aspen Institute, in its role as managing partner for the Ford demonstration project, also facilitated process-oriented mid-project learning meetings with many of the CBFs.

Reasons for ecological monitoring

CBF groups expressed a variety of reasons for investing in ecological monitoring, including the basic objectives reflected in the different types of monitoring described earlier: characterizing the system (inventory and assessment); ensuring that management is implemented as planned (compliance monitoring); assessing the effectiveness of management and progress towards goals (effectiveness monitoring); and learning about the system or testing hypotheses (validation monitoring). Several groups expressed a strong commitment to the concept of adaptive management—an intentional and structured process of learning by doing and reflecting on the results of our actions. For example, an agency manager involved in the UP Project with PLP stated, "*That was kind of a founding philosophy of that strategy, that it was going to be adaptive, …, that we were going to be a little bit humble about it and agree to revisit it every three years. Revisit our objectives, revisit the effects we were actually getting on the ground, and be willing to change course.*" WR staff expressed a similar commitment: "*We believe strongly in the need for continuous monitoring and assessments to understand what's happening, what our impacts are, what the impacts of decisions are, and just the general environmental trends here*."

In addition to these more conventional reasons for monitoring, CBFs also expressed other reasons for monitoring, which often focused on the role of monitoring in building relationships and establishing the credibility of CBF organizations. WR staff spoke to the importance of ecological monitoring to building trust and credibility at the same time as the group focused on socio-economic monitoring to better understand the social impacts of its stewardship activities: "*It was really important to establish the organization as an entity in itself and also important to align ourselves with ecological monitoring, ecological projects. At the same time we recognized it was important to gather information about social benchmarks so we could begin to trend information. …So while we began to work in these ecological demonstration projects to build the trust, to build the understanding and to increase our own knowledge, we also were taking a look at how do we manage to pull information together so we can make those connections about social and economic impacts of natural resource work*."

PLP undertook the Burn Canyon Monitoring project for several reasons. One important reason was to satisfy the concerns of environmentalists about a proposed salvage timber sale. But some PLP members also saw Burn Canyon as an opportunity to expose the public to ecological monitoring, and to involve youth and other community members in a hands-on activity that would help rebuild a connection between local people and the land

that some felt had been lost in recent years. Monitoring, it was thought, could help reconnect people to the land by physically linking them with their landscape through the act of measuring vegetation cover and soil compaction, while also teaching them about land-based livelihoods such as logging that were part of the local heritage.

Ecological monitoring was also a way to provide training and jobs for local people affected by restructuring in the timber industry. Surveying and monitoring were among the skills that WRTC's ecosystem workforce training program developed in its workers. Similarly, WR and AFWH helped train and create jobs for local workers conducting ecological surveys and designing and carrying out various monitoring projects.

Benefits of monitoring

Having them involved in the analysis makes them understand it better. If you can see the raw data, [and the protocols], you have more ownership and better understanding. Some of the success of where we got with the environmental groups was because they didn't feel like somebody was making it up. …. the fact that it's open for anyone to look at was important. Everyone knows the protocols. (WR)

CBF groups perceive that their investments in monitoring have been justified by their benefits. Groups that followed through with effectiveness and validation monitoring learned about management impacts and ecosystem function, and, more generally, community members learned to appreciate the complexity of ecological dynamics. For example, one PLP participant observed, "*I think there is just a better understanding of how complicated that ecosystem is. It isn't just take one thing out or add one thing and everything goes back to paradise.*"

Similarly, PLP members and a WRTC board member felt that environmentalists' views were influenced by participating in multiparty monitoring efforts or learning about the results of CBF monitoring. The WRTC board member reflected, "*Actually, [the Chopsticks monitoring project] was most beneficial for various environmental groups because I think that it was obvious that the condition that we left those stands in was much more, much closer to the natural condition and in much better condition in herms of fuels, I mean there was very little disturbance*. … [As a result of the monitoring project] *I think* [the environmental groups] *were more comfortable with the type of treatment we were doing.*" In this case, and others, including JBC and PLP, the monitoring influenced environmentalists' perceptions of the impacts of thinning, and may also have strengthened the CBF groups' credibility with environmental observers. For example, none of the Forest Service projects proposed as a result of the Upper Joseph Creek Watershed Assessment (WR) have been appealed.

JBC used monitoring to verify with formal data what they believed they already knew about the impacts of their work in the woods. For JBC, the multiparty discussions about designing and monitoring their restoration project were more important than the monitoring data themselves. As one participant noted, "*It's really the process we went through that we found is important to talk about. You know, there are no outliers,*

nobody taking pot shots at us now, we can show other people that are trying to do something like this that hey, you can do this, you can get something done."

I think the reason for that is we all need to be more involved, and one way to catch people, to get them involved, is to start having these community monitoring projects. And that gets them more involved in planning issues. You know, we're all so busy on so many projects, we're not going to get involved if we're just going to informational meetings. But if we think we're somehow importantly learning about and changing the direction adaptive management kind of processes require, kind of monitoring to give them the feedback they need, the feedback loop, to go beyond scoping. (PLP)

Monitoring allows community members to be more actively involved in natural resource planning and decision making. It provides a framework for addressing the complexity of ecosystems and it provides a common language for discussing it. Participants progress from being passive recipients of information or competing stakeholders to contributing partners, sharing their skills and knowledge. They can provide important feedback to managers which contributes to adaptive models of learning. In Crescent Lake, Oregon, AFWH mushroom monitors are performing outreach with harvesters, sharing sustainability concerns. They developed a protocol for biophysical plots, and are studying the effect of forest management on Matsutake harvests. Through collaboration, the harvesters accomplished a change in the permit system that is used on 5 federal Forests. The permit now limits the length of harvest tools, including the handle, discourages raking, and makes picking "baby" mushrooms illegal.

I mean they even call us funny names…us external people, like stakeholder (laughs). The have to come up with funny names to describe this community, this broader community. And they are flip chart sessions. People get tired of going to flip chart sessions and being called stakeholders. (PLP)

Challenges and barriers to monitoring and stewardship

Barriers to implementing monitoring and other aspects of on-the-ground stewardship varied among CBF groups, but several common challenges emerged. Some of these will be explored in greater depth in our manuscripts on collaborative monitoring and local knowledge, science and monitoring.

Lack of financial and staff resources. Lack of money and staff was one of the main constraints to monitoring, even when CBF groups could demonstrate that their monitoring or assessment was highly cost-effective compared to agency efforts. Participants in several groups noted that despite the success of initial monitoring efforts, they doubted whether these monitoring projects could be replicated in the future due to budget and time constraints.

Unexpected natural or management events. PLP experienced several cases of unexpected ecological changes or management events that may influence future monitoring or stewardship activities, including cheatgrass invasions in treated areas, pinyon mortality, and aerial reseeding.

Monitoring design and methods challenges. Designing monitoring projects presented a number of challenges for CBF groups. In some cases these challenges stemmed from lack of access to needed expertise, and in others from conflicting objectives among participants, inconsistent monitoring and data protocols, vegetation classification systems, or weed policies and regulations among different partner agencies. Many of these challenges revolved around the need to define monitoring and monitoring objectives, and to determine the appropriate level of scientific rigor for a given situation. These issues will be further discussed in our manuscript on local knowledge and science in community-based forestry.

Lack of community, youth or landowner involvement. Many of the CBF monitoring and assessment projects aimed to involve community members, youth or landowners, but not all were successful in recruiting or maintaining the desired level of community involvement. When volunteers played a major role in carrying out field monitoring, projects were sometimes vulnerable because of over-reliance on a single individual. The benefits and challenges of collaborative and community-based monitoring will be discussed in depth in our manuscript on the role of collaborative monitoring in community-based forestry.

Fear that monitoring data will be misused or misrepresented. Ironically, both private landowners and environmentalists had concerns about the use of monitoring data collected by CBF groups. Private landowners working with WR, for example, were concerned how the condition of their private property would be represented in publicly accessible maps and documents, and whether this information might be used to harm them. On the other side, environmentalists involved in PLP's Burn Canyon monitoring effort were worried that the findings from that project might be over-generalized and used to justify salvage logging on inappropriate sites.

Agency challenges. As with many other aspects of community-based and collaborative natural resource management, working with land management agencies presented a number of challenges to CBF monitoring efforts. When ecological assessments or monitoring took place across jurisdictional boundaries, CBF groups reported problems related to lack of consistent monitoring protocols and data requirements across agencies, and sometimes incompatible regulations or policies (for example, with respect to noxious weed treatments. CBF groups mentioned that significant effort was required to keep many agency partners up to date, or to bring new staff up to speed. High rates of staff turnover also affected long-term support for monitoring. Some agencies expressed skepticism about the quality of CBF monitoring, especially when community members or students were involved. Finally, some CBFs that invested significant time and effort to train local people to do ecological survey and monitoring work were discouraged when agencies contracted instead with large non-local firms.

Facilitating factors

Factors that facilitated successful ecological monitoring and stewardship efforts included committed and trusted leadership, willing partners and opportunities to collaborate with

established programs, and a positive rapport and reputation with landowners. Leadership was important in all types of organizations, while a long-term relationship and reputation for trustworthiness was especially important for settings dominated by private lands and disenfranchised landowners (such as FSC), or by otherwise disempowered people, such as forest workers and harvesters. Partnerships and collaborations with other organizations, federal agencies and existing programs were especially important for groups working on public lands in the Western US. Cooperative agency and government (e.g., county) leadership was essential for many CBF projects.

DISCUSSION

Ecological and Social Contexts

We found the varying contexts of the CBF groups to be related to their stewardship objectives strategies, and outcomes. In the two eastern CBFs we visited, forests are more resilient and, although poor management, past and present, is apparent, the temporal scale for recovery is on the order of decades rather than centuries.

At this particular time, I'd respond by saying, the forest doesn't need us, we need the forest. The forest is going to take care of itself. It will be what it is. We can say we're doing it for various reasons, but our primary reason for interfacing with the forest isn't a selfless thing about forest health, it's a thing about forest use. (VFF)

"*Preserve the land: riparian buffers, litter eradication, recycling. So conservation is not as prevalent. Water is not an issue yet, but it will be. There are some issues around forest health, but not highlighted.*" (FSC)

Socio-demographic trends are changing the nature of forest ownership, planning and management in all the communities we studied. In the Southeast, in some cases, return migrants are caring for family land but in many, families are selling or losing their heritage. In the Northeast, urban refugees are driving up the value of forested land. CBFs in these regions are working with private landowners to connect (or reconnect) with their land, to create a stewardship ethic and expand ecological knowledge, as well as derive some economic benefit thought added value. Their strategies include a range of education and outreach activities and community building efforts. VFF relies upon forestry and ecology consultants, formal workshops, and Forest Stewardship Council certification criteria to encourage stewardship; FSC employs peer-to-peer, hands-on learning, and advocacy for assistance for agencies such as State Forestry.

Landowners about to throw the towel in are saying, oh, there is hope. (FSC)

In the West, wildfire figures prominently in forest health; exclusion of fire, risk of catastrophic wildfire, or salvage and restoration after a wildfire are concerns of CBFs we studied. Other natural risks such as drought, disease and insect infestations are compounded by lack of management; alternatively, industrial-style, large-scale management compromises forest health. Family forest management in the West is less

significant to the landscape than that on the vast industrial and public lands in the Intermountain and Pacific West.

Western CBFs work across the landscape, primarily on public lands, or intermixed private and public. Economies of public lands communities have been driven by outside interests and dislocated forest workers have ridden decades of booms and busts in the timber industry. CBFs look to forest restoration or byproducts of forest restoration as providing opportunities for economic benefit. CBFs train workers in holistic techniques of forest restoration (e.g., low-impact thinning and riparian work), recreational development (e.g., trail building) and technical inventories (e.g., GIS and species surveys). They conduct assessments of watershed ecosystems and land management projects in order to build capacity (for agencies to plan and for contractors to implement projects), to participate in stewardship projects, and to provide economic opportunities (e.g., in the woods and in manufacturing plants).

CBFs facilitate monitoring projects to evaluate and demonstrate the effectiveness of their innovative management techniques and technology. In communities undergoing socio-demographic change and rapid growth, as well as those with active stakeholder interest in federal forest management, monitoring is important to create civic environmentalism – to learn, to build trust, to bridge interest groups, and to participate in federal land management planning and evaluation.

What we are really doing in my opinion is trying to evaluate the effectiveness of the Forest Service prescription (PLP)

CBF groups in the West employed monitoring to learn about their fire-dependent ecosystems, to gather different points of view, and to address stakeholder, especially environmental group, concerns. *"… going to get different side's different views of a controversial project and make it less controversial and learn about this as we go and people understand about what this stuff is about*." (PLP) Because agencies are limited in their ability to do monitoring, or monitoring was done groups in an uncoordinated manner, CBF groups saw monitoring as a role they could play.

But in reality what we're doing is educating a core group of people from the community in forestry issues in a very real way. A wide group, not just the environmental community, but the business community, the government community. Because we're doing that, everybody's learning how difficult it is, how right Forest Service often is, where there are problems, and we're getting a better idea of what needs to be done in the future.

Different CBF groups employed varying used different kinds of monitoring to achieve their objectives. Groups whose objectives are to create communities of forest land stewards (VFF and FSC) use inventory and compliance monitoring to signify membership, to teach about ecosystems, and to create community. Groups seeking to create community benefit through forest restoration (WR, WRTC, PLP) emphasize inventory and effectiveness monitoring in order to implement forest restoration projects

beneficial to local economies. Groups facilitating civic environmentalism and addressing stakeholder interest in federal forest management and wildfire restoration (PLP, WRTC and JBC) emphasize collaborative monitoring and effectiveness monitoring of federal land management projects in order to take learn about the consequences of federal decisions, to gather divergent viewpoints and create common goals.

An obvious goal of monitoring for CBF groups is to demonstrate the ecological outcome of their forest restoration activity; however, ecological outcomes are long-term than the duration of the Ford CBF project. Many groups reported that their experience of monitoring may be just as important as the ecological findings. As stated by one CBF group leader:

It's really the process we went through that's we found is important to talk about. You know, there are no outliers, nobody taking potshots at us now, we can show other people that are trying to do something like this that hey, you can do this, you can get something done. It's more important to talk about the collaboration we've been through. (JBC)

Strategies and Outcomes

Our analysis of CBF objectives, strategies and outcomes points to the interdependent nature of the ecological and social objectives of community-based forestry, as well as the strategies CBF groups use to achieve them. Many of the groups we studied made significant investments early on in establishing relationships and building trust through collaboration and education/outreach. These relationships made later stewardship planning and implementation projects possible. At the same time, activities such as multiparty monitoring and collaborative ecological assessments served to build trust and relationships. Education and outreach efforts influenced community members' knowledge of and attitudes towards the forest, and interactive and collaborative processes helped develop mutual respect and improved communication among potentially adversarial stakeholders.

We speculate that stronger relationships among community members in turn foster deeper attachments to place, because participants experience being part of a human community embedded in and brought together by its concern for both the well-being of the land and the futures of local families. We further hypothesize that stronger community ties and place attachment advance CBF ecological and social goals by helping to motivate private landowners to be good stewards and active forest managers, and by providing moral and practical support for project implementation by facilitating good working relationships and enhancing access to outside organizational and technical resources.

CBF Stewardship: Compared to What?

Although we did not directly compare CBF stewardship activities with conventional agency forest planning and monitoring cases, it appears that CBF stewardship likely differs from conventional management approaches in several key ways. One of these is the emphasis, described above, on building relationships as an integral component of stewardship. We hypothesize that ecological assessment and monitoring by CBFs is

more collaborative than conventional monitoring, and that CBFs make use of more diverse knowledge sources, including both local knowledge and conventional science. These two themes—collaborative and community-based monitoring and knowledge integration—are explored further in appendices X and X. CBF commitment to adaptive management and social learning also sets it apart from much conventional forest management.

IMPLICATIONS & CONCLUSIONS

Our findings suggest several implications:

- The CBFs that participated in the Ford Demonstration program were diverse in many respects, yet among the 7 groups we studied, broad patterns emerged in the relationships among ecological and social contexts and the objectives, strategies and outcomes of groups. Monitoring on public land involves a wider array of stakeholders than on private land, and many objectives are not appropriate to all ownerships or ecoregions; however, we found monitoring and stewardship by all groups to build community, create capacity for future collaborative planning and implementation, and serve as an important learning process.

- It is important for CBF groups, as well as their critics and proponents, to recognize the interdependent nature of CBF stewardship strategies, and to appreciate, in particular, the value and necessity of early investments in community-building activities that clear a path for collective action on the ground. CBFs' long-term ecological and social goals may take decades to achieve, and measuring progress towards these goals should remain a priority, but many groups have laid the groundwork for success by building relationships and educating community members.

- Adaptive management, an iterative process of systematically varying forest management approaches, monitoring alternative outcomes, and adjusting course, is championed as a way to address the complexity of ecosystems and meet the need for innovation and incorporation of local knowledge and perspectives. Many of the CBF groups we studied embraced the basic tenet of adaptive management: learning to manage and managing to learn. They were willing to make mistakes because they knew lessons learned would improve forest management. Federal agencies have been less willing or able to take these risks, partly because they fear stakeholder reprisal. Partnering with CBF groups with the capacity and willingness to learn through monitoring will be invaluable to public land management agencies.

- Stewardship and monitoring activities described here have increased community members' access to forest assets, whether private or public, through democratizing information. Scientific frameworks, terminology and methods of assessment have been shared in forums which invite landowners, managers, stakeholders, and forest workers to share their knowledge and viewpoints. By sharing the power and

legitimacy of science, CBF creates more equitable relationships among its membership and those who control forest assets and decision making.

FIGURES & TABLES

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Figure 1. This "logic model" illustrates how the diverse strategies and activities of the study CBFs directly and indirectly influence ecological stewardship and conditions on the land. We suggest that early and ongoing investments CBFs make in education, outreach and collaboration help build the knowledge, trust and relationships needed to implement and monitor projects on the ground. At the same time, on-the-ground activities, especially when undertaken collaboratively, further contribute to trust- and relationship-building. Cumulatively, we expect these collaborative activities in the community and on the ground to lead to improved ecological health and increased capacity to learn from and manage the land in an adaptive way.

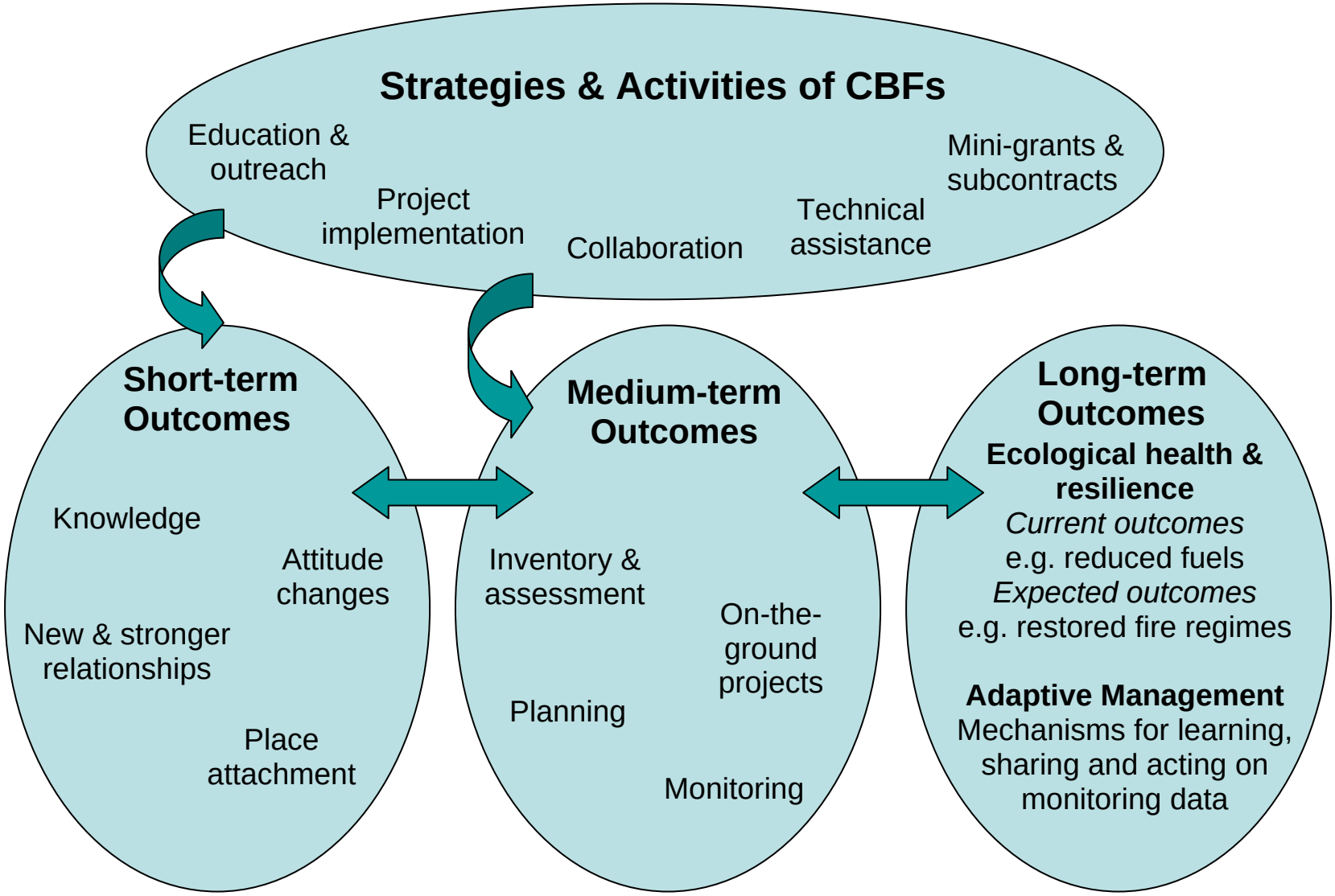

Table 1. Ecological settings, threats, and objectives of 7 community forestry organizations in the USA.

