



United States Department of Agriculture

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# Monitoring Implementation Guide

## 2019 Revised Land Management Plan for the Colville National Forest

Approved by: 

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## Introduction

This document provides guidance on methods and protocol on how to implement the Monitoring Strategy (Chapter 4) of the Land Management Plan (LMP) for the Colville National Forest (USDA-Forest Service, 2019).

The guide is intended to be flexible and may be changed as new methods, techniques, and needs are identified. Monitoring of any given item may be conducted in whole or in part, and is dependent on funding, personnel, and other considerations. Monitoring may be performed by the Forest Service, its partners, or other interested parties.

The guide uses information in the Plan, but it is not part of the Plan. Changes to this document are not considered to be an amendment or an administrative change to the Plan.

## Monitoring

The monitoring described in this guide is primarily effectiveness monitoring, which seeks to answer the question “How effective are the projects and activities conducted under the Forest Plan in moving towards the appropriate Desired Conditions?” In most cases, data already collected by the Colville National Forest are reviewed to answer the monitoring questions. Only where necessary is new monitoring conducted.

Changes can be made outside of the Forest Plan revision process only after notice to the public of the intended change and consideration of public comment. Public notification may be made by posting to a webpage, email, or through the biennial monitoring evaluation reports. Changes to this monitoring guide or annual monitoring work is not an administrative change and does not require public notification.

## Assumptions

- Project-level monitoring is a requirement of the Plan (Plan, p. 157).
- Because we intend to use as much field/resource data already collected and/or records of management activities annually reported in databases, it is assumed in this guide that the reporting personnel (Colville National Forest employees, in most cases) are keeping those databases current and populated with all information fields pertinent to the monitoring information needs stated on the following pages.

- Cost estimates included in this document reflect additional resources needed to gather, analyze, interpret, and report data, but do not reflect the costs of data collection which is accomplished by projects, partners, or separately funded processes or entities.
- Data storage locations reflect current Forest Service systems. As updates occur and data are moved, this guide will be updated to reflect new reference locations.

## **Organization of the Guide**

This document contains a section for each of the monitoring questions found in table 39 (chapter 4) in the Forest Plan. Monitoring questions are presented within boxes and reflect the exact language in the Forest Plan. Some monitoring questions are divided into sub-questions. Sections have the following subheadings and content:

### **Monitoring Indicators, Frequency of Evaluation**

This information is taken from table 39 of the Plan.

The evaluation frequency is indicated in the Forest Plan for each monitoring question. Monitoring intervals for sub-items may vary. The evaluation frequency (in years) should not be confused with the monitoring frequency described in the sample design. When scheduled for reporting, all Forest Plan monitoring and evaluation will be reported in the Biennial Monitoring and Evaluation Reports (BMER).

### **Indicator and Unit of Measure**

One or more indicator is specified. Indicators are variables to be measured which can answer the monitoring question.

### **Method, Protocol, Sample Design**

The approach used for answering the monitoring question is discussed. This includes the survey method, what equipment is used, and analysis methods. If data are obtained from a database or other location, that location should be specified here. If needed, include the Sampling Design (number of samples, how they are located, and the frequency of sampling. When possible and relevant, the statistical basis of the sample design is discussed.) The sample design should include details of how data are obtained, including the frequency with which they are collected.

### **Data Location**

This is the location where the data should be placed once collected. Data for certain questions are stored in program-specific locations. All monitoring data that is compiled for biennial reports, will be stored at:

[Pinon 1900-Planning\Monitoring\MonitoringData\](#) by fiscal year and question number.

### **Responsible Staff Position**

List the position that is responsible to ensure monitoring and evaluation of the question is completed.

### **Trigger**

What would trigger the need to consider a change to the Forest Plan? What follow up actions would be conducted once a trigger is reached?

### **Estimated Annual Personnel Days and Other Costs**

Estimate of costs are provided. However, this is not a budget document. Actual implementation costs may vary considerably from year to year and may increase with inflation and time.

