Multiparty Monitoring and Stewardship Contracting

A Tool for Adaptive Management

Sustainable Northwest

PHOTOS: GEORGE GENTRY

Multiparty Monitoring and Stewardship Contracting:
A Tool for Adaptive Management v2

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About this Guidebook

Multiparty Monitoring and Stewardship Contracting: A Tool for Adaptive Management is the last in a series of three guidebooks produced by Sustainable Northwest. This guidebook follows *Best Value & Stewardship Contracting Guidebook: Meeting Ecological and Community Objectives* and *Stewardship Contracting and Collaboration: Best Practices Guidebook*. The intended audience of this guidebook is members of collaborative groups and federal agency personnel who are interested in developing a multiparty monitoring program. The purpose of this guidebook is to help readers understand the steps necessary to developing a monitoring program; to identify questions that need to be addressed before beginning a monitoring program; and to provide examples that may be useful for reference. This guidebook is meant to be used as a helpful resource, but readers should understand that the process of developing a multiparty monitoring program requires a significant effort and may be best developed with the assistance of an experienced practitioner.

CLOCKWISE FROM LEFT: GEORGE GENTRY; RYAN HAGERTY; GEORGE GENTRY

Are your projects achieving the desired results? Would a different approach be more efficient or more effective? Are some individuals questioning or obstructing proposed projects? Do people know about the good work that's being done? Do they believe it when they hear about it?

Multiparty monitoring offers a way to answer questions such as these by engaging people with diverse perspectives in a structured process of questioning and evaluating project activities and outcomes.

Building trust, learning, and adapting

All monitoring is about learning: monitoring is the process of periodically and systematically gathering and analyzing data to understand trends over time. Multiparty monitoring adds a component of communication that promotes understanding and builds trust among project proponents and detractors.

In a multiparty monitoring process, stakeholders with different backgrounds and perspectives collectively discuss conditions, raise questions about observed and potential activities and outcomes, and evaluate monitoring data to better understand how conditions are changing. The process is inclusive – anyone with an interest in the project is encouraged to participate – and transparent – monitoring data and results are available to everyone.

"We see the health of the forest and the results of our multiparty monitoring as the legacy we will leave for the future – so we design our multiparty monitoring process primarily to be used for learning. This learning is intended to provide both inspiration and knowledge to those within the forestry community and those whose lives are otherwise affected by these processes, both now and in the future."

Johnny Sundstrom, Siuslaw Forest Stewardship Groups

"Forest Service work done in Lake County has not had an appeal since 2001 as a result of the monitoring program."

Jim Walls, Lake County Resources Initiative

Multiparty monitoring addresses conflict and builds trust by encouraging group discussion and evaluation of potential problems. When reliable methods are used, multiparty monitoring can reduce uncertainty and build support for management activities. The monitoring data provide feedback on the effects of specific management actions that can be used to inform future projects, making them more efficient and effective.

How to use this guidebook

This guidebook is intended to help collaborative groups who want to conduct project-level multiparty monitoring of stewardship contracting projects and other forest restoration and community development projects. The process described here is drawn from the experiences of several multiparty monitoring groups, other monitoring manuals, and policy directives on multiparty monitoring. This guidebook is intended to complement and not duplicate the information provided in other multiparty monitoring manuals. Therefore, this guidebook does not provide detailed methods for measuring and analyzing monitoring data. For more information on gathering and analyzing ecological, social, and economic data, refer to the publications listed in the resources section on pages 39-41.

Examples of different types of monitoring, monitoring indicators, and monitoring methods are provided to help collaborative groups decide whether to conduct multiparty monitoring, what stakeholders want to monitor, and how to monitor. The checklists at the end of each section will guide readers through the process and help avoid common pitfalls.

Case summaries on pages 27-38 describe how other groups have conducted multiparty monitoring and their lessons learned. Use the resources provided at the end of the guidebook for more information on the technical aspects of monitoring, including data collection and analysis methods.

Use this guidebook to:

- Decide whether multiparty monitoring is right for a particular situation
- Clarify multiparty monitoring goals
- Put together an effective multiparty monitoring team
- Identify what stakeholders want to monitor
- Determine how the monitoring results will be used
- Identify resources for choosing monitoring methods and developing a monitoring plan

A note on landscape-scale and programmatic monitoring

This guidebook is intended primarily for project-level monitoring, but several sections will be useful for monitoring landscape scale projects or implementation of agency policies and programs.

While a landscape scale forest project may include many thousands or even millions of acres, it often is composed of a series of smaller projects strategically located across the landscape and implemented over several years. Often, the goals of these projects are similar to those described in this guidebook and the indicators and methods discussed here will be applicable. When the same indicators and methods are used across the landscape, results often can be aggregated to track regional outcomes and effects.

Similarly, monitoring to evaluate and inform policies and programs may ask some of the same questions and use some of the same monitoring methods described in this guidebook. Sometimes agencies or funders require project managers to collect and report information that will be used in programmatic monitoring.

However, landscape scale and programmatic monitoring require a broad perspective and may use different indicators and methods that are not discussed in this guidebook. Landscape scale and programmatic monitoring may ask questions about regional or cumulative project effects and may use different sampling designs or models. These models may require specific data. Remotely sensed data, in addition to field data, is more likely to be used in landscape monitoring.

Definitions: Types of monitoring

Monitoring is the periodic and systematic collection and evaluation of data to track changes over time.

Multiparty monitoring involves discussion and mutual learning among a diverse group of individuals representing different groups and interests.

Implementation monitoring, also known as compliance monitoring, records actions taken and outputs relative to targets. Implementation monitoring asks, "Did we do what we said we would do?"

Effectiveness monitoring measures changes in specific conditions relative to desired outcomes. Effectiveness monitoring asks, "Did we achieve our desired results?"

Validation monitoring tests underlying assumptions about how a system operates. Validation monitoring asks, "What caused the observed changes?"

Process monitoring tracks how well projects or programs function in terms of things like access to services, communication, and relationships.

Programmatic monitoring tracks the implementation and performance of policies and large scale plans rather than specific projects.

Quantitative monitoring tracks numerical data, such as changes in amounts or sizes.

Qualitative monitoring is based on descriptive data from structured observation and evaluation rather than numerical data.

Third-party monitoring refers to data collection and analysis by a neutral individual or organization independent of the project or program managers.

Why conduct multiparty monitoring

Monitoring can be conducted by any group or individual working alone. The primary goal of multiparty monitoring is to help project participants and other interested parties better understand each others' viewpoints and build trust in each other and in specific management activities. This can allow projects to move forward when there is uncertainty about potential outcomes. Often, interested individuals initiate multiparty monitoring because they have questions about how management is conducted, whether targets are being met, or about the impacts of specific management actions. Sometimes multiparty monitoring is required by law, policy, or grant stipulations.

Mutual learning

An important reason for engaging in multiparty monitoring is to help stakeholders with different views learn together and build trust. This is achieved by discussing concerns and observed conditions as a group. Sometimes, multiparty monitoring groups use validation monitoring to test management assumptions or to better understand ecological, economic, and social functions.

Accountability

The most common questions asked of forestry projects are whether they are being implemented as planned and whether they are achieving expected outputs. Most groups use implementation or process monitoring to answer these questions.

Adaptive management

Increasingly, project managers and others are interested in monitoring to provide feedback on the effects of specific management actions and improve future management. When the primary goal is adaptive management, effectiveness monitoring and sometimes validation monitoring are used.

Policy requirements

Multiparty monitoring is required for all projects funded under the Collaborative Forest Landscape Restoration Program.

The Forest Service and Bureau of Land Management are required to conduct programmatic multiparty monitoring of stewardship contracting at the national level, and are also required to participate in multiparty monitoring of stewardship contracting or projects authorized by the Healthy Forest Restoration Act if local groups or individuals request it. See page 43 for a more detailed discussion of multiparty monitoring policy.

> *See the box on page 10 to determine what type (or types) of monitoring to conduct. Understanding why stakeholders want to monitor will help the group identify appropriate monitoring indicators and measurement methods.*

Deciding whether to conduct multiparty monitoring

Sometimes all stakeholders agree with the project goals and methods and expect that planned management actions will achieve expected outcomes. In other cases, monitoring is desired but it does not have to have to be conducted through a multiparty process. For instance, stakeholders may trust that the results of monitoring by one entity, such as the land management agency, will be reliable and will be used. If there are no questions of trust and no need for shared learning, it is not necessary and may not be desirable to engage in multiparty monitoring.

In some instances, a lack of technical capacity, or funding, or a lack of support from those responsible for project decision making and implementation may prohibit multiparty monitoring from going forward. Embarking on multiparty monitoring without sufficient resources or support can be an exercise in frustration. Use the following questions to decide whether to engage in multiparty monitoring.

Is it required?

- Have local groups or individuals requested monitoring for a project that uses stewardship contracting or Healthy Forest Restoration Act authority?
- Did your collaborative group receive or are they applying for a Collaborative Forest Landscape Restoration Program grant?

Is there a need for mutual learning or trust building?

- Do stakeholders need a better understanding of each other's viewpoints?
- Are some concerned that projects will not be implemented as planned?
- Do some have concerns about possible project impacts?
- Do some have different opinions about the effects of specific management actions?

Are the necessary resources and support available?

- Does the group have access to individuals with the necessary expertise to develop and implement a reliable monitoring plan?
- Does the group have enough funding to pay for monitoring?
- Are project partners willing to commit time to tracking and analyzing monitoring data over a period of years?
- Are project implementers (e.g., resource specialists, contracting officers) and decision makers willing to use the monitoring results in future planning and management decisions?

The multiparty monitoring process

Multiparty monitoring is a five-step process, starting with engaging participants and understanding why and what they want to monitor and ending with collectively evaluating and using monitoring results. The steps are shown below and described in the following sections.

Step 1. Assemble multiparty monitoring team

Step 2. Determine why and what stakeholders want to monitor

Step 3. Develop a monitoring plan

Step 4. Collect and analyze data

Step 5. Interpret, share and use results

Step 1: Assemble multiparty monitoring team

The goals of multiparty monitoring are building trust, mutual learning and adaptive management. In order to achieve these, a group needs to involve individuals with diverse knowledge, technical resource skills and perspectives on forest health, community conditions, and the types of projects being developed and implemented. The group will also need an individual willing to take responsibility for coordinating the monitoring, working with individuals with research or monitoring skills and using the monitoring results. It is important to have participants representing a range of perspectives, including stakeholders who have concerns about potential project results and those who could block the project. It is also important to include people with decision making authority.