	AFHW	**FSC**	**JBC**	**PLP**	**WR**	**WRTC**	**VFF**
Ecological setting	Northwestern mixed conifer forests to California mixed conifer to oak savanna	Southern pine and hardwood forests and associated pasture & farmland	Southern pine and hardwood forests and associated pasture & farmland	Western conifer forests; piñon-juniper woodlands; sagebrush-grassland rangelands	Western conifer forests; riparian habitat; Palouse prairie rangelands	California mixed conifer forests, with some Ponderosa pine, oak savannas & early successional shrublands	Northeast mixed hardwood & conifer forests
Ecological threats	Invasive non-native species, altered fire regimes, degradation	Fragmentation and land conversion, poor logging & reforestation practices	Fragmentation and land conversion, poor logging & reforestation practices	Altered fire regimes, non-native invasive species, habitat loss and fragmentation, erosion	Altered fire & flood regimes, non-native invasive species, habitat loss and degradation, fragmentation.	Habitat degradation, altered fire regimes, history of poor logging practices	Fragmentation, altered hydrology due to poor logging practices
Ecological goals	● Reduce risk of catastrophic fire ● Restore the link between livelihoods and the forest ● Resource (mushroom, basket material) protection ● Reduce herbicide use	● Prevent land conversion ● Promote forest stewardship	Southern pine and hardwood forests and associated pasture & farmland	● Enhance and maintain diverse, healthy & viable environments ● Restore the link between livelihoods and the land	● Understand and maintain natural variation ● Address causes as well as symptoms of degradation ● Use adaptive mgt ● Restore the link between livelihoods and the forest	● Reduce risk of catastrophic fire ● Wildlife habitat enhancement ● Restore the link between livelihoods and the forest ● Use adaptive mgt	● Prevent fragmentation ● Promote good stewardship ● Understand the forest

Table 2. Social settings and objectives, landownership and organizational structures of 7 community forestry groups in the USA.

	AFHW	FSC	JBC	PLP	WR	WRTC	VFF
Social setting	Culturally diverse, underserved community. Distrust among harvester groups and between harvesters and agencies. Invisible and undervalued workers.	Underserved community due to institutionalized racism, agency focus on larger landowners and regulations disadvantage small landowners, distrust, land loss among black families, disconnect from land. Primarily African-American.	Low socio-economic levels, job loss due to loss of timber on federal lands and mine closures. Anglo, Hispano & Latino, Native American.	Rapid demographic change and growth, with increase in retirees, amenity residents, tourism & exurban development. Decline in economic viability of land-based livelihoods. Growing Hispanic population.	Community in transition due to changing forest policy, timber industry restructuring, and demographic change. Increasing poverty. Cultural conflict over land and resource use. Declining institutional capacity. Primarily Anglo	Community in transition due to changing forest policy, timber industry restructuring and demographic change. Increasing poverty. Declining institutional capacity. Primarily Anglo	Demographic change and turnover in forest ownership, leading to changing landowner values, fewer "working forests," and growing "disconnect" from the land. Primarily Anglo.
Organizational structure	Membership organization	Membership organization	Community-based organization	Community-based organization	Community-based organization	Non-membership CBO	Membership organization
Land ownership	Primarily public lands, some tribal and private lands (fuel reduction)	Private lands	Public lands	Primarily public lands	Primarily public & some private lands	Primarily public lands & some private lands (Post Mountain)	Mainly private lands, some college and municipal forests

Social objectives	●Social justice ● Pay scale that acknowledges skill and work ● Training	●Promote hands-on learning and networking ●Advocacy, outreach ●Build ties to the land ●Improve land retention, stewardship and income generation.	●Build trust and support from environmental organizations and USFS for forest restoration prescriptions ●Create jobs from small diameter wood utilization ●Reduce conflict	● Facilitate constructive dialogue about public land management ● Participate in public land management decision making ● Increase awareness of interdependence of local economies & landscapes ● Increase civic engagement and social learning	●Build trust and support in community and USFS for forest restoration prescriptions. ●Build trust and reduce conflict about management. ●Training, education and outreach. ●Build contractor capacity and create jobs ●Civic science and social learning.	●Address conflict ● Build relationships among organizations & agencies ●Build contractor capacity ● Support traditional resource-based economy ●Civic science & social learning	●Improve stewardship of family forests ●Build ecological knowledge and awareness ●Identify VFF participants ●Create community.

Table 3. Ecological stewardship strategies and outcomes in 7 community forestry organizations in the USA.

	VFF	FSC	WR	PLP	JBC	WRTC	AFHW
Ecological Strategies	• education • mapping natural communities • developing mgt. plans • sustainable harvest using VFF mgt checklist • monitoring using checklist	• education: 1) 1-on-1 2) workshops 3) peer-learning networks • developing mgt. plans • income-generation/management demonstrations (e.g. goat project)	• assessment & inventory • restoration & mgt. projects (including fuel reduction) • monitoring, adaptive mgt. & research • education (K-12 and college level • income/job generation	• large-scale habitat restoration (UP Project) • small-scale experimental restoration projects • negotiation & monitoring of USFS projects • documentation of LEK • fostering place attachment • forum for collaboration • participate in USFS planning process	• natural process prescription, forest restoration treatments on FS lands • small diameter wood utilization to provide markets for poles removed in treatments •monitoring	• manage public and private lands together as a matrix of multiple patches with different goals, some wildlife, some fuels reduction •negotiation of USFS projects – stewardship contracts? •monitoring and adaptive management •Community Fire Plan •forest products and job generation	•education and training (peer learning) •restoration •monitoring •job generation
Ecological Outcomes	• Natural community mapping on	• 12+ mgt plans completed • 20+ landowners	• Upper Joseph Ck. Watershed	• Involvement in UP Project design and	• On some National Forest land –	•Community Fire Plan for Post Mountain	•Protection of mushroom

	__ properties •Certification in place on ___ properties • ____ mgt. plans • Use of checklist to monitor	involved in sylvopastoral project • Changes in knowledge, attitudes, trust • Community-building: networking, leadership development	Assessment • Weed inventory • Many small-scale restoration projects • Many monitoring projects (e.g., Aspen, Buck Stewardship) • Changes in knowledge, attitudes and trust • Partnerships, community building and increased knowledge	landscape assessment • Small-scale restoration projects • Changes in knowledge, attitudes & trust • Monitoring projects	reduce tree density, retain large trees, restored structure to support surface fire	•Monitoring program for Post Mtn. •Chopsticks fuels reduction project • Progress toward change in knowledge, trust and attitudes	fields •Small-scale restoration projects •Hand pulled weed project • Changes in knowledge, attitudes and trust

Table 4. Ecological inventory and assessment and monitoring carried out by 7 community forestry groups in the USA.

	Monitoring/ Assessment Project	Type of Monitoring/Assessment	Monitoring Objectives	What was learned?	How was the information used?
AFWH	Mushroom monitoring	Compliance	Educate harvesters, reduce social conflict, protect resource	Information regarding best practices and resource values	Improved mushroom harvest practices. Altered timber sale design in response to mushroom and picking locations.
	Weed monitoring	Effectiveness	Determine if hand pulling as effective as herbicide; promote alternative management (pulling)	AFWH felt that hand-pulling a viable option, not able to convince USFS	Report to FS regarding alternatives to spraying
JBC	Mill Creek #1 & #2	Effectiveness	Quantify thinning treatment on FS land and impacts on understory and soils	Desired basal area achieved using JBC methods; little change in understory or soils	Reports to USFS and CFRP; Used to design other thinning projects.
PLP	UP Project Watershed Assessment & Monitoring	Ecological assessment & effectiveness monitoring	Planning (assessment), learning and adaptive management (monitoring)	Too early to tell (monitoring)	Assessment used to design habitat restoration treatments
	Burn Canyon Monitoring	Effectiveness monitoring	Learn about salvage logging effects; involve and teach public about logging; reconnect	Little difference between logged and unlogged plots. Cheatgrass more abundant in	May inform design of future monitoring projects. May influence treatment of invasive

			people with land	logged areas.	plants
	Poop and Stomp Project	Effectiveness monitoring	Learn if restoration approach works	Too early to tell	
VFF	Natural Community Mapping	Inventory	Help landowners identify community types for mgt. planning. Identify & protect rare types.	Some rare communities identified	Used in management planning. Rare communities protected
	Certification Harvest Checklist	Compliance	Determine if harvest implemented according to certification standards	Whether land complies with standards	Used to make certification decisions
	Colby Hill Long-term Ecological Monitoring	Validation (learning)	Long-term observation of trends		
	Monitoring/ Assessment Project	Type of Monitoring/Assessment	Reason for monitoring?	What was learned?	How was the information used?
WR	Upper Joseph Creek Watershed Assessment	Ecological assessment	Understand system, identify project priorities, establish a collaborative planning process for the community	Lessons learned both about ecosystem conditions and function, and about the process of collaboration	Used to prioritize projects for funding & implementation
	Aspen & Landbird Habitat Monitoring	Effectiveness monitoring	Build trust and credibility; identify best restoration methods	Fencing to exclude herbivores works, wildlife exclusion most effective, some fences harm birds	Demonstration led to increased landowner participation
	Haypen Project	Effectiveness monitoring	Determine if stand	Stand could have	Learning influenced

			improvement objectives were met; political accountability & trust-building	been subjective to more harvest. Good for building trust, but ground vegetation did not benefit as much as it could have	subsequent work on Upper Joseph Creek Assessment
	Buck Stewardship Project	Compliance and effectiveness monitoring	Minimize soil compaction and determine if objectives met	Soil compaction was lower on logged sites (no negative impacts of logging)	Results reassured environmentalists that thinning did not harm soils
	Wallowa Lake WUI Project	Compliance monitoring Impact monitoring	Build local contractor capacity and monitoring workforce; reduce fuel loads in a socially acceptable manner	Fuel reduction techniques; visual acceptability of thinning project	Built contracting capacity; public education regarding aesthetics of fuel reduction; need to widen buffer to avoid effects from fires higher on mountain
	Weed Monitoring	Weed inventory Effectiveness monitoring Research	Track weed infestations, treatment demonstrations, learn if treatments work	Effectiveness of different herbicide types, application timing and rates; Effectiveness of bug releases	Recommendations to citizens and agencies on herbicide use and biocontrol. Determine when new bug release needed.
	Lynx Survey	Inventory	Determine if lynx are present in area; training and jobs for local people	No lynx found	Information used by the USFS in project planning and analysis.

	Goat Grazing Weed Trial	Demonstration; effectiveness monitoring	Learn if goats control knapweed	Too soon to tell	
	ICAPS Experiment	Research	Learn if diet and habitat use differ between Corriente & English cattle breeds	Too soon to tell	
WRTC	Stewardship Training Team Inventories	Inventory and assessment of species and habitats	Various, depending on agency objectives	Status and location of target species and habitat	Pre-NEPA planning and project design
	Chopsticks Monitoring	Effectiveness monitoring	Assess impacts of thinning and slash treatments, especially on soils	Piling and burning slash causes more damage to soils than other treatments or yarder	Used in design of subsequent thinning projects
	NTFP Assessment and Harvest Research	Inventory and research	Identify location and quantity of NTFPs, assess impacts of harvest	Broader location and abundance, and fewer harvest impacts on medicinal plants than expected	Provided information to harvesters and Forest Service
	Post Mountain Stewardship Collaborative Monitoring	Effectiveness monitoring	Satisfy multiparty concerns about impacts of thinning treatments	Monitoring system informed planning and challenged assumptions	Too soon to tell

Appendix G: Collaborative and Community-based Monitoring in Community Forestry: Lessons from Five Community Forestry Organizations in the Western USA

November 28, 2006

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ABSTRACT

Collaborative monitoring is becoming more frequent (or at least more frequently discussed), yet few studies have examined the process and outcomes of these multiparty and community-based monitoring approaches. We studied 5 community-based forestry organizations (CBFs) and 18 collaborative or community based ecological monitoring projects they undertook, to investigate the objectives, process and outcomes of collaborative ecological monitoring and assessment by CBF organizations, as well as the benefits and challenges of these types of activities in CBFs. We found that collaborative monitoring can lead to shared ecological understanding among diverse participants, build trust internally and credibility externally, and foster social learning and community-building. CBFs experienced challenges in recruiting and sustaining community participation in monitoring, building needed technical capacity for monitoring, and communicating monitoring results back to the broader community. Our results suggest that involving diverse and sometimes adversarial interests at key points in the monitoring process, particularly objective-setting, design and interpretation, can help resolve conflicts, increase trust, and advance social learning, while also strengthening the link between social and ecological systems by improving the information base for management and increasing collective awareness of the interdependence of human and natural forest communities.

INTRODUCTION

As the popularity of community forestry and other community-based and collaborative approaches to natural resource management grows in the USA, there is an increasing need to understand the nature of these groups and their achievements and learn from their successes and failures. Policy makers and funders, in particular, want to know how community forestry differs in its methods and outcomes from conventional forest management carried out by public land management agencies or non-industrial forest landowners advised by consulting foresters. In this paper, we examine the roles of collaborative and community-based ecological monitoring and assessment in community-based forestry organizations (CBFs). This focus is justified for two reasons. First, ecological monitoring is a key way to document and learn from the environmental outcomes of community forestry. Second, if community forestry organizations widely use and promote collaborative and community-based monitoring, this emphasis qualitatively distinguishes community forestry from conventional forestry. Further, new programs such as New Mexico's Collaborative Forest Restoration Program (2000) and

the Pilot Stewardship Program (Kusel et al. 2000) require multiparty assessments of ecological conditions before and after restoration activities are implemented, making it important to understand the benefits and drawbacks of these approaches as they relate to the goals of community forestry.

Collaborative or participatory monitoring involves multiple individuals or organizations with different interests and forms of expertise in the design and implementation of monitoring. Multiparty monitoring is a form of collaborative monitoring involving representatives of opposing stakeholder groups, such as environmental organizations and timber industry representatives. Community-based monitoring implies the direct involvement of local community members in monitoring, either through their participation in collaborative monitoring efforts, or by training and contracting local workers to carry out monitoring projects.

Although programs such as CFRP require multiparty monitoring and several handbooks provide guidelines on how to develop a multiparty monitoring project (Savage 2003, Pilz et al. 2005), few published studies have examined the process and outcomes of collaborative monitoring. The objective of this research was to investigate the nature, benefits and challenges of collaborative and community-based monitoring in CBFs. Based on the existing literature and our preliminary findings, we posed five initial propositions about the nature of collaborative monitoring in CBFs:

1. Collaborative monitoring leads to shared understanding of the ecosystem.
2. Collaborative monitoring fosters social learning and builds community.
3. Collaborative monitoring builds trust and credibility within and outside CBFs.
4. Community involvement in monitoring leads to communication of monitoring findings to the broader community.
5. Community involvement in monitoring increases the likelihood that monitoring information will be acted upon and used to make decisions.

The paper is organized as follows. First we place CBF monitoring efforts in the broader context of citizen involvement in ecological monitoring and research by reviewing the literature on community-based, multiparty and volunteer monitoring specifically, and civic science more broadly. We also introduce social learning as a concept and framework for understanding the key objectives and outcomes expressed by the CBF organizations we studied. We then present our findings as they relate to the descriptive objectives of our study, and evaluate the evidence to support or refute our initial propositions about the nature of collaborative monitoring in community forestry. Finally, we discuss our findings and implications for community forestry specifically, and collaborative and community-based natural resource management more broadly. We contend that despite the significant challenges CBFs face to sustain community participation and build their technical capacity in monitoring, collaborative monitoring by CBF organizations creates opportunities for social learning, conflict management, and, ultimately, reconfiguring human-landscape relationships, advancing the overall goals of community forestry organizations.

BACKGROUND

Community Participation in Science and Monitoring

Although collaborative and multiparty monitoring are relatively new terms, these modes of community involvement in tracking ecological conditions are only the most

recent iterations of a long tradition of citizen participation in natural history and other formal scientific endeavors (Withers and Finnegan 2003). A litany of terms has evolved to describe the various ways that individual citizens or groups of non-scientists may participate in designing and carrying out scientific research or environmental monitoring. Citizen science and volunteer or community monitoring usually refer to actions taken by individuals or organized groups of citizens to collect data for scientific research or management-oriented environmental monitoring. Examples of citizen science include citizens who record rainfall and temperature in their back yards as part of the Community Collaborative Rain, Hail, and Snow Network to help scientists better understand spatial variability in weather patterns (Cifelli et al. 2005). Common volunteer monitoring efforts include citizens who record water quality data in lakes and rivers across the USA (Lopez and Dates 1998, Nicholson et al. 2002, Greve et al. 2003, Boylen et al. 2004). In citizen science and volunteer monitoring, the data gathering objectives and protocols are usually established by scientists or resource management agencies, and the citizens who gather data are not usually involved in planning the research or analyzing or interpreting the results. A growing literature reflects on the role of volunteers in gathering monitoring data, and addresses issues of data quality (Canfield et al. 2002, Nicholson et al. 2002, Brandon et al. 2003, Gouveia et al. 2004), volunteer motivation (Whitelaw et al. 2003) and data application (Vaughan et al. 2003, Boylen et al. 2004, Bruhn and Soranno 2005), among other aspects.

Civic science, a term coined by Kai Lee (Lee 1993), refers to the democratization of science and its reorientation towards public dialogue and interpretation. Shannon and Antypas (Shannon and Antypas 1996) state that "Civic science seeks to reunite these divided roles and responsibilities [science and democracy]," and challenges the traditional stance of science as objective knowledge situated outside of, rather than part of, society. Carr (Carr 2004) advocates for what she calls "community science," which she describes as more inclusive than citizen science and more radical than civic science, and defines as, "the interaction between conventional (institutional, professional) and community-based (unaffiliated, volunteer) scientific knowledge systems. Community science is driven by community issues and concerns rather than theoretical frameworks or basic research questions."

In its orientation towards community-defined questions, community science as defined by Carr, shares features with participatory research. Participatory research includes a spectrum of community involvement from functional participation in data gathering to empowering participation, which signifies the engagement of community members as full partners in all parts of the research process, including question definition, research design, and data gathering, analysis and interpretation (Johnson et al. 2001). Analogous to participatory research, collaborative and multiparty monitoring involve community members and other stakeholders throughout the monitoring process, including developing monitoring objectives and protocols, gathering data, and analyzing and interpreting the results (Kusel et al. 2000, Bliss et al. 2001). Unlike volunteer monitoring or participatory research, which are well-studied phenomena, little research has investigated the process and outcomes of collaborative or multiparty monitoring in natural resource management (Kusel et al. 2000, Bliss et al. 2001, Hartanto et al. 2002, Mungai et al. 2004), and many of the existing studies are from an international development context.

In the USA, community participation in monitoring is increasing due to government cuts in monitoring programs, the growing need for information on local environmental changes, increasing recognition of the value and importance of including stakeholders in management processes, and a corresponding desire on the part of citizens to participate in management decisions that affect them (Moir and Block 2001, Weber 2003, Fernandez-Gimenez et al. 2005a, Fernandez-Gimenez et al. 2005b). Community participation in monitoring can help identify indicators and create monitoring plans that are meaningful to local participants (Gasteyer and Flora 2000). Collaborative monitoring projects also can yield significant social benefits, such as increased trust and improved relationships (Kusel et al. 2000, Fernandez-Gimenez et al. 2005b). We expected that community involvement in monitoring by CBF organizations would also lead to greater sharing of monitoring results throughout the local community, and a greater likelihood that monitoring results would be used in future decision-making.

Adaptive Management, Social Learning, and Socioecological System Resilience

Recent advances in the theory and practice of natural resource management have focused explicitly on strategies for learning and applying new knowledge. Adaptive management, an approach first introduced by Holling (Holling 1978) strives to overcome the limitations of conventional natural resource science and command and control resource management by treating management actions as structured experiments, and attempting to document and learn from both planned actions and unplanned environmental "surprises." Although adaptive management has faced many hurdles and criticisms in practice, including lack of broad-based public participation and integration of different knowledge sources (Kusel et al. 1996, McLain and Lee 1996), institutional roadblocks (Stankey et al. 2003), misinterpretation and misapplication of the concept (Bishop 2005, Stankey et al. 2005), and inadequate or poorly designed monitoring (Moir and Block 2001), it remains a conceptual ideal and guiding principle for natural resource management because it appears to be our current best alternative for understanding and sustaining complex and unpredictable socioecological systems.

