

Appendix A. Monitoring Program

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Introduction

The monitoring program includes monitoring, or the collection of data and information, followed by the evaluation of that information. Monitoring and evaluation are separate, sequential activities required by the National Forest Management Act to determine how well objectives have been met and how closely management standards and guidelines have been applied. Effective land management plan monitoring fosters adaptive management and more informed decisions.

Monitoring and evaluation are conducted at several scales and for many purposes, each of which has different objectives and requirements. Monitoring occurs at the scale of the Forest, the Region, and even larger areas. Monitoring may be the responsibility of the Forest Service, another agency, or may involve multiple agencies and organizations.

Monitoring provides the feedback for the forest planning cycle by testing assumptions, tracking relevant conditions over time, measuring management effectiveness, and evaluating effects of management practices. Monitoring information should enable the Forest to determine if a change in plan components or other plan management guidance may be needed, forming a basis for continual improvement and adaptive management. Direction for the monitoring and evaluation of forest plans is found under the 2012 planning rule at 36 Code of Federal Regulations 219.12 and in the directives at 1909.12 Chapter 30.

The plan monitoring program addresses the most critical components for informed management of the Forest's resources within the financial and technical capability of the agency. Every monitoring question links to one or more desired conditions, objectives, standards, or guidelines. However, not every plan component has a corresponding monitoring question.

The monitoring program is not intended to depict all monitoring, inventorying, and data gathering activities undertaken on the Forest. Consideration and coordination with broad-scale monitoring strategies, multi-party monitoring collaboration, and cooperation with state agencies where practicable will increase efficiencies and help track changing conditions beyond the forest boundaries to improve the effectiveness of the plan monitoring program. In addition, project and activity monitoring may be used to gather information for the plan monitoring program if it will provide relevant information to inform adaptive management. Monitoring also provides feedback to prioritize and improve the plan monitoring program and broader-scale monitoring strategy.

The monitoring plan sets out the plan monitoring questions and associated indicators and measures. The Forest used the best available scientific information in the development of the monitoring plan, giving consideration to expected budgets and agency protocols.

The monitoring program will include a monitoring guide and a biennial monitoring evaluation report. The monitoring guide will provide detailed information on the monitoring questions, indicators, frequency and reliability, priority, data sources and storage, and cost. Data sources and frequency of updates may change, so the specifics will be included in a monitoring guide. It is important to note that not all monitoring questions are expected to be evaluated biennially.

The biennial monitoring evaluation report will summarize the results of monitoring, evaluate the data, consider relevant information from broad-scale or other monitoring efforts, and make recommendations to the responsible official. The monitoring evaluation report will indicate whether or not a change to the Forest Plan, management activities, or the monitoring program, or a new assessment, may be warranted based on the new information. The monitoring evaluation report is used to inform adaptive management of the plan area and will be made available to the public.

Some kinds of monitoring indicators will require longer time frames for thorough evaluation of results, but a biennial review of what information has been collected will ensure timely evaluation to inform planning. The biennial monitoring evaluation does not need to evaluate all questions or indicators on a biennial basis but must focus on new data and results that provide new information regarding management effectiveness, progress towards meeting desired conditions or objectives, changing conditions, or validation (or invalidation) of assumptions.

Modifying a plan's monitoring program does not require any other change to the plan; that is, a plan need not be amended nor revised simply to facilitate monitoring pursuant to the Rule.

A change to a monitoring question or an indicator may be made administratively, but only after the public has had an opportunity to comment. A change to a monitoring guide or annual monitoring work plan does not require public notification. In addition, because the broader-scale monitoring strategy is comprised of questions and indicators from plan monitoring programs, a change of the broader-scale monitoring strategy questions and indicators would require a change of the relevant plan monitoring programs.

Required 2012 Planning Rule Monitoring Items

The Forest Service has discretion to set the scope, scale, and priorities for plan monitoring within the financial and technical capabilities of the administrative unit. However, they are required to include one or more monitoring question(s) and associated indicator(s) for the eight items set out in the Planning Rule at 36 CFR 219.12(a)(5) as follows:

- i. The status of select watershed conditions.
- ii. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
- iii. The status of focal species to assess the ecological conditions required under 36 CFR 219.9.
- iv. The status of a select set of the ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
- v. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
- vi. Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
- vii. Progress toward meeting the desired conditions and objectives in the plan, including providing for multiple use opportunities.
- viii. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)). (36 CFR 219.12(a).

Social, economic, and cultural sustainability must also be addressed in the monitoring program (FSH 1909.12 Section 32.13f).

The following was also considered to help determine the need to track information related to the plan components.