Some stakeholders and decision makers may choose not to participate. Keep these individuals informed as monitoring moves forward. It is helpful to have a representative of the multiparty monitoring team periodically meet with non-participating stakeholders to make sure that their interests and concerns are being addressed.

Who does what: Roles and responsibilities

Not everyone needs to be engaged at every step in the monitoring process. It is important to have broadly representative participation when defining monitoring questions – what and why to monitor – and when interpreting monitoring results and deciding how the results should be used. Typically, a subset of the collaborative group will form a multi-party monitoring team to lead the development of a monitoring plan and ensure its implementation. An independent consultant is often used to help develop the monitoring plan and to gather and analyze monitoring data. However, it is very important to have input from stakeholders with different perspectives during plan development, so that everyone understands and agrees on the questions the group wants to address through monitoring.

Full multiparty team: Bring together individuals representing diverse view points to identify monitoring questions and goals, approve the monitoring plan, interpret results, and make recommendations for adapting management.

Coordinator: Identify an individual within the monitoring team to oversee all aspects of the monitoring process, and who will maintain communication among all participants and make sure the plan is being implemented.

Technical experts: Technical experts help ensure that the appropriate monitoring indicators and methods are used. These

experts may be found within the multiparty monitoring team, or a third party may be needed to select the monitoring methods, collect the data, and analyze the data. Discussing monitoring questions, indicators, and methods with an interdisciplinary group of technical experts helps ensure that the appropriate indicators and methods are developed to achieve the monitoring goals.

Project implementers: Involve the individuals responsible for planning and implementing projects (e.g., NEPA specialists, contracting officers, contractors). They have expertise that will be very helpful for identifying gaps in knowledge and key questions about project implementation and effects. Also, project implementers are often needed to help gather monitoring data and are most likely to use the monitoring results to adapt management.

Land management decision makers: In addition to agency resource specialists, it is important to involve the individuals responsible for approving management plans (e.g., District Rangers, Forest Supervisors) to ensure that they can and are willing to use monitoring results. These individuals may not be active participants in the multiparty monitoring team, but should understand and support the process and agree with monitoring goals and protocols.

Community volunteers and youth groups: If the group wants to encourage community learning about local systems, teach skills, or reduce data collection costs, consider training local volunteers or youth groups to do the data collection. Some multiparty groups engage youth conservation corps teams; others work with local school groups. In both cases, education is a major component of the monitoring.

Deciding who should participate

- Who is affected by or could affect the project or issues of concern?
- Who is responsible for project planning and implementation?
- Who might use the monitoring results?
- Who is responsible for making management decisions?
- Who is already tracking conditions or project activities?
- Who has technical expertise in monitoring?
- Who might be interested in learning how to monitor and about local conditions?
- Who would be good at motivating others and coordinating the effort?

Step 2: Determine why and what to monitor

Before determining what to monitor and how to monitor it, the group should first establish its monitoring goals. As the following table shows, the types of monitoring chosen will follow directly from the reasons the group would like to monitor. In turn, knowing the appropriate type of monitoring will help in selecting appropriate monitoring indicators and methods. The type of monitoring chosen will also affect the difficulty and cost of monitoring – validation monitoring is the most expensive and difficult, and implementation monitoring is the easiest. In all cases, the collaborative will be using a multiparty process with group discussion and review to build trust, promote learning, and answer the monitoring questions.

Questions	Purpose	Types of monitoring
Are projects being implemented as planned? Are prescriptions being followed? Are targets being met?	Accountability Build trust Learning	Implementation monitoring – track project activities and outcomes
How collaborative are planning, management and monitoring? Are expectations for inclusiveness and communication being met?	Accountability Build trust Learning	Process monitoring – track outreach, meetings, consultations, and perspectives on communication, mutual learning and relationships
What are the project effects on social, economic, or ecological conditions? Are management activities resulting in desired outcomes?	Adaptive management Build trust Learning	Effectiveness monitoring – measure conditions pre- and post-treatment using reliable, replicable methods
How do we know that our actions are causing the observed effects? What might happen if we experiment with a new activity?	Adaptive management Build trust Learning	Validation monitoring – careful research design that controls for different variables

What should be monitored: Identifying questions and indicators

In general, project-level monitoring is focused on project activities, outputs, and outcomes. For stewardship contracting projects, these may address any of the following:[1]

- Improve, maintain, or restore forest or rangeland health
- Restore or maintain water quality
- Improve fish and wildlife habitat
- Reestablish native plant species and increase their resilience to insect and disease
- Reduce hazardous fuels that pose risks to communities and ecosystem values
- Meet local and community needs
- Use broad-based public and community involvement
- Use an open, collaborative process to achieve land-management and community goals

To identify the monitoring questions, the group should discuss the project goals, what activities are planned, and questions, concerns, or conflicting views about management actions and potential project outcomes. The boxes on the following pages provide examples of commonly asked multiparty monitoring questions. These questions are to stimulate discussion about possible monitoring questions for future projects.

[1] Forest Service Stewardship Contracting Questions & Answers, www.fs.fed.us/forestmanagement/stewardship/direction/index.shtml
Bureau of Land Management Stewardship Contracting Guidance Document, www.blm.gov/wo/st/en/prog/more/forests_and_woodland/0.html

Once the monitoring questions have been identified, the next step is to identify indicators for each question. An indicator is a variable that can measure or describe current conditions. Sample indicators are provided on the following pages and in the examples on pages 27-38. For additional examples of monitoring questions and indicators, see the references listed on pages 39-41, particularly:

> *Wildlife Monitoring for the Collaborative Forest Restoration Program.*
> www.nmfwri.org/collaborative-forest-restoration-program

> *Evaluation Sourcebook: Measures of Progress for Ecosystem- and Community-Based Projects.*
> www.snre.umich.edu/ecomgt/evaluation/tools.htm

> *Multiparty Monitoring for Sustainable Natural Resources Management.*
> http://ewp.uoregon.edu/resources/community-guidebook

Project implementation

Implementation monitoring, also known as compliance monitoring, records actions taken relative to target outputs. Often, project managers are required to track and report these types of indicators to a land management agency or project funder.

Typical monitoring questions	Commonly used indicators
How well were project protocols and contract specifications followed?	Tree or stump diameters Basal area Species harvested and species retained Native seed species used for erosion control Road bed returned to natural land contours Slash placed appropriately to minimize soil displacement
Are target outputs being met?	Acres or miles treated Number of trees planted Number of individuals trained Number of community outreach events Volume of biomass removed Miles of riparian habitat restored

Process

Process monitoring tracks how well projects or programs function in terms of things like access to services, communication, and relationships. Because improved collaboration and meeting community needs are goals of stewardship contracting, process monitoring may be particularly relevant for stewardship contracting projects.

Typical monitoring questions	Commonly used indicators
Are goals and project activities clear to all participants?	Percent of participants who describe project goals and activities the same way
Are participants motivated and engaged?	Number of co-sponsored events per year Percent of participants who say they are better off working together Percent of participants who frequently attend meetings and activities
Are key stakeholders involved?	Percent of key interest groups represented on the monitoring team
Is communication open and effective?	Percent of participants who believe they are communicating openly Percent of participants who agree their concerns have been heard and discussed
What are the costs? How are resources allocated?	Contract award amount Contract administration costs Project implementation costs Number of staff hours dedicated to the collaborative process

Socioeconomic effects

Socioeconomic effectiveness monitoring measures changes in public values, attitudes, and behaviors; employment; business vitality; and other community conditions that could be impacted by the project.

Typical monitoring questions	Commonly used indicators
How are project activities affecting local employment conditions?	Number of jobs created Number of seasonal, part-time, and full-time jobs Types of jobs created Wage rates
How is the project affecting local industries?	Number of businesses purchasing material generated by the project Types of products Volume of each product Value of each product
How much money is the project contributing to the local economy?	Local tax revenues from business purchases and employee residency
How are public attitudes toward forest restoration activities changing?	Percent of survey respondents who understand the project goals Percent of survey respondents who support project activities Percent of landowners who create defensible space Number of individuals using restored sites

Biophysical effects

Ecological effectiveness monitoring measures changes in specific biophysical conditions that could be affected by the project, such as ecosystem structure, fuel loads, plant composition, wildlife habitat and abundance or water quality.

Typical monitoring questions	Commonly used indicators
How have treatments affected forest structure?	Tree height Tree diameter Tree height to crown Canopy closure Crown bulk density Vertical structure Dead and down wood Tree density or basal area Seedling and sapling density Shrub density Understory cover Clumpiness or patchiness Fire, habitat, and forest health models and classifications
What are the implications of forest structure changes for fire risk, forest health, and wildlife habitat? How have treatments affected plant composition?	Tree species Understory species Plant communities Vegetative classes Models and classifications for forest health, biodiversity, vegetation types, and habitat use and effectiveness
What are the implications of plant composition changes for biodiversity, forest health, and wildlife habitat? Where specific wildlife species are found, and how abundant are they?	Species incidence and abundance, e.g.: Management indicator species Songbirds Species of special concern
How are management actions affecting water quality and aquatic habitat conditions?	Water temperature Turbidity Species richness

What is most useful and what is feasible: Selecting indicators

Initially, most multiparty monitoring teams identify several monitoring questions and indicators that would be interesting to measure. Time and financial constraints usually require that they then cull the list to the most feasible ones.

One way to quickly focus on the most relevant monitoring indicators is to ask what information the indicator data will provide, and how will it be used. In particular, will it provide feedback useful for evaluating the project and improving future projects?

Also consider the feasibility of measuring the indicator. Are there widely accepted methods of reliably gathering data on the indicator? How much will it cost to gather and analyze those data? In some cases, the indicator data may already be collected through existing monitoring. Land management agencies are required to do some types of monitoring on

public lands, and researchers or interest groups may be doing studies in the project area.

When selecting indicators, keep in mind that some indicators reflect change in more than one condition. For example, forest structure or vegetation class indicators may reflect changes in both wildlife habitat and fire risk. It may be more efficient to choose these kinds of indicators.