Like adaptive management, the terms "social learning" and "organizational learning" emerged in the late 1970s (Bandura 1977, Argyris and Schon 1978), and their subsequent development and application to resource management have been influenced heavily by systems thinking (Argyris and Schon 1978) and educational theory (Kolb 1984). The term social learning was originally used to refer to individual learning through observation of peers in social settings (Bandura 1977). In the natural resources context, the term has taken on a somewhat different meaning, focusing on an intentional process of collective self-reflection through dialogue among diverse participants (stakeholders). This definition emphasizes learning through interactions in a group setting embedded in a particular biophysical and socio-cultural context, and the nature of learning as conscious act of collective self-reflection.

Keen et al (2005, p. 9) define social learning as, "a process of iterative reflection that occurs when we share our experiences, ideas and environments with one another." Drawing on the language of systems analysis and organizational learning (Argyris and Schon 1978, Senge 1990), Keen et al. (Keen 2005) and Keen and Mahanty (Keen and Mahanty 2006) describe how social learning can occur at several levels, from learning about the consequences of specific actions ("single-loop learning"), to learning about the

assumptions underlying our actions ("double-loop learning"), to learning that challenges the values and norms that underpin our assumptions and actions ("triple-loop learning") (Figure 1). Keen and Mahanty (2006) highlight three key dimensions of social learning in natural resource management: learning through a systems orientation, learning through negotiation and dialogue, and learning through reflection.

Several others provide similar definitions in recent works. Bouwen and Taillieu (Bouwen and Taillieu 2004) characterized Woodhill's (Woodhill 2003) definition of social learning as, "building capacity to consciously and critically assess the consequences of our behaviour and understand how social structures and institutions shape the way we think and act. Social learning actively engages different groups in society in a communicative process of understanding problems, conflicts and social dilemmas and creating strategies for improvement. Thus social learning is more than just 'community participation' or learning in a group setting. It involves understanding the limitations of existing institutions and mechanisms of governance and experimenting with multi-layered, learning-oriented and participatory forms of governance," (p.143). Similarly, Pahl-Wostl and Hare (Pahl-Wostl and Hare 2004) defined social learning as, "an ongoing learning and negotiation process where a high priority is given to questions of communication, perspective sharing and development of adaptive group strategies for problem solving," (p. 193-194). Lee (1993) characterized social learning as a combination of adaptive management and policy change, and emphasized learning about the different players, their perspectives, roles and relationships, as well as the necessity of "bounded conflict."

Keen and Mahanty (2006) and Wenger (Wenger 1998) both emphasize the ways that learning and knowledge generation are socially and culturally embedded. According to Keen and Mahanty (2006), "A learning approach to NRM must accept that knowledge can be generated in different ways, and that all knowledge can be contested. Thus, all learning processes are contextual—that is, they exist in relation to the place in which they occur, the experiences from which they arise, and the cultures with which they are associated," (p. 498). Wenger (1998) advances the notion of learning as participation in "communities of practice," that influence and are influenced by social structure, and individual identity within that structure (from Pahl-Wostl and Hare 2004).

Pahl-Wostl and Hare (2004, p.195) identify seven key ingredients that enhance the capacity of groups to engage in social learning in a natural resource management context: awareness of each others' sometimes different goals and perspectives, shared problem identification, understanding of actors' interdependence, understanding the complexity of the management system, learning to work together, trust, and creation of informal as well as formal relationships. Daniels and Walker (Daniels and Walker 2001) developed a process they refer to as collaborative learning, which is structured to engage diverse participants in environmental conflicts in constructive dialogue. The collaborative learning process addresses many of the ingredients listed by Pahl-Wostl and Hare, and seeks to manage conflict rather than resolving it.

Like adaptive management, social learning in natural resource management is thought to enhance the flexibility and responsiveness of socioecological systems, enabling these linked human and natural systems to better cope with and adapt to stress and change, without changing their fundamental nature. Together, these approaches should lead to more resilient socioecological systems (Berkes and Folke 1998). We refer

to socioecological systems, rather than distinguishing between distinct human social and natural ecological systems, to acknowledge the inherently interdependent nature of human-ecological interactions. The linkages between the social and ecological subsystems are multiple, and include the ways that humans derive their livelihoods and learn from their interactions with natural systems; and the ways we use local ecological knowledge, science, cultural practices and institutional arrangements consciously and unconsciously to alter the ecological systems in which we live (Berkes and Folke 1998). Resilience here means the ability of a system to absorb stress and disturbance without changing its underlying structure and controlling processes (Carpenter et al. 2001). This view of resilience incorporates the notion of a dynamic system where disturbance and natural variation play integral roles, and human ability to learn from, adapt to, and maintain these dynamic systems is the key to their long-term persistence. According to this view, resilience is a value-neutral characteristic, since systems in an undesirable state can be resilient. In the context of community-based forestry, the goal of many CBF organizations in the USA is to restore or maintain healthy, interdependent relationships between human communities and forested ecosystems, and resilience of such healthy systems is seen as a desirable attribute.

In this paper, we investigate the role of collaborative and community-based monitoring in facilitating adaptive management and social learning in community forestry organizations. We look for evidence of the different levels of social learning (single, double, and triple-loop) described by Keen et al (2005), as well as the facilitating factors suggested by Pahl-Wostl and Hare (2004).

METHODS

Sampling Frame and Study Sites

The Ford Community-Forestry Demonstration project funded 13 CBF organizations for 5 years beginning in 1999. In the last year of the program (2004), we were invited to develop a research program based on the experiences of the 13 demonstration projects. One theme of this research program was the role of CBF organizations in ecological stewardship, and vice versa. Within the broader theme of stewardship, we focused on ecological assessment and monitoring, since assessment is a key element in natural resource planning and monitoring is essential to measuring short and long-term environmental outcomes. Due to the short-duration of the Ford program, and the diversity of funded groups and their environmental settings, we did not attempt to measure or make inferences about direct ecological impacts. Because the development of strong ecological assessment and monitoring capacity was important to the long-term ecological success of community-based forest stewardship, we therefore focused our analysis on the roles of ecological assessment and monitoring in CBF organizations.

We purposively selected 7 of the 13 funded groups for study based on each group's interest and willingness to participate in the research, and its involvement in on-the-ground ecological stewardship, assessment and monitoring activities. Of these 7 groups, 5 were engaged in some form of community-based or multiparty monitoring and were the focus of this analysis.

The 5 studied groups were all located in the western USA, and worked on public lands exclusively or on a mix of public and private lands. The groups were: the Alliance of Forest Harvesters and Workers (AFHW), the Jobs and Biodiversity Coalition (JBC),

the Public Lands Partnership (PLP), Wallowa Resources (WR), and the Watershed Research and Training Center (WRTC). Table 1 provides a summary of each group's social and ecological setting, the ecological threats to the system, and the group's primary social and ecological objectives related to ecological stewardship of forests.

Our research team used a modified participatory research approach, such that all of the 13 demonstration projects contributed to identifying key research questions, and provided input and feedback on the research at key points throughout the process. On several occasions this input took place at meetings or workshops where the research team met directly with representatives of all the CBF demonstration projects. Following the conclusion of the majority of data collection and preliminary analysis, we convened a 3-day "ground-truthing" workshop, during which CBF organizations helped to validate and participated in the interpretation of our results.

Data Collection and Analysis

We collected data on the ecological stewardship, assessment, and monitoring activities of each group using a combination of on-site interviews and participant observation, telephone interviews, and document review. We visited each group for a minimum of 3-5 days of interviews and field tours. Initial interviews were with CBF staff, agency partners, community participants, and other potentially affected or involved organizations or individuals (e.g. environmental groups, industry representatives). We made additional multiple site visits to 3 of the study groups (AFWH, PLP, WRTC) as participant observers in monitoring or related stewardship activities in order to observe interactions among multiparty and community participants in these projects. After completing our initial analyses, we conducted additional interviews to seek potentially contradictory evidence and substantiate or reject our initial findings. In all, we conducted formal interviews with 51 individuals in the 5 groups. Documents reviewed included project proposals, internal reports and reports to the Ford Foundation; ecological assessment and monitoring project protocols, interim and final reports, and meeting minutes; public presentations by CBF organizations about their stewardship and monitoring projects (i.e. powerpoint slides and digital files from workshops); and existing case studies and published literature on the study organizations.

Formal interviews were audiorecorded, transcribed and coded using QSR N*VIVO software. Codes addressed descriptive research questions (e.g. CBF ecological stewardship objectives, strategies and outcomes), and evidence related to our propositions (e.g. trust, social learning, community-building, shared ecological understanding, communication and application of monitoring results), and to the stages and types of community participation in ecological assessment and monitoring. The resulting coding reports were synthesized within and across CBF organizations to assess the evidence in relation to our propositions and identify emergent themes in the data.

RESULTS

Community Roles in CBF Ecological Assessments and Monitoring

The 5 CBF groups studied engaged in a wide range of ecological assessment and monitoring activities that involved community members in a variety of roles throughout the monitoring process (Tables 2 and 3). Four of the 5 groups we studied conducted or contributed to ecological assessments or inventories, including two landscape-scale

ecological assessments and an inventory of non-timber forest products. Two groups conducted compliance monitoring and all groups were involved in some form of effectiveness monitoring.

A variety of objectives were common to several of the projects. All of the 18 projects monitored to learn about the system, 13 monitored to build trust, 11 monitored to determine the effects of management actions, 9 monitored to help manage conflict, 6 monitored to train local people for jobs, 6 provided monitoring jobs for community members, and 3 monitored in part to promote civic engagement.

The most prevalent types of community involvement were combined multiparty and community involvement—projects that involved both representatives of opposing interest groups and unaffiliated citizens—and projects that involved community members who did not necessarily represent multiple opposing interest groups. Two other types of community involvement observed were multiparty involvement of interest group and agency representatives and CBF staff, without broad community involvement, and involvement of CBF staff as representatives of the broader community.

In all of the 18 assessment and monitoring projects we studied, community members were involved at some stage of the monitoring process, but few projects engaged community members in most or all phases of monitoring. Multiparty involvement (with or without unaffiliated community members) was most common in the objective-setting (9 projects), design (8 projects), interpretation (7 projects) and communication (8 projects) phases of monitoring. Citizen involvement in a non-multiparty context was most common in the data collection phase (10 projects). Only one project involved community members in formal data analysis, which was most often conducted by 3rd party consultants or researchers (6 projects) or agencies (6 projects), often together with CBF staff.

Overall, three general patterns of community participation emerged: 1) community involvement primarily in the objective-setting, design, and interpretation phases, 2) community involvement primarily in the data-gathering phase, and 3) community involvement in most or all phases of monitoring. Here we describe here a representative example of each of these 3 patterns. Summary characteristics of all the projects, and the type of participation in each phase, can be found in Tables 2 and 3.

Pattern 1. Community involvement in the objective-setting, design and interpretation phases: Burn Canyon Monitoring Working Group

In the late summer of 2002, a wildfire swept through the foothills of the southern Rocky Mountains in western Colorado, scorching over 50,000 acres of oak and ponderosa pine woodlands. In hopes of providing some economic benefit from this event, the Forest Service scheduled a salvage timber sale on a portion of the burned area. Regional environmental groups objected, but PLP saw the sale as an opportunity to advance their goals of improving local livelihoods while restoring the health of the forest. PLP facilitated a dialogue among community members and concerned environmental groups, and the environmentalists eventually agreed not to appeal the salvage sale if monitoring were implemented to discover whether the logging was harmful, helpful, or benign in its ecological impacts. PLP invited scientists nominated by diverse interests within the group to help clarify the group's monitoring objectives, identify appropriate indicators, and craft a monitoring protocol the group could implement on its own. A

wide range of local interests and citizens participated in the discussions about monitoring objectives and design. The final design was largely based on the experience of an environmentalist who was a retired Forest Service employee, but incorporated recommendations of one of the invited scientists. The same environmentalist volunteered to collect the field data and PLP provided this individual with a small amount of funding to cover fieldwork costs for 3 years. The data were analyzed by a university researcher contracted as a 3rd party consultant. The researcher presented the preliminary and final data analysis at several meetings of the monitoring working group, and the group discussed their interpretation of the data and planned to present their findings to a broader community meeting. The PLP hopes to apply its learning from this project to other community-based monitoring projects in the area.

Pattern 2. Community involvement in data collection: WR Lynx Survey

Lands on the Wallowa-Whitman National Forest were identified as potential habitat for the Canadian lynx. The US Forest Service needed to conduct surveys on lynx occupation and use of these areas, but lacked sufficient staff and resources to carry out the surveys. WR arranged to hire and train local residents, including out-of-work loggers and mill workers, to conduct the lynx surveys for the Forest Service using USFS protocols. Local surveyors were hired, trained and conducted the surveys, and were monitored for quality control by an external evaluator designated by the USFS. In this example, local community members were involved only in the data collection and the objectives, design, analysis and interpretation were determined by the agency. Other examples of this pattern include the eagle and grouse surveys (WR), and the ecosystem stewardship training program (WRTC). Some of these projects involved training local people to work as paid contractors for agencies or the CBF organization, while others involved groups of citizen volunteers or school groups gathering data.

Pattern 3. Community involvement throughout the monitoring process: WRTC Post Mountain Stewardship Collaborative

Post Mountain is a small community of homeowners located on the edge of the town of Hayfork, California, in which private property is intermingled with and surrounded by US Forest Service land. The WRTC facilitated a community-based multiparty process to plan and monitor a proposed thinning project in this wildland urban interface zone. Participants included WRTC staff, US Forest Service, the volunteer fire chief, environmentalists, a registered forester, and residents of Post Mountain. This diverse group worked together on all phases of the monitoring project, from developing a conceptual model of their situation, to identifying objectives, designing and carrying out monitoring in the field. Data analysis likely will be conducted by WRTC staff, but the Post Mountain Stewardship Group will be involved in data interpretation, communication and application. This project is an example of multiparty community involvement at virtually every stage of monitoring (with the exception of data analysis). The Upper Joseph Creek Watershed Assessment (WR) is another example of this pattern, where community members were involved in every phase, including data analysis for some parts of the assessment.

Benefits and Outcomes of Community Involvement in Monitoring

Understanding Ecosystems

Monitoring by CBFs led to new knowledge about the impacts and effectiveness of specific management practices (e.g. WR aspen regeneration, WRTC Chopsticks, PLP Burn Canyon, JBC Mill Site, AFHW weed and mushroom projects), but also to a greater appreciation on the part of CBF participants of the complexity of ecosystems and the difficulty of obtaining complete and reliable information about their behavior. As one PLP participant observed, *"I think there's a better understanding of how complicated that ecosystem is. It isn't just take one thing out or add one thing and everything goes back to paradise. And that's a common conception."* The same individual went on to reflect on what community members learned about the process of monitoring, "*You heard people from the community express how difficult that monitoring is and I think that was an eye-opener for them. That is wasn't just the agencies no doing their job as far as monitoring. I mean that's not an easy process.*" When a CBF was engaged in numerous inventory and monitoring projects over time, the collective sum of its work advanced understanding of the local ecosystem overall (e.g. WRTC, WR).

PLP's role in the UP Project's ecological assessment and project design was to bring a "community perspective." An agency participant noted that PLP did this in part by facilitating a collaborative approach that included broader citizen participation in the discussion of project objectives and treatments, "*It's been good, because we've been forced to have dialogue and I think probably [as a result of] those meetings they have, a lot of people have a common understanding.*"

Similarly, an agency staff member observed that the collaborative process of the UJCWA led to a greater shared understanding of that ecosystem, *"It was really neat to see what had come out of the collaborative process. The entire county seems to be pretty much on the same page. Not everybody is agreeing with everybody else, but there's enough agreement and enough common ground and commonality to know what is out there. … I thought that it's a really great basis from which to start to do a lot of these projects. It opened up a lot of communication, and there's a lot more willingness to work together that I never experienced elsewhere and I feel very fortunate to be here now. It's like my job is so much easier because of this process that has happened with this watershed assessment."*

Even when broad consensus was reached on important issues, differences among stakeholders remained. For example in the UJCWA, there was broad agreement on the historic conditions in the warm dry sites and the measures needed to restore these areas, but similar consensus was lacking for the cool dry sites. In JBC, the FS and environmentalists agree on the overall objective of restoring a fire-adapted ecosystem, but debate continues on the appropriate basal area required to achieve this goal. JBC has tended to look very carefully within an individual stand, whereas the FS looks at variation among stands across a large landscape.

Social Learning

The literature on social and organizational learning defines three levels of learning, often described as single, double and triple-loop learning. We found evidence of social learning at all three levels among the CBFs we studied. With respect to single-loop learning, many of the CBFs clearly described what they learned about the impacts or effectiveness of management from their monitoring efforts. For example, JBC's

monitoring showed that their thinning prescriptions achieved the desired basal area with little impact to the forest understory or soils, and WRTC learned that piling and burning slash caused more soil damage than other slash treatments or than using a yarder to harvest. WR's herbicide trials and monitoring led to recommendations about the type of chemical, rates and timing of application for optimal treatment of specific invasive weed species.

Collaborative assessment or monitoring sometimes changed participants' assumptions about ecological processes, as well as their social assumptions--examples of double-loop learning. One participant in PLP's Burn Canyon Monitoring effort described the shift in participants' ecological assumptions and beliefs as follows. *"I think the expectations were completely different from the two parties. The environmentalists knew that salvaging timber was going to be damaging and that it would be better to leave it unsalvaged. That was the unspoken, or even the spoken, expectation of the environmental community. And almost the opposite of the business timber industry was that salvage logging had no impact at all. What we see is, well it's right in the middle, it's not either. It's not a huge impact, but there is an impact. There may be some cheatgrass, there may be some problems, but it's not a huge change."*

Another PLP member spoke more generally about changing his views as a result of the collective learning process, *"Everyone is going to come to the table with their opinions, but you are able to actually learn about stuff that you may have had preconceived notions about but may not be true. Maybe you will learn that. I know I have."* An agency staff person who interacts with PLP on the UP Project remarked that she had seen attitudes and beliefs of participants change as a result of the combination of research evidence and dialogue about research results among diverse interest groups facilitated by PLP. For example, recent research conducted on fire frequency in piñon-juniper communities demonstrated that the historic fire intervals in this type were much longer (i.e. fires were less frequent) than previously thought. This finding was controversial and unpopular with some PLP participants, but they were eventually convinced and changed their beliefs to reflect this new knowledge.

We also found examples of social attitudes and assumptions that were altered through the interactions that occurred in a CBF. One AFHW member recounted, *"I went on a field trip and I have my own way of thinking about things—this is not right, all this commercial harvesting of products out of the woods. But there was a man, I think Laotian maybe, on the bus they chartered for our field trip. Just hearing his story, hearing his life and what occurred before he came here and how important it was for him to go out and harvest mushrooms. It was a real human thing, it wasn't about the money, and that made me stop and look at it a little different."*

Changes in norms and values (i.e. triple-loop learning) were more difficult to attribute to monitoring alone, and reflected the larger collaborative dialogues that the study CBFs engaged in. One example was a shift in values on the part of an environmentalist participant in PLP who came to better appreciate the role of land-based livelihoods in the economic vitality of his community.

The most significant indicator of social learning may be the intentional approach to learning that some CBFs take. Several of the studied groups had an explicit commitment to monitoring and adaptive management, and actively promote organizational learning and critical self-reflection in their staff, participants and

communities (WR, PLP, WRTC). This commitment was carried out in the "lessons learned" meetings and documentation that WR facilitated following the UJCWA process and the "learning workshop" PLP held to facilitate a broad community dialogue about what was learned from the restoration and monitoring projects the group has carried out.

Community Building

We found evidence that CBFs use collaborative monitoring as a community-building strategy. In the words of a WR staff member, *"Getting out and doing collaborative monitoring is a very strong partnership building exercise. And it has, certainly on the Upper Joseph Creek Watershed, allowed for a lot more convergence of opinions and perceptions of what the current concerns and appropriate strategies we could implement to achieve a diverse set of values. And that was a result of getting out there and working together on the assessment, rather than each having our own data sets and science that we're using in contentious debate and argument. Basically, learning together in the place we're interested in."* In addition, several CBFs saw collaborative monitoring as a direct and tangible way to "re-connect" people with the land (AFHW, PLP), strengthening awareness of the interconnectedness of ecological and human communities.

PLP members also viewed monitoring as a means to educate citizens about and engage them in natural resource issues, fostering civic engagement and environmental citizenship. One local politician and PLP member put it this way, "*In order to have that involved collaborative process, you need a knowledgeable base, just like democracy requires educated voters. You need an educated constituency to make these kinds of decisions. So these monitoring projects can help us in that direction."*

Some AFHW members spoke of monitoring as a form of empowerment for their members, instilling harvesters with a sense of ownership over the resources they use and care for. *"The empowerment that's going on, the ownership. … The mushroom monitors are so excited about the pictures. Why are they so excited? I think because they spell ownership."*

Trust

Some CBFs embarked on collaborative monitoring projects specifically to gain trust and credibility with a wide range of community members (WR, WRTC), with federal agencies (AFHW, JBC), and with outside environmental organizations (PLP, JBC). As a WR staffer recalled, *"It was really important to establish the organization as an entity in itself and also important to align ourselves with ecological monitoring, ecological projects. …So we began to work on these ecological demonstration projects to build trust, to build the understanding and to increase our own knowledge."*

In other cases, trust building was an outcome, if not an explicit goal, of collaborative monitoring. Sometimes trust, or at least greater respect and understanding, developed among diverse stakeholders participating together in a multiparty monitoring process. In other cases, monitoring results led to greater trust in the CBF on the part of agencies and environmentalists (WRTC, JBC, WR). A JBC participant talked of the importance of the collaborative aspect of project design and monitoring in building trust and credibility with outside environmental groups: "*It's really the process we went through that we found is important to talk about. You know, there are no outliers,*

nobody taking pot shots at us now, we can show other people that are trying to do something like this that hey, you can do this, you can get something done. It's more important to talk about the collaboration we've been through." The monitoring data JBC gathered was important in maintaining credibility with the Forest Service, since it showed that the JBC project came close to typical FS prescriptions in the basal area remaining after thinning.

