



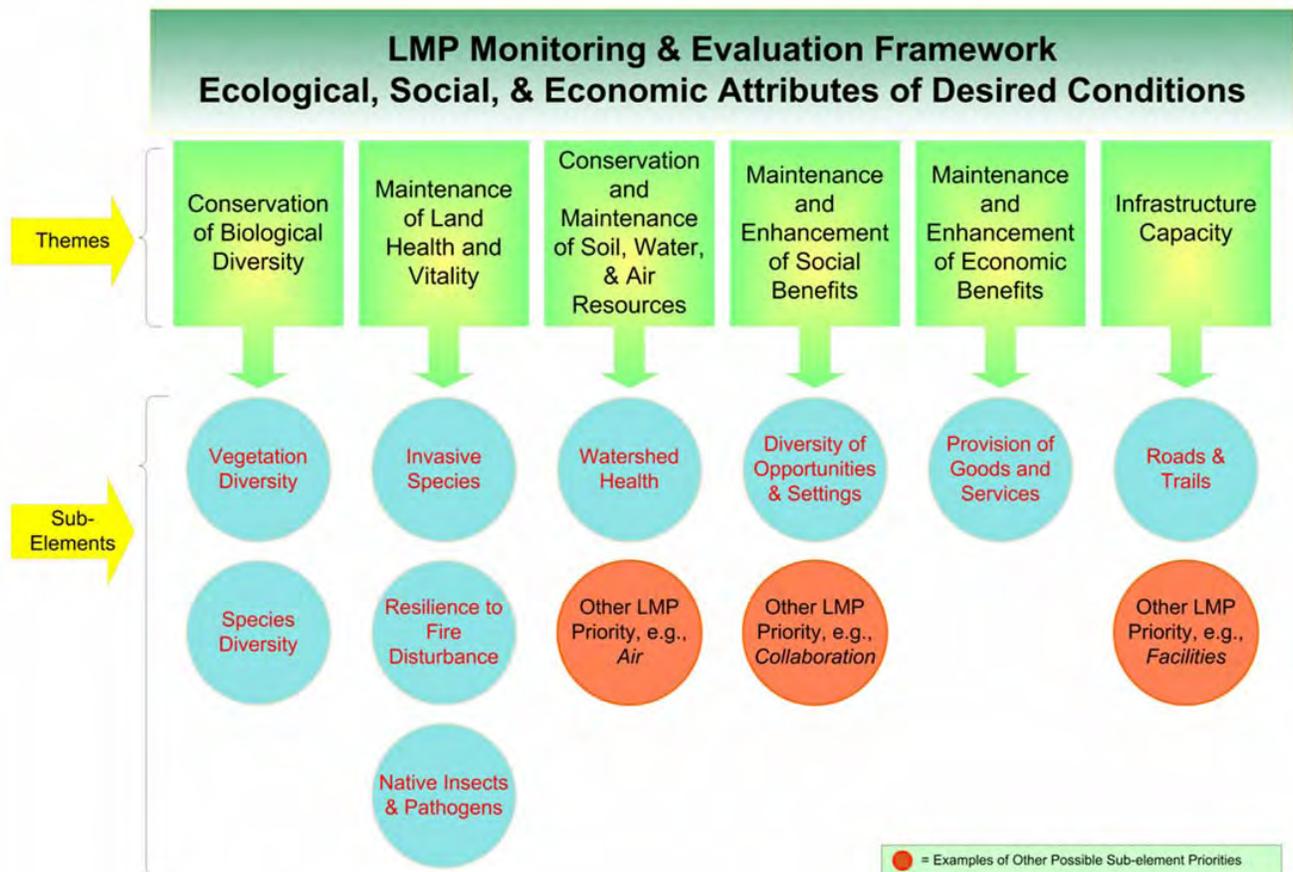
United States
Department of
Agriculture

Forest Service

April 2007

LMP Monitoring and Evaluation

A Monitoring Framework to Support Land Management Planning



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A National Monitoring and Evaluation Framework

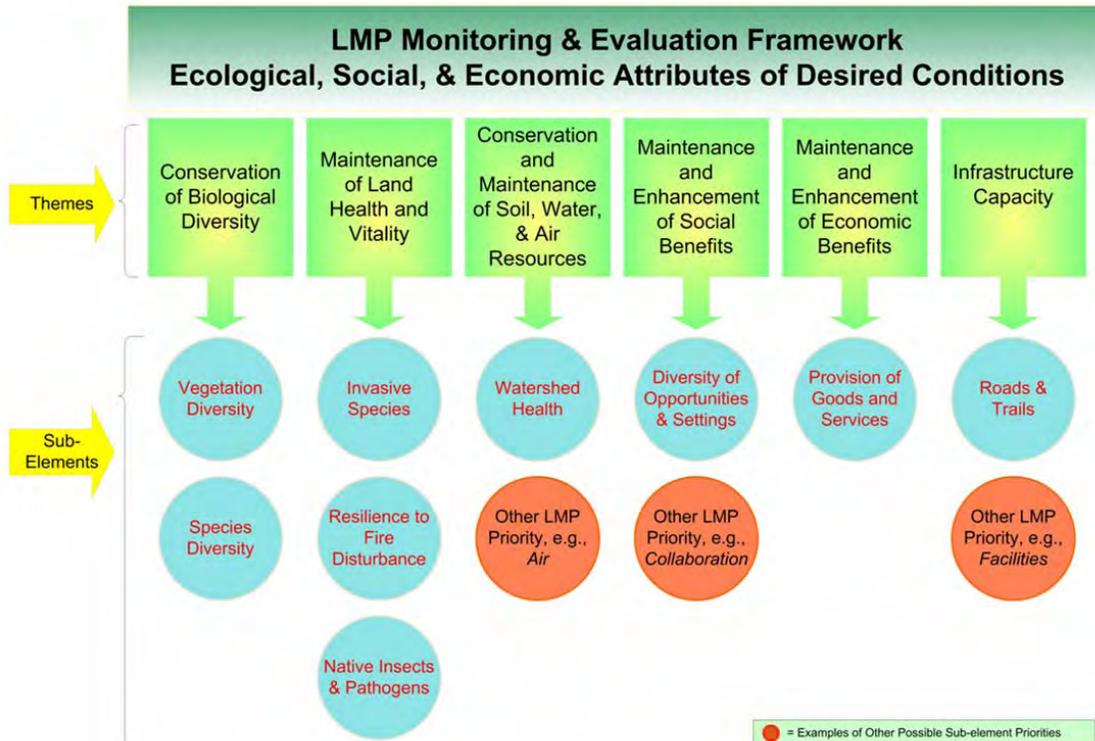
Since passage of the National Forest Management Act (NFMA, 16 USC 1600-1614), the Forest Service has developed many Land Management Plan (LMP) Monitoring and Evaluation strategies. However, none served as a cohesive framework that proved useful and relevant across all forests and grasslands agency-wide, or could be used as a tool for meeting regional and national reporting needs. The MET was chartered to develop a framework for application agency-wide as the foundation of a multi-scale National Forest System (NFS) monitoring and evaluation program.

“The MET will develop a unified, multi-scale national framework for monitoring progress towards achieving both standard and unique LMP desired conditions and objectives on National Forest System (NFS) lands. This framework will form the foundation for a NFS monitoring and evaluation program within the agency resource information strategy.”

2005 MET Charter

The six themes of the LMP M&E framework nestle within, and/or are compatible with other related national monitoring systems. Similarly, where corporate performance measures were applicable, they were applied to the LMP M&E framework thus contributing to a unified, multi-scale LMP-oriented framework for monitoring forest/grassland, regional, and national progress toward achieving standard and unique desired conditions on forests within the NFS. As an organizing tool, the framework serves as a platform on which to bring diverse communities of interest together to characterize and tell multiple, integrated stories, characterizing social, economic, and ecological elements of sustainability and progress towards desired conditions.

The themes and sub-elements of the LMP M&E framework provide the architecture for development of LMP desired conditions and related performance measures (see following figure). The LMP M&E framework enables a consistent NFS approach in monitoring progress of land management toward achieving desired social, economic, and ecological conditions. Properly applied, it will serve as a tool to launch discussions of progress and emerging issues, to inform the need for change, and to increase the capacity of collaborative processes with our neighbors.



Context for NFS M&E Framework

Required Monitoring and Evaluation

NFMA requires "...continuous monitoring and assessment in the field" to have the basis for "evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land" (16 USC 1604(g)(3)(C)). Land management planning is an adaptive management process requiring evaluations of social, economic, and ecological conditions and trends that contribute to sustainability and that, therefore, reflect progress towards the land management goals for each NFS unit. Monitoring efforts and evaluations characterize key social, economic, and ecological performance measures relevant to a plan area.

Characterizing Key Attributes of Economic, Social, and Ecological Conditions

The six themes of the LMP M&E framework summarize key forest management legislation that guides and regulates management on the NFS and reflect interrelated and interdependent social, economic, and ecological elements of sustainability. The six themes fall into four general categories: vital functions and attributes (biodiversity, land health, and soil and water protection), social values, economic values and benefits, and aspects of infrastructure affecting delivery of multiple LMP objectives.