1. Required by law – collection of information is required through Biological Opinion Terms and Conditions, court orders, settlement agreements, etc.
2. Magnitude of departure from desired condition (if of concern) - Is there a high degree of disparity between existing and desired conditions? Examples: (1) a particular habitat component is at a much lower level than desired; (2) the amount of use of a particular resource or use at a particular location is much higher than desired.
3. Degree of uncertainty regarding the available data or uncertainty due to lack of data (FSH 1909.12 Section 32.1, 32.11). Is available information incomplete or inconclusive?
4. Long standing management assumptions that need to be verified or re-verified? (FSH 1909.12 Section 32.1, 32.11). Is there a high degree of uncertainty associated with management assumptions? Examples: (1) a new way of doing something where there is limited experience with the new technique; (2) actions taken in response to an unprecedented situation; (3) a lack of information or out dated information on the effects of a management action on specific habitat needs
5. The risk and consequences to the resource for not having information to reduce the uncertainty/knowledge gap/assumption.
 - i. Risk of action/event occurring - Are management activities AND/OR other drivers and stressors (climate change, invasives, insect diseases, flooding events, etc.) likely to occur that would have discernable outcomes to the resource? Is the parameter responsive to changed conditions (climate, insect/disease, invasives, management activities, etc.?)
 - ii. Consequences to resource – What are consequences to resource for not having this information? I.e. collection of this information will make a difference in how we manage for sustainability of the resource.
6. Distinctive roles and contributions within the broader landscape (FSH 1909.12 Sec. 32.1). Will monitoring respond to a key public issue? Key issues identified through scoping may warrant monitoring even if they are (1) well understood, (2) the existing condition is good and (3) management activities will have little impact. Monitoring may be necessary for educational and/or accountability purposes.

Focal Species

The following focal species have been identified for the HLC NF. Monitoring for these species is indicated in the applicable resource monitoring sections.

- Limber pine (*Pinus flexilis*)
- Westslope cutthroat trout (*Oncorhynchus clarki lewisi*)

Monitoring Elements by Resource Area

Aquatic Ecosystems – Watershed (WTR)

Table 1. Aquatic Ecosystems – Watershed (WTR), Fisheries and Aquatic Habitat (FAH), RMZ, CWN

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-WTR-DC-01; FW-WTR-DC-03; FW-WTR-DC-07 ; FW-WTR-DC-09; FW-WTR-DC-11; FW-WTR-DC-12; FW-FAH-DC-01; FW-FAH-DC-02; FW-FAH-DC-03; FW-FAH-DC-05; FW-FAH-DC-07; FW-FAH-DC-08; FW-RMZ-DC-01, FW-RMZ-DC-02	MON-WTR-01 What is the trend in instream physical characteristics for managed watersheds as compared to unmanaged?	Instream Physical Habitat <ul style="list-style-type: none"> <i>Pools, woody debris, bank angle, channel substrate, D50, Aquatic invertebrates</i> 	PIBO (5 years)
FW-WTR-DC-04 FW-WTR-STD-03; FW-RMZ-STD-01; FW-RMZ-STD-02	MON-WTR-02 What BMPs are implemented in wetlands in order to not impede the sustainability of wetland characteristics and diversity?	BMP implementation for projects with wetlands <ul style="list-style-type: none"> <i># and types of BMPs implemented</i> <i>Quality at which the BMP are implemented</i> 	Supervisor’s Office Records PALS National BMP database; Bi-Annual State BMP review (5 years)
FW-WTR-DC-05; FW-WTR-DC-06; FW-WTR-DC-07	MON-WTR-03 What is the status of 303 and 305 State listed streams?	State listed stream segments Forestwide and by Conservation Watershed Network <ul style="list-style-type: none"> <i># and locations stream reaches on 303 and 305 list</i> <i>Acres, miles, and types of actions that improve the reasons for which the stream reach was listed</i> <i>MT State assessment of Beneficial Uses status (fully supporting, not fully supporting, threatened) for each listed stream segment</i> 	MT State 303d and 305b integrated report (annual)
FW-WTR-OBJ-01	MON-WTR-04 How many restoration projects were completed in priority watersheds?	Restoration projects completed in priority watersheds.	WCF (5 years)
FW-WTR-OBJ-02	MON-WTR-05 How many acres of restoration occurred in priority watersheds?	Acres of restoration in priority watersheds.	WCF (Annual)
FW-CWN-DC-01; FW-FAH-OBJ-01; FW-FAH-OBJ-02; FW-CWN-OBJ-01; FW-CWN-OBJ-02; FW-WTR-GDL-04	MON-WTR-06 What stream habitat improvement actions have occurred?	Stream Habitat Improvements <ul style="list-style-type: none"> <i>Miles, types, and locations of stream habitat improvements</i> 	WIT (Annual)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-CWN-GDL-01; FW-CWN-GDL-02	MON-WTR-7 What road and access improvements have been completed in Conservation Watershed Network areas?	Road Management in Watershed Conservation Networks <ul style="list-style-type: none"> • #, types, miles or road management actions/decisions in Watershed Conservation Network 	INFRA WIT (5 years)

Aquatic Ecosystems – Fisheries and Aquatic Habitat (FAH)

Table 2. Aquatic Ecosystems – Fisheries and Aquatic Habitat (FAH)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-FAH-DC-01 FW-FAH-DC-04 FW-FAH-DC-05 FW-FAH-DC-08	MON-FOCAL-01 What is the status of WCT Focal species?	Presence and abundance of genetically pure westslope cutthroat trout populations <ul style="list-style-type: none"> • Number of fish/mile, or miles of occupied stream reaches 	Montana FWP Database (5-10 years)
FW-RT-STD-02; FW-RT-STD-03; FW-RT-STD-04; FW-BRDG-DC-01	MON-FAH-01 Are culverts and bridges being constructed to these directions?	Number of culverts and bridges that meet standards	FACTS WIT (5 years)

Aquatic Ecosystems – Riparian Management Zones (RMZ)