The multiparty monitoring team may also want to consider selecting commonly used indicators, so the monitoring results can be compared to or aggregated with results from other monitoring efforts to build broader knowledge. Ask technical experts to help evaluate the reliability and usefulness of the selected indicators.

Criteria for selecting indicators:

- Is it useful (will it answer questions about management actions or outcomes)?
- Is it understandable (does everyone define it the same way)?
- Is it measurable (are data available or able to be gathered using reliable, accepted methods)?
- Is it sensitive to change (responds quickly to actions or stressors)?
- Is it cost-effective?
- Are adequate funds available?

Identifying targets and triggers for management action

Once the indicators have been selected, identify desired conditions. For each indicator, can a desired target value be defined? Then, consider what an undesirable finding would be. At what point will indicator data reach a trigger point that leads land managers to reassess and perhaps change management decisions?

> Trigger point: A predetermined value of an indicator that suggests a need to reevaluate, stop, or change management activities.[1]

It is important to identify these targets and trigger points before starting monitoring, so that all participants in the multiparty monitoring team understand how results will be used. In particular, discuss and get agreement on these targets and trigger points with those responsible for making and implementing management decisions. Doing so will go a long way toward building trust and will help ensure that the monitoring results are used to evaluate and adapt management. It may be helpful to describe the "change mechanism" – i.e. specific actions to be taken and who will be responsible for implementing them – in the monitoring plan. For more information on identifying trigger points and developing an adaptive management action plan, see: *Measuring Progress: An Evaluation Guide for Ecosystem and Community-Based Projects.*[1]

For each indicator, determine:

- What is the target value or condition for this indicator?
- What is the range of acceptable values or conditions for this indicator?

[1] *Measuring Progress: An Evaluation Guide for Ecosystem and Community-Based Projects*. www.snre.umich.edu/ecomgt/evaluation/templates.htm

- Is there a threshold value, above or below which results are unacceptable?
- What indicator results would trigger a need to reassess management practices?
- When (how soon) should the target be reached?
- What specific actions should be taken if the indicator's threshold or trigger point is exceeded?
- Who is responsible for taking action?

Step 3: Develop a monitoring plan

The monitoring plan describes what will be monitored, how to conduct the monitoring, how the monitoring results will be used, and who is responsible for each step in the process. Completing the plan before the projects are developed will help ensure that the monitoring data are reliable and will be used.

Monitoring plan components	*Guidance*
Questions: What does the group want to know?	pages 10-14
Indicators: What will be measured or described to answer the questions?	pages 14-15
Targets and trigger points: How will the monitoring data be used?	pages 15-16
Methods: How will reliable indicator data be gathered?	pages 16-19
Sampling design: Where and when will data be gathered?	page 20
Responsibilities: Who will gather, compile, and store the monitoring data? Who will analyze the data? Who will make sure data are used?	pages 8-9
Budget: What will it cost?	pages 25-26
Sharing results: How will the data and results be communicated?	pages 23-25

Step 4: Collect and analyze data

There are many ways to gather indicator data. The methods the monitoring team chooses will depend on local conditions, project goals and activities, and the level of detail needed. It is very important to select reliable monitoring methods and carefully document the methods chosen, so that all stakeholders can understand and trust the monitoring results. Individuals with technical expertise should be consulted to help select the monitoring methods and decide where, when, and how often data will be gathered. Typically, data is gathered by a combination of agency staffs, private third-party contractors, and volunteers, such as multiparty monitoring team members and youth groups.

The following sections provide general descriptions of common monitoring methods without discussing specific sampling designs or measurement techniques. Do not attempt to use these methods based on the summary descriptions provided here. See the references listed under each method and consult technical experts to select and apply monitoring methods. Also see *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.* Island Press, Covelo, CA.

Choosing qualitative or quantitative data methods

When the group's primary goal is to understand how conditions are changing or specific effects of management actions, quantitative methods are most useful. Quantitative monitoring uses numerical measurements to provide a clear representation of change, such as dollars expended or percent change in understory cover. When indicators or data are gathered carefully, using accepted sampling and measurement methods, quantitative data are very reliable and widely accepted.

If the primary goal is to better understand perspectives, qualitative methods may be more useful. Qualitative monitoring is based on observation and opinions. In some cases, such as when monitoring the quality of communication between a collaborative group and land management agency, descriptive observations reflect reality better than quantitative indicators can. In addition, where quantitative monitoring focuses attention on the pre-selected indicators, qualitative methods like photo points and group discussions may identify important information on variables that weren't initially selected for monitoring. However, because they are descriptive and influenced by the values and perspectives of the individuals providing the data, qualitative monitoring results need to be interpreted carefully and are most useful when used in conjunction with quantitative monitoring.

> Consult technical experts for help selecting and applying monitoring methods.

Qualitative methods: meetings, field tours, interviews, and photo points

Photo points and field tours are generally used to monitor ecological conditions. Interviews and focus groups are typically used to monitor socioeconomic conditions.

Remember that the purpose of monitoring is to track trends over time. Most project monitoring compares conditions before and after a project is implemented. It is important to gather baseline data before project activities begin to enable an accurate comparison of conditions after a project is complete.

Photo points

Photo points can be used to provide a quick visual assessment of forest structure, plant composition, and some soil conditions. Photos are taken periodically, usually yearly, at permanently marked points. Photos are taken from exactly the same position, during the same season, and ideally at the same time of day. For a detailed description of the photo point method, see:

> *Handbook Four: Monitoring Ecological Effects.*
> www.eri.nau.edu/en/information-for-practitioners/monitoring

Interviews and focus groups

For some indicators, such as commitment to the collaborative process or perceptions of fire risk, the best source of data is knowledgeable individuals.

Both interviews and focus groups follow a prepared set of questions to gather information on the status of selected indicators. While interviews are one-on-one, focus groups allow discussion of the questions among participants, so that

different perceptions can be explored and developed through discussion.

The individuals interviewed or involved in the discussion and their observations are carefully recorded and later organized by topic so they can be analyzed. To make sure data gathered at different points in time are comparable, stakeholders representing the same perspectives must be involved and asked the same questions each time.

When using focus groups or interviews, it is important to review the questions asked and the procedures for facilitating discussion and recording responses with someone familiar with these methods. Ideally, interviews or focus group discussions are facilitated by someone with experience using these methods.

For detailed descriptions of the interview and focus group methods, see:

> *Handbook Five: Monitoring Social and Economic Effects of Forest Restoration.*
> www.eri.nau.edu/en/information-for-practitioners/monitoring

> *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.*
> Island Press, Covelo, CA.

Field tours

When used as a monitoring method, field tours are a type of focus group, enhanced by physical access to the topic of discussion. As with other focus group discussions, questions should be prepared before the tour. The questions will usually address project goals, protocol, and observed conditions. It is important to ask the same questions on pre- and post-treatment tours and to always document the discussion and types of participants so changes in their observations and opinions can be tracked over time. For more information on using this method, see the references for focus group methods listed above.

Quantitative methods: plots, transects, surveys, and accounting

For socioeconomic data and most implementation data, the most commonly used quantitative methods are careful record keeping and formal opinion surveys. For ecological data, the most commonly used quantitative monitoring methods are plots and transects. Water quality, aquatic habitat, and some wildlife population studies may use different methods that are not described here.

With the exception of documenting and reviewing project records, all quantitative methods require technical expertise to design and implement. Most quantitative methods are based on sampling a subset of the project area or population being monitored. Therefore, in addition to understanding how to set up plots and transects, design surveys, and use specific equipment, it is important to select representative samples.

As with qualitative monitoring, it is important to gather baseline data before any project activities begin, to enable a comparison of conditions after project activities have taken place.

Keeping accounts

Most implementation indicators and many socioeconomic indicators are measured by keeping notes or other documentation during the course of the project. It is important to ensure that data are regularly recorded, and recorded in

the same way every time. Make sure everyone defines the indicator the same way. For instance, is "number of jobs" the number of individuals employed, the number of distinct positions, or the number of full-time-equivalent positions? It is helpful to develop a standardized form or checklist to be periodically filled out, either monthly or at key points in the process such as when public meetings are held or when products are removed or sold. Data recorded at the time of an event is usually more accurate than numbers recollected (or estimated) after the fact. For sample data recording sheets, see:

> *Multiparty Monitoring and Assessment of Collaborative Forest Restoration Projects: Short Guide for Grant Recipients.*
> www.nmfwri.org/collaborative-forest-restoration-program

Plots and transects

Biophysical data are usually gathered by measuring indicators in defined areas (plots) or along transects (lines across the landscape). The number, size, and location of the plots and transects will depend on the site features and level of detail needed.

In transect-based sampling, data are collected in points along a line. Most forest structure, wildlife abundance, and surface fuel data are collected along transects, which are typically 50 to 300 feet long.

Plots are circular or square areas placed on the ground at regular distances. The size of the plot will vary depending on the indicator being measured. For instance, tree density is usually measured in a 50- to 100-square-foot plot, while understory cover is measured in a smaller plot of 10 square feet or less. Most tree size and density and understory plant data are collected in plots.

It is important to use accepted practices when selecting the subset of the area to be monitored and the number and location of plot transects and photo points. See the information on sampling design in links below. Using an appropriate sampling design will minimize bias and skepticism about monitoring results.

The specific measurements taken and equipment needed to gather the data will vary depending on the indicators. For detailed instructions on setting up plots and transects and measuring different ecological indicators, see:

> *Handbook Four: Monitoring Ecological Effects.*
> www.eri.nau.edu/en/information-for-practitioners/monitoring

> *Forest Inventory and Analysis Field Guides, Methods, and Procedures.*
> www.fia.fs.fed.us/library/field-guides-methods-proc/

Public opinion surveys

Surveys are a structured form of asking questions to gather information about the beliefs, attitudes, and other characteristics of a relatively large group, such as all adult residents in a community. Surveys use closed-ended questions that ask participants to choose from a limited number of answers. It is important to carefully word questions and ask them in a consistent way to get reliable, unbiased data. Therefore, while the initial questions to be answered should be determined by the multiparty monitoring group, the specific wording and manner of asking the questions should be determined by someone with expertise in survey design and implementation. Surveys may be conducted over the phone, by mail or internet, or in person. For more information on the public survey method, see:

> *Handbook Five: Monitoring Social and Economic Effects of Forest Restoration.*
> www.eri.nau.edu/en/information-for-practitioners/monitoring

Gathering useful and reliable data

Use a valid sampling design

Plots, transects, and public surveys gather data from a subset of the entire landscape or population of interest. It is important to carefully select locations and times for data gathering to avoid skewing data toward certain individuals. How well the sampled data represents the entire study area depends on the sampling design, which describes where and when data should be gathered. Sampling designs are often complicated and must be strictly followed to produce reliable results.