Communication of Monitoring Results

We expected that involving diverse stakeholders and community members directly in monitoring would increase the likelihood that monitoring results would be communicated back to and throughout the community. While dissemination of results remains a challenge, there was some evidence to support this proposition. Sometimes communication took place formally, through community meetings (PLP, WR), websites (PLP, WR) or publications (WRTC, WR, PLP). In the case of the UJCWA, some 70 participants were involved in the process, a significant fraction of the community. PLP held a public "learning workshop" on restoration and monitoring, in part to showcase and discuss their experience with the Burn Canyon Monitoring project.

Often, monitoring results were communicated informally, as when local contractors involved in ecological surveys shared their observations with friends and neighbors (WRTC). As one WRTC staffer reflected, *"What we've discovered is … when you have an exlogger sitting at the bar and telling someone about the cool fisher tracking plates, that gets into the community a lot faster than the scientists who have been here every year studying the red legged frogs, but nobody in town knows anything about red legged frogs."*

A PLP member spoke about PLP as a mechanism for communicating about natural resource issues throughout the community, including the results of monitoring: "*Well, I would say it provides a forum for anyone who's interested; it's open to everyone. And if people want to learn, they can. It provides a core group that's educated, so it's not like everybody in the community is knowledgeable, but there is a group that is knowledgeable. … When S. talks about forest issues, P and L talk about the Sheep Mountain Alliance, or when I talk to the county, it has a real ripple effect on everybody, so in that sense you're inoculating the community against ignorance by having this group*."

One WR staffer admitted that in general, the group's monitoring results were not well communicated. Occasionally, the contractors or community members who collected the data gave a public lectures. A web page for monitoring results had been discussed, but had not yet been developed. A major constraint to formal communication back to the community was lack of funding. In some cases, there were not yet results to report. Overall, however, most CBF groups communicated monitoring results formally or informally to their membership, and in some cases, to the broader community. The efforts that CBF groups make to share their information compare favorably with those of public land management agencies like the USFS and BLM, which often do not communicate monitoring data at all, except perhaps to permittees or contractors directly affected by the results.

Application of Monitoring Results

CBFs used the knowledge gained through collaborative monitoring in several ways. For some CBFs, the emphasis was on learning from the multiparty community monitoring process and attempting to improve upon, expand, or apply this process to other projects and settings (PLP, JBC, WRTC). For example, a PLP leader reflected on the application of collaborative monitoring to other projects and forest planning generally, "*And I'm thinking about the transferability of this process in two specific ways. Number one, we have the power line project, assuming that ever goes. And secondly, in the forest plan revision, and under the new rule, monitoring is written all the way through that and it's not well defined. And so I'm thinking that community monitoring groups might in fact play a role in defining that*."

For others, learning documented in ecological monitoring reports or from visual inspections of demonstration projects has led to modification of future project designs (WRTC, WR). As one WRTC staff member explained, *"What we did at Chopsticks changed the prescriptions. … we had enough decision space to change based on what we learned. That was pretty fun."*

When WRTC facilitated the Post Mountain multiparty monitoring project, they found that the collaborative process helped them think in advance about how the data would be used, and thus narrow down the data that they would collect. *"And that's been a very important dialogue [about ecological objectives] during our multiparty monitoring meetings, because people brought pages and pages of information that they wanted to monitor, but when we asked how will it be used, what will we do with it, why do we want it… boy the list shrunk. People [realized] oh, I guess we don't need all that information*." WRTC staff

Many groups also learned about the technical aspects of monitoring design and analysis, and are applying this knowledge to future projects. There are also a number of instances in which it is not clear whether or how monitoring data were used. In at least one case, the monitoring data were so voluminous and complex the CBF was not sure how to analyze them.

Challenges and Barriers to Collaborative Monitoring in CBF

Challenges to collaborative monitoring fall into several categories: resources, participation and communication, and technical and institutional hurdles. Funding, time and labor were often the limiting resources in conducting any kind of monitoring, and since collaborative monitoring took more time, it often demanded more funding and labor as well. Nevertheless, most of the CBF groups we studied were carrying out monitoring at least in part to fill a gap in agency monitoring programs, as the following statement by a PLP member illustrates.

"There's going to be a point of diminishing returns. … I think there are better ways, and probably better systems, that we could employ to get people involved than monitoring, per se. Monitoring should more rightly be done by the agency and by the scientific community. The agency hasn't done it. The scientific community doesn't have the money to do more than spot checks. And if you look at overseas development, if you care about your community, and you care about what's happening on your public lands,

then monitoring is an excellent tool, community monitoring, is an excellent affordable tool to be involved in those changes."

Participation challenges included difficulty in getting or keeping key stakeholders involved (e.g. environmental groups, tribes, some agencies), over-reliance on specific individuals (e.g. a dedicated volunteer with specific knowledge, a visiting scientist), and generally difficulty in mobilizing and maintaining long-term volunteer commitment to monitoring. In a large multiparty collaborative ecological assessment, internal power differentials also presented a challenge to balanced and equitable participation, *"Most of it was the complexity. Some of it was because not everybody had equal power in the room and it was obvious, and so where some people thought there might be an easy solution, there was obstruction from people that had more power, either mandated authority because of their state or federal role, or legal power through the courts."*

Internal communication challenges included keeping all members of a large group up to date on project process and discussions when not everyone comes to every meeting. External communication challenges included distributing monitoring results broadly throughout the community.

Technical challenges in collaborative monitoring can be significant. Many CBFs struggled to determine an acceptable level of scientific rigor for community monitoring projects, and lacked technical expertise in monitoring design and protocols. Involving many people in monitoring design occasionally led to "too many cooks in the kitchen," resulting in an untenable monitoring design or data that could not be analyzed. Outside consulting scientists were not always helpful in resolving these issues, and sometimes made impractical recommendations. On the other hand, some groups found consultants and researchers to be an important resource in helping them design monitoring projects and analyze data. One CBF participant highlighted the importance of having clear management and monitoring objectives to help overcome some of these challenges, "*I think that an important thing is to be sure that they are really clear about their goals are, you know, what kinds of stuff they want to learn from the monitoring. And then, to make sure that they tie whatever measurements they do to what they want to learn, I think that's really important. And another thing, too, I'm not sure how well I've done on this yet because I haven't gotten to this phase, is to kind of think about the analysis of all the data that you're collecting, because I think that that's a downfall of a lot of monitoring projects is that, they collect all this data, and then at some point nobody really knows what to do with it, it's just a bunch of papers in a notebook somewhere."*

CBFs working across agency jurisdictions faced the challenge of differing monitoring standards and methods and differing vegetation classification systems among agencies. In the case of the AFWH, the agency would not accept or use the information gathered by CBF members. In one project conducted by WR, the CBF had to go to great lengths to protect the confidentiality of data gathered on private land. Other institutional hurdles included frequent agency staff turnover, shifting agency priorities that reduced funding and staff available for monitoring and assessment projects, and short-term stewardship projects with no funding for monitoring long-term ecological impacts.

DISCUSSION AND IMPLICATIONS

In the CBFs we studied, community members participated in ecological assessment and monitoring at different points in the monitoring process, depending on

the objectives of the project and of community involvement. Community involvement also took different forms depending on the project objectives (Table 3). When CBFs used monitoring as a strategy to manage conflict or build trust, monitoring projects emphasized multiparty and community involvement in the objective-setting, design and interpretation phases, or throughout all phases of monitoring. Involvement in these phases was also important for incorporation of local knowledge (Ballard et al. 2006). When the primary goal of the project was to provide job training and employment opportunities, participation of individual community members in data collection was most important. When learning and reconnecting people with the land were important goals, broad community involvement in data collection was important. When community members were involved in either data gathering or interpretation, they may have been more likely to share and apply what they learned, but this proposition requires further investigation. As the trend towards community-based and multiparty monitoring continues, these findings may prove useful in developing recommendations for community groups that want to conduct monitoring or agencies that want to involve the community in monitoring activities.

Many of the monitoring projects we studied were relatively young or were short-duration projects from the outset, and faced on-going challenges. Obtaining broad-based and sustained community participation in long-term ecological monitoring projects remained a challenge for many groups. The lack of community involvement in the data analysis phase of monitoring may indicate weak technical capacity of some CBF groups. Although contracting out data analysis to consultants or researchers may be more efficient and effective than training or hiring in-house staff, a participant of one group that did involve community members in some of the data analysis felt this involvement was an important element in the group's success conducting a collaborative ecological assessment. "*Having them involved in the analysis makes them understand it better. If you can see the raw data, [and the protocols], you have more ownership and better understanding. Some of the success of where we got with the environmental groups was because they didn't feel like somebody was making it up*." Lack of technical capacity to analyze data and write technical reports can lead to perceived lack of credibility on the part of some CBF partners. For example, the minutes from PLP's Learning Day reported, "*People like __ have a hard time with community monitoring if it isn't reported in a manner that befits data – i.e. a report. For it to be legitimate in his eyes, it must look legitimate*." Lack of confidence in data gathered by community members on the part of agencies, environmentalists or scientists is not new and it can be overcome, as some of the study CBFs have demonstrated. The decision of whether to develop technical capacity internally, form partnerships with researchers or consultants who can perform this task for the CBF, or forgo formal data analysis and reporting depends in part on the objective of monitoring. Among the CBFs we studied, trust-building was often an important monitoring objective, and technical capacity played a role in establishing and maintaining trust and credibility, especially with partner agencies and environmental organizations.

Despite the challenges of participation and technical capacity, our findings suggest that community involvement in monitoring advanced the overall CBF goals of understanding and transforming relationships among ecosystems, communities and local economies in several ways. First, it tangibly reconnected people with the landscape and

with each other, by getting diverse community members to work and learn together on the land. Second, it facilitated double- and triple-loop learning, encouraging participants to question their assumptions and underlying norms and values through the self-reflective processes of adaptive management and social learning. Third, collaborative monitoring also appeared to help build trust among diverse participants within CBFs, and to establish the credibility of CBFs with other organizations and agencies. This trust and credibility provide an important foundation for future collaborative projects between organizations. As these findings illustrate, we observed among the study CBFs all of 7 ingredients outlined by Pahl-Wostl and Hare (2004) that facilitate social learning in natural resource contexts.

Finally, the intentional approach to learning espoused by several of the CBFs studied should in theory enhance the resilience of local social-ecological systems by helping communities to anticipate and adapt to changing conditions, and to better appreciate the complexity of linked social and ecological systems. Taken together, the multiple and intertwined dimensions of intentional learning that some CBFs advance—adaptive management to learn about ecosystems, social and collaborative learning about socio-cultural systems, and critical self-reflection to advance organizational and community learning and development—can be understood as a renegotiation of the meaning of the people-land connection. Increased understanding of ecological complexity and uncertainty gained from collaborative ecological monitoring may lead community members to question their ability to manage natural systems in any simple prescriptive manner. This deepened understanding also reinforces the need to monitor to avoid ecological harm (and its social and economic consequences), develop locally workable and effective stewardship practices, and continue learning about these complex and unpredictable systems. Using a deliberative, transparent and collaborative process to collect and interpret data makes it more difficult for agencies and communities to ignore the results, and may empower them to respond more quickly and flexibly to new information than they had in the past. The increased civic engagement, respect, trust, and appreciation of interdependent human and natural systems that collaborative monitoring fosters instill some participants with a greater sense of civic responsibility towards their community and environment, and specifically towards sustaining healthy interdependent relationships between the two.

This study contributes to the scant research on the process and outcomes of collaborative and community-based monitoring. We acknowledge that our results represent a small and potentially unrepresentative sample of CBF groups and their ecological assessment and monitoring projects, primarily on public lands in the Western USA. Large sample studies of CBF organizations and their monitoring activities are needed to confirm or reject these preliminary findings about the relationships between the type and stage of community involvement in monitoring, and monitoring objectives and outcomes. Though difficult to design, comparative "case-control" studies are needed to compare the outcomes of collaborative community-based monitoring with conventional monitoring by agencies and consultants. Despite the possible limitations of our sample, our findings illustrate why the CBFs we studied monitored and what they achieved through collaborative monitoring, as well as the constraints to community involvement in ecological monitoring. Through their stewardship activities, and especially through their collaborative and community-based monitoring, the CBF organizations we studied

engaged ordinary citizens and diverse interests in examining complexity and reclaiming collective responsibility for the welfare of their communities and landscapes.

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Table 1. Overview of the ecological and social settings and objectives of the 5 study CBFs.

	AFHW	JBC	PLP	WR	WRTC
Ecological setting	Northwestern mixed conifer forests to California mixed conifer to oak savanna	Southwestern ponderosa pine forests	Western conifer forests; piñon-juniper woodlands; sagebrush-grassland rangelands	Western conifer forests; riparian habitat; Palouse prairie rangelands	California mixed conifer forests, with some Ponderosa pine, oak savannas & early successional shrublands
Ecological threats	Invasive non-native species, altered fire regimes, degradation	Altered fire regimes, poor logging practices	Altered fire regimes, non-native invasive species, habitat loss and fragmentation, erosion	Altered fire & flood regimes, non-native invasive species, habitat loss and degradation, fragmentation.	Habitat degradation, altered fire regimes, history of poor logging practices
Ecological goals	● Reduce risk of catastrophic fire ● Restore the link between livelihoods and the forest ● Resource (mushroom, basket material) protection ● Reduce herbicide use	● Achieve historic ponderosa pine forest structure and function through restoration rather than "standard" fuel reduction ● Create wildlife habitat	● Enhance and maintain diverse, healthy & viable environments ● Restore the link between livelihoods and the land	● Understand and maintain natural variation ● Address causes as well as symptoms of degradation ● Use adaptive mgt ● Restore the link between livelihoods and the forest	● Reduce risk of catastrophic fire ● Wildlife habitat enhancement ● Restore the link between livelihoods and the forest ● Use adaptive mgt
Social setting	Culturally diverse, underserved community. Distrust among harvester groups and between harvesters and agencies. Invisible and undervalued workers.	Low socio-economic levels, job loss due to loss of timber on federal lands and mine closures. Anglo, Hispano, Mexican-American and Native American.	Rapid demographic change and growth, with increase in retirees, amenity residents, tourism & exurban development. Decline in economic viability of land-based livelihoods. Growing Hispanic population.	Community in transition due to changing forest policy, timber industry restructuring and demographic change. Increasing poverty. Declining institutional capacity. Primarily Anglo	Community in transition due to changing forest policy, timber industry restructuring, and demographic change. Increasing poverty. Cultural conflict over land and resource use. Declining institutional capacity. Primarily Anglo
Social Goals	●Social justice ● Pay scale that acknowledges skill and work ● Training.	●Build trust and support from environmental organizations and USFS for forest restoration prescriptions ●Create jobs from small diameter wood utilization ●Reduce conflict	● Facilitate constructive dialogue about public land management ● Participate in public land management decision making ● Increase awareness of interdependence of local economies & landscapes ● Increase civic engagement and social learning	●Build trust and support in community and USFS for forest restoration prescriptions. ●Build trust and reduce conflict about management. ●Training, education and outreach. ●Build contractor capacity and create jobs ●Civic science and social learning.	●Address conflict ● Build relationships among organizations & agencies ●Build contractor capacity ● Support traditional resource-based economy ●Civic science & social learning

Table 2. Overview of the ecological assessment and monitoring projects of the 5 studied CBFs.

CBF Group	Monitoring/ Assessment Project	Type of Monitoring or Assessment	Monitoring objectives	What was learned?	How was the information used?
AFWH	Mushroom monitoring	Compliance monitoring Inventory	Educate harvesters, reduce social conflict, protect resource, document mushroom and picking locations	Information regarding best practices and resource values	Improved mushroom harvest practices. Altered timber sale design in response to mushroom and picking locations.
	Weed monitoring	Effectiveness monitoring	Determine if hand pulling is as effective as herbicide; promote alternative management (pulling)	AFWH felt that hand-pulling a viable option, not able to convince USFS	Report to FS regarding alternatives to spraying
JBC	Mill Site #1 & #2	Effectiveness monitoring Impact monitoring	Quantify thinning treatment on FS land and impacts on understory and soils	Desired basal area achieved using JBC methods; little change in understory or soils	Reports to USFS and CFRP; Used to design other thinning and monitoring projects.
PLP	Uncompaghre Plateau Project Watershed Assessment & Monitoring	Ecological assessment Effectiveness monitoring	Planning (assessment), learning and adaptive management (monitoring)	Roller-chopping treatments associated with increased cheatgrass instead of restored native community	Assessment used to design habitat restoration treatments; monitoring used to modify design of future treatments
	Burn Canyon Monitoring	Effectiveness monitoring	Learn about salvage logging effects; involve and teach public about logging; reconnect people with land	Little difference between logged and unlogged plots. Cheatgrass more abundant in logged areas.	May inform design of future monitoring projects. May influence treatment of invasive plants

WR	Upper Joseph Creek Watershed Assessment	Ecological assessment	Understand system, identify project priorities, establish a collaborative planning process for the community	Lessons learned both about ecosystem conditions and function, and about the process of collaboration	Used to prioritize projects for funding & implementation
	Aspen & Landbird Habitat Monitoring	Effectiveness monitoring	Build trust and credibility; identify best restoration methods	Fencing to exclude herbivores works, wildlife exclusion most effective, some fences harm birds	Demonstration led to increased landowner participation
	Haypen Project	Effectiveness monitoring	Determine if stand improvement objectives were met; political accountability & trust-building	Stand could have been subjective to more harvest. Good for building trust, but ground vegetation did not benefit as much as it could have	Learning influenced subsequent work on Upper Joseph Creek Assessment
	Buck Stewardship Project	Compliance and effectiveness monitoring	Minimize soil compaction and determine if objectives met	Soil compaction was lower on logged sites (no negative impacts of logging)	Results reassured environmentalists that thinning did not harm soils
	Wallowa Lake WUI Project	Compliance monitoring Impact monitoring	Build local contractor capacity and monitoring workforce; reduce fuel loads in a socially acceptable manner	Fuel reduction techniques; visual acceptability of thinning project	Built contracting capacity; public education regarding aesthetics of fuel reduction; need to widen buffer to avoid effects from fires higher on mountain
	Weed Monitoring	Weed inventory Effectiveness monitoring Research	Track weed infestations, treatment demonstrations, learn if treatments work	Effectiveness of different herbicide types, application timing and rates; Effectiveness of bug releases	Recommendations to citizens and agencies on herbicide use and biocontrol. Determine when new bug release needed.

	Lynx Survey	Inventory	Determine if lynx are present in area; training and jobs for local people	No lynx found	Information used by the USFS in project planning and analysis.
	Eagle Survey	Inventory	Track local population trends and habitat use; Build local monitoring capacity; build relationships with ODFG	Population status and habitat use	ODFG Reports
	Grouse Survey	Inventory	Track local population trends and habitat use; Build local monitoring capacity; build relationships with ODFG	Population status and habitat use	ODFG Reports
WRTC	Stewardship Training Team Inventories	Inventory and assessment of species and habitats	Various, depending on agency objectives	Status and location of target species and habitats	Pre-NEPA planning and project design by agencies and WRTC
	Chopsticks Monitoring	Effectiveness monitoring	Assess impacts of thinning and slash treatments, especially on soils	Piling and burning slash causes more damage to soils than other treatments or yarder	Used in design of subsequent thinning projects s
	NTFP Assessment and Harvest Research	Inventory and research	Identify location and quantity of NTFPs, assess impacts of harvest	Broader location and abundance, and fewer harvest impacts on medicinal plants than expected	Provided information to harvesters and Forest Service
	Post Mountain Stewardship Collaborative Monitoring	Effectiveness monitoring	Address multiparty concerns about impacts of thinning treatments	Monitoring system informed planning and challenged assumptions	Too soon to tell (Project still in progress)

Table 3. Type of community involvement in each stage of ecological monitoring and assessment in projects conducted by 5 Community-based Forestry organizations (CBF).