- **Theme 1 - Conservation of Biological Diversity:** This theme addresses NFS contributions to securing the nation's heritage of plant and animal species in the plan area. Disturbance processes are included under maintenance of land health and vitality theme (T-2). In addition, abiotic plan components for ecosystem diversity are included under the conservation and maintenance of soil, water, & air resources theme (T-3).
- **Theme 2 - Maintenance of Land Health and Vitality:** This theme addresses ecological disturbance processes affecting social, economic, and ecological conditions within LMP plan areas.
- **Theme 3 - Conservation and Maintenance of Soil, Water, and Air Resources:** This theme addresses the ecological condition (for soil, air, and water) of watersheds to protect the physical, chemical and biological integrity; the productive capacity of NFS land; water quality and quantity; and opportunities for beneficial uses. It also addresses the related capacity of watersheds to respond resiliently to flooding and to reach or sustain their aquatic ecosystem potential.
- **Theme 4 - Maintenance and Enhancement of Social Systems:** This theme addresses the opportunities, settings, suitable uses for multiple-use provided by the NFS, including opportunities for market and non-market activities. Related goods and services derived from the opportunities and settings provided are reflected in the economic theme.
- **Theme 5 - Maintenance and Enhancement of Economic Systems:** Given the opportunities and settings, suitable uses, and activities designed to make progress towards desired conditions, there are goods and services that come off the land. This theme is about goods and services derived from the opportunities and settings referenced in the social theme (T-4). Key contributions of goods and services include revenue and jobs associated with recreation, tourism, resident amenities, environmental services, and commodities such as AUMs and the potential for timber production.
- **Theme 6 - Infrastructure Capacity:** This theme addresses NFS infrastructure's ability to contribute to the aspirations characterized in the LMP.

In addition to the six themes, the framework establishes and conveys a vital few set of nine social, economic, and ecological sub-element priorities to be considered in respective Forest/Grassland LMP monitoring programs. *Common sub-element priorities include: vegetation diversity, species diversity, invasive species, resilience to fire disturbance, insects and disease, watershed health, diversity of opportunities and settings, provision of goods and services, and roads and trails.*

Taken together, the themes and sub-elements of the framework suggest an implicit definition of the conservation and sustainable management of NFS landscapes at the LMP level. The themes and sub-elements provide and characterize a framework to guide and evaluate on the ground management. It is recognized that no single theme or sub-element alone is an indication of progress towards the sustainability goal. Rather, individual themes and sub-elements should be considered in the context of other themes and sub-elements.

Required Reporting

Monitoring results are reported in the required periodic evaluations that may cover a single year (annual reports) or multiple year periods. These evaluations synthesize data and information derived from the key social, economic and ecological performance measures. An annual evaluation report of monitoring information is not intended to be a comprehensive compilation of all the monitoring and evaluation described in the plan. Rather, it may be limited to a few key characteristics or key attributes established in the monitoring program or annual monitoring work plan. The LMP M&E framework identifies the vital few elements that are common to the majority of NFS units. For each element, the LMP M&E Framework identifies desired conditions and related performance measures. The framework includes illustrations for augmenting these as appropriate to reflect locally desired specificity for place-based aspirations. The monitoring results are reviewed by the Responsible Official and form the basis for determining whether the monitoring plan or the forest plan need to be changed.

Required Monitoring and Evaluative Questions

Monitoring requires addressing key social, economic, and ecological performance measures. Selection of those measures is based upon relevancy to the following four key questions that derive from NFMA:

1. Monitoring to determine whether plan implementation is achieving multiple use objectives;
2. Monitoring to determine the effects of the various resource management activities within the plan area on the productivity of the land;
3. Monitoring of the degree to which on-the-ground management is maintaining or making progress towards the desired conditions and objectives for the plan;
4. Adjustments of the monitoring program or plan content as appropriate to account for unanticipated changes in conditions, new information, or new policy.

The LMP M&E framework contain a vital few set of key social, economic, and ecological priorities common to the NFS. The Themes and sub-element priorities with related monitoring questions and performance measures are designed to answer the required monitoring questions. Associated monitoring questions are considered integral to the development of comprehensive evaluation reports and are designed to inform determination of whether a need for change exists.

Sustainability and Desired Conditions

Sustainability for any unit has three interrelated and interdependent elements: social, economic, and ecological. A plan can contribute to sustainability by providing a framework to guide on the ground management; however, a plan by itself cannot ensure sustainability. Sustainability as such, is not a destination: rather; it is viewed as a journey of incremental decisions modified through time along the path towards desired conditions. Desired conditions are the guiding star and reference point for assessing progress towards sustainability. Based upon NFMA, *the overall desired condition is that NFS lands contribute to sustaining social and economic systems within the plan area and provide a framework to contribute to sustaining ecological systems to support the diversity of native plant and animal species in the plan area.* The framework identifies a key set of social, economic, and ecological desired conditions towards which the management of the land and resources of the plan area is to be directed.

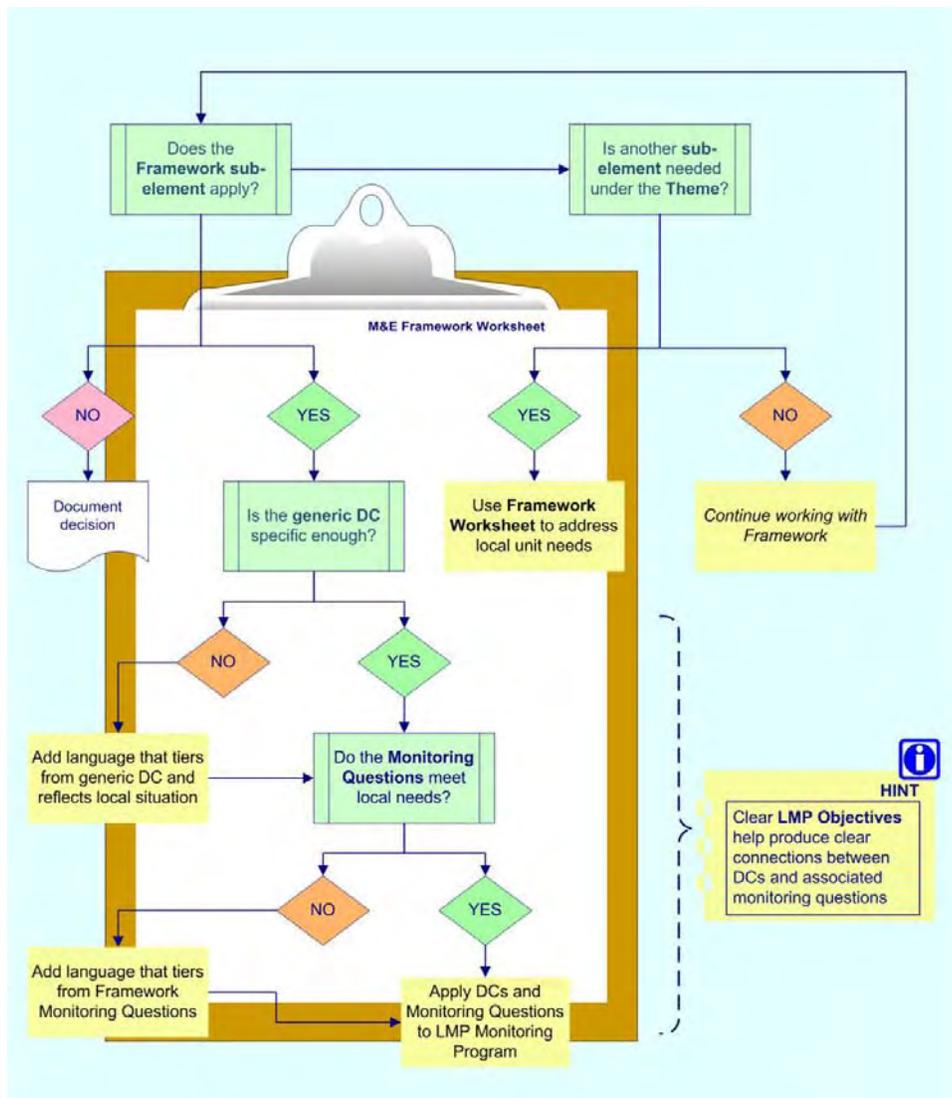
Application of Framework

In developing the LMP M&E strategy, use the six themes as an organizing framework to organize all desired conditions for LMP M&E

Collectively, the themes provide a unifying, multi-scale monitoring and evaluation (M&E) framework for gauging NFS progress towards sustaining the multiple uses of its renewable resources in perpetuity and for assessing contributions to social, ecologic, and economic systems in the plan area. Desired conditions to be monitored would be organized under the applicable theme.

Apply NFS Priority Sub-elements Only If Relevant to Local Unit; Add Additional Priority Sub-element(s) If Appropriate for Local Unit

While Forest/Grasslands would use the six themes of the framework to organize all desired conditions for LMP M&E, ONLY those sub-element priorities that apply to the plan area would be included under the themes. However, Forests/Grasslands are not limited to the nine vital few sub-element priorities. As appropriate, additional LMP priorities, not included in the common set of nine sub-element priorities, can be added to respective themes. For example, if impaired “air” was a significant issue in the plan area, a sub-element “Air” can be added under Theme 3: Soil, Water, and Air. Similarly, “Facilities” could be included under Theme 6: Infrastructure Capacity. The following figure illustrates this process.



Augment data sheets for each of the nine sub-element priorities to reflect local priorities and local circumstances

As applicable to the NFS Unit, the Monitoring and Evaluation Framework's boilerplate desired condition statements, core monitoring questions, and related performance measures are intended for agency-wide application. As appropriate to clarify the relevancy of a generic desired condition statement to the unit, NFS units should augment the generic statements with details specifically related to that NFS unit. The augmented desired condition statements will guide more clearly activities and projects anticipated locally during the life of the local LMP.

Complete data sheets for any local priority sub-element added to the Framework themes

If an NFS unit adds a sub-element to reflect local priorities within the LMP M&E framework, the unit also should develop data sheets for each additional sub-element. A generic datasheet template is provided as one of the LMP M&E Framework products. At a minimum, each unit should develop a desired condition statement, monitoring questions, and related performance measures for each local priority sub-element. These are needed to inform local progress towards desired conditions and to identify any need for change that may emerge subsequently. The local LMP monitoring plan or program also will need these items to ensure that the local priority is addressed.

Datasheet Content for LMP M&E Framework

Datasheets include two types of components for each of the sub-elements: stable and dynamic. Stable components are standardized for current NFS policy. These include the six Themes, the nine sub-elements, and the NFS generic Desired Condition statement and Monitoring Questions for each sub-element.