In most cases, sampling designs for monitoring need not be as rigorous as research design. While researchers are generally looking for 95% accuracy in their data, the monitoring team may simply want to know if the indicator values are trending toward or away from desired goals. The monitoring team may decide that a 75% degree of certainty will provide adequate feedback for adaptive management, while requiring fewer sampling points and reducing monitoring costs.

For more information on sampling design, see:

> *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.*
> Island Press, Covelo, CA

> *Handbook Four: Monitoring Ecological Effects.*
> www.eri.nau.edu/en/information-for-practitioners/monitoring

Pretest tools

Field equipment should be tested before monitoring begins to make sure it is working accurately. Survey, interview, and focus group questions need to be piloted to make sure they are clear and everyone interprets them the same way.

Gather baseline data

For effectiveness and validation monitoring, a full set of monitoring data will need to be collected before any project activities take place, especially before there are any on-the-ground treatments. It is important to document conditions before beginning a project so data are available to compare against post-project conditions. In some cases, a series of samples will need to be collected over time to get an accurate picture of the baseline. For instance, fish and wildlife populations naturally fluctuate and a series of baseline data should be collected to strengthen the validity of the monitoring results.

Use consistent methods

In order to compare pre-project and post-project data, it is important to measure exactly the same variables, exactly the same way. For each indicator, make sure data are being measured and recorded in the same way every time data are gathered. It helps to develop explicit data gathering instructions and standard forms for recording data at the outset.

[1]Haas, G.E. 2003. Restoring dignity to sound professional judgment. Journal of Forestry 101(6):38-43.

Review and clean the data

Once the data have been compiled, review them for obvious errors and outliers. If the recorded data show a tree diameter of 300 inches, for example, remove that data point from the set to be analyzed. If a data point appears suspect, go back to the original source and check it.

Use secondary data judiciously

Sometimes, another group or individual will have already gathered the necessary data, and it will only have to be compiled. For instance, the Forest Service may have gathered stand exam data on a project site that can be used as a baseline for multiparty monitoring. Employment and wood products data are often available from county, state, or federal sources. It can save time and money to identify these "secondary" data sources and use their data.

Remember, however, secondary data were gathered by someone else for a different purpose. Data may not be available at the scale or in the form needed. It is also very important to know what methods were used to gather the secondary data and determine whether they are accurate enough to be used. In some cases, particularly with economic data, the same data are gathered by more than one source. For instance, employment data is often available from both state and federal databases, and production data may be reported gathered at the local, state, or federal level. In this case a comparison of their values can be made to help determine the data's accuracy.

To get reliable monitoring results:

- Use a valid sampling design
- Carefully review secondary data
- Pre-test measurement tools
- Measure indicators before any project activities begin, and measure them the same way every time
- Record indicator data on standardized forms
- Make copies of all data sheets and back up electronic files
- Review data for obvious errors and outliers

Data analysis

Data analysis can be very simple and straightforward. However, in some cases statistical analyses may be needed to determine whether or not a project actually caused observed effects. This section gives a general overview of data analysis. For more detailed instructions on analyzing quantitative data including common statistical tests, see:

> *Measures of Success: Designing, Managing, and Monitoring Conservation and Development Projects.*
> Island Press, Covelo, CA

For guidance on analyzing qualitative data, see:

> *Handbook Six: Analyzing and Interpreting Monitoring Data.*
> www.eri.nau.edu/en/information-for-practitioners/monitoring

Analyzing quantitative data

Implementation data analysis may be as simple as describing what was done, e.g., "removed all Russian olive trees" or tallying numbers, e.g., "treated 350 acres" or "created 6.5 full-time equivalent jobs." It may be important to calculate an average or present a range, e.g., "on average, the mill produced 501 thousand board feet (mbf) per month, with a high of 1,223 mbf and a low of 0 mbf per month." The multiparty monitoring team may also want to group data, e.g., "five employees lived within 25 miles of the project site, three lived more than 25 miles but less than 50 miles away, and one commuted more than 50 miles."

For effectiveness monitoring, it is important to compare pre- and post-project data. Most often, these data are presented as a percent change over time, e.g., "basal area was reduced by 23%." The monitoring team may want to present a range or standard deviation to show how much the data points varied from the average. It may be useful to create a table to present related data, such as percent of understory cover in different categories (grasses, forbs, shrubs, litter, bare ground).

Most often, the post-project data will reveal a change in conditions such as tree density or canopy closure that clearly is a result of project actions. In some cases, however, it may not be clear if the recorded changes over time were a result of the project or were caused by some other change such as unusual weather conditions or unexpected market shifts. If it is not clear whether the observed results were caused by the project, statistical analyses may be used to compare the difference between two plots, show the relationship between two indicators, or see how closely an average value reflects the average of the entire population.

Analyzing qualitative data

Analyzing qualitative data involves organizing the data, determining the level of agreement among observations, and preparing a summary description. If extensive notes or transcripts from interviews, meetings, or other discussions were gathered, it will be most useful to start by focusing on the information that is relevant to the multiparty monitoring project. If photo points were used, the data will consist of the photos and a written description of what the photos show. Next, organize the data by categorizing comments by topics and subtopics. The last step is to identify the most commonly reported observations and any interesting or useful comments or interpretations.

With qualitative data, take care not to extrapolate beyond what the data show. Unless public perception data were gathered from a representative sample of the larger population, they reflect only the opinions of the people surveyed.

Data storage

Decide ahead of time who will be responsible for gathering data and who will be responsible for compiling and storing data. Data can easily be lost, particularly as some project partners may eventually leave. To avoid data loss, make copies of data forms as soon as they are filled out, and store them in a permanent place that is fire and water safe. As soon as possible, enter data into an electronic database and back up and label electronic files.

Questions on data storage:

- Does a partnering agency have an existing database that can be used?
- Will the data collected be compatible with existing data?

- Is a new database needed?
- Who will be in charge of and manage the database?
- Will the data be posted on a website for public observation and reference?

Take the time up front to determine whether the data can be entered into existing databases used by the agency or a collaborative partner. The data will be more useful if it is compatible with existing data sets. If not, the monitoring team may need to adjust the data collection methods or transform data to make it compatible. If no database exists, a new one will need to be developed. In addition, the monitoring team will need to determine whether to make the database widely available. Some multiparty monitoring teams post searchable databases on the internet to make their work more transparent and make the data available to others studying similar indicators.

Step 5: Interpret, share and use results

The final stages in the multiparty monitoring process make the results useful to others and provide an understanding of what the restoration actions mean and how effective they were. If these steps are not completed, the data can end up unused and not contribute to mutual learning or adaptive management.

Mutual learning

Collectively reviewing and interpreting the analyzed monitoring data helps everyone understand what happened and provides an opportunity for discussing different reasons for the observed results. For instance, if 60% of the community supported fuels reduction efforts before the project and only 40% afterward, why might that be? If the target basal area was 50 and the post-project data found it was 70, should the prescription be revisited for changes? To achieve agreement on what the monitoring data means, it is important to involve the full monitoring team in the data interpretation.

It is helpful to hold data interpretation meetings in the field where the monitoring team can visually observe results while discussing the data. In some cases, opposing or dissenting viewpoints can reach agreement on discrete actions when these discussions are held with the on-site context of the actual proposed treatments. The goal is to break down barriers and communicate by having visual references that individuals can relate to, thus removing hypothetical contexts and instead, using real contexts for all participants.

Take this opportunity to consider the full array of factors that may have affected the monitoring results. For example, did management activities change midway throughout the project? Did the project location change so that baseline data was not collected on the same site that treatments occurred? Did a drop in the timber market or an unusually wet year make it difficult for the contractor to complete the work on time?

Multiparty discussions of monitoring results are important for building understanding and reaching agreement on whether there is a need to adjust management as a result of what has been learned. Carefully document these discussions, particularly any agreements about adapting management practices, to be able to explain the findings to others and revisit them in the future.

Adaptive management

Often, monitoring is undertaken with the explicit goal of evaluating and, if needed, improving management. If a goal of

the monitoring is to provide feedback for adaptive management, it is important to know beforehand how the monitoring results will be used. What does the monitoring team hope the indicator data will show? What are the targets for each indicator? Is there a threshold where management activities should be reviewed because monitoring results indicate an unacceptable change in conditions?

Having pre-set targets (desired results) and trigger points (undesirable results that suggest a need to reevaluate, stop, or change management activities) for each of the indicators will make the monitoring data immediately useful for adaptive management. A change mechanism should also be identified to inform how management will be adjusted in response to different monitoring outcomes, and who is responsible for making those changes.

At the multiparty monitoring meeting to review and interpret monitoring results, review the targets and trigger points and discuss what information the data provides about current management practices and what the multiparty monitoring team thinks should be continued or changed.

For more guidance on setting trigger points for adaptive management, see:

> *Measuring Progress: An Evaluation Guide for Ecosystem and Community-Based Projects.*
> www.snre.umich.edu/ecomgt/evaluation/tools.htm

Reporting and outreach

Local community members, non-participating stakeholders, funders, agency personnel, and other individuals working on similar projects elsewhere can all benefit from the monitoring results. In addition, it is reasonable to expect turnover on the multiparty monitoring team, in agency personnel, and with forestry contractors, so it is important to keep good records of the monitoring process and results and periodically revisit them with new participants who will be unfamiliar with what has been done. Develop a communication plan that identifies all of the interested parties with whom the monitoring results will be shared (agency personnel, general public, interest groups, etc.) and how the activities and results will be communicated to each group.

Keep a copy of the data readily accessible, preferably in electronic form. Some multiparty monitoring groups post their databases online, so that anyone can access and work with the data.