Table 3. Aquatic Ecosystems – Riparian Management Zones (RMZ)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-RMZ-OBJ-01	MON-RMZ-01 How many acres of riparian management zones have been improved?	Acres of riparian management areas improved through activities including but not limited to: <ul style="list-style-type: none"> • Road obliteration • Riparian planting • Reconstruction of flood plains through removal of roads or berms 	WIT and FACTS (5 years)

Soils (SOIL)

Table 4. Soils (SOIL)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-SOIL-STD-02; FW-SOIL-GDL-04; FW-SOIL-GDL-05	MON-SOIL-01 Are post management activities conserving forest floor and coarse woody debris at levels that maintain dynamic soil quality?	Post-treatment forest floor conditions <ul style="list-style-type: none"> • Detrimental Soil Disturbance (<i>% areal extent</i>) • Course Woody Debris (<i>tons/acres</i>) • Visual ground cover estimates • Soil burn severity 	Soil Monitoring Report Forest wide soil monitoring data base (<i>Annual</i>)
FW-SOIL-STD- 04; FW-SOIL-STD-05	MON-SOIL-02 Were road or trails restored to provide for soil quality to trend towards improvement?	Number/acres and types of road/trail treatment	Project Monitoring data, WIT/FACTS/INFRA (<i>5 years</i>)

Air Quality (AIR)

Table 5. Air Quality (AIR)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-AQ-DC-01	MON-AQ-01 Is air quality in compliance with and maintained per Clean Air Act and Wilderness Act requirements?	Air quality, forestwide <ul style="list-style-type: none"> • National Ambient Air Quality Standards • Regional Haze Rule • Air Quality Related Values 	NAAQS monitoring stations State regional haze plan IMPROVE monitoring sites (<i>Annual</i>)

Fire and Fuels Management (FIRE)

Table 6. Fire and Fuels Management (FIRE)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-FIRE-DC-01	MON-DSTB-01 What is the extent and severity of wildfire burned areas?	Burn Severity, forestwide <ul style="list-style-type: none"> • Acres burned by wildfire and by severity class (low, moderate, high) by R1 Broad PVT *for fires >1000 acres. 	Monitoring Trends in Burn Severity (MTBS) database (<i>Annual</i>)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-FIRE-GDL-04	MON-FIRE-01 Are fire management strategies supporting ecosystem function resulting in becoming self-regulating?	Fire management efficacy, forestwide <ul style="list-style-type: none"> • Acres of re-burn • Fire Severity on re-burned acres • Fire spread limited by previous fires 	FACTS FTEM (5 years)
FW-FIRE-OBJ-01	MON-FIRE-02 To what extent are fuels management activities occurring to meet the objective of 15,000 acres of treatment per decade within the WUI?	Hazardous fuels management, forestwide <ul style="list-style-type: none"> • Acres of prescribed fire • Acres of wildfire • Acres of other fuels treatments (rearrangement of fuels, pile burning, chipping, mastication) 	FACTS database (Annual)
	MON-FIRE-03 Are treated fuel management areas being maintained?	Maintenance of treated acres, forestwide <ul style="list-style-type: none"> • acres and locations of existing fuel treatments • acres of maintenance treatments completed 	FACTS (Annual)
FW-FIRE-STD-01	MON-FIRE-04 Did reportable injuries occur on any wildfires?	Wildfire-related injuries, forestwide <ul style="list-style-type: none"> • # of wildfire related injuries 	eSafety (Annual)
FW-FIRE-DC-02 FW-FIRE-GDL-03	MON-FIRE-05 Are fuels treatments helping to protect high value resources and assets, and control and/or management of the fire?	Fuel Treatment Effectiveness, forestwide <ul style="list-style-type: none"> • # of fuel treatments that changed fire behavior 	FACTS FTEM (5 years)

Vegetation – Terrestrial (VEGT)

Table 7. Vegetation - Terrestrial (VEGT)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage; - Scale; and (<i>Interval of data collection</i>)
FW-VEGT-DC-01	MON-VEGT-01 What management activities have promoted shade intolerant trees (i.e., promoted resiliency)?	Vegetation management activities that promote shade intolerant trees, Forestwide <ul style="list-style-type: none"> • Acres of regeneration harvest • Acres of natural regeneration and plantings • Acres of intermediate harvest • Acres of stand improvement • Acres of mechanical fuels treatments • Acres of prescribed burning • Acres of artificial and natural regeneration after wildfire 	FACTS restoration/resiliency report (5 years)
	MON-FOCAL-02 What is the influence of management and climate on transitional ecotone plant communities (xeric and alpine)?	Limber pine distribution and condition forestwide, by broad potential vegetation type, and by geographic area <ul style="list-style-type: none"> • % presence limber pine (at least 1 tree, any size; at least 1 tree present <5" DBH; and at least 1 tree present >5" DBH) • Proportion of limber pine trees affected by white pine blister rust and mountain pine beetle • Number of limber pine snags by size class 	FIA Plots and intensified grid plots (5 years)
FW-VEGT-OBJ-01	MON-VEGT-02 To what extent have vegetation management treatments been applied on the landscape?	Vegetation Management Treatments, Forestwide <ul style="list-style-type: none"> • Acres of Timber harvest • Acres of Planned ignitions • Acres of Unplanned ignitions • Acres of Planting • Acres of Pre-commercial thinning or other noncommercial stand tending • Acres of Fuel Reduction Treatments (re-arrangement of fuels, pile burning, chipping, mastication, etc) 	FACTS (average for the decade)

Vegetation – Forested (VEGF)