Dynamic components are illustrative. These include example contextual statements, example LMP desired conditions, example objectives, and possible data sources. ***Illustrative material helps illuminate intent and serves as examples for local augmentation. Illustrative components are not required.***

The following links go to the datasheet of each sub-element. A “Return to Framework Key” link appears on the top of each datasheet’s first page. Selecting that link electronically returns to this page.

<u>Datasheet Key for Sub-elements</u>	
Framework Components for Each Priority Sub-element	
Standardized Components	Illustrative Components
Theme 1: Conservation of Biological Diversity	
<u>Vegetation Diversity</u>	<u>Vegetation Diversity</u>
<u>Species Diversity</u>	<u>Species Diversity</u>
Theme 2: Maintenance of Land Health and Vitality	
<u>Invasive Species</u>	<u>Invasive Species</u>
<u>Resilience to Fire Disturbance</u>	<u>Resilience to Fire Disturbance</u>
<u>Native Insects & Pathogens</u>	<u>Native Insects & Pathogens</u>
Theme 3: Conservation and Maintenance of Soil, Water, and Air Resources	
<u>Watershed Health</u>	<u>Watershed Health</u>
Theme 4: Maintenance and Enhancement of Social Benefits	
<u>Diversity of Opportunities and Settings</u>	<u>Diversity of Opportunities and Settings</u>
Theme 5: Maintenance and Enhancement of Economic Benefits	
<u>Provision of Goods and Services</u>	<u>Provision of Goods and Services</u>
Theme 6: Infrastructure Capacity	
<u>Roads and Trails</u>	<u>Roads and Trails</u>

Datasheet Key for Sub-elements

Two rows are highlighted because they contain boilerplate language to be applied for sub-elements relevant to LMP plan areas. Non-highlighted text can be part of the Plan Set of Documents as appropriate.

[Return to Framework Key](#)

Theme	The six themes reflect the NFS sustainability goal, which has three elements (social, economic, and ecological). Collectively, the themes provide a unifying, multi-scale monitoring and evaluation (M&E) framework for gauging NFS progress towards sustaining the multiple uses of its renewable resources in perpetuity and for assessing contributions to social, ecologic, and economic systems in the plan area. The six themes of the framework should be used to organize all desired conditions for LMP M&E.
Sub-element NFS Generic Desired Condition	Within the six Themes are nine sub-element desired conditions. These social, economic, and ecological attributes are the priorities towards which management of the land and resources of NFS plan areas are to be directed. The themes and priority sub-elements form the architecture for developing LMP desired conditions and for subsequent monitoring and evaluation of progress towards those conditions.
Contextual Statement	The contextual statement provides a brief, executive level, overview of the issue. It establishes the context for desired conditions developed for respective sub-elements. For illustrative purposes only, example desired contextual statements have been included.
LMP Desired Condition Statement	As appropriate, boilerplate sub-element desired condition statements should be augmented to reflect NFS Unit specificity to guide subsequent project and activity level work envisioned during the life of the plan. For illustrative purposes example augmented desired condition statements have been included.
Objectives	Objectives are projections of measurable, time specific intended outcomes and the means of measuring progress towards achieving desired conditions. For illustrative purposes only, example objectives for respective desired conditions statements have been included.
Desired Trend Statement	Desired trend statements are provided to reflect what one might expect as the LMP makes progress towards respective desired conditions. Trends can be reflected in comprehensive evaluation reports.
Monitoring Questions	Monitoring questions are evaluative in design and address two topics: (1) status and trends related to desired social, economic, and ecological conditions identified in the LMP and (2) effectiveness of management actions in contributing to the sustainability of affected social, economic, and ecological systems in the plan area.
LMP Performance Measures	This section identifies performance measures that are responsive to activities and that when monitored, would enable answering the monitoring questions, and for use in developing evaluation reports.
Data Sources	Lists available data sources ready to respond to the performance measures. This list is expected to improve through growth or contraction as even better sources of "Best Available Science" data become reflected.
Importance	States the sub-element's importance to the agency. Statements establish scope, references, and applicable legislation or elements of strategic documents that apply.
What it Tells Us	Tells managers the types of information that could be addressed and connects the uniqueness of LMP desired conditions to NFS-wide shared priorities.

Stable Framework Elements

The six Framework Themes reflect the agency's mission as conveyed in the National Forest Management Act and other legislation and policy. This direction is expected to remain fairly stable in the foreseeable future. Accordingly, generic NFS Desired Conditions and evaluative monitoring questions will enable the agency to demonstrate progress towards the mission over time and in a coherent manner.

Theme 1: Conservation of Biological Diversity

This theme addresses NFS contributions to securing the nation's heritage of plant and animal species in the plan area. Disturbance processes are included under maintenance of land health and vitality theme (T-2) In addition, abiotic plan components for ecosystem diversity are included under the conservation and maintenance of soil, water, & air resources theme (T-3)

<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T1.1 Vegetation Diversity:</i> <i>Contributing to securing the nation's heritage of plant species and related habitats for T&E, SOC, & SOI in the plan area.</i></p> <p>Vegetation composition, structure, abundance, distribution, and successional processes contribute to the diversity of native plant and animal species in the plan area.</p>
<p>Monitoring Questions</p>	<p>What are the current condition and trend of key characteristics for vegetation identified in the desired conditions (DC) for the plan area?</p> <p>How are management actions maintaining or making progress toward DC for the key characteristics of vegetation in the plan area?</p>

<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T1.2 Species Diversity:</i> <i>Contributing to securing the nation's heritage of animal species and related habitats for T&E, SOC, & SOI in the plan area.</i></p> <p>Appropriate ecological conditions are provided throughout the plan area to contribute to the recovery of T&E species, to avoid federal listing of SOC, and to achieve SOI resource goals.</p>
<p>Monitoring Questions</p>	<p>How are ecological conditions for selected T&E species, SOC, or SOI maintaining or making progress toward the LMP desired conditions and objectives? How are management actions for the recovery of T&E species, conservation of SOC, and management of SOI achieving LMP objectives?</p>

Theme 2: Maintenance of Land Health and Vitality

This theme addresses ecological disturbance processes affecting social, economic, and ecological conditions within LMP plan areas.

<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T2.1 Invasive Species</i> The National Forest/Grassland has reduced the potential for introduction, establishment, and spread of invasive species and has reduced existing infestations in priority areas.</p>
<p>Monitoring Questions</p>	<p>What are the status and trends of areas infested by aquatic and terrestrial invasive species on the unit's plan area relative to the desired condition? How effective were our management activities including partnerships in preventing or controlling targeted invasive species (some of which may be Species of Interest)?</p>

<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T2.2 Resilience to Fire Disturbance.</i> Fire-adapted ecosystems in the plan area contribute to sustainable environmental, social, and economic benefits, i.e., Fire Regime Condition Class (FRCC) 1.</p>
<p>Monitoring Questions</p>	<p>What is the distribution and trend in Fire Regime Condition Class on the National Forest/Grassland? How effective are management actions in moving the National Forest/Grassland toward FRCC 1?</p>

<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T2.3 Native Insects & Pathogens.</i> National Forest/Grassland ecosystems have the capacity for renewal and recovery from outbreaks caused by native insects and pathogens while meeting desired values, uses, products, and services.</p>
<p>Monitoring Questions</p>	<p>What are the status and trends of outbreaks of native insects and pathogens on the National Forest/Grassland? What are the trends in areas at risk to future outbreaks of native insects and pathogens on the National Forest/Grassland?</p>

Theme 3: Conservation and Maintenance of Soil, Water, and Air Resources

This theme addresses the ecological condition (for soil, air, and water) of watersheds to protect the physical, chemical and biological integrity; the productive capacity of NFS land; water quality and quantity; and opportunities for beneficial uses. It also addresses the related capacity of watersheds to respond resiliently to flooding and to reach or sustain their aquatic ecosystem potential.

Sub-element NFS Generic Desired Condition	<i>T3.1 Watershed Health</i> Ecological function operates in its natural role within watersheds of the plan area while resource management activities sustain human needs and uses.
Monitoring Questions	What is the ecological condition and trend of watershed health, including the aquatic ecosystem potential, for watersheds identified in the desired condition and/ or objectives of the plan area? How effective are management actions in moving the National Forest/Grassland toward improving watershed health?

Theme 4: Maintenance and Enhancement of Social Systems

This theme addresses the opportunities, settings, suitable uses for multiple-use provided by the NFS, including opportunities for market and non-market activities. Related goods and services derived from the opportunities and settings provided are reflected in the economic theme (T-5).

Sub-element NFS Generic Desired Condition	<i>T4.1 Diversity of Opportunities and Settings</i> (including 'Access' & 'Opportunity for Commodity Production') Settings available on the NFS unit deliver multiple social opportunities that contribute to the sustainability of social, ecological, and economic systems in the plan area (219.10.a.b).
Monitoring Questions	What is the status and trend of settings and opportunities provided by the NFS unit compared to Desired Conditions stated in the LMP? How are management actions maintaining or improving Desired Conditions for settings and opportunities provided by the NFS unit, including contributions to sustaining social systems within the unit's LMP analysis area? How do people involved in the adaptive planning process interpret settings and opportunities provided by the NFS unit compared with Desired Conditions? Do they think there is a need for change?

Theme 5: Maintenance and Enhancement of Economic Systems

Given the opportunities and settings, suitable uses, and activities designed to make progress towards desired conditions, there are goods and services that come off the land. This theme is about goods and services derived from the opportunities and settings referenced the social theme (T-4). Key contributions of goods and services include revenue and jobs associated with recreation, tourism, resident amenities, environmental services, and commodities such as AUMs and the potential for timber production.

Sub-element NFS Generic Desired Condition	<i>T5.1 Provision of Goods and Services</i> Goods and services provided by or derived from [the NFS unit] contribute to sustaining economic systems in the plan area.
Monitoring Questions	What are the status and trends of goods and services provided from the unit with regards to progress towards desired conditions? How do these goods and services contribute to key opportunities for sustaining economic systems relevant to the plan area?