Write formal reports of the monitoring process and results. The reports should include who was involved in the monitoring and how they participated, what questions were asked, what indicators and methods were used, what was learned, and what actions were taken or recommended. The report does not have to be long, but it should include all of these elements. Some readers prefer material presented in tables and lists, while others prefer narrative "stories."

Develop presentations that will share the results with different groups. A monitoring team may also want to develop brochures, report cards, or posters that summarize the findings. In particular, the monitoring team will want to make presentations to groups and individuals with leadership and decision making authority. These individuals may not have been able or willing to participate in the monitoring effort, but they need to understand how the monitoring was conducted and what conclusions the monitoring group has drawn from the results or they may resist using the results in future activities.

One of the most useful ways to share monitoring results and bring new participants up to speed is through discussion sessions. These allow the monitoring team to share what was conducted and what was learned and let others raise questions and concerns that can be discussed and addressed. These sessions may result in new monitoring questions or suggested improvements to the monitoring plan.

When developing a communication plan, consider:

- Who are the potential audiences?
- What outreach mechanisms will be used?
- When and how often will information be shared?
- Who is responsible for organizing and disseminating information?
- What are the key messages?

Funding monitoring programs

Monitoring can be fairly inexpensive, particularly if the monitoring plan is primarily designed to conduct implementation monitoring and utilizes volunteers or project managers to gather and compile the data. On the other hand, some monitoring plans are very expensive, costing over $100,000 per year due to having a large scale and requiring rigorous data collection and analysis methods. In general, a good rule of thumb is to keep monitoring costs below 10% of the project budget.

Costs and budgeting

The main items in the monitoring budget will be personnel costs, travel expenses, and equipment. When developing the monitoring plan, think carefully about each of these and account for every expense. Even if volunteers are donating time, equipment, or other costs, it is important to document those costs as in-kind funding contributions, which can be used to match grants and other funds.

Time

When considering what will be monitored and what methods will be used, think about how much time it will take to complete the monitoring plan. Personnel costs are often the greatest monitoring expense and can include: a monitoring coordinator to keep the entire process on track, several multiparty monitoring team participants (representing different interests), individuals to gather and analyze the monitoring data, and individuals to prepare reports and share results. Consultants can make monitoring more efficient, but may also be costly. Volunteers and youth groups can gather data cheaply, but will need training, assistance, and oversight. Be sure to budget time for grant and contract administration.

Travel

Remember to take into account travel to meeting points as well as travel from a gathering point to a project site. Travel to and from meetings and project sites requires gas and vehicle maintenance. If the distances are long or roads are rough, these costs can add up. One method to estimate transportation costs is to use an accepted government rate for cents per mile.

Equipment

Consider equipment expenses up front because sometimes the cost of equipment such as GPS units, densiometers, cameras, increment borers, digital recorders, and transcription machines can be very expensive. In most cases additional supplies will be needed, such as paper, access to computers and printers, tape measures, and other small items which can increase expenses. Once the monitoring team has determined the methods and sampling design the data collection costs will be able to be estimated.

Funding sources

Monitoring funds should be built into project budgets. Funding needs may range from 1-10% of the total project cost. Some multiparty monitoring is funded through agency appropriations. Forest Service policy recommends that funds for stewardship contracting monitoring primarily come from project funds, supplemented by in-kind donations. These in-kind contributions may be from other agencies, organizations or grants. For projects funded through the Collaborative Forest Landscape Restoration Program, up to 50% of the cost of implementing and monitoring can be covered by project funds.[1] Check with the local agency contact to understand how or if your multiparty monitoring program may be included in CFLRP funded projects.

In some cases, receipts retained from stewardship contracting projects can be used to defray the costs of multiparty process monitoring. The Forest Service allows retained receipts to be used for facilitation, meeting rooms, travel, incidental expenses, and dissemination of monitoring findings to the public. Retained receipts may also be used to answer questions about project planning, contract development, community involvement and collaboration, and other process and programmatic issues. The Regional Forester approves all uses of Forest Service retained receipts for project-level monitoring. Similarly, the Bureau of Land Management will consider allowing the use of retained receipts for project-level multiparty monitoring where there is sufficient interest.[2]

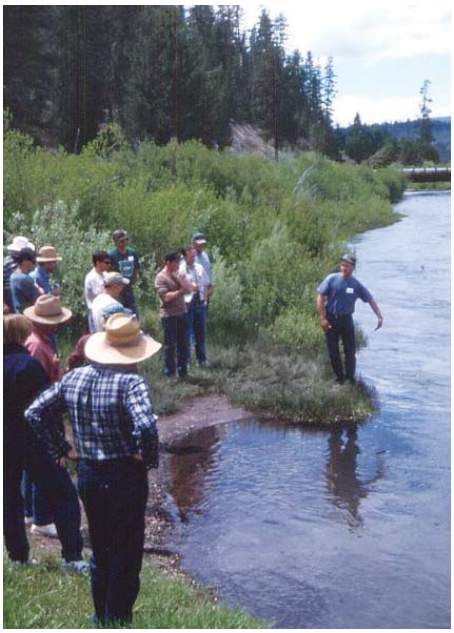
More often, multiparty monitoring is funded through grants from agencies or foundations, such as the National Forest Foundation or the National Fish and Wildlife Foundation. Grant programs change from year to year, and it will take some time to sort through government and private grant sources for current programs. There are several grant search engines on the Internet. For listings of federal and private grant programs, start with the following sources:

> Red Lodge Clearinghouse (both government and private foundations): www.rlch.org
> Grants.gov (official site for all federal grant programs): www.grants.gov
> Catalog of Federal Domestic Assistance (federal grant programs): www.cfda.gov
> National Forest Foundation (funds multiparty monitoring): http://nationalforests.org/conserve/grantprograms
> National Fish and Wildlife Foundation (funds monitoring effects on wildlife and invasive species): www.nfwf.org

A common source of funding for multiparty monitoring of stewardship contracting and similar projects has been the Title II County payments grants. Many counties have received annual payments from the Secure Rural School and Community Self Determination Act passed in 2000.[3] In some counties, Title II funding can be used to support multiparty monitoring and other collaborative group activities.

[1] www.fs.fed.us/restoration/CFLR/questions/answers/index.php
[2] BLM Stewardship Contracting Guidance 2-0 (2005) – Sections G(4) and I(1); Forest Service Handbook 2409.19, Sections 60.5, 67.2.
[3] H.R. 1424, Sec. 601. [Note: Act sunsets in 2011. Unknown if it will be renewed.]





LEFT AND CENTER: US FOREST SERVICE; RIGHT: SUSTAINABLE NORTHWEST

Siuslaw National Forest Stewardship Groups

Since 2002, local stewardship groups have worked with a contractor and Forest Service staff to monitor over 60 stewardship projects in and adjacent to the Siuslaw National Forest. Fifteen of these are stewardship contracting projects and the remainder are stewardship projects funded by retained receipts from the stewardship contracting projects.

Multiparty monitoring began with designation of the Siuslaw Basin Rehabilitation Project, one of the first stewardship contracting pilot projects in the nation. All pilot stewardship contracting projects were required to conduct multiparty monitoring, and the Siuslaw Stewardship Group (SSG), with participants from local government, non-profit organizations, private landowners, and regional environmental organizations, was formed to serve as the multiparty monitoring team for this project.

When the pilot stewardship contracting program ended, project level multiparty monitoring was no longer required for stewardship contracting projects. However, SSG members and Forest Service staff found that without project-level monitoring, their questions about the ecological and economic effects of their work, and how well projects were meeting their goals, were not being answered. In 2006, they reinstated multiparty monitoring. Since then, two new stewardship groups, the Alsea Stewardship Group and Mary's Peak Stewardship group, have been formed.

Multiparty monitoring has evolved over time, from an initial emphasis on project implementation and socioeconomic outcomes to more intensive ecological monitoring of project outcomes. However, the primary goal of multiparty monitoring has stayed the same: to learn from and improve forest stewardship projects.

Process

The Siuslaw Stewardship Group, the Forest Service, and a third-party contractor worked together to identify initial monitoring indicators and to develop a monitoring plan. Each year the consultant measures the indicators and presents the

results to the three stewardship groups. The groups discuss results and provide feedback to improve both the monitoring and forest management based on what they have learned. The contractor works closely with the Forest Service and stewardship groups to collectively review and revise monitoring protocols from year to year. The same protocol is used on all projects.

Much of the multiparty discussion occurs in the field. Pre-treatment field tours are held to discuss desired conditions and planned stewardship activities, and the contractor presents monitoring results on post-treatment field tours where stakeholders observe and discuss project outcomes.

Multiparty monitoring questions:

- What management activities have been completed on stewardship contracting projects and projects funded using retained receipts?
- How is stewardship contracting affecting the local economy?
- What are the effects of stewardship treatments on stand dynamics and spatial heterogeneity?

Multiparty monitoring process:

1. Initial multiparty meetings and field tours were held to identify monitoring goals.
2. Initial monitoring plan was developed collaboratively by the stewardship group, Forest Service staff, and monitoring contractor.
3. Annual data gathering and monitoring reports are completed by the monitoring contractor, with assistance from the Forest Service.
4. Stewardship groups review monitoring results and make recommendations for adapting monitoring and management.
5. Monitoring protocols and management activities are adapted by the Forest Service, contractor, and stewardship groups.
6. Monitoring results are shared with people outside the stewardship groups through publications and field tours.

Indicators and methods

Initially, the only ecological data gathered were from permanent photo points. The Forest Service provided implementation data such as number of acres treated, number of in-stream structures placed, and volume of biomass or marketable timber removed. Socioeconomic data, including the number of individuals employed, average wages, and volume of wood processed, were gathered through extensive interviews with contractors. In meetings and field tours, the multiparty monitoring group qualitatively assessed project outcomes and implementation of the stewardship authorities.

Over time, both indicators and methods have evolved as the groups review and revise their monitoring protocol. In particular, ecological monitoring has been expanded to measure forest structure and other vegetative changes. The following table lists all indicators that have been measured since monitoring was initiated in 2003.