Table 8. Vegetation - Forested (VEGF)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage; - Scale; (Interval of data collection)
FW-VEGF-DC-01 CR-VEGF-DC-01; DI-VEGF-DC-01; EH-VEGF-DC-01; HW-VEGF-DC-01; RM-VEGF-DC-01; SN-VEGF-DC-01; UB-VEGF-DC-01	MON-VEGF-01 What is the abundance of R1 cover types?	Cover type proportions, forestwide, by broad potential vegetation type, and by geographic area <ul style="list-style-type: none"> • % of each cover type: ponderosa pine, dry Douglas-fir, mixed mesic conifer, lodgepole pine, aspen/hardwood, spruce/fir, whitebark pine, and nonforested. 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-02 BB-VEGF-DC-01; CA-VEGF-DC-01; CR-VEGF-DC-02; DI-VEGF-DC-02; EH-VEGF-DC-02; HW-VEGF-DC-02; LB-VEGF-DC-01; RM-VEGF-DC-02; SN-VEGF-DC-02; UB-VEGF-DC-02	MON-VEGF-02 What is the distribution of individual tree species?	Tree species distribution forestwide, by broad potential vegetation type, and by geographic area <ul style="list-style-type: none"> • % presence of each tree species (at least 1 tree present, any size; at least 1 tree present <5" DBH; and at least 1 tree present >5" DBH) 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-03 CA-VEGF-DC-02; CR-VEGF-DC-03; HW-VEGF-DC-03	MON-VEGF-03 What is the abundance of size classes?	Size class proportions, forestwide, by broad potential vegetation type, and by geographic area <ul style="list-style-type: none"> • % of each size class (0 to 4.9" DBH; 5 to 9.9" DBH; 10 to 14.9" DBH; 15 to 19.9" DBH; 20"+ DBH) 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-04	MON-VEGF-04 What is the abundance of forest density classes?	Density class proportions, forestwide, by broad potential vegetation type, and by geographic area <ul style="list-style-type: none"> • % of each density class (10-39.9% canopy cover; 40-59.9% canopy cover; 60% + canopy cover) 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-06	MON-VEGF-05 What is the quantity of very large trees, and the distribution of large and very large tree concentrations	Large (15"+) and very large trees (20"+) by snag analysis groups <ul style="list-style-type: none"> • % presence - at least 1 tree • Trees per acre • % presence of at least 1 tree of larch, Douglas-fir, ponderosa pine, or cottonwood • Trees per acre larch, Douglas-fir, ponderosa pine, and cottonwood Large and very large tree concentrations forestwide and by broad potential vegetation type. <ul style="list-style-type: none"> • % presence 	FIA Plots and intensified grid plots (5 years)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage; - Scale; (Interval of data collection)
FW-VEGF-DC-07	MON-VEG-06 What is abundance of old growth?	Old Growth forestwide and by broad potential vegetation type <ul style="list-style-type: none"> • % and total acres of old growth 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-08 FW-DC-POLL-01	MON-VEGF-07 What is the quantity and distribution of snags?	Snags by snag analysis groups, by size class (10”+ dbh; 15”+ dbh; and 20”+ dbh) <ul style="list-style-type: none"> • % presence of at least 1 snag • Snags per acre 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-09 FW-DC-POLL-01	MON-VEGF-08 What is the quantity of coarse woody debris?	Coarse woody debris (>3” diameter) by broad potential vegetation types <ul style="list-style-type: none"> • Tons per acre 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-DC-11	MON-DSTB-02 What is the hazard to forest insects?	Hazard to Insect and Pathogen (low, moderate, high), forestwide and by broad potential vegetation types <ul style="list-style-type: none"> • % of mountain pine beetle hazard • % of Douglas-fir beetle hazard • % of western spruce budworm hazard 	FIA Plots and intensified grid plots (5 years)
FW-VEGF-GDL-04	MON-VEG-09 Do old growth stands retain minimum old growth criteria post-treatment?	Stand characteristics in old growth treated with vegetation management <ul style="list-style-type: none"> • Stand-level criteria to determine if old growth criteria are met. 	Stand exams (when treatments occur in old growth)

Vegetation – Nonforested (VEGNF)

