GFFP Monitoring & Research Team
Adaptive Management Framework
6/21/05

The following tables were developed by the Greater Flagstaff Forests Partnership (GFFP) Monitoring and Research Team as the initial makings of a monitoring and research plan for the 180,000 acre project area of the GFFP (see www.gffp.org). This framework could be applied to a smaller or larger landscape. The following five broad areas of concern reflect the monitoring needs categories of this partnership, and are divided into fuels reduction, ecosystem restoration, social issues, economic health, and institutional health. This is a very broad framework of what areas COULD be monitored within the larger area. The actual application of what SHOULD be monitored within individual projects may be a much smaller, and more focused subset of these variables. Decisions about which goals are desirable for individual projects should be decided by the actual project designers (e.g., ID team), and determined based upon very specific project objectives, the specific landscape that is affected by the project, the desired conditions for that landscape, and how those desired conditions are proposed to be achieved. Also, an explicit relationship needs to be developed between an analysis of the outcomes of the monitoring, and how those outcomes affect future management. **Objectives and indicators in BOLD are considered a priority in the monitoring process.**

***** For terms marked with an asterisk, please see glossary at end of document for current definitions and references, or click on the hyperlink.

GOAL: Reduce threat of uncharacteristic* fire							
Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr)**
Create conditions that are conducive to the increased use of frequent, low intensity fire* in the fire-adapted landscape, including fires resulting from both human and natural ignitions	**1. Forest Vegetation Simulator (FVS) w/ Fires & Fuels Extension** **2. Fire model ** (e.g. NEXUS or FLAMMAP) runs indicate that fuels reduction treatments are effective in reducing the risk of active and passive canopy fire*** **3. Cumulative acres in characteristic and uncharacteristic fire condition (Fire Regime Condition Class)** 4. Number of acres in Fire Use Plans 5. Number of acres where "monitoring" or containment is considered an appropriate suppression tactic	(1-2) [1] - Canopy cover - Stand height - Crown base height - Crown bulk density - Deadwood fuel loading - Litter, dead, and live fuels moisture levels (3-5) - Annual reports of acres treated [2] - Forest ERA analysis process	- Before and after treatments, FVS uses stand data typically collected by USFS personnel. FLAMMAP gives predictive ability; factor in continued treatment	Project and roll up to landscape	USFS district, regional, RMRS? Volunteers? Forest ERA	QA/QC and compare outputs and applicability, limitations, assumptions of different models	H
Reduce risk of uncharacteristic* fire for community protection and other special areas	**1. Fire model** **2. Defensible space**	1. See above - #2 indicator 2. Amount of defensible space around neighborhoods/homes	Pre- and Post-treatment; Seasonally (bi-annually or quarterly)	Short term- Project Long term- Regional			H

** **What are known thresholds?**
Depends on fuel model, but thresholds exist for surface or ground fire, passive canopy fire and active canopy fire.

[1] Brown 1974, Anderson 1978, Scott 1999, http://fire.org/nav.mas?pages=fire&mode=14
[2] http://www.frcc.gov/

GOAL: Restore Forests Ecosystem Health							
Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
Increase use of frequent, low intensity fire in the landscape (or ponderosa pine and associated ecosystems) Improve fire regime*	**1. Number of acres burned by characteristic* surface fire (both Rx and wildfire individual and combined)**	USFS, state/private, county, and city review of accomplishments (units in ac/ha and # of burns) List by FY and CY	Annual & cumulative	Project & Landscape Short & Long-term	USFS, ASLD, fire districts; compiled by GFFP		L if fuels reduction monitoring is done
Create conditions that are conducive to the increased use of frequent, low intensity fire in the landscape	1. Number of acres that will support a surface fire	See above in **Fuels Reduction**	Annual & cumulative	Project & Landscape	USFS, ASLD, fire districts; compiled by GFFP		L
Retain, enhance, and develop old and large trees*, both living and dead, and mature ecosystems-pp & Gambel oak	**1. Number of old/large trees/acre 2. Number and decay class of snags & dead/down trees/acre 3. Number of acres of existing and developing old growth* ecosystems**	1. USFS and partner surveys of trees per acre by stand 2. Cumulative survey of OG areas [3]	Before and after projects	Project scale rolled up to landscape level	USFS does some surveys, needs evaluation for meeting needs of goal	Landscape survey and analysis	L at project H at landscape
Conserve and enhance native species*' (flora & fauna; threatened, endangered, rare, sensitive) populations and their habitat and reduce invasive, nonnative species*	1. Abundance, distribution & diversity of selected native species 2. Abundance, distribution & diversity of nonnative selected species 3. Number of acres of intact native habitat*	(1-2) Species transects and quadrats, point-intercept data and time-constrained sampling in selected areas and for selected species [4] (3) USFS surveys	Before and after treatments/projects Annual/seasonal	Project scale rolled up to landscape level	1. MIS by USFS 2. USFS does some surveys, needs evaluation for meeting needs of goal. 3. ERI does some 4. RMRS		H
Conserve soil resources	1. Degree of erosion **2. Amount of bare ground 3. Under story/ground cover**	Field surveys [5]	Before and after projects	Project & Landscape			M?
Maintain and improve watershed function	1. Amount of water flow, timing (hydrograph), and water quality 2. Degree of erosion & sedimentation	Stream gages, direct water sampling, geomorphology measures[6]	Before and after projects Annual	Project & Landscape			M