Theme 6: Infrastructure Capacity

This theme addresses NFS infrastructure's ability to contribute to the aspirations characterized in the LMP.

Sub-element NFS Generic Desired Condition	<i>T6.1 Roads and Trails</i> The road and trail system on the NFS unit is safe, reflects appropriate access, considers needs of adjacent landowners, and meets public demand.
Monitoring Questions	How many miles of the designated roads and trails are maintained to standard? Where is unauthorized use occurring on or off the road and trail system? Are the impacts from the road and trail system on soils, water quality, wildlife, and other natural and cultural resources sustainable and within acceptable tolerance? Is the road and trail system serving its intended purposes and addressing recreational demands?

Dynamic Framework Elements: Illustrations

A successful NFS Monitoring and Evaluation Framework must have the flexibility to respond to local unit needs even as it serves as a source of consistency needed by the agency as a whole. To illustrate the flexibility of the Framework, the following pages show datasheets for each NFS priority sub-element identified during the MET effort. Each datasheet reflects field-level lessons learned during illustration pilot tests conducted as part of this work. For example, each datasheet has a LMP Desired Condition statement that tiers to the generic NFS Desired Condition, yet shows how local needs can be reflected (see [illustrative diagram](#) on page 5). Local needs may include those that emerge from internal discussions among subject-matter experts or from external discussions with partners and other members of the public.

Theme 1: Conservation of Biological Diversity

[Return to Framework Key](#)

<p>Theme 1</p>	<p>Conservation of Biological Diversity: This theme addresses NFS contributions to securing the nation’s heritage of plant and animal species in the plan area. Disturbance processes are included under maintenance of land health and vitality theme (T-2). In addition, abiotic plan components for ecosystem diversity are included under the conservation and maintenance of soil, water, & air resources theme (T-3).</p>																																																																																										
<p>Sub-element NFS Generic Desired Condition</p>	<p>T1.1 Vegetation Diversity: <i>Contributing to securing the nation’s heritage of plant species and related habitats for T&E, SOC, & SOI in the plan area.</i></p> <p>Vegetation composition, structure, abundance, distribution, and successional processes contribute to the diversity of native plant and animal species in the plan area.</p>																																																																																										
<p>Contextual Statement</p>	<p>Illustration of LMP Contextual Statement: The Name NF has 12 cover-types, which are reflected by the composition and dominance of particular species (Table 1 below). Eight of those are at desired condition (DC) and management will be directed towards maintaining that condition. Four cover-types—sagebrush, aspen, Douglas fir, and grasslands—are outside the historic range of variability and management will be directed towards moving to desired condition within that historic range.</p>																																																																																										
<p>Example LMP Desired Condition Statement</p>	<p>Illustration of LMP Desired Conditions: Vegetation composition, structure, abundance, distribution and successional processes contribute to the diversity of native plant and animal species in the plan area. Ecosystem diversity by cover-type:</p> <table border="1" data-bbox="371 1079 1487 1854"> <thead> <tr> <th rowspan="2">Table 1</th> <th colspan="2">Percent Cover</th> <th colspan="3">The mix of desired conditions for size classes for the dominant conifer cover types and aspen across the forest are within the ranges shown (existing condition in parenthesis)</th> </tr> <tr> <th>Existing Condition</th> <th>Desired Condition</th> <th>Seedling/sapling</th> <th>4 to 9 inches Diameter</th> <th>Greater than 9 inches Diameter</th> </tr> </thead> <tbody> <tr> <td colspan="6"><i>Outside historic range of variability</i></td> </tr> <tr> <td>Grasslands</td> <td>30</td> <td>30 to 32</td> <td colspan="3">NA</td> </tr> <tr> <td>Sagebrush</td> <td>1</td> <td>1 to 3</td> <td colspan="3">NA</td> </tr> <tr> <td>Douglas-fir</td> <td>15</td> <td>13 to 15</td> <td>5 to 20% (<1%)</td> <td>30 to ** (29%)</td> <td>** to 30% (71%)</td> </tr> <tr> <td>Aspen</td> <td>1</td> <td>1 to 2</td> <td>5 to 35% (<1%)</td> <td>25 to ** (82%)</td> <td>** to 40% (18%)</td> </tr> <tr> <td colspan="6"><i>Within historic range of variability</i></td> </tr> <tr> <td>Willow, alder</td> <td>.05</td> <td>.05 to 1</td> <td colspan="3">NA</td> </tr> <tr> <td>Spruce/fir</td> <td>14</td> <td>13 to 15</td> <td>5 to 30% (<1%)</td> <td>10 to ** (23%)</td> <td>** to 60% (77%)</td> </tr> <tr> <td>Lodgepole pine</td> <td>12</td> <td>11 to 13</td> <td>5 to 20% (4%)</td> <td>30 to ** (53%)</td> <td>** to 40% (43%)</td> </tr> <tr> <td>Whitebark pine</td> <td>12</td> <td>11 to 13</td> <td colspan="3" rowspan="4"></td> </tr> <tr> <td>Limber pine</td> <td>2</td> <td>1 to 3</td> </tr> <tr> <td>Other Vegetation</td> <td>.05</td> <td>.25 to .75</td> </tr> <tr> <td>Rock, barren, ice</td> <td>13</td> <td>13</td> </tr> <tr> <td>Water</td> <td>.05</td> <td>.05</td> <td colspan="3"></td> </tr> </tbody> </table>					Table 1	Percent Cover		The mix of desired conditions for size classes for the dominant conifer cover types and aspen across the forest are within the ranges shown (existing condition in parenthesis)			Existing Condition	Desired Condition	Seedling/sapling	4 to 9 inches Diameter	Greater than 9 inches Diameter	<i>Outside historic range of variability</i>						Grasslands	30	30 to 32	NA			Sagebrush	1	1 to 3	NA			Douglas-fir	15	13 to 15	5 to 20% (<1%)	30 to ** (29%)	** to 30% (71%)	Aspen	1	1 to 2	5 to 35% (<1%)	25 to ** (82%)	** to 40% (18%)	<i>Within historic range of variability</i>						Willow, alder	.05	.05 to 1	NA			Spruce/fir	14	13 to 15	5 to 30% (<1%)	10 to ** (23%)	** to 60% (77%)	Lodgepole pine	12	11 to 13	5 to 20% (4%)	30 to ** (53%)	** to 40% (43%)	Whitebark pine	12	11 to 13				Limber pine	2	1 to 3	Other Vegetation	.05	.25 to .75	Rock, barren, ice	13	13	Water	.05	.05			
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Objectives	Illustration of LMP Objectives: <p>The 2022 outcome is 31% of total cover on Forest Service lands dominated by grasslands.</p> <p>The 2022 outcome is 2% of total cover on Forest Service lands dominated by sagebrush.</p> <p>The 2022 outcome is the decreased presence of Douglas-fir on aspen, sagebrush, and grassland cover types.</p> <p>The 2022 outcome is 2% of total cover on Forest Service lands dominated by aspen.</p> <p>The 2022 outcome is 1% of total cover on Forest Service lands dominated by willow and alder.</p> <p>The 2022 outcome is whitebark pine is at least 11% of total cover on Forest Service lands.</p> <p>The 2022 outcome is 98% of overall range condition is in Satisfactory or better condition.</p>
Desired Trend Statement	<p>The composition, structure, abundance and distribution of vegetation move toward the levels identified in the LMP desired conditions.</p>
Monitoring Questions	<p>What are the current condition and trend of key characteristics for vegetation identified in the desired conditions (DC) for the plan area?</p> <p>How are management actions maintaining or making progress toward DC for the key characteristics of vegetation in the plan area?</p>
LMP Performance Measures	<p>Current condition and trend for vegetation composition, structure, abundance, distribution, successional processes identified in the DC, as might be shown by such indicators as:</p> <ol style="list-style-type: none"> 1) Species composition of vegetation types and successional stages 2) Structural characteristics (e.g., canopy closure, # of canopy levels, tree sizes) of vegetation types and successional stages 3) Vegetation abundance (e.g., acres of vegetation types by successional stages or age classes, acres or number of unique ecosystems by type, percent by area of successional stages for each vegetation type relative to the reference condition and DC for the plan area) 4) Landscape vegetation pattern (e.g., patch size, connectivity, amount of edge) <p>Effect of management actions, as might be shown by such indicators as:</p> <ol style="list-style-type: none"> 1) Acres and kind of treatment by vegetation type 2) Effects of activities on acres treated 3) Percent of overall change for key characteristics described in DC (i.e., resulting from management and resulting from management and other influences)
Possible Data Sources	<p>FIA, NRIS (Fauna, FSVeg, Terra, Water), FACTS.</p> <p>Illustrations of local sources: R2VEG, Wyoming Game and Fish Department ASPEN surveys</p>
Importance	<p>Managing for the diversity of plant and animal communities is required by NFMA. The specific direction is the following:</p> <p>“provide for diversity plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives” (16 USC 1604(g)(3)(B)).</p> <p>Ecosystem diversity, as reflected in vegetation diversity, is a primary means by which a plan contributes to sustaining ecological systems and conserving biodiversity. (NOTE: Disturbance processes are included under maintenance of land health and vitality theme. In addition, abiotic plan components for ecosystem diversity are included under the conservation and maintenance of soil, water, and air resources theme.)</p>

