MODULE 5: ECOLOGICAL IMPACTS

Purpose

This module describes measures for ecological restoration and rehabilitation efforts. The module is primarily focused on fire hazard reduction and its ecological effects. Because ecological goals and concerns vary considerably from place to place, these measures should be modified to address local conditions.

We offer program-level indicators to determine if restoration projects are meeting ecological goals and not causing harm. We recommend that communities interested in pursuing project-level data collection and field monitoring consult, *Community Monitoring for Restoration Projects* published by the Forest Trust (see Appendix 4). It provides detailed information about collecting field data. It was written with ponderosa pine forests in mind but many of the methods and indicators apply to other fire-prone landscapes. Several aquatic monitoring guides are also listed in Appendix 4.

General Approach

When developing your ecological monitoring program, consider your both resource restoration and resource protection (See http://www.fireplan.gov). In addition, consider focusing on those components of your efforts that are experimental or controversial. And, of course, consider the unique conditions of your landscape that should be monitored (e.g. soil type, slope, species, etc.).

Many of the measures below are the same as those suggested as part of the National Fire Plan's 10-year comprehensive plan. In some cases, federal land management agencies may be collecting this information. However, you may want to create more specific measures that address local ecological issues, such as soil conditions or noxious weed invasion.

Suggested Measures

Outcome #1: Reduced fire hazard and restored fire-adapted ecosystems.

No.	Measure	Purpose
1.A	Percent of acres in fire-adapted ecosystems in condition class 2 and 3 compared to class 1	Determine the amount of land in the moderate-to-high risk category for fire danger
1.B	Percent of acres treated that were identified in a strategic plan (such as fire safe plan)	Determine the extent to which priority acres are being treated
1.C	Percent of acres treated that were identified as priorities by the Ten-Year Comprehensive Strategy	Determine the extent to which priority acres are being treated
1.D	Percent of acres treated that shifted from condition class 3 to condition class 1	Determine if treatments are reducing fire hazard
1.E	Ratio of the costs of suppression, preparedness, and rehabilitation to fire-hazard reduction and planning	Determine if fire-hazard reduction treatments are cost effective compared to suppression

Outcome #2: Maintained or improved ecosystem health

No.	Measure	Purpose
2.A	Percent of projects implemented that included wildlife prescriptions	Determine extent to which projects are addressing wildlife habitat
2.B	Number of projects implemented that were designed to improve/protect endangered-species habitat	Determine if projects designed to improve or protect endangered-species habitat
2.C	Percent of acres treated with prescription to leave vegetation appropriate seral stage	Determine whether treatments are improving stand structure
2.D	Percent of acres with fire-adapted ecosystems that are functioning within the historical range of fire occurrences (fire regime I and II, condition class I)	Determine the extent to which fire-adapted ecosystems are being restored
2.E	Percent of acres previous burnt by wildfire that have been treated for post-fire rehabilitation	Determine the extent of post-fire rehabilitation

Objective #3: Treatments met government ecological standards and monitored their ecological impacts

No.	Indicator	Purpose
3.A	Percent of acres treated to reduce fire hazard that met water-quality guidelines	Determine the extent to which treatments follow ecological standards and guidelines
3.B	Percent of acres treated to reduce fire hazard that met soil guidelines	Determine the extent to which treatments follow ecological standards and guidelines
3.C	Percent of projects with ecological-monitoring plans	Determine the extent to which project-level ecological monitoring is occurring.

Likely data sources

Numerous agencies and organizations keep ecological data. For those related to fire-hazard-reduction Forest Service, Bureau of Land Management, and rural fire departments may be particularly helpful. The technical staff and people who work with geographic information systems may be particularly useful. Finally, members of the monitoring team and the people planning and implementing the fuels-reduction work may need to collect some data.

Similar to the need to define local in the other modules, you and your partners will have to decide the extent of the land base you want to examine. You might consider watershed, subwatersheds, national forests, county or other ecologically and socially logical boundary. As you make this decision, consider the interests of your group, how you defined "local" in earlier monitoring, how existing data is collected, and the time you have available for analysis. Some areas may be too small to have enough examples to show trends; other areas will be so larger that you are overwhelmed by information. In addition to considering your scale, you have to decide which types of land ownerships you want to

consider—public, private, or some combination. Again, you will have to balance the group's interest with the availability of data.

Monitoring Details

Outcome #1: Reduced fire hazard and restored fire-adapted ecosystems.