Siuslaw Stewardship Group indicators	Methods
Implementation Acres treated, by treatment type (e.g., noxious weeds removed, meadows created, trees thinned, trees planted) Miles treated, by treatment type (e.g., roads maintained, roads closed) Number of habitat enhancements (e.g., in-stream structures, snags) Volume of material removed (e.g., fill, sawlogs, woody material)	Document review (agency)
Process Bid rates and prices paid to contractors Employees' places of residence Total receipts retained	Interviews (contractors) Document review (agency)
Socioeconomic Jobs created (e.g., number and types of jobs, average wages, job durations) Wood product production rates (e.g., volume and value of material removed, volume of wood processed, types of wood products) Indirect economic impacts (e.g., indirect and induced jobs, tax benefits)	Interviews (contractors) Document review (agency) Economic models (Bureau of Economic Analysis regional input-output model, IMPLAN, state forester's estimates and multipliers)
Ecological Trees (e.g. species, diameter, height, crown class, crown ratio, age, damage) Fuels and forest structure (e.g. tree density, height to crown, down woody material, seedlings and saplings) Other vegetation (e.g., species, percent cover)	Photo points Transects Plots (common stand exam and variable density) Stem mapping Field tours

From the start, the monitoring teams' primary interest in terms of socioeconomic conditions has been how stewardship contracting affects the local economy. To determine whether project funds stay in the area, they measure the places of residence for contractors and employees. This information is gathered by interviewing every contractor.

In 2008, they began to estimate employment data rather than use contractor records. This change was made for two reasons: (1) data were being collected during the work season, before contractors had tabulated employment data and in a time when contractors were generally unavailable for interviews, and (2) some contractors objected to sharing economic data that they consider proprietary for competitive purposes. As a result, the contractor and the Forest Service work together to estimate hours spent on various project activities, based on standard labor requirements for these activities. Wage estimates are then determined using average regional wage rates provided by the state forest economist. Because wage estimates are provided at the county scale, employment data are now reported by county rather than by project.

In terms of ecological monitoring, there has been a shift from implementation to effectiveness monitoring. In 2009, permanent plots and transects were established on new projects so that changes in plant species composition, forest structure, and habitat conditions could be monitored over time. Plots and transects will be measured pre-treatment,

one year post-treatment, and every five years thereafter. Trees in some plots have been permanently marked so that radial growth and mortality can be measured over time. The group has sought considerable review of their ecological monitoring methods and plans to use the same methods in the future, so that results will be comparable between sites and over time.

How results are used

Multiparty monitoring is used to educate, build trust, and inform management and policy decisions. Although quantitative ecological effectiveness monitoring only began in 2009, the Forest Service used earlier feedback from qualitative multiparty assessments to adapt their stewardship contracting prescriptions. For instance, the Siuslaw Stewardship Group observed that early designation-by-prescription projects calling for a standard number of trees per acre resulted in relatively homogeneous stands of evenly spaced trees. Based on the monitoring group's feedback, the Forest Service changed their prescriptions to require gaps and leave trees to encourage regeneration, with the result that later projects show more variation.

Quantitative economic data on the benefits of stewardship projects to local economies have helped allay public concern that projects are being awarded to contractors from outside the defined local area. The data demonstrated that stewardship in the Siuslaw National Forest is stimulating the local economy. People who were formerly skeptics of stewardship contracting and restoration work have come to support the projects.

In addition to the stewardship groups, other local stakeholders and interested individuals from other areas have learned about the stewardship projects from the annual monitoring reports, educational pamphlets, and field tours.

Lessons learned

Funding multiparty monitoring is the biggest challenge. When the SSG first began monitoring, the Siuslaw National Forest was able to dedicate a portion of retained receipts from stewardship contracts to fund the monitoring work. However, current Forest Service policy only allows retained receipts to be used for process monitoring. Consequently, monitoring funds are now drawn from the increasingly limited budget of the Siuslaw National Forest.

Effectiveness monitoring is more useful than implementation monitoring. Although the Siuslaw multiparty monitoring tracks project implementation, the most useful information gathered to date has come from local economic impact data and multiparty assessment of post-project site conditions. The stewardship groups and the Forest Service are looking forward to developing a body of quantitative ecological data to better measure ecological effects.

Monitoring can and should evolve over time. The stewardship groups have adapted their monitoring to include biophysical data that will be more useful to evaluating and informing management actions. Socioeconomic data collection has been adjusted to reflect data collection challenges and funding constraints. At the same time that the groups have refined their monitoring protocol, they are aware that data gathered or estimated using different methods are not directly comparable and have taken steps to ensure that their new ecological methods reflect reliable science.

Budget and funding

Since 2006, the Siuslaw National Forest has funded the multiparty monitoring using congressionally appropriated

funds, the same money that pays Forest Service staff salaries and project work. The agency contracts with Cascade Pacific Resource Conservation and Development Council, which in turn hires a contractor to gather and analyze the data and write an annual monitoring report. The annual budget for the contractor and administration by the RC&D is approximately $27,000 to $30,000. This budget does not include Forest Service staff time to compile data or time spent by stewardship group members touring sites and reviewing monitoring data. The total budget for project planning and implementation on the Siuslaw National Forest, including timber contracts as well as stewardship contracts, is approximately $1 million per year.

For more information:

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> Johnny Sundstrom, Siuslaw Stewardship Group, (541) 964-5901, siwash@pioneer.net

Northeast Washington Forestry Coalition

In 2007, the Northeast Washington Forestry Coalition initiated monitoring on the Burnt Valley and the Bangs Mountain stewardship contracts on the Colville National Forest. The Coalition had helped design both projects, and wanted to improve dialogue and build trust with the Forest Service by monitoring compliance with agreed-upon prescriptions and targets such as diameter limits and fuel reduction. The group was also interested in understanding how vegetation management projects linked to local biomass industry supply needs, so they tracked volume of biomass removed and number of jobs created. Although these first two monitoring efforts focused more on implementation than effectiveness monitoring, the multiparty monitoring team's qualitative assessment of post-project conditions led the Coalition to adapt a thinning protocol for dry forests. The Colville National Forest has adopted the new protocol.

The Coalition is seeking funding for three new monitoring projects using effectiveness, validation and implementation monitoring. The new proposals would track implementation and effects of the agency's best management practices, measure outcomes of regeneration treatments, compare the effects of different burning protocols, and test two different hydrological models. Some Coalition members would like to see more socioeconomic monitoring as well. For example, they would like to be able to determine whether a stewardship contract would provide the same economic benefit to the community as a standard timber sale contract.

Multiparty monitoring questions:

- How well does project implementation match treatment protocols?
- Are projects resulting in the expected volumes of biomass removed and number of jobs created?
- How effective are (1) forest thinning protocols, (2) regeneration harvest protocols, and (3) prescribed burning protocols in terms of achieving desired ecosystem conditions?
- How well does the current hydrological model estimate sedimentation, water yield, and peak flow effects?
- Is an alternate model more accurate? Is it possible to calibrate the current model to more accurately predict hydrological effects to improve future management in mesic forests?
- How well is the Forest Service implementing best management practices for forest management and roads, and what are the effects of those management practices on sediment yield, water yield, peak flows, and low flows?

Examples

- What is the best way to estimate whether a stewardship contract or timber contract would provide more economic benefit to the community?

Process

The Coalition's project committee, in collaboration with the Colville National Forest staff, worked through several drafts of a monitoring protocol. Next they hired a third-party contractor to finalize the monitoring plan and gather and analyze the monitoring data. The contractor developed a plan of work, which was approved by the project committee and the Coalition. The monitoring plan was also presented to county conservation districts before it was implemented. Once the data had been gathered and compiled, the multiparty monitoring team reviewed results together during pre- and post-project field tours.

Indicators and methods

Indicators	Methods
Ecological	Plots on a 4-chain by 5-chain grid to allow sampling every 2 acre across entire treatment area (The group will be changing to a sampling design that would require fewer plots)
Tree clumpiness (% clumps/acre)	Photo points
Number and size of landscape openings	Field tours (qualitative assessment)
Number of stumps over 21"	
Number of trees per acre, by species and diameter class	
Tree diameter at breast height	
Basal area	
Number of seedlings per acre	
Number of saplings per acre	
Estimated average tree height	
Plant association groups	
Percent crown ratio	
Crown base height	
Crown bulk density	
Socioeconomic	Contractor and Forest Service documentation
Biomass removed	
Jobs created	

Ecological indicators were measured on plots located every two acres across the entire project area and were analyzed to determine whether results were within 10% of the Colville National Forest's prescription specifications. Socioeconomic indicators were tracked through careful record-keeping by the Forest Service and contractors. Pre- and post-treatment field tours to project sites provided a forum for discussing quantitative monitoring results and qualitatively evaluating on-the-ground effects.

The Coalition revised its monitoring protocol based on experience with the first two monitoring projects. Where the

initial projects were monitored using a plot for every two acres across a 14,000-acre area, the Coalition plans to use a sampling design and measure fewer plots.

As a result of analyzing the monitoring results, the multiparty monitoring team recommended focusing more on effectiveness monitoring. In particular, they wanted to add crown bulk density calculations to their fuels monitoring and to be trained in the agency's Fuels and Fire Extension of the Forest Vegetation Simulator (FFE-FVS) in order to evaluate fire behavior effects as a result of treatments.

How results are used

Monitoring results are shared with all Coalition members, county conservation districts, the general public and staff from other land management agencies, primarily through presentations and field tours. Field tour participants review the monitoring results and discuss conclusions.

The first two monitoring projects built understanding and trust between the Coalition and the Colville National Forest staff. Field plot data confirmed that the thinning prescriptions for diameter limits by species were followed and treatments reduced wildfire risk by reducing ground and ladder fuels, crown spacing and crown bulk density, and tree density. Monitoring also showed that biomass volume for the project was higher than expected.

The Coalition and Colville National Forest agreed to adapt the management protocol for dry forests based on their observations of treatment effects. Although basal area on several plots was lower than the targeted 80 square feet per acre, field assessments of project results showed that the lower basal areas still met forest health objectives. They also noted that the lower basal area was necessary to meet other project targets, such as reduced crown closure. The new protocol calls for a lower basal area.

Lessons learned

Work closely with the Forest Service to ensure that multiparty monitoring will inform project design. The Coalition's multiparty monitoring team collaborated with the Colville National Forest's NEPA coordinator and silviculturist to identify where and how multiparty monitoring could supplement and not duplicate Forest Service monitoring. The agency staff consulted on and agreed to the multiparty monitoring indicators and measurement protocols. This level of collaboration helped the agency staff understand that the goal of the multiparty monitoring was to help them assess how well they were achieving their targets, not to criticize the agency if results were different than expected.