### **Comments**

Relevant information not covered in other sections, including annual adjustments to the monitoring plan.

## **Question 1—Vegetation- Desired Conditions MON-VEG-01**

To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), and increasing resistance and resiliency to disturbance factors including climate change? This includes vegetation size classes, down wood, snags.

**Indicators, Units, Scale, Frequency of Evaluation Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
MON-VEG-01-01	Acres treated to meet FW-OBJ-VEG-01	Acres	CNF	Annual	FACTS
MON-VEG-01-01a	Acres treated to respond to forest disease pathogens	Acres	CNF	Every 5 years	FACTS
MON-VEG-01-02	Acres burned through prescribed and wildfire	Acres	CNF	Every 5 years (review of FRCC across the Forest)	FACTS
MON-VEG-01-03	Acres of forest by structure and vegetation type compared to the desired condition	Acres	CNF	Every 5 years	CNF Forest Type geodatabase (gdb), and WA DNR digital aerial photogrammetry (DAP) derived structure class gdb or LiDAR-derived structure classes gdb (if available)
MON-VEG-01-04	Snags and down wood by watershed	Change in snags and down woody debris	CNF by Eastside mixed conifer, Montane mixed conifer	Every 5 years	DecAID Histograms: T:\FS\NFS\R06\Program\wildlife-2600\GIS\DecAID
MON-VEG-01-05	Number of acres influenced by insects	Acres	CNF	Every 5 years	Aerial Detection Survey GIS files

**Method, Protocol, Sample Design**

**MON-VEG-01-01** data will come from an annual Forest Activity Tracking System (FACTS) database query. The query will include treatment activities that affect plant species composition, such as: commercial harvest, pre-commercial thinning, planting, and prescribed fire underburning.

**MON-VEG-01-01a** data will come from an annual Forest Activity Tracking System (FACTS) database query. The query will include treatments activities that reduce insect and disease vulnerability, such as: commercial harvest and pre-commercial thinning.

**MON-VEG\_01-02** Conduct a GIS analysis of FRCC percent departure (by forest type) of current conditions against LMP conditions.

The purpose of the analysis is to determine current trends of FRCC across the Forest.

From landfire.gov, utilize FRCC<sub>MT</sub> (FRCC Mapping Tool) with the following three inputs:

1. From *landfire* - BpS Data (biophysical settings)
2. From *landfire* - Most recent S-Class (succession classes)
3. Colville NF GIS layer file - Vegetation type

Outputs to analyze from the FRCC<sub>MT</sub> should be:

1. Strata FRCC
2. Landscape Departure of FRCC
3. Excel summary report produced by the FRCC<sub>MT</sub> of Stand FRCC acreage for each BpS stratum.

Analyzing the outputs listed above will show current FRCC conditions. This will allow for a comparison to LMP conditions and determine how FRCC is trending in Forest vegetation types within their associated BpS.

**MON-VEG-01-03** data will include structure class and vegetation type data. The vegetation type data is stored under the filename "S\_R06\_COL.PAG2012" on the server SDE\_R06\_COL. The structure class data would be updated at 5-year intervals by WA DNR using DAP or LiDAR as described in Appendix E of the WA DNR 20-year Forest Health Strategic Plan Monitoring Framework. The vegetation type and updated structure class data would then be merged and compared with baseline information, the 2017 LiDAR-derived structure classes from Derek Churchill stored at:

T:\FS\Reference\GIS\r06\_col\LayerFile\Vegetation\Structure Class 5

The 2017 data would be compared with data in 2023 to determine a trend towards or away from HRV conditions for each vegetation type and structure class.

**MON-VEG-01-04** The DecAID Advisor is a planning platform intended to help provide the best available data and information to biologists, silviculturists, ecologists, pathologists, and managers as they conserve and manage snags, partially dead trees, and down wood for biodiversity in Oregon and Washington. DecAID is based on:

- A synthesis of information on insects and diseases that create dead wood, snag dynamic analysis specific to Pacific NW Region, and other ancillary data that may be of interest regarding wood decay and ecosystem processes.