Table 9. Vegetation – Nonforested (VEGNF)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (Interval of data collection)
FW-VEGT-DC-01; FW-VEGNF-DC-01; FW-POLL-DC-01; FW-VEGNF-DC-03; FW-VEGNF-DC-04; BB-VEGNF-DC-01; CA-VEGNF-DC-01; CR-VEGNF-DC-01; DI-VEGNF-DC-01; EH-VEGNF-DC-01; HW-VEGNF-DC-01; LB-VEGNF-DC-01; RM-VEGNF-01; SN-VEGNF-	MON-VEGNF-01 What is the abundance and condition of nonforested plant communities?	Rangeland Condition and Trend forestwide and by GA <ul style="list-style-type: none"> • Composition of shrubs, grasses, and forbs on rangeland sites over time in livestock allotments, compared to the estimated natural range of variability for the rangeland site. • Changes in percent bare ground and litter in nonforested cover types 	Range AMP monitoring files (5 years) FIA plots (5 years)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
DC-01; UB-VEGNF-DC-01; FW-POLL-DC-01; FW-WL-GDL-01		% of nonforested cover types, forestwide, by broad PVT, and by GA.	
FW-DC-POLL-01	MON-POLL-01 Do plant communities contain pollinator-attractive species and species which bloom at different times including both early and late season species?	Plant (forb, graminoids, and shrub) diversity in rangelands, forestwide <ul style="list-style-type: none"> Similarity index by allotment or pasture (<i>Weight of plant species within dominant sites in a pasture/allotments</i>) Species composition/richness in nonforested PVTs. Number of projects implemented that improve pollinator habitat forestwide # of projects that improved pollinator habitat (<i>beneficial seed mix, habitat improvements, etc.</i>)	Range 2210 and/or 2240 files (<i>annual</i>) FIA plots (<i>5 years</i>) MT Heritage species observations/occurrences FACTS Pollinator project records (<i>annual</i>)
	MON-POLL-02 Do both non-forested and forested plant communities provide structural diversity?	Mosaic of vegetation structures forestwide <ul style="list-style-type: none"> Size class proportions, forestwide, by broad PVT, and GA (% of each size class (0 to 4.9" DBH; 5 to 9.9" DBH; 10 to 14.9" DBH; 15 to 19.9" DBH; 20"+ DBH)) Acres of regeneration harvest Acres of high severity fires Spatial distribution of transitional VMap classes	FIA plots (<i>5 years</i>) FACTS (<i>annual</i>) VMap (<i>5 years or when available</i>)

Vegetation – Plant Species at Risk (PRISK)

Table 10. Vegetation – Plant Species at Risk (PRISK)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-PRISK-DC-01	MON-PRISK-01 What is the status of rare plant occupancy?	Rare plant occupancy, forestwide <ul style="list-style-type: none"> # of stems; acres of occupancy; # surveys conducted; # sites present; # sites absent 	MT State Heritage Species of Concern records, Forest botany data (<i>5 years</i>)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
	<p>MON-PRISK-02</p> <p>What is the distribution and condition of whitebark pine?</p>	<p>Whitebark distribution and condition forestwide, by broad PVT, and by GA</p> <ul style="list-style-type: none"> • % presence of each tree species (at least 1 tree present, any size; at least 1 tree present <5" DBH; and at least 1 tree present >5" DBH) • Proportion of whitebark pine trees affected by white pine blister rust and mountain pine beetle • Number of whitebark pine snags by size class 	<p>FIA Plots and intensified grid plots (5 years)</p>
<p>FW-PRISK-OBJ-01</p>	<p>MON-PRISK-03</p> <p>What management actions contribute to the restoration of whitebark pine, and what is the success of established seedlings?</p>	<p>Whitebark pine restoration actions forestwide</p> <ul style="list-style-type: none"> • Acres treated for the purpose of sustaining or restoring whitebark pine. • Survival of planted whitebark pine seedlings 	<p>FACTS; stocking surveys (5 years)</p>

Vegetation – Invasive Plants (INV)

Table 11. Vegetation – Invasive Plants (INV)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
<p>FW-DC-VEGNF-02</p> <p>FW-INV-DC-01</p> <p>FW-INV-DC-02</p>	<p>MON-INV-01</p> <p>What is the extent of nonnative plant species?</p>	<p>Invasive plant presence and abundance forestwide</p> <ul style="list-style-type: none"> • Net infested acres by species • Percent invasive species cover in inventoried areas 	<p>TESP-IS (5 years)</p>
<p>FW-INV-OBJ-01</p>	<p>MON-INV-02</p> <p>What is the status of invasive plant treatments?</p>	<p>Acres of treatment types</p> <ul style="list-style-type: none"> • Biocontrol, Herbicide, Cultural, Sheep Grazing, or other types) 	<p>FACTS (5 years)</p>
<p>FW-INV-GDL-03</p> <p>FW-PRISK-DC-01</p>	<p>MON-INV-03</p> <p>Are non-detrimental weed treatments occurring in areas that overlap with known populations of at-risk plant species?</p>	<p>Invasive weed treatments that occur in at-risk plant populations</p> <ul style="list-style-type: none"> • # of at-risk plant occurrences that receive beneficial weed treatments • Invasive plant treatments used in at-risk plant communities 	<p>Botany viability report (5 years)</p>

Wildlife (WL)

Table 12. Wildlife (WL)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (Interval of data collection)
<p>DI-WL-DC-01 UB-WL-DC-01 UB-WL-GDL-01</p>	<p>MON-WL-01 Have there been changes to landscape connectivity in the Divide and Upper Blackfoot GAs?</p>	<p>Landscape scale connectivity</p> <ul style="list-style-type: none"> • # and types of actions - in Divide GA and Upper Blackfoot GA • # of land acquisitions in Divide GA only <p>Management Actions in connectivity corridors</p> <ul style="list-style-type: none"> • # and types of actions in Divide and Upper Blackfoot GAs • # of land acquisitions in Divide GA 	<p>FACTS INFRA WITS PALS Land acquisition SO records (5 years)</p>
<p>FW-WL-DC-04</p>	<p>MON-WL-02 Are bear and other wildlife conflicts being minimized?</p>	<p>Bear conflicts</p> <ul style="list-style-type: none"> • # conflict incidents • # food storage violations 	<p>Law enforcement reports Fish Wildlife & Parks Conflict Database NCDE and GYE Conservation Strategy Monitoring Reports (5 years)</p>
<p>FW-WL-NRLMD plan components</p>	<p>MON-WL-03 Have there been changes to lynx habitat as a result of forest management</p>	<p>Alterations of lynx habitat</p> <ul style="list-style-type: none"> • Acres changed from suitable to not currently suitable • Number of acres of exceptions used. 	<p>FACTS, project decisions (5 years)</p>
<p>FW-WL-Grizzly Bear Amendment plan components</p>	<p>MON-WL-04 Have there been changes to baseline habitat conditions for grizzly bears as defined in the GB Amendment?</p>	<p>Habitat security conditions</p> <ul style="list-style-type: none"> • Open and Total motorized route density by BMU Subunit, • acreage of secure core by BMU Subunit, • number of developed recreation sites by BMU Subunit 	<p>NCDE CS monitoring report (data derived from INFRA and PALS) (5 years)</p>
<p>EH-WL-DC-02; UB-WL-DC-2</p>	<p>MON-WL-03 What is the status of habitat conditions that support flammulated owls during the nesting season?</p>	<p>Ponderosa pine and snag habitat</p> <ul style="list-style-type: none"> • Percentage of the warm-dry and warm-moist biophysical settings (with ponderosa pine trees greater than 15 inches d.b.h (dominance type or presence). • Average number of snags per acre greater than 15 inches d.b.h. in the warm-dry and warm-moist biophysical settings. 	<p>FIA FACTS (5 years)</p>