[3] Harrington, Michael G.; Sackett, Stephen S. 1992, Coconino LMP 1987.
[4] Pellant et al. 2000, Pyke et al. 2002.
[5] Herrick et al. 2002. (Jornada experimental range)
[6] Taylor 1999, O'Dea 2003.

GOAL: Improve Social Understanding & Acceptance of Land Management Practices							
Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
SUB GOAL: MAINTAIN QUALITY OF LIFE							
Reduce the perceived risk of uncharacteristic (high intensity) fire	**Perceived risk/threat of uncharacteristic (high intensity) wildfire that will directly or indirectly affect residents' quality of life**	1. Survey residents to determine the perceived risk/threat of uncharacteristic (high intensity) fire 2. Focus groups during GFFP field trips/presentations.	Pre- and Post-treatment surveys/focus groups	Short term- Project Long term- Regional			M
Increase the perceived benefits of characteristic (frequent, low-intensity) prescribed and natural fires	**Perceived benefit of characteristic (frequent, low-intensity) prescribed and natural fires that will directly or indirectly affect residents' quality of life**	1. Survey residents to determine the perceived benefit of characteristic (frequent, low-intensity) prescribed and natural fires 2. Focus groups during GFFP field trips/presentations	Pre- and Post-treatment surveys/focus groups	Short term- Project Long term- Regional			M
Reduce the risk of uncharacteristic (high intensity) fire	**1. Fire model** **2. Defensible space**	**1. See "Fuels Reduction" metrics** 2. Acres of defensible space around neighborhoods/homes 3. Location of defensible space relative to high risk fire areas	Pre- and Post-treatment; Seasonally (bi-annually or quarterly)	Short term- Project Long term- Regional			H
Increase/maintain public's perception of recreational opportunities, in the context of restoration activities, in the local community	Public perception of access and level of use for recreational activities in the forests in and around the local community (in the context of restoration activities)	Survey residents to determine perception of recreational opportunities in the forests in and around the local community (in the context of restoration activities)	Pre- and Post-treatment surveys	Short term- Project Long term- Regional			M

Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
Protect/promote the aesthetic value of the forest	Public perception that restoration projects will/are preserving and promoting forest aesthetics in and around their community	1. Survey residents to determine perception of the effects of restoration efforts on forest aesthetics in and around their community 2. Focus groups during GFFP field trips/presentations	Pre- and Post-treatment surveys/focus groups	Short term- Project Long term- Regional			M
Protect/promote spiritual value/archeological/historic sites of the forest	- Public perception that restoration projects will/are preserving and promoting the spiritual value of the forest - Archeological, cultural, historic sites are protected	1. Survey residents to determine perception of restoration efforts in protecting the spiritual value of the forest. Over sample Native American members of the community. Conduct personal interviews/focus groups with Native American members of the community. 2. Focus groups during GFFP field trips/presentations	Pre- and Post-treatment surveys/focus groups	Short term- Project Long term- Regional			M
Reduce the number of human-caused forest fires in the GFFP area	Number of human-caused fires in the forest in the GFFP area	Forest Service logs of fire occurrences and the ignition sources	Pre- and Post-program implementation	Long term- Regional			M
Public's perception of forest closures	Public's knowledge of the reasons for forest closures	Survey residents to determine knowledge of why forest closures occur; does the public link it to restoration activities?	Pre- and Post-program survey	Short term- Program Long term- Regional			M
Public's perception of forest restrictions	Public's knowledge of the reasons for forest restrictions	Survey residents to determine knowledge of why forest restrictions occur; does the public link it to restoration activities?	Pre- and Post-program survey	Short term- Program Long term- Regional			M