Effectiveness monitoring is more useful than implementation monitoring. Although initial implementation monitoring did build trust between the Coalition and the Forest Service, both the multiparty monitoring team and the agency found it more helpful when the monitoring looked at end results, not just whether or not standards were met. The honest and open discussion between the multiparty monitoring team and the Forest Service allowed them to jointly revise treatment protocols.

Ongoing multiparty monitoring and communication is needed. The Coalition still has questions about the effects of current management practices. Some Forest Service staff still do not understand why the Coalition questions the agency's management and monitoring. Ongoing dialogue is essential to building trust and identifying knowledge gaps that will

improve management protocols. In addition, frequent agency staff transitions make it critical to share and discuss previous monitoring results and management agreements.

Lack of funding constrains monitoring. The Coalition has plans for more extensive monitoring, but lacks the necessary funding to expand the program.

Budget and funding

Funding for the Burnt Valley and Bangs Mountain monitoring came from a grant under Title II of the Secure Rural Schools & Community Self-Determination Act. The Coalition is applying for a second Title II grant to fund the next monitoring proposals.

Implementation monitoring for the Burnt Valley and Bangs Mountain projects, which included data collection on 651 plots on 1,410 acres, was largely funded by the $52,300 Title II grant. In addition, a number of multiparty monitoring team members and organizations donated their time. The budget breakdown is shown below:

Task	*Budget**
Contract preparation and administration	$5,760
Plan design, field work, and data analysis	$39,600
Travel	$3,395
Supplies	$3,545
TOTAL	$52,300

* Does not include in-kind contributions

For more information:

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> Dick Dunton, NEWFC, (509) 936-1995, lrdunton@centurytel.net

Lakeview Stewardship Group

The Lakeview Stewardship Group (LSG) has been conducting monitoring on the Lakeview Federal Stewardship Unit of the Fremont-Winema National Forests since 2002. Rather than focusing on specific projects, the LSG has developed an overarching protocol for monitoring a wide variety of biophysical indicators across the landscape. The indicator data are analyzed to track trends in forest health conditions and responses to disturbances and management.

The Forest Service's management goals for the 667,000-acre Lakeview Stewardship Unit are to:

- Sustain and restore a healthy, diverse, and resilient forest ecosystem that can accommodate human and natural disturbance
- Sustain and restore the land's capacity to absorb, store, and distribute quality water
- Provide opportunities for people to realize their material, spiritual, and recreational values and relationships with the forest.

The LSG was established to provide guidance to and oversee management on the Unit. To this end, the LSG has established a Long Range Plan, (created in 2005, updated in 2010) that has been adopted by the Forest Service. Plan updates are driven in part by monitoring findings. Active management is expected to follow the broad guidelines in the Plan. The focus is on quantitatively monitoring ecological conditions, but the LSG has also used socioeconomic and programmatic assessments to update the Long Range Plan.

Multiparty monitoring purpose and goals

A unique element of the monitoring program is that it was not established with specific questions in mind or attached to specific projects. The Long Range Plan states that the purpose of the Lakeview monitoring program is "to periodically collect direct information about the composition, structure and functional condition of managed and unmanaged forests from hundreds of permanent plots located across the Unit." In other words, the monitoring program was designed to provide a large body of baseline and trend data that could be used to answer any number of ecological questions at various scales.

The indicator data are used to develop broad understanding about forest health trends and patterns and also to answer specific questions. For instance, the data have been used to evaluate soil percolation on landing slash sites, effects of catastrophic fires and salvage logging on forest soils, beetle kill effects, and vegetation regeneration around burned trees. The Forest Service, members of the LSG, and outside observers have posed questions to the monitoring coordinator who queried the database and created dozens of reports, available at:

> www.lcri.org/ecosystem_monitoring/monitoring.html

LSG plans to analyze the data gathered over a number of years to identify factors leading to improved forest health and adapt management.

Process

A forest ecologist and soil scientist designed the original protocols and directed the monitoring effort through 2005. In 2006, Clair Thomas, a Lakeview High School science teacher, began directing the monitoring work. Lake County Resources Initiative adminsters the project, and the LSG oversees all monitoring efforts. An external advisory group, which includes most of the environmental partners, also reviews all monitoring activities and reports. Every meeting includes a field tour of the monitoring sites.

Monitoring indicator data are gathered by trained, paid youth crews. Each year, an 8- to 12-member monitoring crew is assembled with local high school students and recent graduates. On average, 40% of the crew are high school students and 60% are college students and college graduates. The monitoring program coordinator trains the crews and oversees the monitoring work.

Data are stored in a relational GIS database on a dedicated server, along with narrative descriptions of methods and results. The data and narratives are available to the Forest Service, the community, and the general public on a web site. (www.lcri.org/monitoring). As discussed above, the monitoring coordinator can query the database to respond to monitoring questions posed by LSG members and others.

Examples

Indicators and methods

The LSG chose the 275-square mile Upper Chewaucan River drainage to begin its biophysical monitoring because it contains characteristics found across the Lakeview Stewardship Unit and is therefore representative of its different ecosystem types. A large sample of over 300 tenth-acre permanent plots was established across the watershed. In each of the plots, detailed data are gathered on core ecological indicators within the following categories – soil, canopy, vegetation, site map and aquatics. Unique site features are also recorded in the field.

In addition, over 800 additional $^{1}/_{50}$-acre plots were established in the remainder of the Stewardship Unit to model forest structure and behavior at a landscape-scale using the Landscape Management System computer model. Indicator data are being analyzed to determine which core biophysical indicators provide the best information and reduce the number of indicators being measured.

Indicators	Methods
Soil Soil temperature, soil compaction, rhizome depth, duff layer, soil moisture, soil depth, soil texture, topsoil chemistry	Plots and transects
Canopy Canopy height, tree diameter (DBH), tree species, crown width diameter, crown ratio, growth index, notation of unique characteristics (*disease, scarring, old growth, etc.*)	Plots and transects
Vegetation Species, height/width, total count (by species)	Line intercepts along the 30-meter transect and counts of every species within the quadrat that did not intercept the transect
Site map Slope, aspect, average age of trees, other features (*rocks, downed woody debris, dominant understory, skid trails, previously harvested trees, etc.*)	Drawing developed during the transect sampling process Also includes a map of how to access the site
Aquatics Stream profile, sinuosity/depth ratios, velocity/volumes, pebble counts, sorting, and stream behavior, temperature, water quality Hillsenhoff Biotic Index, species richness (*macro-invertebrates and flies [EPT]*)	Gathered where transects cross streams

How results are used

A body of information about ecosystem conditions on the Lakeview Stewardship Unit has been established. LSG has used multiparty monitoring to also answer questions about the effects of different management practices, allay concerns about potential management effects, and recommend management adaptations.

Some LSG members, Fremont-Winema Forest Service personnel, and program funders have questioned the efficacy of the Lakeview monitoring protocol, mainly in terms of the amount and usefulness of the data being collected. They question whether the LSG's generalized, watershed-scale monitoring protocol can be used to answer questions about

specific types of sites and specific types of management tools. They note that monitoring is usually designed in response to specific management questions – e.g. "how does a site with characteristic (x) respond to management practice (y) over a period of time?" And furthermore, "is management objective (z) (e.g. development of old-growth characteristic, development of habitat, etc.) achieved?" Others have commented that, while reports are now being developed to share monitoring results, there is a great deal of raw data that are not being used to inform management. Some participants say that the Forest Service could have a stronger role in helping design, develop, and implement the monitoring program to ensure the data are usable by the agency.

However, LSG's monitoring data have been analyzed to answer some specific questions raised by both the Forest Service and others. The monitoring program coordinator describes two cases where the monitoring results were used to address concerns and inform management. On the Abe Timber Sale there were concerns that harvesting methods would cause excessive soil compaction and impede forest recovery in an area with extremely high tree density. LSG compared soil compaction and forest recovery rate and found that the modified methods the agency was using to reduce compaction were supporting stand recovery. "We showed distinctive improvement using the new methods, and the observers agreed that in less than 10 years it will be hard to tell where the tracks were, " noted monitoring coordinator Clair Thomas. In another case, LSG monitored vegetation recovery after road closure and found that outcomes were less desirable in sub-soiled areas. Based on that finding, the Fremont-Winema National Forest now has a policy to not subsoil beyond the topsoil.

Youth development outcomes

While not an original goal, one of the notable outcomes of the Lakeview monitoring program is the opportunity it has presented to local youth. Students working on monitoring crews obtain employment and natural resource experience in their local community, which they have then been able to apply to future schooling and employment opportunities. Two local students who joined the program in high school have since earned PhDs, and the monitoring team has earned over $525,000 in scholarships by presenting papers at local, national and international science fairs.

Lessons learned

Measuring a lot of parameters does not necessarily take a lot of time. The monitoring coordinator has developed a method where all measures are taken in a series of logical steps, reducing time required for data collection. This allowed monitoring crews to gather data efficiently.

Students can do an excellent job of monitoring. The monitoring coordinator places a very strong emphasis on interactive training with each student monitoring technician. They work as interns in the first year and move on to more complex tasks in later years. With training, the students are capable of doing good, efficient work. This work also contributes greatly to the students' skill sets and experiences for academia and the workforce, as well as their knowledge of place.

Invite many diverse interests into the process. The monitoring coordinator points out that the questions posed by diverse interests have helped develop a more rigorous and effective monitoring program. Even visitors have made helpful suggestions on data collection techniques.

Examples

Budget and funding

The first year's budget was $130,000, which included the purchase of two duplicate sets of equipment. The annual operating cost is $80,000, which includes ongoing equipment maintenance and replacement.

From 2001 through 2009, the monitoring program was supported by Title II funding from the Fremont-Winema Resource Advisory Committee. In 2009, Title II money was unavailable, and the monitoring program was suspended. Partners are currently pursuing funding from a private sector partner for 2010-2011. In its Long Range Plan, the LSG indicates a desire to "integrate Forest Service staffing and finances for monitoring to the extent feasible."