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (Interval of data collection)
		<ul style="list-style-type: none"> Average density of the ponderosa pine dominance type. Number of acres of ponderosa pine forest treated to promote desired landscape pattern for flammulated owls. <p>Burned areas</p> <ul style="list-style-type: none"> Acres of 2-20 yrs. old burned (Rx and wildfire) <p>Report by Forest and specifically for Elkhorns & Upper Blackfoot</p>	
<p>FW-FWL-DC-01; FW-FWL-DC-03; FW-FWL-DC-02; FW-FWL-DC-04; FW-FWL-GDL-01; FW-FWL-GDL-02; FW-WL-GDL-05</p>	<p>MON-WL-04 What changes in hunting opportunities have occurred?</p>	<p>Harvest Opportunity</p> <ul style="list-style-type: none"> hunter-days for Hunting Districts that include HLC NF lands 	<p>FWP data (5 years)</p>
<p>FW-WL-GDL-10</p>	<p>MON-WL-05 What management actions are occurring to prevent the spread of white-nose syndrome or other diseases?</p>	<p>Preventative white-nose syndrome actions</p> <ul style="list-style-type: none"> # and locations of preventative actions reducing the spread of white-nose syndrome or other disease 	<p>PALS (5 years)</p>
<p>EH-WL-DC-01 Habitat is available that provides for the needs of species with seclusion as a requirement.</p>	<p>MON-WL-06 What management activities have occurred in the Elkhorn Mountains?</p>	<p>Activities in Elkhorns</p> <ul style="list-style-type: none"> Miles of new trails or road construction authorized Pull indicators from current MOU monitoring plan 	<p>PALS INFRA Cooperative Elkhorns Wildlife Monitoring Program (5 years)</p>

Recreation Settings (ROS)

Table 13. Recreation Settings (ROS)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (Interval of data collection)
<p>FW-ROS-DC-01-13</p>	<p>MON-ROS-01 What is the progress towards achieving desired recreation opportunity spectrum desired conditions?</p>	<p>Recreation opportunity spectrum (ROS) <u>By ROS classes</u></p> <ul style="list-style-type: none"> ROS acres at time of ROD Current ROS acres when measured 	<p>FACTS INFRA (5 years)</p>

Recreation Opportunities (REC)

Table 14. Recreation Opportunities (REC)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-REC-DC-01 FW-REC-DC-03 FW-REC-DC-04 FW-REC-DC-06	MON-REC-01 To what extent are developed recreation sites managed for social and ecological sustainability?	Developed Recreation site conditions <ul style="list-style-type: none"> • # and types of developed recreation sites/areas changed or improved • #of changes to existing facilities 	INFRA (5 years)
FW-REC-DC-07; FW-REC-DC-05 DI-SHRA-DC-03 (South Hills Recreation Area)	MON-REC-02 What is the status of social and resource conditions of recreation rental facilities, dispersed sites and/or trailhead facilities	Recreation conditions <ul style="list-style-type: none"> • # and types of dispersed recreation sites/areas • # of people that using the dispersed sites • Level of satisfaction of sites • # and types of social conflicts in selected, concentrated dispersed camping/recreation areas • # of reported social conflict or resource damage incidents • # and locations of dispersed recreation sites that are under used • # and locations of dispersed recreation sites over used • #, types, and locations of primary use change of dispersed recreation sites • \$ of deferred maintenance needs per recreation rental facility • # and locations of maintenance actions at recreation rental facilities 	National Visitor Use Monitoring (10 years) Law enforcement reports
FW-REC-GO-01	MON-REC-03 To what extent are recreation partnerships and volunteer programs support recreation programs?	Recreation partnerships <ul style="list-style-type: none"> • # of partnerships • # of volunteer programs 	Volunteer/partnership data (5 years)

Recreation Special Uses (RSUP)

Table 15. Recreation Special Uses (RSUP)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-RSUP-DC-01	MON-RSUP-01 What is the status of recreation special use permits?	Recreation Special Use Permits <ul style="list-style-type: none"> • #, type and locations recreation SUP 	SUDS (10 years)

Scenic Character (SCENERY)