CBF Group	Monitoring/ Assessment Project	Who is involved in each stage of assessment or monitoring?					
		Objective-setting	**Design**	**Data Collection**	**Analysis**	**Interpretation**	**Communication**
AFWH	Mushroom monitoring	Community (mushroom pickers)	Community	Community	No formal analysis	Community	Community (Verbal reports to USFS; monitoring notebook shared among pickers)
	Weed monitoring	Community (NTFP harvesters)	Community	Community	No formal analysis	Community	Community
JBC	Mill Site #1 & #2, forest thinning/restoration projects	Multiparty (USFS, environmentalist, logger)	Consultant & Multiparty	Consultant & Community (youth crew; high school class)	Consultant	Consultant & Multiparty	Multiparty (Written report within CBF; reports to CFRP)
PLP	UP Project Watershed Assessment & Monitoring	Multiparty & community	Multiparty & community	Agency	Agency	Multiparty & community	Multiparty & community (symposia, meetings, learning days)
	Burn Canyon Monitoring (post-fire salvage logging)	Multiparty & community	Multiparty & community Consultant	Community (volunteer environmentalist)	Consultant (university researcher)	Multiparty & community	Multiparty & community (meetings, field trips, workshops)

WR	Upper Joseph Creek Watershed Assessment	Multiparty & community (many agencies, interest groups, tribes & landowners)	Multiparty & community	Multiparty & community	Multiparty & community Agency University	Multiparty & community	Multiparty & community
	Aspen & Landbird Habitat Monitoring	Multiparty (agency, consultant & CBF)	Consultant CBF	Consultant & Community (Local field technicians)	Consultant	Multiparty & Community (consultant, agency, CBF community)	CBF & Community (Yearly site visits, newsletter)
	Haypen Project	Multiparty & community (agencies, interest groups, CBF, citizens)	Multiparty & community	Multiparty & community	No formal analysis yet	Multiparty & community	Multiparty & community (Field tours, newsletter, website)
	Buck Stewardship Project	Multiparty (agencies, interest groups, CBF)	Multiparty	Consultant	Consultant	Multiparty	Multiparty
	Wallowa Lake WUI	Multiparty & community	Multiparty & community	Agency & CBF	Agency & CBF	Agency & CBF	Agency & CBF
	Weed Monitoring	CBF staff & consultant	CBF staff & consultant	CBF staff	CBF staff	CBF Staff & Multiparty	Multiparty
	Lynx Survey	Agency	Agency	Community (local contractors w/ USFS oversight)	Agency	Agency	CBF—newsletter Community—informally Agency—formal reports
	Eagle Survey	Agency	Agency	Community (local contractor)	Agency	Agency	CBF newsletters Agency reports
	Grouse Survey	Agency	Agency	Community (high school students)	Agency	Agency	CBF newsletters Agency reports

WRTC	Stewardship Training Team Inventories	Agency	Agency	Community (local trainees)	Agency	Agency	Community-informally
	Chopsticks Monitoring	CBF staff & Researcher	CBF staff & Researcher	Community & Researcher	Researcher	Researcher & CBF staff	CBF staff Community—informally Formal report
	NTFP Assessment and Harvest Research	Researcher & Community (harvesters)	Researcher & Community	Researcher & Community	Researcher	Researcher & CBF staff	Researcher--PNW GTR
	Post Mountain Stewardship Collaborative Monitoring	Multiparty & Community (agencies, CBF, interest groups, citizens)	Multiparty & Community	Multiparty & Community	Project still in progress	Planned Multiparty & Community	Planned Multiparty & Community

Appendix H: Integrating Ecological Knowledge in Community-Based Forestry: Lessons from Seven Organizations in the USA

November 28, 2006

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ABSTRACT

Land management decisions are often based on incomplete knowledge due to both a lack of scientific research, monitoring and assessment, and the failure to draw on local ecological knowledge (LEK). This paper investigates the use and integration of local knowledge and conventional science in the ecological stewardship and monitoring activities of 7 Ford Foundation-funded Community-based Forestry (CBF) Demonstration Projects. We found that all the CBF groups incorporated LEK into some aspect of their management or monitoring activities, and that all groups also used conventional science to design or conduct ecological assessments, monitoring or research to inform their management. Four strategies used by CBF groups were the most consistently successful in integrating local knowledge and conventional science: 1) field tours, 2) establishing focused monitoring task forces or sub-committees, 3) training local people in scientific methods, and 4) hiring scientists with interdisciplinary training. These findings suggest that community-based forestry organizations are committed to monitoring as a way to learn and improve management, and use both science and local knowledge in this process, with the effect of redistributing power through the use of different knowledge sources. Still, tribes and some other groups have not been significantly involved in monitoring and management decisions, and their knowledge has not yet been consistently incorporated. CBF groups' capacity to use science effectively was enhanced by partnerships with scientists that helped build the internal science capacity and the scientific literacy of the community. Field tours and other joint hands-on-the-land activities, while not considered formal monitoring, were effective ways to encourage interaction among holders of different kinds of knowledge (scientists, locals and managers), and foster integration of LEK and conventional science.

INTRODUCTION

Community forestry and other local approaches to natural resource management in the United States have become increasingly popular as the need to balance environmental, social and economic goals becomes ever more pressing (Wondolleck and Yaffee 2000; Gray, Enzer et al. 2001; Baker and Kusel 2003). As one of a variety of approaches to land management that emphasizes public participation, community-based forestry is under scrutiny with respect to how participation occurs in U.S. contexts and where successful models can be found. While discussions of public participation often refer to decision-making in land management, local people can also participate in gathering ecological information that informs the management, via monitoring, research and other stewardship activities. In this paper, we examine the ways community-based forestry organizations (CBFs) use and integrate local ecological knowledge and

conventional scientific knowledge to conduct their forest management and monitoring activities. CBF groups not only work to improve forest management practices and learn about their ecosystem, but also strive for social justice and more equitable access to natural resource decision-making. One of the primary characteristics of the community forestry approach that distinguishes it from more centralized, government-driven management is that people local to the resource participate directly or have a voice in stewardship activities. Hence, the work of CBFs provides an opportunity to examine the widely discussed premise that local and conventional scientific knowledge can be integrated to inform and conduct sustainable forest management (Gadgil, Berkes et al. 1993; Folke, Berkes et al. 1998; Sillitoe 1998; Berkes, Colding et al. 2000; Pierotti and Wildcat 2000; Turner, Ignace et al. 2000). Finally, because land managers in the United States are increasingly asked to include "local stakeholders" and "public participation" in natural resource management and scientific research, it is important to understand the ways in which this stakeholder participation plays out on the ground in the form of strategies to integrate local knowledge and conventional science.

Forest management is increasingly touted as relying heavily on science: scientific principles, scientific methods, and scientific research (Kohm and Franklin 1997); typically large forestry institutions like the U.S. Forest Service, state forest agencies and universities place a higher value on scientific and technical expertise over the knowledge and experiences of local people. Hence, local people without formal scientific training who live in forest-dependent communities are often not only excluded from policy arenas, but also from the scientific research and knowledge production that shape resource policy, management, and access. However, people who have lived in the forest all of their lives, or who depend on the forest for their livelihood, have extensive ecological knowledge of the resource and may be precisely the people most experienced and equipped to inform forest management, monitoring and research. For the purposes of this paper, local ecological knowledge refers to local expertise of peoples that may not have a very long-term relationship with the local environment (in comparison to indigenous peoples), but nevertheless have local wisdom, experience, and practices adapted to local ecosystems (Berkes and Folke 1998; Olsson and Folke 2001). In contrast, conventional scientific knowledge refers to science based on the traditions of Newtonian science and the expertise of government resource managers (Berkes, Colding et al. 2000).

Several recent case studies have examined the integration of local knowledge and conventional science (Moller, Berkes et al. 2004; Wilson, Raakjaer et al. 2006), but have focused on the tropics and/or in fisheries science and management (Mackinson 2001). Although few studies have been in forested ecosystems(Klooster 2002), forest-dependent communities in the United States offer a unique context in which to examine the interaction between local knowledge and conventional science. Further, few published studies examine the evidence of and strategies for integrating knowledge across multiple cases. Based on the existing literature and our preliminary findings, we posed several initial propositions about the integration of different types of knowledge in community-based forestry:

1. Use and application - CBF management and monitoring uses more diverse knowledge sources.

2. Evidence of integration - CBF management and monitoring integrates different knowledge sources more successfully.
3. Practices and strategies of integration - CBFs employs specific practices to accomplish the integration of conventional and local ecological knowledge.

In this paper we first situate the discussion in the broader context of local and traditional knowledge in natural resource and adaptive management literature. We also focus on the theoretical background and empirical studies of combining local ecological knowledge (LEK) and conventional science (CS). We then present our findings regarding local knowledge and conventional science use in stewardship activities of CBF groups, including strategies utilized by CBF groups integrating LEK and CS. Finally, we discuss the implications of our findings for community forestry specifically and civic science more broadly.

BACKGROUND

In the United States, land managers are increasingly asked to include "local stakeholders" and "public participation" in natural resource management and scientific research as part of the goals of adaptive management (McLain and Lee 1996; Shindler and Cheek 1999; Berkes, Colding et al. 2000), community forestry (Baker and Kusel 2003) and civil or civic science (Shannon and Antypas 1996; Borchers and Kusel 2003). This is not only because inclusion might increase public "buy-in" for management decisions on public land. It is also because natural resource managers and scientists increasingly value the ecological, biodiversity and resource management knowledge of indigenous and local communities (McLain and Lee 1996; Berkes and Folke 1998; Shindler and Cheek 1999; Berkes, Colding et al. 2000; Huntington 2000; Klooster 2002; Ticktin and Johns 2002). Despite the widespread interest in including local resource users, there are few studies that attempt to tease apart questions about <u>how</u> to integrate this local knowledge with conventional or "Western" scientific knowledge to improve resource management. The emerging fields of civic science, community science and interdependent science have only begun to be tested and implemented on the ground.

For years many scholars have suggested that using only conventional, or "Western" science approaches to renewable natural resource management has not been successful, and in fact may exacerbate resource degradation problems rather than solve them (McCay and Acheson 1987; Ludwig, Hilborn et al. 1993; Gunderson, Holling et al. 1995; Holling, Berkes et al. 1998). An alternative paradigm proposed for natural resource management and the science that informs it is based on the premise that integrating traditional, indigenous and local ecological knowledge with conventional scientific knowledge will better achieve sustainable natural resource use and biodiversity conservation (Gadgil, Berkes et al. 1993; Folke, Berkes et al. 1998; Sillitoe 1998; Berkes, Colding et al. 2000; Pierotti and Wildcat 2000; Turner, Ignace et al. 2000). This paradigm shift stems in part from the shift in ecology toward conceptualizing ecological systems as uncertain and changes in ecosystems unpredictable, wherein goals of management are focused on a systems approach of adapting to feedback from the ecosystem, rather than command and control and maximum commercial yield (Holling 1978; Walters 1986; Lee 1993).

Though much of the work on traditional and local knowledge has been focused on its importance in informing resource management practices, this paper is more specifically focused on how local knowledge is and might be effectively integrated with conventional scientific knowledge for monitoring, inventory and research to inform management. Numerous studies document the vast indigenous and local knowledge of threatened wildlife, habitats and landscapes, and suggest ways this knowledge might aid conventional management and/or science (Jansson and Hammer 1999; Gasteyer and Flora 2000; Nabhan 2000; Usher 2000; Olsson and Folke 2001; Mallory, Gilchrist et al. 2003). Taking it a step further, several studies also illustrate the actual implementation of this proposed integration of local and conventional scientific knowledge, citing obstacles and challenges as well as ways that the local knowledge enhanced the research or management practices (Stevenson 1996; Calheiros, Seidl et al. 2000; Huntington 2000; Usher 2000; Mackinson 2001; Ticktin and Johns 2002; Davis and Wagner 2003; Pattengill-Semmens and Semmens 2003). However, very few researchers have analyzed the practices and strategies of integrating the two kinds of knowledge and make recommendations for future projects of this kind (Calheiros, Seidl et al. 2000; Huntington 2000; Mackinson 2001; Davis and Wagner 2003).

In many cases, the emphasis on scientific forestry means conventional science represents power, control and access to natural resources. In fact, to examine the ways in which local ecological knowledge (LEK) and conventional science (CS) interact, researchers have used different terms to describe the interaction: LEK is a "complement", "supplement", "enhancement" or "expansion" of CS (Gadgil, Berkes et al. 1993; Becker and Ostrom 1995; Johannes 1998; Berkes 1999; Scoones 1999; Colding and Folke 2001; Olsson and Folke 2001). These terms reflect the reality of the primacy and power that conventional science holds in natural resource management, but also relegate LEK to the role of a potentially unnecessary add-on or extension to the more important CS. In contrast, some authors propose that the interaction of LEK and CS is no less than an act of democratization of science. In this way, civic science is a restructuring of science towards public dialogue and participation rather than objectivity and trying to remain outside the system (Lee 1993; Shannon and Antypas 1996). Community science proposes an interaction of conventional and community-based scientific knowledge systems that are driven by community concerns rather than theory or basic research (Carr 2004). All of these fields of study might fall on a continuum that depends on the strength of the role of LEK and the origin and goals of the scientific questions being asked about a system. In our examination of community-based forestry stewardship activities, we began by documenting the ways that LEK and CS were each used or incorporated, including the implementation of projects as well as assessment and monitoring, to examine the roles they play independent of each other.

Notwithstanding issues of power, control over and access to scientific knowledge, many still believe that science, in all its forms, is at its core the pursuit of better accounts of the world (Haraway 1999). Interdependent science (a term first used by(Murphree 2004)) has been proposed as "a set of knowledge-producing practices intended to provide better accounts of the world through collaboration between conventional and civil scientists," which means new practices for the co-production of knowledge (Ballard and Fortmann in press). Understanding the ways the knowledge of local people and conventional scientists contribute independently to CBF activities will help us understand

how they then might become integrated with each other to create better forest management via broader information sources. Our premise with regards to knowledge integration, rather than simply a co-optation of local knowledge by scientists, is that "the whole is greater than the sum of its parts." Because conventional science and local ecological knowledge each may contribute different content and processes to forest management and monitoring, their integration represents a more comprehensive set of tools with which to manage resources. But what do these new practices look like? Community-based forestry (CBF) groups in the U.S. provide a context in which we can study these new practices of interdependent science.

Based on recent published studies examining the ways that local ecological knowledge and conventional science can be integrated (Castillo, Torees et al. 2005; Fernandez-Gimenez, Huntington et al. in press), we identified two primary indicators as evidence that these were integrated to some degree during the stewardship activities of the community-based forestry groups: 1) Discussion by local knowledge holders and conventional scientists of the value and usefulness of the alternate type of knowledge, and 2) concrete products (documents, projects implemented) that combine LEK and CS, and are used by both types of knowledge holders. With respect to the first indicator, Castillo et al (2005) tracked the interaction of rural producers in a community group in Central Mexico and ecological scientists from the National Autonomous University of Mexico (UNAM). Interviews showed that the ecological scientists did not value the relevance of the traditional knowledge systems of the producers, and consequently the knowledge, particularly of ecosystems, stayed only with the oldest farmers. Hence, though projects benefited the community and scientists, local knowledge was not effectively integrated with the conventional science that informed the projects. Fernandez-Gimenez et al (in press) similarly analyzed interviews with both conventional scientists and local people to examine their values and integration of multiple types of knowledge for natural resource management and research. In that case, however, they found numerous instances when researchers described the value and relevance of the traditional ecological knowledge of the Beluga whale hunters, and vise versa. Hence, we chose to examine the ways local people and conventional scientists discussed the use and value of diverse knowledge systems, in addition to concrete products, as an indicator of the integration of LEK and conventional science in the work of the CBF groups.

Few studies that explore the integration of local ecological knowledge and conventional science include specific on-the-ground practices that are being used by a variety of organizations. (Charnley, Fischer et al. (In press) offer recommendations of factors to consider, such as trust-building between parties, understanding communication styles of knowledge holders and identifying mutual benefits of knowledge sharing. Additionally, several studies draw from one group or organization's experiences (Wilson, Raakjaer et al. 2006; Fernandez-Gimenez, Huntington et al. in press). Hence, we set out to document and analyze the on-the-ground practices and strategies of community-based forestry groups to isolate those that seem to have facilitated knowledge integration. Particularly, Wilson et al (2006) set out to identify indicators of ecosystem health from both fishers and scientists, imagining that an untapped "common ground" would be revealed. What they found instead is that "common ground is not found, it is negotiated", and that for the LEK of resources users to truly make an effective contribution to management, it must be part of "comprehensive studies involving ongoing interactions

between resource users, scientists, and other stakeholders"(Wilson, Raakjaer et al. 2006). With this in mind, we examined the experiences of the CBF groups to see if and when there were examples of "ongoing interactions" between the local (resource users) and scientists. These would potentially reveal not only evidence of integrating knowledge, but also the strategies that CBF groups use to increase interactions of scientists and locals.

METHODS

Sampling Frame and Study Sites

The Ford Community-Forestry Demonstration project funded 13 CBF organizations for 5 years beginning in 1999. In the last year of the program (2004), we were invited to develop a research program based on the experiences of the 13 demonstration projects. One theme of this research program was the role of CBF organizations in ecological stewardship. Within the broader theme of stewardship, we focused on ecological assessment and monitoring, since assessment is a key element in natural resource planning and monitoring is essential to measuring short and long-term environmental outcomes. Due to the short duration of the Ford program, and the diversity of funded groups and their environmental settings, we did not attempt to measure or make inferences about direct ecological impacts.

We purposively selected 7 of the 13 funded groups for study based on each group's interest and willingness to participate in the research, and its involvement in on-the-ground ecological stewardship, assessment and monitoring activities. Five of the participating groups were located in the western USA and worked on public lands exclusively or on a mix of public and private lands. Two of the participating groups worked primarily with private landowners, one in the southeast region and one in the northeast region of the USA. The participating groups were:

- The Alliance of Forest Workers and Harvesters (AFWH), Medford, Oregon
- The Federation of Southern Cooperatives Forest Legacy Program (FSC), Epps, Alabama
- The Jobs and Biodiversity Coalition (JBC), Silver City, New Mexico
- The Public Lands Partnership (PLP), Delta, Colorado
- Wallowa Resources (WR), Joseph, Oregon
- The Watershed Research and Training Center (WRTC), Hayfork, California
- Vermont Family Forests (VFF), Vermont

Table 1 provides a summary of each group's social and ecological setting, the ecological threats to the system, and the group's primary social and ecological objectives related to forest and rangeland stewardship.

Our research team used a modified participatory research approach, in that all of the 13 demonstration projects contributed to identifying key research questions, and provided input and feedback on the research at key points throughout the process. On several occasions this input took place at meetings or workshops where the research team met directly with representatives of all the CBF demonstration projects. Following the conclusion of the majority of data collection and preliminary analysis, we convened a 3-day "ground-truthing" workshop, during which CBF organizations helped to validate and

participated in the interpretation of our results. Drafts of all final research publications were also circulated to the study CBFs for their comments.

Data Collection and Analysis

We collected data on the ecological stewardship, assessment, and monitoring activities of each group using a combination of on-site interviews and participant observation, telephone interviews, and document review. We visited each group for a minimum of 3-5 days of interviews and field tours. Initial interviews were with CBF staff, agency partners, community participants, and other potentially affected or involved organizations or individuals (e.g. environmental groups, industry representatives). We made additional multiple site visits to 3 of the study groups (AFWH, PLP, WRTC) as participant observers in monitoring or related stewardship activities in order to observe interactions among participants in these projects. After completing our initial analyses, we conducted additional interviews to seek potentially contradictory evidence and substantiate or reject our initial findings. In all, we conducted formal interviews with 67 individuals in the 7 groups. Documents reviewed included project proposals, internal reports and reports to the Ford Foundation; ecological assessment and monitoring project protocols, interim and final reports, and meeting minutes; public presentations by CBF organizations about their stewardship and monitoring projects (i.e. powerpoint slides and digital files from workshops); and existing case studies and published literature on the study organizations.

Formal interviews were audiorecorded, transcribed and coded using QSR N*VIVO software. Codes addressed descriptive research questions (e.g. CBF ecological stewardship objectives, strategies and outcomes), and evidence related to our propositions (e.g. use and integration of local ecological knowledge and conventional science in community-based forestry). The resulting coding reports were synthesized within and across CBF organizations to assess the evidence in relation to our propositions and identify emergent themes in the data.

The community-based forestry organizations that were part of this study all had the ecological goal of improved local forest health and sustainability. Hence, we were particularly interested in the ways that both LEK and CS were used by these organizations to conduct forest management and monitoring activities aimed at improving forest health. We first described the ways in which the CBF groups have intentionally sought out and incorporated local ecological knowledge and knowledge holders, as well as conventional science and scientists, in their stewardship activities. We then examined the evidence that CBF groups are integrating multiple types of knowledge in their activities, specifically examining participants' perspectives on use and relevance of diverse knowledge types as well as products that represent an interdependent combination of local ecological knowledge and conventional science. Finally, we evaluated the strategies and practices CBF groups used to combine conventional science and local ecological knowledge to improve forest management.