For more information:

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CLOCKWISE FROM TOP LEFT: DAVID HOGEN; USDA FOREST SERVICE; GEORGE GENTRY

Monitoring guides and methods manuals

New Mexico Collaborative Forest Restoration Program Multiparty Monitoring Handbooks

In 2001, legislation was passed to grant $5 million annually to national forests and community groups in New Mexico to conduct forest restoration and improve the utilization of small-diameter trees removed from restoration projects. The legislation required each grant recipient to conduct a "multiparty assessment" of the "positive or negative impact and effectiveness of the project, including improvements in local management skills and on the ground results." The following guides and handbooks were developed from that work and provide data collection and analysis methods for common ecological and socioeconomic indicators.

> *Multiparty Monitoring and Assessment of Collaborative Forest Restoration Projects: A Short Guide for Grant Recipients*. Moote, A., M. Savage, J. Abrams, T. Derr, E. Krasilovsky, and M. Schumann. 2010. Ecological Restoration Institute, Flagstaff, AZ. www.nmfwri.org/collaborative-forest-restoration-program

> *Handbook Four. Ecological Monitoring.* Derr, T., A. Moote, M. Savage, M. Schumann, J. Abrams, and K. Lowe. 2005. Ecological Restoration Institute, Flagstaff, AZ. www.eri.nau.edu/en/information-for-practitioners/monitoring

> *Handbook Five: Monitoring Social and Economic Effects of Forest Restoration.* Derr, T., A. Moote, M. Savage, M. Schumann, J. Abrams, and K. Lowe. 2005. Ecological Restoration Institute, Flagstaff, AZ. www.eri.nau.edu/en/information-for-practitioners/monitoring

> *Wildlife Monitoring for the Collaborative Forest Restoration Program.* Parsons, D., Savage, M. Knutson, T. Derr, E. Krasilovsky, E. 2009. New Mexico Forest and Watershed Restoration Institute, Las Vegas, NM. www.nmfwri.org/collaborative-forest-restoration-program

University of Michigan Ecosystem Management Initiative

The *Measuring Progress* evaluation guide provides detailed and easy-to-follow steps to identifying and selecting indicators, gathering and managing data, analyzing data, and developing an action plan. The companion sourcebook contains extensive lists of indicators for many ecological, economic, social, and process and links to data sources.

> *Measuring Progress: An Evaluation Guide for Ecosystem and Community-Based Projects.* 2004. Ecosystem Management Initiative, University of Michigan, Ann Arbor, MI. www.snre.umich.edu/ecomgt/evaluation/tools.htm

> *Evaluation Sourcebook: Measures of Progress for Ecosystem- and Community-Based Projects.* Schueller, S.K., S.L. Yaffee, S. J. Higgs, K. Mogelgaard and E. A. DeMattia. 2006. Ecosystem Management Initiative, University of Michigan, Ann Arbor, MI. www.snre.umich.edu/ecomgt/evaluation/tools.htm

Additional Resources

Designing, Managing, and Monitoring Conservation and Development Projects

The following book was designed for conservation and development project practitioners and stakeholders. It includes detailed instructions on developing a monitoring plan, selecting indicators and methods, sampling design, data management, and data analysis. The appendix includes sample monitoring plans.

> *Designing, Managing, and Monitoring Conservation and Development Projects.* R. Margoluis and N. Salafsky. 1998. Island Press, Covelo, CA. List price $50.

Multiparty Monitoring for Sustainable Natural Resource Management

This workbook contains worksheets on developing a plan and detailed methods for implementation monitoring of employment, job quality, and byproduct utilization:

> *Multiparty Monitoring for Sustainable Natural Resource Management.* Moseley, C. and L.J. Wilson. 2002. Ecosystem Workforce Program, Eugene, OR and Watershed Research & Training Center, Hayfork, CA. http://ewp.uoregon.edu/resources/community-guidebook/

Forest Inventory and Analysis Field Guides, Methods, and Procedures

This field guide includes detailed plot setup and measurement methods for condition class, forest structure, lichen communities, soil conditions, tree crowns, vegetation diversity and structure, down woody materials, and ozone bioindicator plants:

> *Forest Inventory and Analysis Field Guides, Methods, and Procedures.* USDA Forest Service, Inventory and Analysis National Program. www.fia.fs.fed.us/library/field-guides-methods-proc/

Broadening Participation in Biological Monitoring: Handbook for Scientists and Managers

This handbook has an extensive discussion of collaborative process for monitoring, including modules and checklists for involving diverse stakeholders in each stage of monitoring:

> *Handbook for Scientists and Managers.* Pitlz, D., H.L. Ballard. and E.T. Jones. 2006. USDA Forest Service, Pacific Northwest Research Station, Portland, OR. PNW-GTR-680. www.fs.fed.us/pnw/pubs/pnw_gtr680.pdf

Communicating Successes Of Public-Private Partnerships: A Primer on How to Develop Metrics for Sharing Your White Water to Blue Water Partnership Successes

This document provides examples of social and process implementation indicators, with instructions on selecting good indicators:

> *A Primer on How to Develop Metrics for Sharing Your White Water to Blue Water Partnership Successes.* White Water to Blue Water, 2006. www.cep.unep.org/ww2bw/primers/

Sample monitoring plans and monitoring reports

White Mountains Stewardship Contract

This report is an analysis and assessment of the administrative, ecological, economic, and social monitoring data collected between 2005 and 2009 for the White Mountains Stewardship Project. The report provides a detailed account of the history, process, monitoring protocols, and initial results of multiparty monitoring on this 10-year, 150,000-acre stewardship contracting project. It also includes methods for most of the indicators and extensive wildlife monitoring

and regional economic monitoring:

> *Evaluating the Impacts of Forest Treatments: The First Five Years of the White Mountain Stewardship Project.* S. Sitko and S. Hurteau. 2010. The Nature Conservancy, Phoenix, AZ. www.fs.fed.us/r3/asnf/stewardship/multi-party-monitoring.shtml

Siuslaw Stewardship Contracting Multiparty Monitoring Report

This report describes the monitoring goals, methods, and results; primarily implementation monitoring and economic impacts:

> *Siuslaw National Forest Stewardship Contracting Multiparty Monitoring Report Fiscal Year 2008.* 2009. Integrated Resource Management, Philomath, OR. www.cascadepacificstewardship.org/resources.html

Cat Creek Stewardship Contract Multiparty Monitoring Plan

Chapter 3 of this report includes a monitoring plan for social, economic, and ecological indicators. It includes indicators and rationales for each monitoring objective:

> *A Multi-party Monitoring Protocol for the Cat Creek Stewardship Project.* D. Churchill, A. Larson, and P. Nelson. 2005. Pinchot Partnership, Gifford Pinchot National Forest. http://nationalforests.org/conserve/learning/multiparty-monitoring; www.nationalforests.org/file/download/704

Bluewater CFRP Multiparty Monitoring Plan

This report includes a basic monitoring plan presented in table format, including indicators, methods, and sampling protocols:

> *Bluewater Multiparty Monitoring Plan.* Forest Guild. www.forestguild.org/CFRP/bluewater_monitoring_plan.pdf

Technical assistance

Many multiparty monitoring groups choose to hire consultants to help develop their multiparty monitoring plan and gather and analyze monitoring data. These consultants may come from local consulting forestry companies, nearby colleges or universities, nonprofit organizations, or governmental organizations like Resource Conservation and Development Councils and the Cooperative Extension Service.

The following list includes national and regional non-governmental organizations that can provide technical assistance or assist multiparty monitoring groups with finding contractors.

Ecosystem Workforce Program
130 Hendricks Hall
5247 University of Oregon
Eugene, OR 97403-5247
(541) 346-4545
http://ewp.uoregon.edu
Contact: Cassandra Moseley
cmoseley@uoregon.edu

Flathead Economic Policy Center
919 Elk Park Road
Columbia Falls, MT 59912
(406) 892-8155
Contact: Carol Daly
cdaly1@centurytel.net

Institute for Culture and Ecology
PO Box 6688
Portland, Oregon 97228-6688
(503) 331-6681
www.ifcae.org
Contacts: Rebecca McLain, Eric Jones
ifcae@ifcae.org

Institute for Natural Resources
Oregon State University, 210 Strand Hall
Corvallis, Oregon 97331
(541) 737-9918
www.inr.oregonstate.edu
Contact: James Johnston
james.johnston@oregonstate.edu

National Forest Foundation
Building 27, Suite 3, Fort Missoula Rd
Missoula, MT 59804
(406) 542-2805 ext. 13
www.nationalforests.org
Contact: Karen DiBari
kdibari@nationalforests.org

Sustainable Northwest
813 SW Alder Street, Suite 500
Portland, OR 97205
(503) 221-6911
www.sustainablenorthwest.org
Contacts: Maia Enzer, Patrick Shannon
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pshannon@sustainablenorthwest.org

Legal and policy guidance on multiparty monitoring

Stewardship contracting

By law, the Forest Service and the BLM are required to conduct multiparty monitoring and evaluation to report on the status of the development, implementation, and administration of stewardship agreements and contracting, including specific accomplishments and the role of local communities in developing agreements or contract plans. The monitoring may include other agencies, tribal governments, and interested groups and individuals. (P.L. 108-7, Section 347(g)).

The Forest Service and the BLM have interpreted the law to require only national-level programmatic monitoring, not project-level monitoring. (A requirement for project-level monitoring of pilot stewardship contracting ended in 2003.) However, the agencies may engage in project-level multiparty monitoring where others have expressed a desire for it.

Healthy Forests Restoration Act

If "sufficient interest is expressed" in multiparty monitoring of projects authorized under HFRA, a "multiparty monitoring, evaluation, and accountability process" is required. The multiparty monitoring process should "assess the positive or negative ecological and social effects of authorized hazardous fuel reduction projects" and applied silvicultural assessments. Participants "shall include diverse stakeholders (including interested citizens and Indian tribes)." HFRA project operations funds may be used for multiparty monitoring of HFRA projects. (P.L. No. 108-148 S. 102(g)(5)).

Collaborative Forest Landscape Restoration Act

The Forest Service and the BLM are required to collaborate with "interested persons" in "a multiparty monitoring, evaluation, and accountability process to assess the positive or negative ecological, social, and economic effects of projects implementing a selected proposal for not less than 15 years after project implementation commences." (P.L. 111-11 S. 4003(g)(4)).

Notes

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US FISH AND WILDLIFE SERVICE; GEORGE GENTRY