Objective	Indicator	Metric	Frequency	Scale *Project, Community, Regional*	Currently Implemented by/ Information available…	Tasks Needed to Complete/ By Whom	Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr
SUB GOAL: INCREASE PUBLIC INVOLVEMENT IN RESTORATION EFFORTS							
Increase the knowledge/ perception of "Fire Wise" principles/communities and implementation of defensible space	1. Amount of public knowledge/perceptions of "Fire Wise" principles/communities 2. Public knowledge/perceptions of implementing "defensible space" (space near and around homes)	Survey residents to determine the knowledge/perceptions of "Fire Wise" principles/communities and implementation of defensible space	Pre- and Post-program implementation	Short term- Program Long term- Regional			M
Increase the number of communities that are recognized as "Fire Wise" in the GFFP area	Number of communities in the GFFP geographic area designated as "Fire Wise"	Determine number of communities in the GFFP region that are recognized as "Fire Wise" through certification of Firewise/Communites/ USA (Currently in AZ → Timber Ridge)	Pre- and Post-program implementation	Long term- Regional			H
Increase the number of neighborhoods/households that are implementing "Fire Wise" principles around their homes	1. Number of households that are implementing (the degree of) "Fire Wise" principles around their homes **2. Number of neighborhoods that are implementing "Fire Wise" principles**	1. Survey residents to determine their level of implementing "Fire Wise" principles around their homes 2. Interview fire station personnel in neighborhood/home assessments 3. Review fire station field survey logs	Pre- and Post-program implementation	Short term- Program Long term- Regional	Local Fire Departments		M

Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
Increase community involvement in restoration activities. Pay special attention to youth service corp. programs that include middle-high school age students	1. Number of GFFP sponsored workshops, field trips, etc. 2. Number of youth programs established by GFFP that promote involvement & education with restoration efforts 3. Number of participants and/or groups attending GFFP events 4. Number of service groups participating in GFFP events 5. Attendance of GFFP meetings - public and GFFP members	1. Review GFFP logs 2. Review event coordinator logs	Pre- and Post-program implementation	Short term- Program Long term- Regional			M
Improve public access and participation in forest restoration	**1. Public's perception of the ability to participate in restoration activities and forest planning** **2. Public's access to information pertaining to restoration activities** 3. Media types utilized to disseminate GFFP information 4. Most common media sources used by the public to access restoration information	1. Survey residents to assess their perceived ability to participate and obtain information regarding restoration activities and forest planning 2. Review number and type of GFFP public announcements for restoration activities 3. Survey public to determine most desirable media source(s) to access the information	Pre- and Post-program implementation	Short term- Program Long term- Regional			M

Objective	Indicator	Metric	Frequency	Scale *Project, Community, Regional*	Currently Implemented by/ Information available…	Tasks Needed to Complete/ By Whom	Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr
SUB GOAL: INCREASE PUBLIC INFORMATION/SUPPORT FOR RESTORATION PROJECTS							
Increase perceptions of "healthy forests" resulting from forest restoration activities that include characteristic wildfire, wildlife habitat and watershed function in and around communities/GFFP geographic areas	Public perception of restoration activities resulting in "healthy forests" in and around their community	Survey residents to determine perceptions of restoration activities resulting in a "healthy forest"	Pre- and Post-program implementation	Short term- Program Long term- Regional			M
Increase awareness/support/ notification for restoration projects	1. Campaigns that are in place as informational tools for restoration projects 2. Number of public notifications that include: prescribed burns-posting signs, new releases, door-to-door in neighborhoods, public meetings, presentations to service clubs/organizations, press releases, development and distribution of material and participation of GFFP in community events	1. Review number of GFFP sponsored workshop, field trips, etc. 2. Review of the number of community participants in the events 3. Review number of public notifications for prescribed burns-posting signs, new releases, door-to-door in neighborhoods, public meetings, presentations to service clubs/organizations, press releases, development and distribution of material and participation of GFFP in community events 4. Perform content analysis of campaign types and messages 5. Conduct focus groups to assess perceived messages of GFFP literature	Pre- and Post-program surveys/focus groups	Short term- Program Long term- Regional			M

Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
Increase awareness/support for restoration projects	1. Number and content of local publications, editorials and letters to the editor regarding restoration efforts (Non-GFFP members) 2. Number and content of USFS public comments	1. Content analysis: review number and content of local publications, editorials and letters in to the editor regarding restoration efforts 2. Content analysis/frequency of public comments submitted to the USFS	Pre- and Post-treatment/implementation	Short term- Program Long term- Regional			M
Increase public educational programs –will reduce impacts to archeological sites, sensitive wildlife and riparian habitat.	1.Number of newely established interpretive trails 2. Type of interpretive trails 3.Number of newly established designated trails 4.Number and type of interpretive signage in caqmpgrounds						
Increase public support for mechanical thinning, road alteration and smoke as necessary tools for ecological restoration	1. Number of complaints to authorities regarding thinning, road construction and smoke resulting from a restoration project(s) 2. Number of complaints to authorities for faster and more efficient implementation of restoration efforts **3. Survey residents to determine perception of the effects of smoke from restoration efforts**	1. Examine local fire department and police logs - Review type and number of complaints filed per restoration project - Review number and type of requests to initiate or complete restoration projects	Pre- and Post-program/treatment implementation	Short term- Program Long term- Regional			M
Improve awareness and public attitude towards partners & cooperators involved in restoration projects (e.g., USFS, ERI, NPS, GCT, TNC, Flagstaff Fire Dept., etc.)	Public's awareness and perceptions of GFFP partners and cooperators	1. Survey residents to determine attitudes towards GFFP partners and cooperators in regards to their involvement in restoration efforts 2. Focus groups of residents to determine	Pre- and Post-treatment surveys/focus groups	Long term- Regional	USFS national surveys		M

		attitudes towards GFFP partners and cooperators					

Objective	Indicator	Metric	Frequency	Scale *Project, Community, Regional*	Currently Implemented by/ Information available…	Tasks Needed to Complete/ By Whom	Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr
Decrease number of appeals and lawsuits filed against GFFP projects	1. Number of appeals of GFFP supported projects 2. Number of lawsuits of GFFP supported projects 3. Number of acres analyzed and treated through the NEPA process	1. Review appeals to determine number filed against GFFP projects 2. Review lawsuits to determine number filed against GFFP supported projects 3. Review the results of the appeal. Was it upheld? 4. Length of time it took the agency to process the appeal	Pre- and Post-program implementation or annual	Short term- Program Long term- Regional	J. Swartz/H. Cortner study		M
Increase public's knowledge of ecologically-based fuels reduction	Public's knowledge of ecologically-based fuels reduction	1. Survey residents to determine knowledge of ecological-based fuels reduction 2. Focus groups during GFFP filed tips/presentations	Pre- and Post-program surveys/focus groups	Short term- Program Long term- Regional			M

A sustainable community is linked to a sustainable ecosystem. ***Healthy forest → Community well-being.***

Steps in the Evaluation Process

Longitudinal Study – Process Evaluation - assess changes over time.

1. Collect baseline data-establish an understanding of what currently exists; before intervention (treatments or programs).
2. Collect data at stages as projects progress; either at regular time intervals or after major interventions.
3. What is the change from pre- to post-test? Analyze the data.
4. Answer the question - Have goals been met? Establish criteria for successful outcomes.
5. Recommendations - refine treatments and programs; guide planning and education efforts.

Areas to explore

1. Insurance industry – current status of homeowner insurance for forest fire loss.

2. USFS and congressional representatives – determine public pressure thresholds to either suspend or omit restoration prescriptions.

References: Improve Social Understanding and Acceptance of Land Management Practices

Greater Flagstaff Forest Partnership and The Ponderosa Fire Advisory Council. 2004. *Greater Flagstaff Community Wildfire Protection Plan.* Retrieved July 26, 2004 (http://www.gffp.org/docs/June_draft.htm).

United States Forest Service and Ecological Restoration Institute. 2004. *The Multiparty Monitoring Handbook Series.*

"Monitoring Social and Economic Effects of Forest Restoration." Handbook Five. Retrieved July 8, 2004 (http://www.fs.fed.us/r3/spf/cfrp/monitoring/index.shtml).

Firewise Communities/USA. Retrieved August 3, 2004. (http://www.firewise.org/usa/).

Royse, David, Bruce A. Thyer, Deborah K. Padgett and T. K. Logan. 2001. *Program Evaluation*. 3d ed., Belmont, CA:Wadsworth/Thompson Learning.