Table 16. Scenic Character (SCENERY)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-SCENERY-DC-01, 02, 03	MON-SCENERY-01 What is the progress on moving towards scenic integrity objectives?	Scenic Integrity Objectives (SIO) <ul style="list-style-type: none"> • Number of NEPA decisions that move towards SIO • Number of decisions that did not meet SIO or do # of decisions needing amendment to the SIO 	PALS – NEPA decisions (10 years)

Designated Areas

(Wilderness, Recommended Wilderness, Wilderness Study Areas, Inventoried Roadless Areas, Eligible Wild and Scenic Rivers, Nationally Designated Trails, Research Natural Areas, Lewis and Clark National Historic Trail Interpretive Center)

Table 17. Designated Areas

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-WILD-DC-01	MON-WILD-01 Is wilderness character in existing wilderness being maintained?	Indicators of wilderness character Naturalness, solitude, etc. Based on the limits of acceptable change Wilderness maintained to standard	Wilderness limits of acceptable change inventory (5 years) Wilderness character baseline inventory (5 years) INFRA (5 years)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-RECWILD-DC-01 FW-WSA-DC-02	MON-RECWILD-01 Are wilderness characteristics being maintained in recommended wilderness and wilderness study areas?	Indicators of wilderness character Naturalness, solitude, etc. Based on the limits of acceptable change	Wilderness Limits of acceptable change inventory (<i>5 years</i>) Wilderness character baseline inventory (<i>5 years</i>)
FW-WSR-STD-01	MON-WSR-01 Are we maintaining eligible wild and scenic rivers to remain eligible?	Outstanding Remarkable Values maintained <ul style="list-style-type: none"> • Scenery – SIOs within river corridors identified with a scenery ORV • Fish – WCT or bull trout population status within river corridors identified with a fish ORV • Recreation opportunities within river corridors identified with a recreation ORV • Cultural – number of damaged cultural sites within river corridors identified with a cultural ORV. No monitoring elements identified for scenery, wildlife or geological ORVs.	MTFISH database Recreation Supervisor's Office Records Natural Resource Heritage 9.0 (<i>5 years</i>)
FW-NDT-DC-01	MON-NRT-01 Is access to trails provided and maintenance conducted?	Miles maintained and improved to standard	INFRA (<i>5 years</i>)
FW-CDNST-DC-01, FW-CDNST-DC-04; FW-CDNST-DC-06	MON-CDNST-01 Is access to the trail provided and maintenance conducted?	Miles maintained and improved to standard	INFRA (<i>5 years</i>)

Cultural and Historic Resources (CR) and Areas of Tribal Importance (TRIBAL)

Table 18. Cultural and Historic Resources (CR) and Areas of Tribal Importance (TRIBAL)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-CR-GDL-01	MON-CRT-01 What is the progress toward preservation and conservation of significant cultural resources?	Cultural resources conservation actions by Forest and Geographic Area <ul style="list-style-type: none"> • # new sites recorded • # significant evaluations • # nominated • # scientific excavation • # public education about sites • # damages • # of 106 (project driven) vs 110 (non-project driven) 	Natural Resource Managers Heritage Database and Heritage Annual Report to the State Historic Preservation Office(5 years)
FW-CR-DC-03 FW-CONNECT-DC-01 FW-CONNECT-DC-02	MON-CRT-02 What public cultural resource learning opportunities are provided?	Cultural resources outreach <ul style="list-style-type: none"> • # education and interpretation outreach • # publications 	Heritage Annual Report to the State Historic Preservation Office (5 years)
FW-CR-DC-04	MON-CRT-03 What opportunities are provided for volunteers to participate in cultural resource conservation activities?	Cultural resource volunteer opportunities <ul style="list-style-type: none"> • # of volunteers by site or cultural project 	Heritage Annual Report to the State Historic Preservation Office (5 years)
FW-CR-GO-02	MON-CRT-04 What consultations have occurred with Native America tribes to aid in the protection and enhancement of cultural resources?	Tribal consultations <ul style="list-style-type: none"> • # of consultation (with whom and what projects) 	Heritage Annual Report to the State Historic Preservation Office (5 years)

Land Status and Ownership (LAND) and Land Uses (LAND USE)

Table 19. Land Status and Ownership (LAND) and Land Uses (LAND USE)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-LAND-DC-02	MON-LAND-01	Easements	ALPs database

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (Interval of data collection)
	To what extent are management actions occurring to provide road and trail easements?	<ul style="list-style-type: none"> • # and location of new and existing easements • # and location of existing temp easements at risk • # and location of access/easement needs 	(10 years)

Infrastructure – Roads and Trails (RT), Bridges (BRDG), and Facilities (FAC)

Table 20. Infrastructure – Roads and Trails (RT), Bridges (BRDG), and Facilities (FAC)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (Interval of data collection)
FW-RT-DC-01	MON-INFRA-01 To what extent are road status changes occurring to provide a safe and cost effective transportation system?	Road status Conversion <ul style="list-style-type: none"> • # miles decom or converted • % decom road that were ID by subpart A (by forest) 	INFRA (5 years)
FW-RT-DC-03 FW-RT-OBJ-03 FW-RT-OBJ-04 FW-RT-OBJ-05 FW-ACCESS-DC-01	MON- INFRA -02 What is the status of road and trail improvement and maintenance?	Road improvement and maintenance <ul style="list-style-type: none"> • Miles maintained roads • Miles maintained trails • Miles improved roads • Miles improved trails 	INFRA (5 years)