- A synthesis of general information on wildlife species use and association with dead wood along with a detailed meta-analysis of quantitative data on wildlife species use and association with dead wood in the Pacific NW. Tolerance level statistics are associated with this meta-data.
- An analysis of vegetation inventory data providing information on the amounts and distribution of dead wood across Oregon and Washington landscapes. This analysis is represented by distribution histograms derived from Forest Inventory Analysis (FIA) base plots and Gradient Nearest Neighbor (GNN) amplification for spatial representation associated with Wildlife Habitat Types (WHT's) that have been cross walked with the regional Potential Natural Vegetation map (PNV) and plant associations. Current and reference conditions are automatically generated for each forest and for each 5<sup>th</sup> code watershed within a given forest by WHT for both snag and down wood.

The Regional Office DecAID Center of Excellence (COE) conducts snag and down wood distribution histogram analysis through an automated process in the first few months of every calendar year to account for wildfire mortality. In addition, the histograms are updated to include wildfire from the year previous for a consecutive analysis to account for one year of delayed mortality. When completed the COE sends a message to all the wildlife biologists, silviculturists, and ecologists in the region with a location to the T drive where they are located. Although the forest plan monitoring report is on a five-year rotation, these histograms would provide the data needed to assess broader scale trends in snags and down wood by wildlife habitat type (WHT) and by specific diameter and density classes for the entire Colville NF as well as for a given 5<sup>th</sup> code watershed if desired. Both reference conditions and current conditions are included. \*Down wood histograms are only updated when GNN is updated. Currently, GNN is on a five year rotation. The last update was completed in 2017 and is incorporated in the DecAID Advisor. For more information on the methods behind the distribution histograms and wildlife meta-data tolerance levels refer to: [https://apps.fs.usda.gov/r6\\_decaid/views/methods.html](https://apps.fs.usda.gov/r6_decaid/views/methods.html)

The histograms for down wood and snags are broken into Eastside mixed conifer, Montane mixed conifer. Down wood is further broken down into >= 5 inches and >=20 inches. Snags are broken down into >= 10 inches and >=20 inches. These comparisons of reference and current conditions will be compared to past histograms every 5 years to look at trend.

In addition to the DecAID work, each zone wildlife biologist will randomly select 2 commercial units each year to monitor before and after snag levels. This will provide the Forest an estimate on the amount of hazard trees removed in a treatment unit. This is to show compliance with FW-STD-WL-12.

**MON-VEG-01-05** data would include 5 years of GIS shapefiles of aerial detection surveys. The data is stored at:  
T:\FS\Reference\GeoTool\r06\DatabaseConnection\r06\_default\_as\_myself.sde\S\_R06.InsectDisease

The 5 years of shapefiles would be combined to get all acres influenced every 5 years.

### **Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-01](#)

### **Trigger**

#### **Trigger MON-VEG-01-01**

Desired Condition: 18-25 thousand acres of active management activities per year (FW-OBJ-VEG-01).

Trigger: reported acres of active management activities below 20 percent of the desired condition. When the trigger threshold is reached, identify the causes at the district and Forest-wide level and develop a strategy within the vegetation program board of directors (BoD) to meet desired conditions.

#### **Trigger MON-VEG-01-01a**

Desired Condition: Insects and disease pathogens exist at endemic levels (FW-DC-IPM-01).

Trigger: If outbreak conditions exist within recently treated units (within 5 years of treatment), consult with Forest Health Protection to develop adaptive management approaches for future projects.

#### **Trigger MON-VEG-01-02**

Trigger: If FRCC for Douglas-fir dry and Northern Rocky Mountain mixed conifer trends away from HRV for two consecutive reporting periods (over ten years), then reassess treatments and measurement scale and consider if a plan amendment is needed.