The Federal Emergency Management Agency. 2004. "At Home in the Woods. Lessons Learned in the Wildland/Urban Interface." Retrieved July 30, 2004 (http://www.fema.gov/regions/viii/athome_woods.shtm).

GOAL: Improve Economic Health of the Community							
Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
Ensure the availability of forest material at a sustainable, consistent level to support appropriate forest product industries	**1. Number of contracts that are awarded locally** **- Type & length of contracts awarded** **- Total value of the contract** **2. Number of acres and total volume (cords) in long-term contracts (10+ years) in the local area** **3. Percent of contracts that are awarded to locally owned businesses** **4. Number of businesses operating close to capacity (approx. 75% +)** **5. Percentage of NEPA-ready acres that are offered contracts each year**	Review USFS and SLD contract reports - Acres - Total volume - Type of contract - Length of contract	Annual	Project Community	1. USFS - Goods for Services Contracts - Service Contracts - Timber Sale Contracts - Stewardship Contracts 2. State Land Department		L
Increase the amount of wood products (small diameter and value-added) that are processed locally	**1. Percent of harvest that is processed locally** **2. Total volume (cords) of small diameter material and/or value-added products processed locally** **4. Number and type of value-added products produced locally** **5. Number & size of locally owned businesses producing small diameter and/or value-added products**	1. Review forest product businesses production reports 2. Interviews/focus groups with forest product companies producing small diameter material and/or value-added products	Annual	Community	1. USFS 2. State Land Department 3. Greater Flagstaff Economic Council 4. Chamber of Commerce		L-M
Increase the amount of small diameter wood products that are distributed locally	**1. Total volume (cords) of small diameter wood products that are**	1. Surveys/interviews with all forest product companies utilizing small diameter material and/or value-added	Annual	Community	1. Local forest products industries		L

Objective	Indicator	Metric	Frequency	Scale *Project, Community, Regional*	Currently Implemented by/ Information available…	Tasks Needed to Complete/ By Whom	Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr
Expand and diversify uses for small diameter Expand and diversify uses for small diameter material and/or value-added products. (The more value-added products, the more cost effective the restoration)	**1. Number and type of local businesses utilizing or selling small diameter material or value-added products** **2. Total volume (cords) of small diameter or value-added products utilized by local businesses** **3. Number and type of products utilized or sold by local businesses** 4. Size (diameter) of wood/raw material utilized	1. Surveys/interviews with all forest product companies utilizing small diameter material and/or value-added products 2. Review products specs of forest products industries	Annual	Community Regional	1. Manufacturing Directory 2. Local forest product industries 3. State Land Department		
Increase investment, research and development in utilization of small diameter trees	1. Number of local forest product industries involved in market research for small diameter wood uses 2. Amount invested by local businesses for development and research 3. Type and amount of market analysis 4. Number of companies applying for grants that support small diameter market research	Surveys/interviews with all forest product companies utilizing small diameter material and/or value-added products	Annual	Community Regional	Local forest product industries		

Objective	Indicator	Metric	Frequency	Scale *Project, Community, Regional*	Currently Implemented by/ Information available…	Tasks Needed to Complete/ By Whom	Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr
Ensure adequate public infrastructure to maintain projects	1. Number and type of utilities, transportation, and facilities available to support restoration projects	Review planning documents and infrastructure databases	Annual	Community	State, local & county planning departments		L
Ensure adequate private infrastructure to maintain projects	1. Number and types of equipment and technically trained staff to support restoration projects	Surveys/questionnaire with all forest product companies utilizing small diameter material and/or value-added products	Annual	Project Community	Businesses & operators		L
Provide employment opportunities to local area residents in forest restoration projects	**1. Number of employees (by category) in forest restoration related companies in the region** **- Seasonal** **- Permanent** **- Harvesting** **- Processing** **- Restoration** 2. Proportion of local residents employed by forest product and restoration-related companies 3. Number of employees that are receiving benefits 4. Employee salaries 5. Total number of minority employees, by group	1. Surveys/questionnaires with all forest product companies utilizing material from restoration projects 2. Latest employment statistics					
Provide professional training to local residents to work on forest restoration projects	1. Number, type and level of professional training events 2. Number of participants in professional training events	1. Survey training institutions to determine number of events/participants and type of events 2. Review number and type of state or federal sponsored trainings	Annual	Project Community	1. Project leaders 2. State and federal training facilitators		L