What it Tells Us	This sub-element addresses the composition, structure, abundance, distribution and successional processes of vegetation types in the plan area. Information on these characteristics provides direct evidence of changes in biodiversity and also indexes of the quality, distribution and abundance of habitat to support other elements of biodiversity in the plan area. This information can be used as indicators of change to ecosystems and their associated biota that are difficult to measure directly. (NOTE: This sub-element was narrowed to focus on key characteristics of vegetation of terrestrial ecosystems. Aquatic ecosystems are included under the conservation and maintenance of soil, water, and air resources theme.)
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<p>Theme 1</p>	<p>Conservation of Biological Diversity: This theme addresses NFS contributions to securing the nation’s heritage of plant and animal species in the plan area. Disturbance processes are included under maintenance of land health and vitality theme (T-2). In addition, abiotic plan components for ecosystem diversity are included under the conservation and maintenance of soil, water, and air resources theme (T-3).</p>
<p>Sub-element NFS Generic Desired Condition</p>	<p>T1.2 Species Diversity: <i>Contributing to securing the nation’s heritage of animal species and related habitats for T&E, SOC, & SOI in the plan area.</i></p> <p>Appropriate ecological conditions are provided throughout the plan area to contribute to the recovery of T&E species, to avoid federal listing of SOC, and to achieve SOI resource goals.</p>
<p>Contextual Statement</p>	<p>Illustration of LMP Contextual Statement: The Name National Forest is one of the seven national forests and two national parks within the Greater Yellowstone Area responsible for the recovery of the grizzly bear. The status of the grizzly bear population and habitat parameters has satisfied recovery goals set forth by the Grizzly Bear Recovery Plan. Currently, the grizzly bear is being considered for delisting from the Endangered Species Act (ESA).</p> <p>The bald eagle has a very limited and sporadic distribution on the Name National Forest. There has not been a known nest location on the Name National Forest since 2002. Each spring the local Audubon Club in conjunction with the State of Wyoming conduct bald eagle surveys adjacent to and within the Name National Forest. Most ground disturbing management activities conducted on the Name National Forest would not impact potential nest trees.</p> <p>There is very limited historical evidence of the presence of black-footed ferret distribution on the Name National Forest. There is one known white-tail prairie dog colony with a small distribution within the boundaries of the Name National Forest.</p> <p>The Name National Forest has an abundance of rare endemic species, disjunctive species, and relict species. The Forest’s elevation changes, variety of substrates and position between northern ecotypes, and southern ecotypes provides the climate for a substantial variety of species.</p> <p>The grey wolf is currently listed as Scientific Non-essential in the plan area.</p>
<p>LMP Desired Condition Statement</p>	<p>Illustration of LMP Desired Conditions: Appropriate ecological conditions are provided throughout the plan area to contribute to the recovery of T&E species (bald eagle, habitat for the black-footed ferret and grizzly bear), to avoid federal listing of SOC (Table 1), and to achieve SOI resource goals.</p> <ul style="list-style-type: none"> • Affected landscapes encompassed by the Grizzly Bear Conservation Strategy (GBCS) contribute to habitat requirements for delisting the grizzly bear. • Plan component for the black-footed ferret are provided in the Black Footed Ferret Recovery Plan and the White-tailed Prairie Dog Conservation Assessment. • Plan component for the bald eagle are within the Pacific Bald Eagle Recovery Plan.
<p>Objectives</p>	<p>Illustration of LMP Objective:</p> <p>The 2022 outcome is Grizzly Bear Management sub-units have amounts of secure habitat at or above 1998 levels.</p>

Desired Trend Statement	<p>Trends in ecological conditions for T&E species, SOC and SOI are moving toward the LMP desired conditions and objectives.</p> <p>Willow distribution in riparian areas has an increasing trend across the Forest. OR Willow and beaver distribution in X and Y watersheds is increasing.</p> <p>Percentage of the Forest in big game winter range with road densities greater than one mile/ square mile is decreasing.</p>
Monitoring Questions	<p>How are ecological conditions for selected T&E species, SOC, or SOI maintaining or making progress toward the LMP desired conditions and objectives? How are management actions for the recovery of T&E species, conservation of SOC, and management of SOI achieving LMP objectives?</p>
LMP Performance Measures	<p>Current level and trend of ecological conditions for T&E, SOC, or SOI, as might be shown by:</p> <ol style="list-style-type: none"> 1. Abundance, distribution, and trend of aquatic and terrestrial ecosystem conditions (e.g., vegetation types and successional stages) that provide species habitat <ol style="list-style-type: none"> a) Effects and trends of structural developments and human uses (e.g., roads, instream structures) b) Miles of streams with Yellowstone Cutthroat Trout c) Number of fish barriers improved, maintained, or removed Acres of nectar sources for the butterfly group d) Road density within big game winter range Acres of willow planted or restored e) Watersheds with beaver f) Landscape vegetation pattern (e.g., patch size, connectivity, amount of edge) g) Abundance, distribution and trend of special habitat features (e.g., snags, down logs) 2. Effect of management actions on recovery of T&E species, conservation of SOC, and achievement of objectives for SOI, as might be shown by: <ol style="list-style-type: none"> a) Number and acres (or other measure of size such as stream miles) of management actions completed by category b) Effects of treatments on areas treated c) Amount of change in species characteristics (population and/or ecological conditions) described in the DC (i.e., resulting from management and resulting from management and other influences)
Possible Data Sources	<p>Interagency Grizzly Bear Study Team, Wyoming Game and Fish Department, FIA, NRIS (Fauna, FSveg, Terra), The Nature Conservancy.</p> <p>FACTS, LANDFIRE, US Fish and Wildlife Service, Bureau of Land Management, National Park Service, Natural Resource Conservation Service, Tribes, State Agencies (e.g., GAP and ReGAP), (Ecoregional Plans), NatureServe, Other Partners.</p>
Importance	<p>Species diversity (T&E, SOC, SOI) is set forth in the 2005 planning rule as part of the framework for sustaining ecological systems (219.10(b)). T&E species, SOC, and SOI must be identified, and specific plan components may be developed for them (Sec 219.10 (b)(2)) and FSM 1921.73 (b) to complement the primary ecosystem diversity approach provided in the 2005 planning rule. T&E species and their habitats are also required to be protected and managed for under the Endangered Species Act.</p>
What it Tells Us	<p>Ecological conditions, not provided for in T1.1 (ecosystem diversity) to establish appropriate ecological conditions for specific T&E, SOC, & SOI, are co-implemented here by additional needed provisions consistent with agency authorities, the capability of the plan area, and overall multiple use objectives. Information is collected on ecological conditions in order to determine whether LMP desired conditions and objectives for T&E, SOC and SOI are being met.</p>

Theme 2: Maintenance of Land Health and Vitality

[Return to Framework Key](#)

Theme 2	Maintenance of Land Health and Vitality: This theme addresses ecological disturbance processes affecting social, economic, and ecological conditions within LMP plan areas.
Sub-element NFS Generic Desired Condition	T2.1 Invasive Species The National Forest/Grassland has reduced the potential for introduction, establishment, and spread of invasive species and has reduced existing infestations in priority areas.
Contextual Statement	Illustration of LMP Contextual Statement: Invasive species (name species) are moving up from south. A general inventory exists for the most accessible (15%-20%) of the whole forest and documented occurrence of invasive plants exists on less than 1% of that inventoried area. Less accessible areas are presumed to contain undocumented populations. Existing infestations are presumably expanding because control efforts are limited to about 5% of inventoried infestations. Some invasive species, like Canadian Thistle, are distributed forest-wide; others, like dyers wode, are localized. Spread-prevention practices currently include timber sale clauses, signage along highways, required use of certified weed-free hay, etc.
LMP Desired Condition Statement	Illustration of LMP Desired Conditions: The Name National Forest/Grassland has reduced the potential for introduction, establishment, and spread of invasive species and has reduced existing infestations in priority areas.
Objectives	Illustration of LMP Objectives: <ul style="list-style-type: none"> • The 5-year outcome is the eradication of Dalmatian toadflax on at least 200 acres, beginning in the south fork of <i>Name</i> drainage. • By 2013, the establishment of xxx acres of blister-rust resistant whitebark pine. • Within 10 years, the elimination of existing zebra snail populations in 5 confined stretches of Big Rocky River. Also, no new incidences are found in the plan area. • The 2012 outcome is the average annual treatment of 400-500 acres of tamarisk (a species-of-interest). • By 2017, spotted knapweed is 5% of the understory vegetation. • By X date, the average annual treatment of 30-35% of inventoried infestations. • Certified weed-free feed accounts for at least 75% of feed used for all stock during the plan period, up from 10% Dec 2006.
Desired Trend Statement	The quantity and rate of invasive species infestations decline throughout the unit's plan area
Monitoring Questions	What are the status and trends of areas infested by aquatic and terrestrial invasive species on the unit's plan area relative to the desired condition? How effective were our management activities including partnerships in preventing or controlling targeted invasive species (some of which may be Species of Interest)?

LMP Performance Measures	<p>Change in extent and rate of spread of the targeted species infestation</p> <p>Change in ecosystem and species diversity in infested areas</p> <p>Percentage of priority (treated) acres successfully restored against targeted invasive species</p>
Possible Data Sources	<p>Data are available from these Forest Service sources: FHM, FHP, FIA, FACTS, and NRIS. Here is a useful web site that has links to many other databases:</p> <p>http://www.fs.fed.us/invasivespecies/</p>
Importance	<p>Invasive species infestations negatively affect forest and rangeland health, management objectives, genetic diversity, recreational use, resource production, water quality, and the economy. The threat to land health from invasive species is acute and is expanding. If invasive species are present, natural processes and the survival of native species are at great risk. NFMA requires that we provide for diversity of native species, and invasive species threaten our ability to meet this requirement. Both the national Invasive Species Council and the Forest Service have national strategies and management plans (see resources).</p>
What it Tells Us	<p>With the wide range of invasive species (plants, vertebrates, invertebrates, and pathogens) affecting ecosystems and the respective native species and natural processes, monitoring the status of infestations on the National Forest System will help us to evaluate the effectiveness of our management activities, and subsequently the condition of the land, or land health. It will also help us to prioritize areas for restoration.</p>