Benefits to People –Public Information, Interpretation, and Education (CONNECT)

Table 21. Benefits to People –Public Information, Interpretation, and Education (CONNECT)

Selected Plan Components	Monitoring Question	Indicator(s) Measure(s)	Data Source/Storage (Interval of data collection)
FW-CONNECT-DC-01: FW-CONNECT-DC-02 See also Cultural Resources and Areas of Tribal Importance section.	MON-CONNECT-01 To what extent is the Forest providing opportunities for public information, interpretation and education?	<ul style="list-style-type: none"> • Percent change in the # of education and interpretation programs offered(since the previous monitoring cycle) • Percent change in the # of people who attended education and interpretation programs (since the previous monitoring cycle) 	NICE database (5 years)

Benefits to People – Livestock Grazing (GRAZ)

Table 22. Benefits to People – Livestock Grazing (GRAZ)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-GRAZ-DC-01; FW-GRAZ-DC -02; FW-GRAZ-DC-03; FW-GRAZ-STD-02	MON-GRAZ-01 Are rangelands maintaining or moving towards desired resource condition in response to livestock grazing management?	Long-Term Effectiveness Monitoring <ul style="list-style-type: none"> • Changes in bare ground and litter • Changes in vegetation composition and cover 	PIBO AMP monitoring (5 years)
FW-GRAZ-DC-04; FW-GRAZ-GDL-01	MON-GRAZ-02 How are riparian plant communities responding to grazing by domestic livestock?	Long-term condition and trend <ul style="list-style-type: none"> • Permanent riparian vegetation transects • Hydrology cross-sections • Riparian photo points 	PIBO AMP monitoring (5 years)
FW-GRAZ-GDL -05	MON-GRAZ-03 What adaptive actions are being implemented and how are resources trending as a result of management changes?	<ul style="list-style-type: none"> • Range vegetation acres improved • Range Betterment Funds expended 	PIBO AMP monitoring (5 years)
FW-FAH-GDL-04; FW-CWN-GDL-03	MON-GRAZ-04 Are new and revised livestock management plans designed to maintain water quality?	Water quality maintained or improved forestwide and by Conservation Watershed Network <ul style="list-style-type: none"> • Miles of intermittent and perennial streams moving towards desired condition • # of improved management strategies expected to move RMZs towards desired conditions 	INRFA FACTS National BMP reviews AMP monitoring (5 years)

Benefits to People – Timber (TIM)

Table 23. Benefits to People – Timber (TIM)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-TIM-DC-02	MON-TIM-01 What is the severity of natural disturbances on lands suitable for timber production?	Disturbances in lands suitable for timber production, Forestwide and in lands suitable for timber production <ul style="list-style-type: none"> • Acres of wildfire in lands suitable for timber production, by severity 	Monitoring Trends in Burn Severity (MTBS) database; Aerial Detection Surveys (ADS) (5 years)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
		<ul style="list-style-type: none"> Acres of insect and disease infestations in lands suitable for timber production 	
FW-TIM-OBJ-01 FW-TIM-OBJ-02 FW-TIM-STD-07	MON-TIM-02 What is the quantity of wood products sold by the Forest?	Volume wood sold forestwide <ul style="list-style-type: none"> Timber sale quantity (products that meet utilization standards) in MMBF and MMCF. Wood sale quantity (all wood products, including firewood, biomass, post/poles, non-saw material, etc) in MMBF and MMCF 	TIM database (5 years)
FW-TIM-STD-02	MON-TIM-03 What is the restocking status of stands that have had a regeneration harvest in the last 5 years?	Reforestation certification status forestwide <ul style="list-style-type: none"> Number of stands and acres that were harvested in the last 5 years by reforestation status: Certified, Progressing, or Failed 	FACTS database (5 years)
FW-TIM-STD-08 FW-TIM-STD-09 FW-TIM-STD-10	MON-TIM-04 What are the patch sizes of regeneration harvest, and to what extent are maximum patch size exceptions being implemented?	Patch size of regeneration harvest units by broad potential vegetation types <ul style="list-style-type: none"> Number of regeneration harvest units less than 40 acres; between 40 acres and 125 acres; and greater than 125 acres 	FACTS database (5 years)

Benefits to People – Other Forest Products and Wood for Fuel (OFP)

Table 24. Benefits to People – Other Forest Products and Wood for Fuel (OFP)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-OFP-DC-01 FW-OFP-DC-02 FW-TRIBAL-DC-01	MON-OFP-01 What quantities of other forest products are sold by the Forest?	Other forest products sold forestwide <ul style="list-style-type: none"> Number of Christmas tree permits sold Quantity of mushrooms sold 	TIM database (5 years)

Benefits to People – Fish and Wildlife (FWL)

Table 25. Benefits to People – Fish and Wildlife (FWL)

Selected Plan Components	Monitoring Question	Indicator(s) and Measure(s)	Data Source/Storage (<i>Interval of data collection</i>)
FW-FWL-DC-01, FW-FWL-DC-03, FW-FWL-DC-04	MON-FWL-01 To what extent is the Forest providing opportunities for fish and wildlife related activities (including, fishing, hunting, photography and wildlife viewing)?	Visitors engaged in fish and wildlife activities Percent change in # of visitors engaged in fishing, hunting, photography and wildlife viewing (since previous monitoring cycle)	NVUM (5 years)