RESULTS

Use of Local Ecological Knowledge by CBF Groups

Amongst the 7 CBF groups studied, we identified 24 projects specifically focused on ecological stewardship. This included all of the stages of the stewardship process, through scoping, assessment and planning, implementation of management, and monitoring and evaluation. We found that local people (such as non-timber forest product harvesters, ranchers, loggers, Native American tribes, and other long-time resource users, as well as other local residents) were involved in some way in all of the 24 projects studied, and that the local ecological knowledge held by these community members contributed in some way to the project outcome or products (Table 2). The way local knowledge holders were involved, however, varied across projects, and influenced how their knowledge was incorporated into the stewardship or monitoring project. In 6 of the 24 projects, local people were involved only in data collection during assessment or monitoring projects, following protocols they did not help design (Table 2). In 5 of the 24 projects, the primary source of local knowledge for the project was the CBF group's staff members, which potentially represent a very small and self-selected group of locals. However, the remaining 13 of the 24 projects included a combination of local people collecting data, large contributions from CBF staff, and/or explicit and direct involvement of local people in the planning, assessment and interpretation of monitoring results of their stewardship projects (Table 2). These 13 projects exhibited most clearly the explicit use of local ecological knowledge through the participation of a variety of knowledge holders in the community. Three of these projects included documenting local ecological knowledge as a primary focus of the project (Table 2). Finally, 6 of the 24 projects sought out participants or representatives from local Native American tribes and attempted to incorporate traditional ecological knowledge (TEK) into the project.

Several CBFs conducted formal local or traditional knowledge documentation studies that might or might not lead to land management activities, depending on the goals of the group. For example, Public Lands Partnership (PLP) documented a "living history" (or oral history) project, primarily of ranchers' experiences with land management and the local ecosystem in the Uncompaghre Plateau area of Colorado. The Federation of Southern Cooperatives Forest Legacy Program (FSC) conducted a study in their region by interviewing local African-American residents in southern Alabama about useful medicinal and edible plants in their area. Philosophically, FSC started with the assumption that landowners are attached to their land and have a feel for when it is healthy. They conducted extensive outreach and education for landowners, but they always began with the ecological knowledge landowners already have about their land. An FSC staffer explained, *"People are familiar with things, they know how to survive and make money doing those things. (We just) have to add a little bit more into that."* The non-timber forest product (NTFP) inventory that the Watershed Research and Training Center conducted was also a means of formally documenting the local ecological knowledge of the medicinal plant harvesters in the region. While it was coordinated by a conventional scientist from a nearby university, the scientist described it as a very participatory process in which people who knew the plants and their ecology were very involved in locating and assessing the extent of the species in the region. While not necessarily incorporated directly into management by the CBF groups or agencies, these documentation studies of LEK and TEK often served to bring resource users and residents into the conversation about forest stewardship in ways that other mechanisms, such as scoping meetings, did not.

The Watershed Research and Training Center (WRTC) in Northern California has had a progressive series of projects that evolved over time to increasingly involve local people in more intensive ways in stewardship projects. In the early years of the Ford Foundation funding of their programs, the WRTC established the Ecosystem Management Training program. These program involved teams of local residents and former loggers and mill workers who were trained to conduct biological surveys and inventories for the Bureau of Land Management, the U.S.D.A. Forest Service, and other agencies in the region. Their local knowledge of the landscape and habitats enhanced their ability to conduct the inventories, however, they were required to follow agency data collection protocols, and were not involved in the analysis of the data. Hence, it was unclear as to whether their particular local ecological knowledge was incorporated into the final reports of those projects. However, these trainees were among the first in the northern California community to suggest fire was a driver in the ecosystem. As one WRTC staff person described, "*These loggers came back…and said, oh my gosh, fire is the driver in this ecosystem, there is too much s__t on the ground, you have to help us figure out how we are going to reduce this vegetation…That's when we started doing small diameter, small log utilization…"* It was not long after that the WRTC staff began developing their fuel reduction stand prescriptions for areas such as the "Chopsticks" project. The staff, who were all local residents, retired Forest Service staff and former loggers, not only developed the stand prescriptions that were eventually implemented, but also conducted the "before and after" monitoring of the projects that allowed the group to determine the relatively minimal effects their treatment had on the forest topsoil. Years later, as WRTC began a new collaborative stewardship project in the nearby mixed residential and National Forest area called Post Mountain, they started by holding meetings with the local residents and the U.S. Forest Service to incorporate local knowledge of fire history and patterns before fuels treatments were even discussed. At the time of writing, the Post Mountain Stewardship Collaborative had developed and had stand prescriptions approved by the Forest Service to be implemented on National Forest and private lands. Local residents were involved in the monitoring of these areas. This effort to involve the local residents during the Post Mountain project and to explicitly incorporate their knowledge in every phase of the stewardship process illustrates the commitment of community-based forestry groups to the use of local ecological knowledge.

Wallowa Resources in Eastern Oregon had a similar array of projects that included local people at various stages of the stewardship process and represented increasing participation and hence use of local knowledge in the projects. Local contractors conducted several sensitive species surveys (lynx, eagle and grouse species) facilitated by Wallowa Resources on federal lands. WR staff expressed that it was essential and important that these surveys were conducted by local contractors and not by contractors from outside the region, for economic reasons as well as for the local knowledge they held. The local contractors' knowledge of the landscape proved invaluable for conducting the surveys in an efficient manner. Other projects facilitated by WR, however, primarily relied on the local knowledge of their own staff, such as the Buck Stewardship Project and the Lake Wallowa WUI project, and so it is unclear as to how extensively local knowledge was incorporated into the project. Subsequently, Wallowa Resources facilitated a 174,000 acre watershed assessment in which they

explicitly sought out people with local expertise and experience with particular resources during the entire project. They specifically targeted the design and analysis phases of this Upper Joseph Creek Watershed Assessment (UJCWA), in which they created sub-teams for each type of resource being assessed, such as range, forest and riparian areas, and made sure at least one person with local knowledge was on each sub-team. The whole project involved over 70 local people and agency personnel, with 30 working intensively on the sub-teams. One WR staffer explained, *"We tried to get at least one person with intimate knowledge of wherever we were. For example…another gentleman has run cows out there for a long time, and he was part of the range group (for the UJCWA), too. So while not a professional, a range professional, we sought him out for his knowledge of the ground."* Wallowa Resources staff characterized this as a key component of the project, as the local ranchers and other resource users provided an important "ground-truthing" function when it was time to interpret the ecological data.

The Public Lands Partnership (PLP) in Colorado often served as a conduit for voicing the concerns, values and knowledge of resource users to agencies in a forum where these voices are less easily ignored than they might otherwise be. PLP held dozens of meetings and workshops to bring together interested stakeholders from within and outside the community, as well as federal agency personnel, to discuss the ecosystem health and management of two areas, the Uncompaghre Plateau and Burn Canyon. For example, the ecosystem "mosaic" model used to guide the Uncompaghre Plateau forest management project was largely science-driven, but it was developed in part through a series of workshops and discussions that included community members and PLP staff. Involving local people not only in the planning and model development, PLP also emphasized the participation of local people in the interpretation of monitoring data in the Burn Canyon Project. Experiential and observational knowledge were used to interpret the monitoring results or to enrich overall understanding of the area. Grazing permittees observed an exotic species and loss of water and sediment after the fire, the effects of a grazing exclosure on mushroom abundance, and presence of wildlife in the salvage logging areas.

In a less formal assessment approach, the Alliance of Forest Workers and Harvesters (AFWH) provided mini-grants and technical support to an active group of mushroom harvesters in Oregon who conducted an informal assessment on productive commercial mushroom patches on the National Forest. Harvesters provided maps of the mushrooms' distributions that USFS personnel were not aware of, showing there were highly productive mushrooms areas slated for impending timber harvest. After extensive meetings and conversations, the harvesters used their resource assessment to convince the USFS to alter the location of their timber sales. As one AFWH member described, *"They (the mushroom harvesters) go out and they travel together and they, in an experiential anecdotal manner keep track of the level of disturbance that's going on…They are people who have a very deep instinctive knowledge that is only available to you in certain realms."* This is an example of how a CBF group facilitated the rare inclusion of local knowledge of a typically marginalized group of harvesters in management planning and implementation by the US Forest Service.

The Watershed Research and Training Center chose to sponsor a more formal inventory of non-timber forest products (NTFPs) in the Trinity-Shasta National Forest, but nevertheless explicitly involved local medicinal plant harvesters as invaluable sources

of local knowledge for the study, just as the AFWH did in their project. The harvesters working with the WRTC and a local university scientist collectively examined the extent and relative abundance of all useful species in the region, in several cases finding that the range of a species extended beyond the range documented by the Forest Service.

An important part of scoping and increasing public involvement for several CBF groups, and also often as part of a resource assessment project, was actively seeking involvement from Tribes or otherwise incorporating indigenous knowledge in some way. AFWH, PLP, WRTC and WR all often included invitations from CBF groups to Tribal representatives to scoping meetings related to proposed management activities, or more informal discussions with Tribal resource users who might have an interest in the CBF group's activities. However, several groups were challenged by the differing time frame and decision-making processes for the Tribes they tried to work with, often finding that the group needed to proceed more quickly than the Tribes wanted to. This presented challenges in fully involving them in management and monitoring. For example, Public Lands Partnership invited the Northern Utes to participate in a Uncompaghre Plateau symposium on the Pinon-Juniper and Sagebrush system. As a U.S. Forest Service personnel pointed out, *"The whole idea of valuing traditional ecological knowledge not has improved currency over where it was previously. I don't know…where we are in terms of all that traditional knowledge, but I think that we are moving in that (positive) direction…I am frankly very pleased that PLP is making that effort and engaging [the Utes] because, once again, it is a question of capacity and I do not have a lot of extensive contacts."* In this way, the CBF group facilitated the involvement of Tribal representatives when the Forest Service might have faltered. While we were unable to interview Nez Perce Tribal member participants, a PLP participant noted that a particular issue for the group is, *"…how do we provide for support… the Tribes, to be able to keep them actively engaged. Of course they were all invited (to the meetings) and they did come and they were represented. They seemed to be pleased. I think they were…they see this as maybe an improved effort to engage them."*

Wallowa Resources also actively invited participation from the Nez Perce Tribe in the UJCW assessment, but WR staff reported that this was difficult and participation was inconsistent, though there was eventually involvement from the Tribe. WR also makes it a point to have Nez Perce Tribal members on their Board. In both of these cases, further investigation is certainly needed to learn how participating Tribal members viewed the projects the CBF groups facilitated. However, a WR staff member pointed out that CBF groups walk a fine line in their work with the tribes and attempting to incorporate traditional ecological knowledge, because *"in a collaborative process the collaboration that occurs, no matter who's involved, does not legally and should not replace the need for direct government to government consultation, … I think, even among the tribe, I think there's a fear… that if they really turn all their cards over so every body can see them in a collaborative process, that they're then going to somehow reduce their level of power and authority as a sovereign to have consultation directly with the federal government. And so I try to highlight often in conversations that collaboration is just around this programmatic collaborative…piece, and that the need for the Forest Service to have government to government consultation with the county commissioners and with the tribe… is really important."* This observation may offer

some insight as to why the CBF groups working with government agencies and Native American tribes have had difficulty incorporating TEK into their projects.

It is important to note, however, that not all groups had difficulty in incorporating traditional ecological knowledge of local Tribes into their work. The Alliance of Forest Workers and Harvesters collaborates consistently with California Indian basket weavers and native plant gatherers in their Weed Project. In this project, forest workers, commercial non-timber forest product harvesters and Native American plant gatherers all have the common goal of promoting non-herbicide weed removal methods that slow the spread of noxious weeds but do not endanger the health of people who work in the forest.

Use of Conventional Science by CBF Groups

Of the 24 stewardship and monitoring projects conducted by the Community-Based Forestry groups, 22 involved scientists (consultants or from a university) or resource professionals (from federal, state or local government agencies) who were professionally trained to use conventional science and scientific methods in their work, and the projects used conventional science in some way. The two projects that did not include conventional science were oral history projects which specifically targeted the gathering of local knowledge and could not have included conventional scientists from outside the community. The way that conventional scientists were involved in the remaining 22 projects, again varied across projects and influenced how conventional science was incorporated into the stewardship or monitoring project. Fourteen of these projects involved conventional scientists training local people in standardized data collection methods, 11 involved scientists who were hired to design, conduct and/or analyzing the monitoring project, 8 involved scientists participating in multi-party monitoring sub-committees or teams, and 6 involved conventional science in the oversight by a government agency that determined the treatment or monitoring methods used.

In 14 of the projects, local residents received training in formal data collection methods and watershed assessment techniques in order to complete projects for agencies and/or in-house projects. For example, the Watershed Research and Training Center employed several of the local people who had been trained during the Ecosystem Management Training program to collect the data for the monitoring of the Chopsticks fuels treatment project. The WRTC has also enlisted a consulting forester and their own staff member to train at least 5 local residents of the Post Mountain area to collect forest overstory and understory data before and after the stand treatments for their Collaborative Stewardship project. Wallowa Resources used a scientist consultant to enhance the training of local contractors so they could conduct several different Threatened and Endangered species surveys of lynx, grouse, and eagle in the area. In an explicit example of a CBF group choosing to provide conventional scientific skills to their community members, the Alliance of Forest Workers and Harvesters sponsored training workshops for forest workers (who typically plant trees, prune and thin stands) conducted by a scientifically-trained CBF staff person to provide them with ecological field data collection skills. AFWH's goal was to improve workers' job skills to allow them to obtain work from natural resources agencies.

In the case of FSC, conventional science was used as a way to gain access to technical resources for landowners to help them manage their land better. As one FSC

staff described,*"Everyone does that (assessing and monitoring resources) in their head, but it's good to refresh those concepts in peoples' minds. 'This is what I was doing all the time.' Maybe the next step is to write it down, pay more attention to it. What we always talk to people about is, 'Do you have a management plan?' If you don't have a plan, you might have it in your head, but if you go to get help from NRCS (Natural Resource Conservation Service) if you don't have a plan, you won't get help. If you show a landowner a management plan they get so excited."* Through one-on-one outreach, peer-to-peer learning networks, and partnerships with state commissions and universities, FSC connected landowners to more formal ways of documenting their land ownership and management plans so they could be both better stewards of their land and realize some economic gains from it.

For the majority of the 13 projects that involved the CBF group hiring outside scientists to consult on some or all of a monitoring or research project, the primary role of the conventional scientist was to design a monitoring or research project using rigorous sampling design and methodology that would allow the CBF group to learn about the impacts of their management activities and would allow them to communicate these results to their partner organizations and critics. For example, WRTC hired a scientist from to design the monitoring and research protocols, train the local community members, and conduct and analyze the project for both the Chopsticks fuels treatment project and the non-timber forest products inventory and research projects. This scientist was actually on staff at WRTC for several years. Jobs and Biodiversity Coalition partnered with a scientist through the Collaborative Forest Restoration Program of the USDA Forest Service to design, train local students, and conduct the monitoring project for Mill Site #1, and similarly hired a scientist as a monitoring coordinator to repeat that process with Mill Site #2. In all of these cases, the scientist was hired by the CBF group to conduct the monitoring project, but was also always partnered with either staff from the CBF group or local community members. Importantly, the monitoring data allowed both CBF groups to compare their thinning approach to other management approaches used by the Forest Service or proposed by environmental organizations. Though this was not necessarily the initial goal for the CBF groups, the ability to "scale-up" their community-based management approaches as a model for other CBF groups is dependent in some ways on whether their information and methods can be used in and compared to other locations.

CBF groups also used partnerships with conventional scientists, either through hiring or volunteer work, to navigate the obstacles inherent in working with both private landowners and public agencies on the same project. For the Upper Joseph Creek Watershed Assessment, Wallowa Resources faced the issue of how to keep the data collected on private property confidential while simultaneously aggregating the information across the watershed. A university scientist working with the project pointed out, *"…as a professor, I could sign a confidentiality agreement through the university with those private landowners to utilize the data collectively, and as the PI I can legally code it confidential because I'm part of the research project. If I hadn't been part of the research project we'd have probably lost the data."* Similarly, WR faced significant skepticism from the federal agencies for which they coordinated several Threatened and Endangered species surveys to be conducted by local contractors. *"They were raising eyebrows at us that we were going to use local residents and therefore we were going to*

bias the results." So WR hired an outside expert to do quality control and check the local contractors to see if they were following the protocol. *"We trained 3 or 4 people from the community up at the Forest Service one fall and then they went out and did 8 different habitat blocks across the county. But because they were residents and because everybody was skeptical about the results we then had a wildlife biologist from University of Idaho… I told the local people we hired… He's gonna do quality control… He would just show up randomly. And he came back with just a glowing report about what an exceptional job everybody had done."* In this case, WR used conventional science to overcome skepticism and bureaucratic obstacles, but also combated a common concern that conventional science in the hands of local community members will produce biased results.

Some members of CBF groups saw conventional science as verifying and confirming what they already know is going on in the system or in response to their management treatments. For example, several JBC members saw the monitoring as measuring what they already knew to be the best approach to thinning in order to convince/demonstrate to the Forest Service. One JBC member commented, *"The monitoring is irrelevant to some extent…well, it's relevant to measure what we've done because right now it's basically an art. This is what we think should be done based on our experience. But what basal area and crown bulk density? So, we can compare it (our approach) to other approaches."* Similarly, one WRTC staff person suggested that years of observations on the ground would likely be validated by the conventional science findings: *"…rather than learning new things about this, it's more of an opportunity to test those theories and decide things around what you've already think you've learned and experienced from being in fires and watching trees. When you've watched the same trees and the ones you've planted and seen the effects of the '87 fires 20 years later the build-up of fuels, I think you have theories and those things just give you an idea and validate your assumptions."* In these examples, conventional science gave the CBF groups the tools to test their assumptions about the effects of their forest treatments, which could then potentially be compared to other treatments used in the same forest type.

Evidence of Knowledge Integration by CBF Groups

The CBF groups conducted 20 projects that involved both local people (residents, resources users, landowners, youth) and those trained in conventional science (public resource agency personnel, university scientists, consulting foresters). Participants and/or partners of all of the 7 CBF groups exhibited evidence of integration of local and conventional science, either via participant's statements regarding the value and usefulness of different knowledge types, or via concrete products such as reports, projects or other documents. The local knowledge holders expressed their appreciation for or use of the skills and knowledge of conventional science and scientists in learning about and managing forests. In addition, in several cases the conventional scientists expressed their appreciation for local people's ecological knowledge and the importance of incorporating this knowledge into forest management and science. Most importantly, in each project conventionally trained scientists and local people both described learning from each other, and learning about the processes that gave rise to their knowledge, whether it was

experience living in the same forest for 50 years, or studying journal articles related to fire frequency in the region.

Attitudes and values towards conventional science in CBF groups

Several participants in both of the projects conducted by the Public Lands Partnership described the ways the CBF projects increased local people's understanding of the scientific process and of the ecosystem of which they were a part. For example, during the Uncompaghre Plateau project, research conducted by a Colorado University PhD student changed understanding of fire dynamics in pinon-juniper on the plateau. These findings were controversial and some participants resisted believing them, but because of the collaborative process of repeated discussions, the community members eventually accepted them, resulting in a "paradigm shift" according to the Bureau of Land Management ecologist. *"What she (the PhD student) found didn't jive with everybody's belief of what was going on. There was some trouble digesting it, but we watched as people slowly came around to saying, 'Well, (her) research is showing this. It doesn't burn as frequently as we thought it did, you know?' And so there was a paradigm shift that came about as a result of that research that [the UP Project] funded, and people who were kind of unwilling eventually came around since it was all in forum and you know, it was discussion. It wasn't like you received the findings in a paper and read it in your office and kind of dismissed them. They were forced to acknowledge them and I think as a result that they've kind of changed their view of how that system is operating."* One PLP participant and observer felt that PLP community members learned a lot about science from participating in UP project field trips as well as discussions, leading to a better appreciation of the scientific basis for agency decisions, and for the complexity of ecosystems generally.

Wallowa Resources intentionally addressed the biases against conventional science that many of their community members had expressed when they first began working on ecosystem management and restoration projects. One WR staff member explained how overcoming this obstacle became a foundation of their approach to community –based forestry, *"…it really led to a new way of doing natural resource management. A way of engaging the local community, of connecting science. To a lot of people science had been our enemy, science and research had been our enemy because it had been treated as a god. And (it) lacked that connection with peoples' local connection with the ground. Blending science…that led to the basic values of Wallowa Resources."* An example of the way local people spoke of their relationship with conventional scientists was in the description of the collaboration with a local Forest Service research scientist by the WR local staff person coordinating their invasive species projects. He explained, "*They said they needed someone to look at invasive plants... that's a nice partnership. A lot of research is going into treatment methods….I helped design and implement the chemical end of her research. In her research, there are replicated plots, all the bells and whistles she needs to say something."* Because WR has emphasized the positive role that science can play in CBF, the WR staff person saw this as a mutually beneficial partnership with a scientist, rather than considering this research as an extraneous addition to his workload.