Theme 2	Maintenance of Land Health and Vitality: This theme addresses ecological disturbance processes affecting social, economic, and ecological conditions within LMP plan areas.
Sub-element NFS Generic Desired Condition	T2.2 Resilience to Fire Disturbance. Fire-adapted ecosystems in the plan area contribute to sustainable environmental, social, and economic benefits, i.e., Fire Regime Condition Class (FRCC) 1.
Contextual Statement	Illustration of LMP Contextual Statement: On the Name National Forest, fire disturbance is a growing and serious concern to us as land managers and to our neighbors as partners who share the costs of suppression and the consequences of fire. A return to fire-adaptive ecosystems throughout Name National Forest is preferred, yet, in areas near residential developments and other high-value sites, rapid suppression and management treatments are likely necessary until successful return to fire-adapted systems occurs on adjacent wildlands. Fire includes wildfire, prescribed fire, and wildland fire use. Wildfire is an unplanned and unwanted fire where suppression response is initiated. Prescribed fire is a fire ignited by land managers designed to meet specific resource objectives. Wildland fire use is the application of the appropriate response to naturally occurring wildland fire to accomplish vegetation desired conditions as well as other specific resource objectives.
LMP Desired Condition Statement	Illustration of LMP Desired Conditions: Fire-adapted ecosystems in the plan area contribute to sustainable environmental, social, and economic benefits, i.e., Fire Regime Condition Class (FRCC) 1.
Objectives	Illustration of LMP Objectives: <ul style="list-style-type: none"> • The 2022 outcome is improved fire regime condition class over 80% of the area outside FRCC 1. • The 2022 outcome is improved fire regime condition class on at least 45,000 acres.
Desired Trend Statement	Management activities allow for no net loss of FRCC 1 lands, while restoring FRCC 2 and FRCC 3 areas, where restoration activities have the highest probability of success, are consistent with multiple resource objectives, and are socially and economically feasible.
Monitoring Questions	What is the distribution and trend in Fire Regime Condition Class on the National Forest/Grassland? How effective are management actions in moving the National Forest/Grassland toward FRCC 1?
LMP Performance Measures	Number of acres in each FRCC at a benchmark (<i>i.e.</i> , the release of LANDFIRE National data) compared to acres in each FRCC at a five year interval following the benchmark year. Impact of management actions designed to improve FRCC distribution

<p>Possible Data Sources</p>	<p>LANDFIRE National data are expected to be available for the western US in 2006, and complete for the lower 48 states by 2009. For further information, see http://www.landfire.gov/</p> <p>Many National Forests currently have an FRCC determination for their forests based on local data.</p>
<p>Importance</p>	<p>The nation's forests and grasslands are experiencing increasing ecosystem health problems. Symptoms of these problems include the development of unnaturally dense vegetation at landscape scales, dying forests, and a heightened susceptibility to damaging wildland fires that are often uncharacteristically large, destructive, and costly to control. In ecosystems where periodic fire has historically played a role in preserving structure and composition, fire suppression policies have allowed fuels to develop to unprecedented levels across the country, contributing to ecosystem health concerns. (The desired conditions statement is from Goal 3 of <i>A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan, May, 2002.</i>)</p>
<p>What it Tells Us</p>	<p>By focusing on assessing resilience to fire disturbance, we will be able to adjust our management actions to restore lands to a more healthy fire frequency and intensity.</p> <p>We will use Fire Regime Condition Class (FRCC), which is a measure of ecological integrity and/or departure from reference conditions. It tells us if the ecosystem in question is doing well, in concert with inherent disturbance regimes (class 1), in some jeopardy based on the time since the last disturbance (class2), or significantly altered and at risk of losing key ecological components that define that ecosystem as unique (class 3). It is most relevant to measure long-term trends rather than annual changes, and the scales of FRCC is also meaningful for hydrological sub unit analysis.</p> <p>In the LMP, FRCC monitoring can be useful in targeting areas for priority management activities or measuring progress or deterioration of a given area over time.</p>

Theme 2	Maintenance of Land Health and Vitality: This theme addresses ecological disturbance processes affecting social, economic, and ecological conditions within the plans area.
Sub-element NFS Generic Desired Condition	T2.3 Native Insects and Pathogens National Forest/Grassland ecosystems have the capacity for renewal and recovery from outbreaks caused by native insects and pathogens while meeting desired values, uses, products, and services.
Contextual Statement	Illustration of LMP Contextual Statement:
LMP Desired Condition Statement	Illustration of LMP Desired Conditions: The Name National Forest/Grassland ecosystems have the capacity for renewal and recovery from outbreaks caused by native insects and pathogens while meeting desired values, uses, products, and services.
Objectives	Illustration of LMP Objectives: <ul style="list-style-type: none"> • Within 5 years, average stand densities are ____ sq. ft/ac to reduce the risk of Douglas-fir beetle infestation in the Douglas-fir cover type. • The 2017 outcome is the ____ insect and disease vulnerability ranking within project areas. • Within ## years, average stand densities are ____ sq. ft/ac to reduce the risk of mountain pine beetle infestation
Desired Trend Statement	Native insect and pathogen populations are maintained within or moving towards a range that allows the ecosystem to recover from outbreaks while meeting desired values, uses, products and services.
Monitoring Questions	What are the status and trends of outbreaks of native insects and pathogens on the National Forest/Grassland? What are the trends in areas at risk to future outbreaks of native insects and pathogens on the National Forest/Grassland?
LMP Performance Measures	Location and extent of outbreaks of native insects and pathogens. Location and extent of areas at risk to future outbreaks of native insects and pathogens.
Possible Data Sources	Data are available from FHM, FHP, FIA, and NRIS.

<p>Importance</p>	<p>Native insects and pathogens are natural components of ecosystems playing critical roles in development and succession of plant communities, decomposition, and soil formation. Population dynamics of native insects and pathogens are influenced by vegetation condition, climate, other disturbances, management activities, host defenses, and natural enemies. Changes in these factors can lead to outbreaks or epidemics of native insects and pathogens with significant ecological and economic consequences.</p>
<p>What it Tells Us</p>	<p>This sub theme will help us determine the status and trends in outbreaks of native insects and pathogens and relate those to the health and sustainability of the National Forest/Grassland ecosystems. Identifying areas at risk for future outbreaks will facilitate development of prevention strategies.</p>

Theme 3: Conservation and Maintenance of Soil, Water, and Air Resources

[Return to Framework Key](#)

<p>Theme 3</p>	<p>Conservation and Maintenance of Soil, Water, and Air Resources: This theme addresses the ecological condition (for soil, air, and water) of watersheds to protect the physical, chemical and biological integrity; the productive capacity of NFS land; water quality and quantity; and opportunities for beneficial uses. It also addresses the related capacity of watersheds to respond resiliently to flooding and to reach or sustain their aquatic ecosystem potential.</p>
<p>Sub-element NFS Generic Desired Condition</p>	<p>T3.1 Watershed Health Ecological function operates in its natural role within watersheds of the plan area while resource management activities sustain human needs and uses.</p>
<p>Contextual Statement</p>	<p>Illustration of LMP Contextual Statement: Name National Forest has tremendous opportunities that depend upon healthy watersheds. The blue ribbon trout fishing is an example and so is the abundance of high-quality water that flows to neighboring communities. Concern for healthy watersheds is growing because so much depends upon it. A watershed is the area of land that drains water to an outlet at some point along a stream channel. Watershed function is the ability of watersheds to route water, sediment, nutrients, and organic material from hill slopes and groundwater aquifers to the channel network. It also includes the ability of stream channels to transport the sediment being delivered to them. The rates at which these processes occur are a function of climate, geology, landforms, soils, and vegetation. Watershed integrity and stability refer to the ability of watersheds, stream channels, riparian areas, groundwater aquifers, and wetlands to absorb and reduce the impacts from normal floods (i.e., those that occur approximately every 2 to 3 years, on average) and similar disturbances without rapid erosive changes to the system.</p>
<p>LMP Desired Condition Statement</p>	<p>Illustration of LMP Desired Conditions: Ecological function operates in its natural role within watersheds of the plan area while resource management activities sustain human needs and uses. Variable response to disturbance occurs, including responses to large natural disturbances, watershed resources (including stream channels) are resilient and regain their ability to function. Water remains in channels and aquifers to maintain riparian vegetation and function, and channel form. Water is available to support a diverse mix of desired plant species in varied structural stages. These plant communities are healthy, self-perpetuating, resistant to rapid change from even extreme normal disturbances such as floods or drought, and are widening or are at their maximum potential area and extent.</p>
<p>Objectives</p>	<p>Illustration of LMP Objectives:</p> <ul style="list-style-type: none"> • The 2022 outcome is an “at risk” status for the Lodgepole Creek Watershed. • The 2022 outcome is 25% of “at risk” watersheds are in a “robust” condition. The Next-to-Lodgepole Creek watershed is the starting point.
<p>Desired Trend Statement</p>	<p>Percentage of streams that meet or exceed state water quality standards is increasing as a percentage of total miles of stream.</p>

Monitoring Questions	<p>What is the ecological condition and trend of watershed health, including the aquatic ecosystem potential, for watersheds identified in the desired condition and/ or objectives of the plan area?</p> <p>How effective are management actions in moving the National Forest/Grassland toward improving watershed health?</p>
LMP Performance Measures	<p>Current status and trend for soil productivity, water quality and quantity, air quality, and other ecological parameters to address ecological condition within watersheds so that they are able to attain their aquatic ecosystem potential. Examples</p> <ul style="list-style-type: none"> ○ Physical characteristics of stream channel (e.g., cross-section of stream channel profile) ○ Chemical characteristics of stream channel (e.g., nutrient loading) ○ Biological characteristics of stream channel (e.g., macro-invertebrate, coarse-woody debris) ○ Riparian area characteristics (e.g., vegetation diversity, invasive species, etc.) ○ Upland characteristics of watershed (e.g., soil monitoring, vegetative trend and condition) [cross-walk to measures identified under ecosystem diversity, invasive species, etc., sub-elements] <p>Percent of overall change of ecological condition within watersheds that are affected by resource management actions. Example might include:</p> <ul style="list-style-type: none"> ● Number of acres disturbed under for energy development
Possible Data Sources	<p>Assessments of ecological condition addressing soil quality, water quantity and quality, aquatic ecological potential, air quality, and other parameters.</p>
Importance	<p>Watershed health is integral to all aspects of resource management and use. Watershed health is a state in which resource management activities sustain human needs and uses of the watershed while ensuring ecological function is maintained. Maintaining watershed health through watershed management requires land managers to balance human needs and uses with ecological conditions within the watershed. Good watershed management maintains the productive capacity of NFS land; protects water quality and quantity; provides beneficial uses; and reduces the threat of flood.</p> <p>An estimated 3,400 towns and cities currently depend on NFS watersheds for their public water supplies. National Forests and Grasslands contain more than 3,000 public water supplies for campgrounds, administrative centers, and similar facilities. Productive soils and adequate moisture ensure the existence of potential community types and wildlife habitats.</p>
What it Tells Us	<p>The sub-element will measure the status and trend of ecological conditions to reflect results of cumulative effects of watershed management activities on watershed health and the cumulative benefits of good land management.</p> <p>This is not a direct measure of biodiversity. Rather, it addresses ecological conditions that will in turn support biodiversity (aquatic ecosystem potential). Biodiversity itself is addressed in the “conservation of biological resources” theme.</p>