1.A. Percent of acres in fire-adapted ecosystems in condition class 2 and 3 compared to condition class 1

Why monitor	Determine the amount of land in the moderate-to-high risk category for fire danger
What you need	Number of acres in fire-adapted ecosystems in condition class 2 and 3 Number of acres in fire-adapted ecosystems in condition class 1 Total number of acres in fire-adapted ecosystems
How to calculate	Compare acres in condition class 2 and 3 to condition class 1

1. B. Percent of acres treated that were identified in a strategic plan (such as a fire safe plan)

Why monitor	Determine if plans are being implemented effectively.
What you need	Number of acres treated that were identified in strategic plans during your time frame Total number of acres treated
How to calculate	Sum the number of acres treated that were identified in strategic plans, divide by the total number of strategic plans, and multiply by 100.

1.C. Percent of acres treated that were identified as priorities under the 10-year comprehensive strategy (wildland-urban interface, municipal watershed, threatened and endangered species, etc.)

Why monitor	To determine if treatment programs are focusing on priority areas, as specified by the 10-year comprehensive strategy
What you need	Number of acres treated Number of those acres that address each of the comprehensive strategy priorities. (See http://www.fireplan.gov/report_page.cfm)
How to calculate	Sum the priority acres treated, divide by total acres treated, and multiply by 100

1.D. Percent of acres originally in condition class 3 in which treatment has reduced the risk to condition class 1

Why monitor	Determine if treatment projects are effective
What you need	Number of acres treated that were originally condition class 3 Number of acres treated formerly in class 3 that are now in class 1
How to calculate	Divide the number of acres originally in class 3 that were reduced to class 1 by the total number of acres originally in class 3 that were treated.

1.E Ratio of the costs of suppression, preparedness, and rehabilitation to fire-hazard reduction and planning

Why monitor	Determine if fire hazard-reduction treatments are cost effective compared to suppression.
What you need	Information on the costs of suppression, preparedness, and rehabilitation Information on the costs of fire-hazard reduction and planning Consumer price index
How to calculate	Compare historic records of costs of suppression, etc., and compare to costs of reduction and planning. Adjust for inflation.

Outcome #2: Maintained or improved ecological health

2.A. Percent of projects implemented that include wildlife prescriptions

Why monitor	Determine extent to which projects are addressing wildlife habitat.
What you need	List of all projects List of those including wildlife prescription
How to calculate	Divide those including wildlife prescription by all projects. Multiply by 100.

2.B. Number of projects implemented that were designed to improve endangered-species habitat

Why monitor	Determine if projects designed to improve endangered-species habitat
What you need	List of all projects List of those including prescriptions for endangered species
How to calculate	Divide those including endangered-species prescriptions by all projects. Multiply by 100.

2.C Percent of acres treated with prescriptions to leave vegetation in the appropriate seral stage

Why monitor	Determine whether treatments are improving stand structure
What you need	List of all projects in monitoring area List of those including prescriptions appropriate to seral stage
How to calculate	Divide those including prescriptions appropriate to seral stage by all projects. Multiply by 100.

2.D. Percent of acres with fire-adapted ecosystems that are functioning within the historical range of fire occurrences (fire regime I and II, condition class I)

Why monitor	Determine the extent to which-fire adapted ecosystems are being restored
What you need	Acres in which current fire-regime class matches historic range Historic fire-regime class for all acres (you will have to decide on a baseline time period)
How to calculate	Divide the number of acres adapted to historic conditions by total number of acres measured. Multiply by 100.

2.E. Percent of acres previously burnt by wildfire that have been treated by post-fire rehabilitation

Why monitor	Determine the extent of post-fire rehabilitation
What you need	Total number of acres burnt by wildfire Total number of acres burnt that have been rehabilitated
How to calculate	Divide acres rehabilitated by all acres burned. Multiply by 100.

Outcome #3 Projects met government ecological standards and included project-level ecological monitoring

3.A. Percent of acres treated to reduce fire hazard that were in compliance with water-quality guidelines.

Why monitor	Determine the extent to which treatments follow ecological standards and guidelines
What you need	Total acres treated Acres in compliance with water-quality guidelines
How to calculate	Divide the acres in compliance by total acres treated. Multiply by 100.

3.B. Percent of acres treated to reduce fire hazard that were in compliance with soils guidelines.

Why monitor	Determine the extent to which treatments follow ecological standards and guidelines

What you need	Total acres treated Acres in compliance with soil guidelines
How to calculate	Divide the acres in compliance by total acres treated. Multiply by 100.

3.C. Percent of projects with ecological monitoring plans

Why monitor	Determine the extent to which project-level ecological monitoring is occurring.
What you need	Total number of projects Total number of projects with monitoring plans
How to calculate	Divide number of projects with monitoring plans by total number of projects. Multiply by 100.