Trigger threshold is relative to the direction of FRCC landscape departure from the historic range of the Forest's vegetation types, specifically the Douglas-fir dry and Northern Rocky Mountain mixed conifer. Assessing FRCC is appropriate because it is a measurement in part, of the vegetation types various structural stages (per the S-class data) towards or away from desired conditions.

Updates to S-classes and other data at [landfire.gov](http://landfire.gov) are to occur in 2023, and although the data is at a coarse scale, it is anticipated that vegetation treatments and any recent wildfires impacting structural stages will impact FRCC departure metrics. Other metrics such as increasing resilience to disturbance and the amount of snags and downed wood are not assessed with thresholds. Resilience is not a metric to be achieved, but rather, something that can be increased. Monitoring assumes that movement toward desired condition for structural stages measured by FRCC, captures increasing resilience. Additional metrics for wildfire and prescribed fire extent and frequency, acres treated to respond to disease pathogens, snags and downed wood, and acres influenced by insects provide important context.

A focus on Douglas-fir dry and Northern Rocky Mountain mixed conifer for FRCC landscape departure is important because of the high extent of both vegetation types across the Forest along with their current FRCC degree of departure of greater than 50% (see LMP FEIS Volume 1, Tables 62 and 63). Percent departure for each vegetation type is anticipated to lessen in small increments over twenty years, so at five years the trigger threshold for reevaluation would be more than 5% departure shift away from desired conditions as listed in Table 63 of the LMP. Changes in FRCC by veg type at the forest scale, as a result of treatments are slow and at

each five-year interval percent change is expected to be small, possibly unmeasurable. For example, Tables 62 and 63 from the LMP anticipate a 4% change over 20 years for Douglas-fir dry vegetation types.

*LMP FEIS Volume I Current vs. 20 year expected FRCC departure (tables 62 and 63)*

Vegetation Type	Current	20 Year Expected	Threshold
Douglas-fir dry	71	67	70.35
Northern Rocky Mountain Mixed Conifer	51	49	51.45

If triggered, conduct more intensive investigation of wildfire extent and effects of the past five years. Also conduct more intensive investigation at the project-level to determine if LMP Desired Conditions, Standards and Guidelines for restoration of forest/woodland structural arrangement and age/size class distribution need better clarification; or if LMP annual treatment acreage objective is not being met.

**Trigger MON-VEG-01-03**

Desired condition: Table 5, page 35 of LMP

Triggers:

1. When conditions are trending away from in a structure class and forest type, identify the cause(s) and the trend. Create a strategy to correct the trends that are moving away from HRV.
2. If there is a 20% or more decline in late closed structure, consider a plan amendment.

**Trigger MON-VEG-01-04** A negative trend in snags or down wood would be reviewed for cause.

**Trigger MON-VEG-01-05**

Desired Condition: Insects and diseases exist in at endemic levels (FW-DC-IPM-01) and new outbreaks are addressed within 1-year of detection (FW-OBJ-IPM-01).

Trigger: If acres affected by insects and diseases trends upward, review with Forest Service Forest Health Protection (FHP) and WA DNR Forest Health and Resiliency and identify problem insect(s) and disease(s) and locations. Get recommendation for localized or forest-wide response.

**Estimated Annual Personnel Days and Other Costs**

Item	Explanation	Cost per Year
MON-VEG-01-01, MON-VEG-01-01a, MON-VEG-01-03, MON-VEG-01-05	Annual reporting is estimated at two days of time and five-year reporting at one week of forest silviculturist time. Work would include coordination with WA DNR Forest Health and Resilience Division, FACTs queries, GIS analysis, and writing input for monitoring report.	\$1,000 for annual reporting, \$2,500 for five-year reporting
MON-VEG-01-02	five personnel days of the fuels program manager will be needed to complete the FRCC analysis and review. Additional support from the Region’s spatial planner staff may also be needed in support of the analysis. No more than two days is anticipated from regional staff	\$1,000 (given that this element is monitored every five years).
MON-VEG-01-04	The regional office will be completing the histogram and DecAID work.	\$500

**Comments**

2022-none

**Question 2—Vegetation – Invasive Plants- MON-VEG-02**

Have management activities met forest plan objectives and trended toward desired conditions for invasive terrestrial plant species?