Conventional scientists' attitudes and values towards local ecological knowledge

Many of the conventional scientists involved with the CBF groups interviewed expressed an increased appreciation for the value of local knowledge in implementing and monitoring new land management practices, as well as for learning about the landscape through monitoring and assessment. For example, scientists working with the Watershed Research and Training Center, the Alliance of Forest Workers and Harvesters, Jobs and Biodiversity Coalition, and Wallowa Resources all commented in some way that the knowledge and experience of local people helped them create more "realistic" monitoring or research protocols that would be increase their applicability to projects on the ground, and that this was an important goal. For example, The Nature Conservancy scientist working with Wallowa Resources on their invasive species projects explained how the local WR staff person's methods of tracking weed abundance was more pragmatic and useful than what his conventional science protocols called for. "*You not only have to know how many acres you have, but the density of it, to have any meaningful knowledge. You can say you've got 1000 acres and there's only 10 plants vs. 1000 acres with 100% cover and to being able to measure both of those things and track those through time…no ones done it in a way that's meaningful at that scale. You would need a million transects. (The WR staff person) saying that this 50 acre site took 2 gallons of chemical, next year 1 gallon, the next year ½ - that's as good as any. Otherwise, it's just impossible."*

Similarly, one scientist working with WTRC had designed thorough and rigorous protocols for monitoring of the impacts of the Chopsticks project forest thinning treatment, however, some CBF staff suggested it had been more work and data collection than was necessary. Consequently, when asked if she'd have any recommendations for other CBF groups for setting up a monitoring project based on her experiences, she replied, *"Keep it simple. Keep it really simple. Photo points. Once a year revisit. Whatever makes sense so you can actually monitor what you're monitoring but don't try to have it be (too) scientifically credible."* In this case, again, the conventional scientist learned by working with local people about the delicate balance between scientific rigor and local applicability, and in the end valued the experience of the local people. She stated, *"I think you'd still be much better off doing the bottom-up, working with the community approach."*

Several people working with the CBF groups also described their sense that the local resource users they worked with contributed additional knowledge or experience to the project. For example, a scientist hired by the Jobs and Biodiversity Coalition to coordinate their monitoring program said, *"I know when I've gone out into the forest with (the local JBC staff), they see things that I don't see, you know what I mean?...they can just see stuff, it's not obvious to me… So I think they assess it when they are out there, and they might not even always say anything about it, but to them it's obvious."* Similarly, a partner working with the Alliance of Forest Workers and Harvesters commented during a discussion about the mushroom harvesters, *"…you build the ecosystem from the bottom up…the balance and health…rests on the backs of the people at the bottom, and they need to be given credit and honored for that…"* Finally, in describing the lessons learned from the collaborative processes during the Burn Canyon project, two different Public Lands Partnership members commented on the importance

of bringing scientists and local people together to learn from each other, explaining, *"This process is a valuable one to educate everybody in the community so that we start to work out our problems together,"* and, "*This stuff is not easy… This should be an engaged process of learning which means that if you do not agree, you have every right and frankly an obligation to tell people about it. Somehow I think it all comes out in the wash in the end. The truth kind of comes to the top…"*

Products that include both local knowledge and conventional science

In addition to the attitudes and discussion about local knowledge and conventional science in community-based forestry, five different CBF groups produced concrete products that integrated local ecological knowledge and conventional science. These took the form of final reports, a document detailing lessons learned, a documented "system model" for the local ecosystem, a General Technical Report published by the Forest Service, certification criteria for a regional forest certification system, and a mycological field guide photo notebook. While these forms may vary in the formality in which they were produced, their distribution to other parties, their generalizability or specificity, they were all produced jointly by local knowledge holders and scientists, and they have all been used by both local people and scientists to further their understanding of the ecosystem or improve forest management.

The Upper Joseph Creek Watershed Assessment facilitated by Wallowa Resources not only resulted in several reports on the condition of each resource type, but also a "lessons learned" document detailing recommendations by each resource sub-team of 3-4 people, each including a local resources user and a Forest Service technician or scientist. These recommendations focused on wildlife and resource uses such as grazing. Several Forest Service personnel interviewed described these as a useful "to do" list for the Forest, since resource users, environmentalists and Forest Service personnel participated in the Assessment and hence pre-empted most conflict. Another example of a formal document produced by a CBF group is the General Technical Report produced by the non-timber forest product inventory and research projects of the Watershed Research and Training Center. The "Guidelines for Non-Timber Forest Product Harvest in the Trinity-Shasta Bio-Region" were produced by a scientist hired to using a participatory approach to the inventory conducted by local medicinal plant harvesters. Harvesters were involved in every step of the inventory, including Native American input regarding certain plants whose location should not be revealed due to fear of over-exploitation. The Guidelines were published by the USFS, but we are not certain of the application or use of the guidelines by the Forest Service for management decisions.

Other less formal products also represented an integration of knowledge. A component of the mushroom monitoring project sponsored by the AFWH involved hiring a scientist consultant to train mushroom pickers in biophysical data collection and methods of taking photo points. These pickers then established the Illinois Valley Mushroom Monitoring Project, in which two mushroom harvesters set up plots and photo points and gathered quantitative data as well as compiled a notebook of local mushrooms to educate other harvesters and Forest Service personnel. This notebook has served as a vehicle for communication between the Forest Service managers and harvesters, combining the pickers' local knowledge with the technical data collection methods learned during the training.

Vermont Family Forests members and partners participated in the formulation of the regional forest certification criteria for the Forest Stewardship Council, an international organization that promotes ecological, social and economic sustainability in forest management (cite website). While small private forest landowners do not participate in the certification process as it is implemented across the region, many of VFF's forest landowner members did provide input into current criteria, along with scientists from VFFs partner organizations. Hence these criteria are a concrete product of both local knowledge of the small forest landowners and non-profit organization's scientists.

A conceptual product that resulted from the integration of knowledge for the Public Lands Partnership came in the form of the "mosaic model" generated during the Burn Canyon project meetings. One participant explained, "*…we were able to use the effort that we first started with, the landscape assessment…effort that we did for sitting down with all the experts, the local folks, ecologists, and fire folks, and silviculturists and academics, researchers, (and talked) about what we would predict the traditional HRV (Historical Range of Variation) to be for each of the plant community types on the Plateau."* Further discussion around this issue produce the model from which the PLP works in all their forest management recommendations, because it is the mutually agreed upon understanding of how the local ecosystem functions (as a shifting mosaic of vegetation types) that resulted from a variety of stakeholder opinions as well as local peoples' knowledge of the landscape and conventional scientists knowledge of the ecosystem type.

Strategies and Practices Used by CBFs to Integrate Knowledge

The community-based forestry groups studied used a combination of strategies to provide opportunities for local people, public land managers, extension professionals and/or professional researchers to learn from each other. We found many examples when CBF groups facilitated "ongoing interactions" between local knowledge holders and conventional scientists as described by Wilson et al (2006). These provided multiple occasions for people to be out on the land together discussing, making observations or collecting formal data about the ecology of a place and their values and concerns regarding it. Four strategies used by CBF groups were the most consistently reported as successful ways to facilitate the integration of local knowledge and conventional science: training local people in scientific field methods, monitoring task forces or sub-committees, conducting field tours, and hiring scientists who explicitly value local knowledge to conduct monitoring and research.

Training local people in scientific methods

Five of the 7 CBF groups studied implemented a training program of varying durations for local people to learn conventional science field data collection methods or scientific information. Of the twelve projects in which this training was a part, the way the training was carried out varied according to project goals. For many of the groups, the training program arose out of a need for information about the landscape that neither the agencies nor environmental organizations could provide. Local people, often those in need of a job, were trained in field data collection and then hired to collect data for a particular project. In some cases the project was a forest management treatment

implemented by the CBF group, and in other cases the projects were survey, inventory or monitoring projects on public lands for which the agency required data. In both types of projects, the degree to which different types of knowledge were integrated depended on the goals of the project. For some cases, the trainings and subsequent data collection allowed scientists and local people the time to interact specifically about a stewardship project in which they had some inherent interest, such as a fuels reduction treatment the group implemented. Conventional scientists and trained local people were involved in WRTC's Chopsticks Fuels Treatment project and monitoring, WR's Watershed Assessment, and JBC's Mill Site monitoring projects. For others, the trainings were solely meant to provide jobs for local people in data collection, and the agencies had no particular commitment to include local knowledge in the project. This seemed to have allowed for the integration of knowledge to varying degrees for the different projects. In the case of the data collection for agencies, for example, the Watershed Research and Training Center's Ecosystem Management Training crews conducted the inventories for various agency projects, such as surveys for slug species and threatened plant species, but there was little evidence that their previous ecological knowledge was included in the results. On the other hand, Wallowa Resources trained a crew to conduct endangered species (lynx) surveys for an agency which had previously ignored local people's claims that no lynx were in the area. A WR staff person says it was crucial that local people conducted the surveys and that their knowledge was included in the results, "*That was a huge emphasis in getting community people that were already out in the landscape involved in some capacity of monitoring, and then valuing the information they had in an annual meeting to share data. And share perceptions and trends or just gut perceptions of people doing the same kinds of work.*"

In other cases, the training program was also an outgrowth of the CBF group's goals of improving the livelihoods of their members. For the Alliance of Forest Workers and Harvesters, this took the form of providing conventional science data collection as a job skill. The Illinois Valley Mushroom Monitoring Project involved two mushroom harvesters were trained in biophysical monitoring and subsequently designed data collection, setting up plots and photo points. They gathered quantitative data as well as compiled a notebook of local mushrooms to educate other harvesters and FS personnel. While this may not be the kind of collaborative or multi-party monitoring usually associated with the concept of incorporating local knowledge, it is example of how CBFs groups used local ecological knowledge as a tool to gain access to forest management through the language of science. The Federation of Southern Cooperatives approach was to provide training in agroforestry techniques to landowners and in ways to access written resources to learn more about their own land. With many members without college educations, this training enabled them to communicate with forestry professionals and learn how to write their own management plans.

Establishing focused monitoring task forces or sub-committees

Three of the CBF groups conducted 8 projects that included the creation of a designated monitoring task force or sub-committee (PLP, WR and WRTC). These committees were made up of a variety of community members, environmental organization representatives, public lands agencies and in some cases tribal representatives. Again, by creating these committees, the CBF group facilitated the

integration of knowledge by fostering ongoing interactions between scientists and local knowledge holders, sometimes for years at a time. Wallowa Resources' UJC Watershed Assessment explicitly involved at least one local knowledge holder and one scientists for each sub-team in charge of a particular resource, "*We tried to structure it that way across all of the resource assessment. The tribe's involvement, we tried to get them involved several times. It was tough to get them here…The other thing that we tried to have on each group that I forgot to mention is we tried to get at least one Forest Service employ-agency person on each of the sub-teams…the inventory was part of it, knowledge of the ground was another part of it. It all blended together."* Another example of a situation created by a CBF group that resulted in integration of knowledge was during the Burn Canyon meetings facilitated by Public Lands Partnership. A conventional scientist asked for community members' observations about what wildlife species were present after a fire, *"One concern of the environmental community is the effects of timbering on wildlife. Any observations? What's the assessment of vegetation and wildlife?"* Several community members offered their observations, *"A bird that comes in after fire?" "…Lewis woodpecker. (We) need to look at the long range, not just right after the fire."* The scientists prompted, *"…I have heard anecdotal comments that deer and elk are moving up.* Other community members respond, "*We saw them moving through." "…Rattlesnakes have increased. And turkeys. And if rattlers have increased, there must be rodents. .."* These opportunities for groups of locals and scientists to talk concretely about their mutual observations provides a vehicle for creating knowledge about the ecosystem jointly, and also a way for people to appreciate the diverse types of knowledge in the group.

Field tours

Our findings revealed that one strategy all groups reported as highly effective in brining scientists and local people together, not as a specific project but as a component of all their projects, is facilitating field tours (also called field trips). All the CBF groups used field tours to bring multiple stakeholders out to locations of stewardship activity, to collectively observe and discuss the landscape and management activities. These field trips were usually to sites being considered for or under stewardship by the CBF group, such as a forest stand that was just thinned or a stream that had received a culvert. Many CBF staff described the constructive conversations and co-learning that occurred from the simple act of bringing people together on the land, rather than in a meeting room, to talk about the landscape about which they were all concerned. *"…that is a huge discussion for us. You have sort of a formal monitoring you can do that is data rich, but maybe inaccessible to the informal systems that are going to have to deal with it. We get in trouble for this a lot, we have fallen back on the informal monitoring systems, field tours, you do photo points, you go out and talk about it, you talk to the Forest Service people who know every square inch of this forest. That's an informal, anecdotal monitoring, but it gets into the fabric of your community and your culture and your society. The formal monitoring is data rich and is scientifically rigorous and a bunch of spreadsheet with a bunch of information in it, and it MAY go into some of the formal decision making process, but then how do you get that into the fabric of your society?"* While field tours do not fall under the category of monitoring, they facilitate knowledge integration in a way similar to more structured multi-party monitoring in that local

people, scientists, environmentalists and agency personnel share their observations and ideas about how the forest or range behaves. "*I think people who went away from those field trips felt pretty positive about what was going on. When they initially went they might have had some questions or doubts, so I think (in the end) they were useful community support."* The Federation of Southern Cooperatives in Alabama and Vermont Family Forests in Vermont used field tours to help private landowners network and learn about new management strategies from demonstration projects and each other.

Wallowa Resources, PLP, WR and JBC used field tours to demonstrate the outcomes of their management practices, including potentially controversial fuels reduction thinning treatments in forest stands, to environmental groups, government agencies and local community members. One PLP participant explained the questions they ask about the next steps for stewardship activities, "…*These 25 timber sales, how do need to process them. Do we need to go out and visit them? What are we trying to accomplish? Whether to do these timber sales? It's field trip, field trip, field trip field trip."* The Watershed Research and Training Center incorporated field tours into nearly every project examined; one scientist working closely with WRTC remarked, *"We did these trips; travel trips…and those two trips were amazing, both because of what we learned on the trips and because of the relationship building that went on there. So that after those trips someone who previously had seen the Forest Service as their enemy would feel comfortable calling up the District Ranger and asking about something... Anything you can do to make it more fun, visible – you could do a lot of ecological monitoring by simply having an annual field day to go out to a certain site and just check up on it."* It may be that because field tours often reach a broader cross-section of local and non-local people, they are an effective tool to encourage ecological knowledge integration and exchange. For example, the Alliance of Forest Workers and Harvesters' Mushroom project included bringing together harvesters and Forest Service personnel in the forest to talk about how timber management practices affected mushroom harvest areas.

Hiring scientists who explicitly value local knowledge

Four of the seven CBF groups (WRTC, JBC, WR and PLP) employed scientists who explicitly valued local knowledge or who had interdisciplinary training to coordinate assessment or monitoring projects. Whereas scientists had conducted research in many of the communities in the past and often disregarded local knowledge, scientists with interdisciplinary training hired by CBF groups integrated local knowledge as part of their projects. Staff at the Watershed Research and Training Center contrasted their approach to the example of researchers who studied the endangered red-legged frog in the region, *"What we've discovered is… when you have an ex-logger sitting at the bar and telling someone about the cool fisher tracking plates (they used), that gets into the community a lot faster than the scientists who have been here every year studying the red-legged frogs…no body in town knows anything about red-legged frogs."* The WRTC hired both scientists and former U.S. Forest Service personnel to conduct the Ecosystem Management Training program, the Chopsticks Fuels Treatment monitoring project, the NTFP Inventory and Research project, and the Post Mountain monitoring project. But these professional scientists were all either locals themselves or had done work in the past that illustrated their value of local knowledge, in this case such as working with NTFP

harvesters in developing countries. Jobs and Biodiversity specifically hired both non-local (Mill Site #1 project) and local (Mill Site #2 project) monitoring coordinators who were professionally-trained ecologists, and both these women were involved in community-oriented organizations that explicitly value local knowledge. In these cases and for the monitoring and research work conducted by PLP and WR, the CBF group had specifically hired a scientist either as a consultant or staff member to work toward the group's goals of social, economic and ecological sustainability, but often entirely on public lands. This is in contrast to the way research and monitoring are often conducted on public lands, in which scientists who may be from the relatively distant regional research station arrive to conduct research with no input or buy-in from local people or organizations. Making the integration of local knowledge with conventional science a priority led CBF groups to take matters into their own hands to gather ecological information by hiring their own scientists.

DISCUSSION

The ways in which CBF groups have sought out and incorporated LEK into their stewardship activities illuminates both the value that LEK has for the participants in these organizations, as well as the challenges CBF groups faced in attempting to include LEK in forest management and science. CBF groups faced the challenge of trying include the Tribes in an appropriate way that did not threaten an Indian nation's ability to negotiate with the U.S. federal government as a sovereign nation. They faced the challenge of convincing the Forest Service that data collected by trained local people should not automatically be suspect. All these obstacles influenced the ability of CBF groups to incorporate local knowledge into their stewardship and monitoring projects. One PLP Burn Canyon member mentioned the challenge of having permittees' knowledge on equal footing with the Forest Service, where the latter is the regulating agency. *"They have the experiential knowledge about the piece of property, that only they have. … The challenge is how do you get that to the table…how do you break that down and have meaningful communication."* The number and variety of projects that integrated local ecological knowledge and conventional science, however, indicate that community-based forestry groups may be particularly well-equipped to face these challenges.

Most notably, our findings illustrate the way that CBF groups can gain access to power and influence forest management and monitoring through the integration of LEK and science. For many CBF groups, integrating local ecological knowledge with conventional science is not an intellectual exercise, but an important vehicle to gain entry into the realm of science that has the power to influence management and policy. Castillo et al (2005) discuss how resource users can "use" ecology as a tool just as they use their own experiential knowledge. In this way, CBFs actually seemed to employ conventional science as a tool more often than we had expected. In many cases CBFs sought to empower participants with conventional science rather than seeking equal footing for local knowledge per se. Participating in and sometimes controlling ecological monitoring of a resource is not only about learning about the land for several groups, though that is also a major goal, but about getting a voice in the process. By hiring their own scientists, training local people in scientific methods, and exposing local people to conventional

science through field tours and monitoring committees, CBF groups helped locals learn the language, methodological framework, and concepts of conventional science. This helped them understand and communicate with scientists and agency managers in ways they could not have otherwise done. For example, in response to a new federal program on Forest botanical products that negatively affected independent harvesters of non-timber forest products (NTFPs) and was not based on any harvester input, the Alliance of Forest Workers and Harvesters not only provided legal assistance and legislative work on the policy, but also talked with the US Forest Service about having harvesters and other stakeholders included in monitoring and assessment of (NTFPs) on federal lands and in conversations about definitions and indicators of resource sustainability. As one member put it, "*They're a voice, they're a really important voice.*" The mushroom harvesters compiled a photo identification binder, documenting the mushrooms in the area that the Forest Service didn't know about. One AFWH member explained, *"they may not be perfectly identified but that's not the point. The empowerment that's going on, the ownership,…And the mushroom monitors are so excited about the pictures. Why are they so excited? I think it because they (the photos) spell ownership. There's something about this process that can be owned by ordinary people."*

Similarly, community members that worked with FSC pointed out the way that informally procuring conventional science knowledge allowed them to work with foresters on more equal footing, which allowed them to gain access to resources from the State that they wouldn't have had otherwise. Some of the innovative and successful landowners who were part of FSC sought training and independent learning, which they adapted to their local knowledge and implemented on their land and demonstrate to other FSC members. *"What I learned, I learned through trial and error and reading. Reading and studying. And I emphasize this, I have eight children myself and I don't have the education like I wished I had. I like for other people to learn everything they can…Had friends who are foresters who have had a look. But has never hired a forester. "I keep the 10% for myself…It's technology plus learnology."* While FSC staff recognized the importance of science for quantifying results and confirming objectives – a desire to monitor the effectiveness of sylvopasture in the pine forest on FSC land -- they have been exploited in the past by extractive modes of research. There is potential for further cooperation in this area, but only if data is gathered in partnership and results are fully shared.

The strategies used by CBF groups to facilitate knowledge integration diverged from many of the standard methods used by public lands agencies to include stakeholders or public participation in the land management and decision-making process. CBF strategies were less about convening stakeholders for a "flip chart session" and more about giving people concrete tasks, multiple different and on-going opportunities for involvement, and time to develop relationships. One PLP participant described the contrast, *"they even call us funny names…us external people, like stakeholder (laughs). The have to come up with funny names to describe this community, this broader community. And they are flip chart sessions. People get tired of going to flip chart sessions and being called stakeholders."* Castillo et al (2005) concluded that training was the principal activity through which collaboration between the community organization and the university was developed. It was recognized as a forum to share knowledge and skills and as a way to transmit environmental awareness. They described

that "…the main instrument used as a linkage mechanism was personal contact during training sessions and two-way information exchanges between scientists and community members." This is precisely the experience described by CBF groups when speaking about training sessions, field tours, and the monitoring committees. Field tours and other joint hands-on-the-land activities were effective ways to encourage interaction among holders of different kinds of knowledge.

Two obstacles remain for CBF groups trying to integrate local knowledge and conventional science in their stewardship activities: reaching and consistently including both traditionally unrepresented groups and Native American tribes in ongoing interactions with scientists. Our findings show that both groups have definitely been included in many CBF projects, but this has either been inconsistent, or the ways in which they were included do not involve interactions with scientists in any lasting way. For some landowner organizations, particularly for the Federation of Southern Cooperatives Forest Legacy Program, there may be an implicit feeling that scientific data is not always used to further the ability of landowners to reach their goals, but rather to evaluate whether they complied with a regulation and to sanction them if they haven't (e.g., withdraw funding). FSC staff explained that quantitative data is not always able to reflect successful stewardship. *"There are results on the ground that you can't quantify.*" Given their pragmatic program objectives and methods of operation, their geographical isolation, and limited technical and staff resources, FSC staff were somewhat skeptical of the benefits of science and scientific monitoring. Similarly, the Alliance of Forest Workers and Harvesters sponsored several projects that were specifically focused on bringing the local knowledge of forest workers and harvesters to the attention of the U.S. Forest Service, but encountered significant resistance on several occasions. While one group of mushroom harvesters was successful in convincing the Forest Service of the validity of their information, several members expressed frustration with the primacy that formal scientific data holds with the agency.