ABBREVIATIONS

BLM	Bureau of Land Management
FTE	full time equivalent
GS	General Services
HUB zone	Historically underutilized business zone
NFP	National Fire Plan

GLOSSARY

Appraised value—calculated dollar value of timber or other goods. The federal government has specific processes for calculating the appraised value of timber.

Base rates—the lowest amount that the Forest Service may sell timber regardless of its appraised value.

By-products—material removed as part of restoration, usually small diameter trees or other woody material.

Cut volume—the amount of timber cut and removed from federal land (see also sold volume).

Dimensional lumber—lumber cut for the commodity market, such as 2"X4"X8' boards.

Full-time equivalent—the equivalent of one person working 40 hours per week for one year. Typically, one FTE includes 40 hours per week for 50 weeks, or 2000 hours (assuming two weeks vacation). Job involving 25 weeks of 8-hour days would be 0.5FTE.

HUB zone—low income or high unemployment areas as designated by the Small Business Administration. Federal procurement contracts are sometimes set aside for businesses located in HUB zones.

Monitor—to keep track of something. For the purposes of this guidebook, monitoring involves keeping track of the social, economic, and ecological impacts of a project, program, or policy.

Multiparty monitoring—monitoring involving the active participation of stakeholders in program development and implementation.

Procurement—purchase of goods and services

Service contract—a contract for the purchase of services

Sold volume—the amount of timber sold , though may not yet be removed (see also cut volume).

Snag—a dead, standing tree

Stimulated job—a job created indirectly. For example, a grant program that trains people may lead to employment for participants. Or, a job in the local mill may supports additional jobs in grocery stores, banks, schools, etc.

Timber sale contract—an agreement between a landowner and a purchaser to sell timber.

Utilization—the processing materials of ecosystem management for activities such as habitat restoration, firewood, dimensional lumber, furniture, energy generation.

Value-added manufacturing—processes that increase the sale price of material though human or machine labor. For example, harvested raw logs have had value added to them through harvest and trucking. Dimensional lumber has more value added than raw logs; but furniture has more added value than lumber.

APPENDIX 1: DEFINING LOCAL

Throughout these modules, you are asked to define local. It is tempting to want a universal definition of "local" or "nearby." But the meaning of local varies considerably from place to place and from purpose to purpose. It implies geographical, social, and economic connection. Local implies that the people who live there have a shared sense of place. In some instances, county is an acceptable proxy for local. In other instances, people think about their places as only a small watershed or neighborhood. Local can also be considered to include multiple counties or portions of several counties. Your definition of local will have to balance people's vision of "local" with practical considerations about how data is collected and how much is available. Because people will have different perspectives and data considerations will intervene, your definition will be imperfect. Give it some thought but don't get bogged down.

Boundary approach

One common way to define "local" is to draw an area on a map with boundaries. Everything inside the map is local; everything outside is not. As you and your partners think through your definition of local, you might begin by considering what nearby means for your group. Which neighborhoods, communities, and land ownerships you want to include? After you have begun to narrow in on your ideal monitoring area, you should think about where your data is likely to come from and how it is complied. Will you be getting county or forest level data? Can you get subwatershed, district, or community data? Next, consider how much data you are likely to get if you chose your particular area. Are you going to be overwhelmed with information? Will you have too little information to reveal patterns? Finally, test your definition of local by looking on both sides of the boundaries. Has an important community or land base been left out? Are some areas unnecessarily included?

Relative approach

A second approach to defining local uses Map Quest or other simple on-line mapping tool to measure the distance between project sites and business locations or worker residences. This approach can be particularly useful if your project locations are near the edges of counties or other logical boundaries or are spread across large areas where the sense of local changes from place to place.

To determine if something is local, use web-based directions services such as Map Quest or Yahoo to calculate the travel distance between to points. In this approach, you might define local as the distance that people drive to and from work each day and still return home to sleep each night. This distance will vary considerably depending on driving conditions and local practice. The example below shows how you might determine how many local workers worked on particular project using commute distances.

A word of warning: Map Quest and other on-line mapping services will be inaccurate when your project sites are deep in national forests far from communities, as they will measure from the closest community.

Example: Measuring between work site and worker residence

What you need	A web-based mapping site like http://www.mapquest.com or http://maps.yahoo.com Zip code or name of the closest town to where the work took place List of the zip codes in which workers live
How to calculate	Using the "driving directions" option on Map Quest or similar web site, enter the zip code or name of the town nearest to where the work was performed. Then enter the zip code in which one or more workers lived. If you are given the choice between the shortest time or the shortest distance, use the shortest distance. It is usually more accurate. Count as "local" all zip codes within a given distance of the project site.