**Indicators, Units, Scale, Frequency of Evaluation Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
MON-VEG-02-01	Acres of non-native invasive plants treated	Acres within planning area	CNF	Annual	Application Records/FACTS Database
MON-VEG-02-02	Extent and number of sites of new non-native invasive plant species	Presence/Absence of new non-native plant species within planning area	CNF	Annual	Application Records/FACTS Database/Site Forms

**Method, Protocol, Sample Design**

MON-VEG-02-01 – Acres of non-native invasive plants treated, will come from a FACTS query. The FACTS info comes from application records.

MON-VEG-02-02 – presence of new non-native plant species within the planning areas. We have some knowledge of existing populations. Surveys will be conducted by the botany crew during pre-planning project area assessment. Project areas will be assessed on a schedule similar 20-year plan. Collector will be used to gather data on any new non-native plants identified. A GPS location will be collected for new populations.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-02](#)

Invasive plant reports will be stored in the [TESP/IS application](#), part of the NRM database.

**Responsible Staff Position**

Range Program Manager

**Trigger**

Desired Condition: Treat an average of 2,000 acres per year over the next 15 years. Restore 50 acres of native vegetation by mulching, seeding, or planting each year (FW-DC-IS-01). For Research Natural Areas, within five years of plan implementation, treat populations of invasive, non-native species on an average of 10 acres annually (MA-OBJ-RNA-02).

Triggers: Invasive plant treatment should average 2,000 acres per year over a three-year period this level of treatments will move toward desired conditions over the course of the life of this plan (FEIS Volume 1 Table 71). If treatment falls 5 % below this average, identify the cause(s) and the magnitude of the trend, create strategy to correct the trend by treating more acres. If treatment falls 20% or more behind the three-year average, consider a plan amendment.

**Estimated Annual Personnel Days and Other Costs**

Work is estimated to take three days in total, two days to collect and query the data and one day for the Range Program Manager to summarize the findings. Data will be collected during existing surveys by the botany crew and should not add considerable time or effort to their existing survey protocol.

Total Cost/Year: \$1,200

**Comments**

2022-none

**Question 3—Vegetation – Hazardous Fuels- MON-VEG-03**

To what extent are management activities moving hazardous fuels toward desired conditions within WUI?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-03-01</b>	Acres of hazardous fuel treatments within the WUI	Acres	Colville Forest WUI	Annual	FACTS (Forest Activity Tracking System)

**Method, Protocol, Sample Design**

Conduct annual FACTS query of hazardous fuels activities on acres of WUI treatment. Hazardous fuels activities to query include:

- Commercial harvest types
- Re-arrangement of fuels
- Thinning and pct of fuels
- Piling of fuels
- Pile burning of fuels
- Jackpot, broadcast and underburning of fuels

In preparation of this plan, it has come to attention there have been inconsistencies in how WUI is identified and reported in FACTS across the Forest. This is due to confusion on how WUI is to be identified specifically for Healthy Forest Restoration Act (HFRA) projects versus non HFRA projects, and denoting WUI in FACTS does not differentiate between the two.

WUI designations for HFRA projects tier to local County Wildfire Protection Plans (CWPP) which are broader in order to capture rural communities with less population densities, critical infrastructure and egress routes. For non HFRA projects, WUI is determined by interface/intermix conditions for communities formally listed in the Federal Register as “Urban Wildland Interface Communities with the Vicinity of Federal Lands That Are at High Risk from Wildfire (FEIS Volume I page 161) It should be noted that although the Forest has much less acres of interface/intermix WUI than WUI identified in local CWPPs, conducting hazardous fuel treatments and projects within CWPP WUI boundaries would continue to benefit rural communities.