As mentioned above, Native American tribes have not been significantly involved in many of the monitoring and management projects, and their knowledge has not yet been consistently incorporated. This challenge occurs at a number of levels: the overextension of the tribe in trying to work on many issues throughout the northwest; the cultural differences in priorities, communication and decision-making; the fact that non-Indian tribal representatives are often strident and "carry the tribal line more harshly than tribal members;" and the fact that collaboration cannot and should not replace government to government consultation with tribes. One WR staff person explained, *"…they are trying to show interest and have standing in a whole host of issues going on across the northwest, and they don't have the capacity to do that. And they also just operate differently. … You know, we live in a world where we ask a question and we expect the answer immediately, right? And that's just not the way they operate."*

Issues of Rigor

Questions continually surfaced about how rigorous the monitoring design and data collection needed to be, often forcing the CBF group to examine its goals and objectives for the project closely. In a quantitative monitoring setting, rigor means designing sampling to maximize accuracy and precision, and to be able to make strong

inferences about cause and effect. More informally, it implies thoroughness in and validity of the observations made. The tension between scientific rigor and practical utility in monitoring is not unique to community-based forestry. Rather it is part of a wide-spread dialogue and debate about the relative merits of more qualitative and subjective monitoring approaches that rely to a greater degree on professional judgment and local knowledge for interpretation compared to monitoring that incorporates more elements of experimental design (such as replication, randomization and controls), and which permits stronger causal inferences and greater generalizability. This plays out in a variety of ways with many CBF groups. Some groups were pleased with their protocols and data quality, even if they did not meet USFS quality standards. For example, on the Upper Joseph Creek Watershed Assessment, WR made the decision not to set up permanent plot centers in order to save funds. One PLP participant and observer felt that PLP community members learned a lot about science from participating in UP project field trips and discussions, leading to a better appreciation of the scientific basis for agency decisions, and for the complexity of ecosystems generally. A Vermont Family Forests participant put it succinctly, *"But I think that the experience…and looking at natural community mapping and trying to map these sensitive areas in point locations, you know, the learning curve - a lot more people can really understand it."*

There were several points of tension over rigor and method for Wallowa Resources. The map created by Oregon State University from the satellite data was thought by some to be sufficiently accurate and by others to be inaccurate. WR consultants felt it was sufficiently accurate to be useful from a practical standpoint. *"When X and I ground truthed out on national forests, we spent probably at least a month, maybe a month and a half, trying to find these areas and realte them to the pixel value on the map. We both felt that from a practical standpoint the map is useful because it does predict repeating patterns across the landscape and so observationally we thought it was a useful tool. Whereas I think folks involved in the project that were more concerned with accuracy values didn't feel it was very accurate."* In the weed monitoring project facilitated by WR, the TNC representative discussed the problems with monitoring weeds, due to the need to estimate both the area infested and the density of the infestation. An accurate and precise estimate of both requires far more sample units than is practical. A proxy may simply be the amount of chemical needed to treat the same area over time. *"You can say you've got 1000 acres and there's only 10 plants versus 1000 acres with 100% cover and to be able to measure both those things and track those through time, no one's done it in a way that's meaningful at that scale. You would need a million transects. M. saying that this 50 acre site took 2 gallons of chemical, next year 1 gallon, the next year…, that's as good as any. Otherwise it's impossible."* On the UJCWA, the decision was made not to set up permanent plot centers in order to save funds. WR is pleased with the quality of the data, however, they would not meet USFS quality standards. *"Some of the stuff that the FS had that was going to meet all our criteria, they typically spent 7 dollars and acre to get it done. And when we were talking about, you know, 55,000 acres of forest, we couldn't do that. But when we looked at it more closely a lot of the cost is just setting up permanent plot centers so that a FS quality control person can replicate exactly and then sign off that the data's valid. We didn't feel like we needed to do that. So we allowed for significant reduction in the plot set up*

costs…. We would go out there together and we just said as long as we think we're 80%, 90% close in what we see from what they saw, we're happy with the data."

In PLP's Burn Canyon project, there is ongoing tension over the required level of scientific rigor for the monitoring. One PLP member explained, *"And then these two people came from the universities and one wanted to run line transects, you know, with circular plots, fixed radius plots, and you know I could see that was totally impractical because you know it would have been days and days of running these plots. 'Cause you know I've done this for years….so I just suggested these line transects, 100 foot transects, and then this professor…she came up and looked at it and she felt 'well, this is all right, but you know, we really need a little more sampling.'… But see, we're all constrained by the money…."* One member described how the scientist that the environmentalists had nominated tried to negotiate between the higher levels of rigor desired and what was realistic in the current circumstances, *"… in the best of all possible worlds we would have a lot more data, but this will give you what you basically want to know and that's is the salvage log sale destroying the land."* This tension is also clear in the tentativeness of group members about the conclusions they are comfortable drawing from the data. *"I think we ought to have some ideas or hypotheses that we draw from this, but to say that this is proving anything is wrong,"* admitted one PLP member.

A question often raised regarding data collected by local people is whether results will be biased by having a resource user, who may be invested in a particular outcome of the results, collecting the data. On Wallowa Resources participant explained his perspective, *It depends on, I guess it really depends on the rancher, the particular rancher. 'Cause there's some very good managers and I think generally on the forest most of the ranchers are good managers. But, there was also a question of having a rancher monitor their own utilization. Some of the environmental groups are saying it's like, you know, sending a wolf to tend your sheep, or something. Which is kind of ridiculous 'cause the person, you know, that really can relate to the resource is the one that's spending the most time there.*

Local Scientists

"So we had a CBOP that did that,… and it was led by Dennis Martinez, who we've mentioned before, who really specializes in ecological restoration. Which actually does, well, he has western science and indigenous knowledge." (AFWH)

"…I guess when you have the resource professional or the person doing things on the ground and have the experience and expertise and you spend your whole life trying to figure it out…" (WRTC)

Simple definitions of local knowledge and science may not apply to much of the work done in community-based forestry. There are many forms of local knowledge and conventional scientific knowledge, and many people hold several forms of knowledge that they apply to management and monitoring activities. Doug Wilson (2006) breaks down the typical dichotomy into tacit (or experiential), oral, and anecdotal forms of knowledge, which often characterize local ecological knowledge, and discursive, written and systematic forms of knowledge, which often characterize conventional scientific knowledge. These offer finer distinctions of the two types often used to talk about

ecological knowledge. Many people in community-based management in the U.S. in fact defy the dichotomy by holding and using virtually all these forms of knowledge simultaneously.

In looking at whether and how local ecological knowledge gets incorporated into monitoring of and research on forest management, the line between scientists, managers and "locals" seems to blur quite a bit. In several CBF groups (WRTC, WR, PLP, AFWH), retired U.S. Forest Service personnel and other private forestry professionals, both managers and scientists, are also valuable members of the local community. These and other local people may have long-term, tacit, oral and anecdotal knowledge of their forests, and are also educated and/or scientifically trained in the Western science traditions of discursive, written and systematic knowledge. These "local scientists," who hold a broad range of different forms of knowledge, seem to play an important role in helping to design management and monitoring projects, as well as serving as a liaison between CBFs and agencies. Examples include several retired foresters from the U.S. Forest Service who now work for the CBF group (WRTC staff), several professionally-trained scientists who work for or with the CBF group (WR's weed monitoring and watershed assessment projects, AFWH leader and forest inventory specialist), multi-generational ranching families who are also trained resource professionals (WR monitoring coordinator), and a local private consulting forester who is on the advisory committee for the collaborative stewardship project (WRTC's Post Mountain project). In these cases, the difference between conventional scientific knowledge and local knowledge becomes harder to distinguish. These local scientists have their feet in both worlds; they form a third category that bridges the gap between conventional scientists and "locals".

CONCLUSIONS

The seven CBF groups studied were part of a demonstration program intended to explore and test new ways of balancing the economic and social health of communities and the ecological health of forests. Considering that all of these groups chose to incorporate local knowledge and conventional science in a variety of creative ways in order to work toward that balance indicates this is an important strategy other groups could also pursue. The main strategies that these groups used to foster the integration of knowledge range from the very time- and energy-intensive (monitoring committees, training programs) to the less time- and energy-intensive (hiring scientists, field tours); community-based groups with similar environmental and development goals could implement these strategies in a variety of contexts. Even further, agencies and non-profit organizations that wish to include local ecological knowledge and integrate it with the conventional science they are already using could also implement these strategies. The facilitation of ongoing interactions between local people and conventional scientists could potentially improve their ecological knowledge base and public understanding of their stewardship work.

The future of this work may lie in the combination of strategies used by the community-based forestry group to integrate knowledge. By training local people in scientific methods and bringing in scientists who value local knowledge, CBF groups are creating and nurturing new local scientists in their communities. As more people become versed in multiple types of knowledge, more bridges may be built between local people

and conventional scientists, broadening the ways we learn about ecosystems and the effects of our management. Continuing interactions between local people and scientists may be the way to address the challenges and concerns about integrating local ecological knowledge with conventional science. Issues about rigor in inventory and monitoring projects can be navigated by locals and scientists together if addressed early on in the process. Establishing monitoring committees that include spots for agency personnel, Native American tribes, as well as local people may institutionalize the relationship that would otherwise be broken when agency personnel are relocated. Field tours that allow people to participate intermittently as a way to check in on the stewardship process may help foster involvement by Native American tribes in a way that is more culturally appropriate.

Finally, our findings imply that an interdependent science can exist in the context of forest management in the United States, in which community members, conventional scientists and local scientists can collaborate to jointly produce new information about ecological systems and natural resource management. Rather than scientists and managers sprinkling local knowledge into their work as they saw fit, we found numerous cases where they worked in partnership with local people to conduct monitoring and research. Rather than waiting for the conventional science to be handed down from agencies or universities, CBF groups hired scientists, trained local people and in other ways garnered conventional science for their own use. Effectively integrating diverse knowledge sources for forest research and management, rather than co-opting local knowledge or consulting with locals in a token way, can redistribute the "power" of conventional science into the hands of local people and underserved communities who are typically excluded from the production of science that informs management. This illustrates that interdependent science is about equitable partnerships between people as much as it is about producing better accounts of the world.

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Table 1. Overview of the ecological and social settings and objectives of the 7 study CBFs.

	AFHW	FSC	JBC	PLP	WR	WRTC	VFF
Ecological setting	Northwestern mixed conifer forests to California mixed conifer to oak savanna	So. pine and hardwood forests and associated pasture & farmland	Southwestern ponderosa pine forests	Western conifer forests; piñon-juniper woodlands; sagebrush-grassland rangelands	Western conifer forests; riparian habitat; Palouse prairie rangelands	California mixed conifer forests, with some Ponderosa pine, oak savannas & early successional shrublands	NE hardwood forests
Ecological threats	Invasive non-native species, altered fire regimes, degradation	Land conversion, habitat loss and fragmentation, poor logging and reforestation practices	Altered fire regimes, poor logging practices	Altered fire regimes, non-native invasive species, habitat loss and fragmentation, erosion	Altered fire & flood regimes, non-native invasive species, habitat loss and degradation, fragmentation.	Habitat degradation, altered fire regimes, history of poor logging practices	Habitat fragmentation
Ecological goals	● Reduce risk of catastrophic fire ● Restore the link between livelihoods and the forest ● Resource (mushroom, basket material) protection ● Reduce herbicide use	● reduce land conversion ● promote forest stewardship	● Achieve historic ponderosa pine forest structure and function through restoration rather than "standard" fuel reduction ● Create wildlife habitat	● Enhance and maintain diverse, healthy & viable environments ● Restore the link between livelihoods and the land	● Understand and maintain natural variation ● Address causes as well as symptoms of degradation ● Use adaptive mgt ● Restore the link between livelihoods and the forest	● Reduce risk of catastrophic fire ● Wildlife habitat enhancement ● Restore the link between livelihoods and the forest ● Use adaptive mgt	● prevent fragmentation ● promote good stewardship ● understand the forest
Social setting	Culturally diverse, underserved community. Distrust among harvester groups and between harvesters and agencies. Invisible and undervalued workers.	Underserved community, institutionalized racism, state agency focus on larger land owners and regulations disadvantage small farmers, distrust, land retention difficulties for black families, disconnect from land	Low socio-economic levels, job loss due to loss of timber on federal lands and mine closures. Anglo, Hispano, Mexican-American and Native American.	Rapid demographic change and growth, with increase in retirees, amenity residents, tourism & exurban development. Decline in economic viability of land-based livelihoods. Growing Hispanic population.	Community in transition due to changing forest policy, timber industry restructuring and demographic change. Increasing poverty. Declining institutional capacity. Primarily Anglo	Community in transition due to changing forest policy, timber industry restructuring, and demographic change. Increasing poverty. Cultural conflict over land and resource use. Declining institutional capacity. Primarily Anglo	Demographic change, turnover in forest land ownership, fewer "working forests" because of economics but also changing values of landowners; disconnect from land
Social Goals	●Social justice ● Pay scale that acknowledges skill and work ● Training.	Promote hands-on learning, network building, advocacy, outreach, build ties to land	●Build trust and support from environmental organizations and USFS for forest restoration prescriptions ●Create jobs from small diameter wood utilization	● Facilitate constructive dialogue about public land management ● Participate in public land management decision making ● Increase awareness of interdependence of local economies & landscapes	●Build trust and support in community and USFS for forest restoration prescriptions. ●Build trust and reduce conflict about management. ●Training, education	●Address conflict ● Build relationships among organizations & agencies ●Build contractor capacity ● Support traditional resource-based economy ●Civic science &	Improve stewardship of family forests, build ecological knowledge, identify VFF participants and create community

			●Reduce conflict	● Increase civic engagement and social learning	and outreach. ●Build contractor capacity and create jobs ●Civic science and social learning.	social learning	

Table 2. Overview of projects, participants and use of local ecological knowledge and conventional science in stewardship and monitoring projects of the 7 studied CBF groups.
Under **Use of Local Ecological Knowledge**: * (n=13) = Projects in which the use of local ecological knowledge (LEK) clearly contributed to the final product. † (n=6) = Projects in which the local people involved were primarily involved only in ecological field data collection. ‡ (n=5) = Project in which local people involved were primarily staff of the CBF organization. √ (n=3) = Projects in which local ecological knowledge documentation was a primary focus. # (n=6) = Projects in which the CBF group sought involvement from Tribes and/or incorporated traditional ecological knowledge (TEK).
Under **Use of Conventional Science**: † (n=14) = Projects in which conventional scientists trained local people in standardized data collection methods. ‡ (n=11) = Projects in which scientists were hired to design, conduct or analyze monitoring project. *(n=8) = Projects in which scientists participated in multiparty monitoring teams or monitoring sub-committees. # (n=6) = Projects that involved conventional science primarily in the form of oversight by a government agency that determined the treatment or monitoring methods used.

CBF Group	Project	Who was involved?	Use of Local Ecological Knowledge?	Use of Conventional Science?
AFWH	Mushroom monitoring	Community (mushroom pickers)	*Harvester knowledge of location of spp. and impact of harvest, collected photo point data and compiled mushroom ID notebook	† Scientifically-trained CBF staff trained harvesters to collect biophysical data, photo points
	Weed Removal and Monitoring	Community (NTFP harvesters)	*# Forest workers' knowledge of location and extent of weeds, working to locate and pull weeds in non-herbicide treatments	† CBF is part of bioregional working group on noxious weeds, networking and sharing removal methods, scientifically-trained CBF staff trained members to collect biophysical data
	Cave Junction Forest Worker Training in Field Methods	Community (forest workers), Scientist consultant, CBF staff	† Forest workers' knowledge of the landscape	† Scientist consultant trained forest workers in field data collection methods to increase job skills
FSC	Oral History Project	Community, University researcher	*√ Local residents' knowledge of land use history, species?	NA
	Goat Agroforestry Project	Community (local residents), CBF staff	*Local resident's knowledge of animal husbandry	† CBF group provided local people with information and training about agroforestry and forest management plans
JBC	Mill Site #1 Fuels Treatment Project	Community (youth), agencies, Scientist consultants, CBF staff	‡ CBF staff knowledge of stand dynamics and effects of fire	†‡ Agencies contributed to and approved stand prescriptions, scientist consultant trained locals and directed monitoring project using standardized protocols
	Mill Site #2 Fuels Treatment Project	Community (youth), agencies, Scientist consultants, CBF staff	‡ CBF staff knowledge of stand dynamics and effects of fire	†‡ USFS contributed to and approved stand prescriptions, scientist consultant trained locals and directed monitoring project using standardized protocols
PLP	Uncompaghre Plateau Project Watershed Assessment & Monitoring	Community (citizens, loggers) USFS, Environmental organizations, CBF staff, scientists consultants	*#Local residents' and loggers' knowledge of ecosystem functioning, effects of fire, participated in planning meetings and analysis of data	*‡ USFS and environ. organization scientists contributed to management activities, scientist consultants designed monitoring and assessment
	Burn Canyon Project and Monitoring	Community (citizens, loggers), USFS, Environmentalist, CBF staff, university scientists	*#Local residents' and loggers' knowledge of ecosystem status and process, effects of fire, participated in planning meetings and analysis of data	*‡ USFS and university scientists helped design salvage logging treatments and conducted monitoring project
	Oral History Project	Community, CBF staff	*√# Local residents and ranchers knowledge of land use history, effects of fire	NA

WR	Upper Joseph Creek Watershed Assessment	Community (landowners, loggers, ranchers), many federal and state agencies, tribes, university scientist, interest group, CBF staff	*#Ranchers knowledge of grasslands and range management, loggers knowledge of forest and forest management, tribes' traditional knowledge of watershed functioning and management	*‡ Agency personnel involved in each monitoring sub-team, university scientist involved in design and analysis of data
	Aspen & Landbird Habitat Monitoring	Community (local field technicians), federal agency, scientist consultant, CBF staff	† CBF staff knowledge of the habitats and threats, local field technicians' knowledge of the landscape and habitats	†‡ Scientist consultant and agency personnel contributed to design and analysis of data for monitoring project
	Haypen Project	Community (citizens), agencies, interest groups, CBF staff	‡ Local residents' knowledge of __?	* Agency personnel involved in multi-party monitoring project
	Buck Stewardship Project	CBF staff, agencies, interest groups, scientist consultant	‡ CBF staff knowledge	‡# Scientist consultant contributed to data collection and analysis of monitoring project, agencies provided scientific oversight for data collected and applied recommendations to management
	Wallowa Lake Wildland-Urban Interface (WUI) Project	Community, agency, CBF staff	‡ Local residents' knowledge of landscape and effects of mixed land use	*# Agency personnel involved in multi-party monitoring project
	Weed Monitoring	CBF staff, agencies, environmental organizations, community	*Local residents' knowledge of location and extent of weeds, CBF staff knowledge	* Agency and environmental organization scientists collaborate with CBF group weed coordinator on invasive species biology and BMPs/ treatment
	Lynx Survey	Community (local contractors), agency, CBF staff	† Local contractors' knowledge of lynx habitat (and presence/absence?)	†#‡ CBF staff scientist trained local contractors in data collection, agency provided oversight, scientist consultant hired for quality control of data collection by contractors
	Eagle Survey	Community (local contractors), agency, CBF staff	† Local contractors' knowledge of eagle habitat (and presence/absence?)	†# CBF staff scientist trained local contractors in data collection, agency provided oversight
	Grouse Survey	Community (high school students), agency, CBF staff	† Local contractors' knowledge of grouse habitat (and presence/absence?)	†# CBF staff scientist trained local contractors in data collection, agency provided oversight
WRTC	Ecosystem Management Training Team Inventories	Community (local trainees), agencies, scientist consultants, CBF staff	† Local trainees' knowledge of landscape features and habitat	†# CBF staff scientists trained local people in data collection and ecosystem management, agency provided scientific oversight
	Chopsticks Fuels Treatment Project and Monitoring	Community (local trainees), university researcher, CBF staff	*CBF staff knowledge of forest management and fuel treatments, local trainees knowledge of landscape features and habitat	†‡ Scientist consultant hired to train local people, design, collect and analyze monitoring data
	NTFP Assessment and Harvest Inventory and Research	Community (NTFP harvesters), university researcher, CBF staff	*√ # Harvesters knowledge of medicinal plant location, extent and impacts of harvest; contributed to design and collection of data for inventory and research projects	†‡ CBF staff scientist hired to train local people, design, collect and analyze research data

	Post Mountain Stewardship Collaborative Project and Monitoring	Community (citizens), agencies, interest groups, consulting forester, CBF staff	*Local residents' knowledge of their forest and effects of fire, fuels treatment; involved in multi-party planning and implementation of forest stand treatments, trained to collect data for monitoring project	†*‡ Agency personnel involved in multi-party planning and implementation of forest stand treatments, consulting forester and CBF staff trained local people, designed and collected monitoring data
VFF	Development of Forest Stewardship Council Criteria and Indicators for Forest Certification	Community (landowners), environmental groups, agencies, CBF staff	*Local landowners' knowledge of forest and forest management, habitat; involved in development of forest certification criteria for the region	* Scientists from agencies and environmental groups involved in development of forest certification criteria for the region