GOAL: Institutional Health							
Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost L- <$1000/yr M- $1K-10K/yr. H- >$10K/yr**
Increase annual budget to facilitate forest ecosystem restoration	1. Annual budget of GFFP, with operations as a percent 2. Number of donors, gifts, grants and contracts awarded (public & private) by category 3. Number of 5-6 figure projects budgets/grants by category	1. Review budget 2. Review development database	Annual				
Increase satisfaction among GFFP partners	Partner satisfaction (strategic direction, conflict resolution, consensus building, etc.)	1. Survey (D. Hospodarsky)	Annual				
Maintain and enhance collaborative effort among partners	1. Number of PAB members 2. PAB and work team participation and attendance 3. Content analysis of meetings 4. Number of independent projects between partners fostered by GFFP 5. Content analysis of editorials	1. Review meeting minutes 2. Reports from partners 3. Review newspaper editorials	Annual				
Achieve annual objectives and develop long term strategy	1. Proportion or number of goals and objectives achieved 2. Long term strategic plan development and perception among members of its implementation	1. Review of objectives and cumulative achievement of goals 2. Creation of document 3. Survey of GFFP members	Annual				
Implement MOUs developed with USFS Cooperators (RMRS PNWRS, SRS, FPL, CNF)	Percent of "shalls" in MOUs followed	1. Review of MOUs	Annual				
Increase communication among GFFP partners, cooperators and project team members	1. Percent of project updates that are current 2. Minutes are shared between BOD, PAB and work teams 3. Partner's perception of communication 4. Amount and type of website updates	1. Survey of GFFP partners 2. Content analysis of minutes 3. Website analysis	Annual				

Objective	**Indicator**	**Metric**	**Frequency**	**Scale** *Project, Community, Regional*	**Currently Implemented by/ Information available…**	**Tasks Needed to Complete/ By Whom**	**Cost** **L- <$1000/yr** **M- $1K-10K/yr.** **H- >$10K/yr**
Increase visibility of GFFP at regional and national level	1. Number of visits to website, project area, media hits 2. Requests for GFFP documents, presentations	1. Review website log 2. Interviews 3. Elected official's meeting 4. GFFP records					

Glossary for Greater Flagstaff Forests Partnership
Research and Monitoring Team

Characteristic & Uncharacteristic– In ecological systems, this refers to whether or not a variable or condition of the ecosystem or its parts is included in what is known about its historic or natural range of variability, which may be specific to a given geographic area. E.g., we know from tree ring studies around Flagstaff that the historic range of variability for low intensity fires for the period of 1500 to 1872 was 2-15 years. Thus fires that currently occur within that range are characteristic in frequency (see **Fire Regime**).

Fire Regime -- A fire regime is defined according to fire characteristics such as intensity, frequency, severity, season, extent, duration, behavior, spatial distribution, and type of fire (see **Crown Fire**).

Fire Regime Condition Class (FRCC) -- - http://www.frcc.gov/

Old Trees, Old Growth Trees, Old Growth Forest –

Forest Health/Healthy Forest –

Native Species/Non-native Species

Ecosystem Restoration

Community Protection

Surface Fire -- A fire that burns over the forest floor, consuming litter, killing aboveground parst of herbaceous plants and shrubs, and typically scorching the bases and crowns of trees. Source: Barnes, Burton V., Donald R. Zak, Shirley R. Denton, and Stephen H. Spurr. 1997. Forest Ecology (4th Edition). John Wiley and Sons, Inc. New York, NY p. 281 (se also **Crown Fire**).

Sustainability

Appropriate Forest Product Industry

Indicator

Metric

Method

Monitoring Cost Categories
L – Low = $1-1,000 per year or monitoring period/effort
M – Medium = $1,000 – 10,000
H – High = $10,000 - $100,000

Crown Fire, Active and Passive -- This is a fire that travels from one crown (or treetop) to another in dense stands of trees, killing most trees in its path. However, even in intense crown fires, unburned strips may be left due to powerful, downward air currents. A passive (or dependent) crown fire relies upon heat transfer from a surface fire burning below the crowns. An active (or independent) crown fire does not require transfer of heat from below the crowns. Source: Barnes, Burton V., Donald R. Zak, Shirley R. Denton, and Stephen H. Spurr. 1997. Forest Ecology (4th Edition). John Wiley and Sons, Inc. New York, NY. p. 282. (see also **Surface Fire**)

Qualitative vs. Quantitative vs. professional judgment

Indicator vs umbrella vs MIS

Flagstaff area = 100 mile radius

Small diameter material = dbh <16”