Theme 4: Maintenance and Enhancement of Social Systems

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<p>Theme 4</p>	<p>Maintenance and Enhancement of Social Systems: This theme addresses the opportunities, settings, suitable uses for multiple-use provided by the NFS, including opportunities for market and non-market activities. Related goods and services derived from the opportunities and settings provided are reflected in the Economic Theme.</p>
<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T4.1 Diversity of Opportunities and Settings</i> (including ‘Access’ & ‘Opportunity for Commodity Production’)</p> <p>Settings available on the NFS unit deliver multiple social opportunities that contribute to the sustainability of social, ecological, and economic systems in the plan area (219.10.a.b).</p>
<p>Contextual Statement</p>	<p>Illustration of LMP Contextual Statement:</p> <p>The Name National Forest consists of 3.4 million acres in the Greater Yellowstone Area and lies within the physiographic province called the “Middle Rocky Mountains.” This province is characterized by high-elevation coniferous forests, sage/grass steppes, mountain ranges, and deep valleys. The Western Name and Eastern Name Tribes are principal Native American Tribes indigenous to the area. The Name National Forest, which is known nationally and internationally, is most known for particular features such as scenery, diverse and healthy wildlife populations, diverse and healthy plant communities, clean water and clean air, healthy and functioning watersheds that drain into the West’s main river basins, large backcountry areas that offer opportunities for multi-day trips, blue-ribbon trout fisheries and big game hunting, winter sports of many kinds at ski resorts and in the backcountry, dispersed recreation of all kinds, and a natural backdrop for area communities and settlements. Demand for more specialized recreation, such as mountain biking and kayaking, is increasing and the diversity of that specialized recreation is increasingly broad. Regional population growth is expected to lead to greater demand for existing and emerging recreation, especially shorter duration visits. Growth of subdivisions in WUIs is changing demand for recreation access and activities in adjacent forest lands. This demand is leading to conflicts with wildlife and wildland fire management. The planning area provides opportunities and settings for multiple-use, including opportunities for market and non-market activities.</p>

<p>LMP Desired Condition Statement</p>	<p>Illustration of LMP Desired Conditions: Settings available on the NFS unit deliver multiple social opportunities that contribute to the sustainability of social, ecological, and economic systems in the plan area.</p> <p>Roads and trails: Public facilities and services (particularly roads and trails) are accessible to all members of the population. The road and trail systems, including motorized and non-motorized trails, on the Name National Forest are safe, stable, and diverse in providing access to the public (Note: Conditions of Roads and Trails are further considered in T-6).</p> <p>Scenic Integrity: The forest has high scenic integrity that is sustainable and resilient to short-term disturbances. Constructed features and landscape alterations complement and blend with landscape characteristics, approximating natural disturbances to the extent possible. Recreation settings continue to be attractive while offering motorized and non-motorized users the opportunity to experience the forest’s scenic landscapes.</p> <p>Commodity: Opportunities for water development, energy development, and mineral development on the Name National Forest contribute to economic sustainability in the LMP area.</p> <p>Heritage resources: Heritage assets provide opportunities for interpretation and education so that the public may gain a better understanding and perspective of our heritage. Visitors to the National Forest find opportunities to touch, explore, enjoy, and learn about their cultural heritage.</p> <p>Tribal relations: Treaty-ceded areas represent sustainable components of the ecosystem and continue to be available for tribal members to exercise their treaty rights.</p> <p>Research and Education: Interpretation and conservation education reflect scientifically supported scholarship and research data, conveying clear messages regarding natural resources and multiple-use. Educational messages are effective influences on visitor behavior so that people use the forest in ways that increase its capacity to accommodate them and reduce the need for law enforcement.</p>
<p>Objectives</p>	<p>Illustration of LMP Desired Conditions:</p> <ul style="list-style-type: none"> • 2012 outcome is all existing developed campgrounds are in full compliance with ADA. • Within 7 years, Sweet Smelling Toilets exist where vault toilets previously existed. • The 2022 outcome is that access for compatible activities remains at current levels for the plan area. • During the next 5 years, high-quality water is available from the three domestic water supply watersheds (Big Timber, Little, Hideaway, and New Hamlet).
<p>Desired Trend Statement</p>	<p>Trends in monitoring measures indicate either progress toward or alignment between desired conditions, desired settings, and desired opportunities</p>
<p>Monitoring Questions</p>	<p>What is the status and trend of settings and opportunities provided by the NFS unit compared to Desired Conditions stated in the LMP?</p> <p>How are management actions maintaining or improving Desired Conditions for settings and opportunities provided by the NFS unit, including contributions to sustaining social systems within the unit’s LMP analysis area?</p> <p>How do people involved in the adaptive planning process interpret settings and opportunities provided by the NFS unit compared with Desired Conditions? Do they think there is a need for change?</p>

<p>LMP Performance Measures</p>	<p>Settings and opportunities associated with social systems (e.g., via facilities, Wilderness, open space, recreation infrastructure, access, commodity production, special use permits, visitor days, outfitter guide permits, etc.) Other as appropriate</p> <ul style="list-style-type: none"> • Acres and location of ROS classes (status and trend, per CER cycle perhaps) • Visitor encounters in ROS class/setting • Incidents of OHV violations (discernable routes and miles, violations per patrol-day, etc.) • Backcountry campsite conditions (dispersed recreation sites) • [weeds in high-value areas (crosswalk with insects and disease T2.3)] • NVUM survey indicators • customer satisfaction comment cards (completed at campgrounds) • Ecological intactness relative to long-term scenery and scenic integrity: scenic effect of ecological processes and conditions • Number of acres under lease for oil and gas development • Number and acres of minerals material pits available on the Forest <p>Contributions to sustaining social systems within the unit's LMP analysis area (e.g., via social benefits associated with settings and opportunities stated in the Desired Condition statement).</p> <p>Perceptions of need for change in LMP components reported by interested and engaged individuals, groups, Tribes, agencies, or organizations</p>
<p>Possible Data Sources</p>	<p>Overall data availability varies and needs verification. Data is available from existing programs, such as NVUM, budgets, and contracting information. Additional survey questions could be added to NVUM and other existing survey instruments to address performance measures. Existing INFRA databases to consider include INFRA-WILD, INFRA-TIMS, and INFRA-RANGE. Special Use Database (SUDS) is available to track permittees, ski areas and other facility operations, concessionaires, and other special uses. GIS overlays for recreational opportunities are also either available or possible.</p>
<p>Importance</p>	<p>An overall goal of the NFS is to contribute to sustaining the social and economic systems within LMP plan areas. Our ability to characterize the diversity of settings and associated opportunities provided by NFS units is essential for us to tell an integrated story of delivering multiple social and economic benefits to diverse communities. All agency goals have social dimensions and the settings and opportunities provided are especially useful for showing how agency goals are interrelated. For example, reducing a setting's exposure to risk from catastrophic wildfire or invasive vegetation depends not only on ecological conditions, but also on socially defined meanings of risk and on opportunities for access. <i>In telling our story of delivering multiple benefits, this sub-element gets at settings and opportunities that must exist before anyone can realize benefits that might be reflected in other sub-elements.</i></p>
<p>What it Tells Us</p>	<p>It enables us to tell how we are doing in our efforts to (1) contribute to sustaining social systems affected by FS activities and (2) provide settings and opportunities that contribute to maintenance or achievement of sustainable social, ecological, and economic systems. It enables us to tell whether we are providing opportunities consistent with desired conditions. And it enables us to describe our need to change or continue forest and grassland strategies in response to the combination of changing public demands, ecological conditions, and fiscal constraints.</p>

Theme 5: Maintenance and Enhancement of Economic Systems

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<p>Theme 5</p>	<p>Maintenance and Enhancement of Economic Systems: Given the opportunities and settings, suitable uses, and activities designed to make progress towards desired conditions, there are goods and services that come off the land. This theme is about goods and services derived from the opportunities and settings referenced Theme 4. Key contributions of goods and services include revenue and jobs associated with recreation, tourism, resident amenities, environmental services, and commodities such as AUMs and the potential for timber production.</p>
<p>Sub-element NFS Generic Desired Condition</p>	<p><i>T5.1 Provision of Goods and Services</i> Goods and services provided by or derived from [the NFS unit] contribute to sustaining economic systems in the plan area.</p>
<p>Contextual Statement</p>	<p>Illustration of LMP Contextual Statement: Contributions to economic sustainability are reflected in traditional financial measures, amenity values derived from living, working, or owning property within the plan area of analysis, and from non-market valuation of benefits, such as recreation days or environmental services. For the Name National Forest, many of the economic contributions made are dependent upon markets outside the control of the NFS. Nevertheless, we want to monitor product and/or financial measures affected by LMP implementation so we have an indication of how opportunities and setting provided are contributing to local economies within the plan area.</p>
<p>LMP Desired Condition Statement</p>	<p>Illustration of LMP Desired Conditions: Goods and services provided by or derived from [the NFS unit] contribute to sustaining economic systems in the plan area. Goods and services (e.g., AUMs, forest products, campground receipts, visitor days, stewardship contracting, minerals and energy) provided by or derived from the Name National Forest contribute to sustaining social, ecological, and economic systems relevant to the plan area.</p>
<p>Objectives</p>	<p>Illustration of LMP Objectives:</p> <ul style="list-style-type: none"> • The 2022 outcome is the continual offering of AUMs responsive to forage conditions. • The 2022 outcome is the annual offering of ## bd. ft. of timber for sale.
<p>Desired Trend Statement</p>	<p>Trends in goods and services derived from or provided by the NFS unit are consistent with near-term and long-term progress towards desired conditions.</p>
<p>Monitoring Questions</p>	<p>What are the status and trends of goods and services provided from the unit with regards to progress towards desired conditions? How do these goods and services contribute to key opportunities for sustaining economic systems relevant to the plan area?</p>

<p>LMP Performance Measures</p>	<p>Value and quantities of goods and services: (e.g., the following might apply)</p> <ul style="list-style-type: none"> • Wellheads for production • Mineral materials removed • AUM's • Bdft offered • Bdft sold • Permits, etc • Employment and labor income attributable to goods and services provided by NFS management in the plan area. • Wages • Contracts • Support • Local economic contribution of Forest Service salary and non-salary expenditures related to management investments made to progress towards the desired conditions defined in all other monitoring sub-elements. • Local economic impact of progress or lack of progress towards the desired conditions defined in all other monitoring sub-elements (i.e. the detrimental economic effects of invasives).
<p>Possible Data Sources</p>	<p>Resource data availability is generally good at the broad scale within the Forest Service. The FS has relevant data and technical guidance in place and available agency-wide through IMPLAN (Impact Analysis for Planning—an input-output model), and Forest-level specialist reports. Primary information sources that could contribute to our understanding of this sub-element include purchases and salaries by the local unit, NVUM (National Visitor Use Monitoring) data, recreation and wildlife visits and spending, volume of timber harvested and minerals extracted, AUM permits issued. IMPLAN is the FS model used along with FEAST (Forest Economic Analysis Spreadsheet Tool) and Forest resource information to estimate the local economic impacts of resource consumption and FS expenditures.</p>
<p>Importance</p>	<p>An overall goal for NFS planning is to contribute to sustaining the social and economic systems within the plan area. While the Maintenance and Enhancement of Social Systems Theme characterizes settings and opportunities provided the public, the Maintenance and Enhancement of Economic Systems Theme characterizes the associated economic outcomes of the settings and opportunities provided. Management of National Forests and Grasslands generates commodity and non-commodity goods and services. Examples include timber and non-timber forest products, range forage, recreation opportunities, water, minerals, energy resources, and various other environmental goods and services. Such complex economic systems involve many participants. Responsible Officials decisions impact multi-scale economies whether the Forest is a major or minor contributor. Regardless of the magnitude of contribution, stability and trend of labor and employment contributions and the impact of goods and services on local economies tend to be common concerns across many NFS units. Additionally, “how” we impact economic systems is not limited to magnitude of quantified valuation, but also includes more subtle qualitative relationships, e.g. the economic activity spawned by wildlife viewing or scenic byways.</p>
<p>What it Tells Us</p>	<p>This sub-element allows us to measure contributions to economic systems that are relevant to the plan area and that are attributable to NFS management. It also allows us to measure our efforts in contributing to economic systems using an interdisciplinary and collaborative approach.</p>

Theme 6: Infrastructure Capacity

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Theme 6	Infrastructure Capacity: This theme addresses NFS infrastructure's ability to contribute to the aspirations characterized in the LMP.
Sub-element NFS Generic Desired Condition	T6.1 Roads and Trails The road and trail system on the NFS unit is safe, reflects appropriate access, considers needs of adjacent landowners, and meets public demand.
Contextual Statement	Illustration of LMP Contextual Statement: Conversion from large ranch holdings to smaller lots has led to access issues. Where the large land owner was once willing to allow public access, current homeowners tend not to allow public access to public lands. There are two implications for the National Forest: (1) greater pressure on remaining access points and (2) need to be more proactive with counties on zoning plans to include easement access to public lands across private lands.
LMP Desired Condition Statement	Illustration of LMP Desired Condition: The road and trail system on the Name NF is safe, reflects appropriate access, considers needs of adjacent landowners, and meets public demand. Access to the Forest boundary is sufficient to allow the public to reach the Forest in traditional and desired locations and considers needs of adjacent landowners. Within the Forest, the transportation system provides ample access to desired locations, supports a diversity of forest uses inclusive of commodity production, and provides access across national forest lands to private in-holdings. Modes of transportation are compatible with the recreation settings and the condition of the roads and trails is maintained to standards to meet the purposes and objectives of each. Trailhead design and access roads accommodate larger vehicles such as horse and snowmobile trailers where needed.
Objectives	Illustration of LMP Objectives: <ul style="list-style-type: none"> • Within 10 years, no new unauthorized OHV travel occurs off of authorized routes. • Within 10 years, a sustainable and desirable designated OHV route system, including loop opportunities, is established. • Within 3 years, the road miles on which at least one physical maintenance activity is performed to applicable standards during the fiscal year is increased from 60% in December 2005 to 75% (OML 1-5). • Within 5 years, the percent of the road system maintained in Operational Maintenance Level 1 (properly stored) is increased from 10% in December 2005 to 15%. • Within 5 years, the percent of road system maintained in Operational Maintenance Level 3-5 by Condition Class is decreased from 70% in December 2005 to 60%. • Within 7 years, the miles of road maintained in Operational Maintenance Level 2 (as a percentage of road system) is increased from 15% in December 2005 to 20%. • Within 2 years, the miles of Trail on which at least on physical maintenance activity is performed to applicable standards during the fiscal year is increased from 50% in December 2005 to 75%. • Within 3 years, the percent of Trail system maintained for equestrian use is increased

	<p>from 40% in December 2005 to 50%.</p> <ul style="list-style-type: none"> • Within 4 years, the miles of Trail system maintained properly for OHV use equals the miles of Trail system on which OHV use is authorized.
Desired Trend Statement	Deferred maintenance needs and environmental impacts of the road and trail system within the plan area are stable or declining. Suitable recreation opportunities provided by the road and trail system are increasing.
Monitoring Questions	<p>How many miles of the designated roads and trails are maintained to standard?</p> <p>Where is unauthorized use occurring on or off the road and trail system?</p> <p>Are the impacts from the road and trail system on soils, water quality, wildlife, and other natural and cultural resources sustainable and within acceptable tolerance?</p> <p>Is the road and trail system serving its intended purposes and addressing recreational demands?</p>
LMP Performance Measures	<p>Miles and percent of road and trail network maintained to standard.</p> <p>Percent of road miles decommissioned compared to target decommissioning</p> <p>Percent of NFS lands covered by motor vehicle use maps prepared under 36 CFR part 212, subpart B.</p>
Possible Data Sources	Infra roads, Infra trails, Infra ATM
Importance	Each administrative unit is required to monitor the effects of motor vehicle use on designated roads and trails and in designated areas (36 CFR 212.57). Management of trail and road systems can have important effects on land productivity and the accomplishment of desired conditions. Nationally, the Forest Service manages 125,000 miles of National Forest System trails, including portions of 6 national scenic trails and 11 national historic trails, and 386,000 miles of National Forest System roads. This system of roads and trails provides recreational and administrative access and transportation for goods and service providers. It is essential to the Forest Service's capacity to contribute to social, economic, and ecological sustainability, which is an overall goal for NFS management. A well-maintained system provides transportation and recreation opportunities while contributing towards desired ecological conditions.
What it tells us	Knowing the status and condition of our road and trail systems inform our efforts to (1) contribute to sustaining social systems affected by FS activities and (2) provide settings and opportunities that contribute to maintenance or achievement of sustainable social, ecological, and economic systems. It highlights the threats of unmanaged recreation, especially OHV recreation (EO 11644), and whether we are providing opportunities consistent with desired conditions. It tells us how well we provide for outdoor recreation and for support for resource protection activities such as wildfire mitigation.

Other Considerations

Select Strategic Attributes and Geographic Areas to Monitor

Strategic plans, such as LMPs, require a strategic level of monitoring. The attribute and spatial resolutions required to characterize desired conditions and objectives within a planning area can significantly affect the cost associated with monitoring and evaluations. Generally speaking, finer scale characterizations greatly increase the cost of data gathering and evaluation. LMP monitoring activities should be strategic in design and shift away from intensive, project level monitoring schemes. Strategic monitoring should utilize existing data and corporate data bases to the greatest extent possible. Strategic monitoring also should be designed to provide representative sampling of affected landscapes as appropriate. Monitoring requirements and related standards for application should be unambiguous, achievable, and avoid conflict with other performance measures (including those required by federal and state law) to the maximum practical extent.

Select Broadly Applicable Performance Measures

Social, economic, and environmental sustainability concerns often cross multiple jurisdictions and thus require consistent information across administrative and political boundaries. Broadly accepted performance measures are essential to collaborative assessment, planning, and decision-making processes that address shared concerns. The LMP M&E framework performance measures were identified with consideration for general information needs, available information sources, accepted and developing standards, and corporate information systems. Selection of LMP monitoring performance measures at the regional and individual unit level should support continuing efforts of the agency to define measures that are broadly accepted and used for similar reporting requirements, such as for EMS, Forest Service Strategic Plan and the R&D 2003 Sustainable Forest Report.

Recognize Linkages to the EMS

The LMP M&E framework recognizes similarities to the Environmental Management System requirement and enables leveraging of the distinct but related components. For example, three of the framework sub-element priorities (vegetation diversity, resilience to unwanted wildfire, and roads & trails) have been identified for inclusion in the Forest Service's national EMS strategy under development.