Learning that denoting WUI treatments in FACTS has been inconsistent has provided an opportunity to address and rectify proper WUI FACTS designations moving forward.

In order to determine the average, annual acres of WUI treatment, a three-year FACTS query of WUI treatments (2020, 2021, and 2022) will be conducted the first year of monitoring. This average acres per year will help identify a trigger threshold, that will be included in the 2022 Report and will be updated in this monitoring plan.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-03](#)

**Responsible Staff Position**

Forest Fuels Assistant Fire Management Officer

**Trigger**

Desired Condition: Annual WUI treatments are within 10% of the average acres of hazardous fuels treatments.

Triggers: Hazardous fuel treatments in WUI should be within 10% of the annual average. If treatments fall below 10% of average for two consecutive years, conduct a spatial analysis to first determine if there are hazardous fuel treatments being conducted in CWPP WUI boundaries that are not identified as WUI in FACTS per appropriate guidelines. If treatments still fall below 10% of average for two consecutive years, identify the cause (s) and magnitude of the trend, and create a strategy to treat more WUI acres annually.

**Estimated Annual Personnel Days and Other Costs**

Three to five personnel days of the fuels program manager will be needed to conduct the analysis of WUI treatments and acres.

Total Cost per Year: \$1,500-2,500

**Comments**

2022 - none

**Question 4—Vegetation- Timber Products- MON-VEG-04**

To what extent is the Forest meeting forest plan objectives and trending toward desired conditions to provide a mix of timber products in response to market demands?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Indicator	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-04-01</b>	MMBF offered and MMBF sold	MMBF Offered MMBF Sold	CNF	Annual	PTSAR

**Method, Protocol, Sample Design**

Report annual offered and sold volume from the Periodic Timber Sale Accountability Reports ([PTSAR](#)). Divide sold volume by offered volume to derive the trigger.

**Data Location**

[Pinon \ 2400-Timber \ TargetAttainment \ PTSAR-and-Bobs-reports](#)

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-04](#)

**Responsible Staff Position**

Staff officer in charge of Timber program, with assistance from Forest Timber CO, Forest Silviculturist, and Timber Resource Specialist (ATSA-TIM accounting skills).

**Trigger**

When volume sold is below 95 percent of volume offered, identify causes and potential barriers. Develop an understanding of impacts to the forest product industry through discussion with American Forest Resource Council (AFRC) and local small contractors such as firewood contractors. Develop a strategy within the vegetation program board of directors (BoD) to improve towards 100 percent for subsequent years.

**Estimated Annual Personnel Days and Other Costs**

Annual data collection and reporting is estimated to take about 2 hours of forest silviculturist time.

Total Cost/Year: \$125

**Comments**

2022 Comments: ATSA and TIM produce monthly volumes and permit sales reports, which can be summarized by fiscal year after the Sept. 30 reporting period closing (automated reports ready about early November).

**Question 5—Vegetation - Openings (NFMA) - MON-VEG-05**

To what extent is the Forest meeting NFMA requirements and desired conditions on size of harvest openings?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-05-01</b>	Number of even-aged regeneration harvest units exceeding 40 acres in size and category for exceeding	Number of Units	CNF	Annual	FACTS

**Method, Protocol, Sample Design**

Data will come from an annual Forest Activity Tracking System (FACTS) database query. The query will include even-aged regeneration harvests that do not have established regeneration. This includes FACTS activities and codes: patch clearcut 4111, stand clearcut 4113, patch clearcut with reserves 4115, stand clearcut with reserves 4117, shelterwood preparatory cut 4121, seed-tree preparatory cut 4122, and shelterwood establishment cut 4131. The query will exclude 2-aged, uneven-aged regeneration harvests, even-aged harvests that have established regeneration, and treatments intended to restore non-forest conditions (for example, areas with mollisol soils). More information about the FACTS activities and codes is available at:

[http://fsweb.nrm.fs.fed.us/support/help/facts/#t=Appendix\\_B.htm](http://fsweb.nrm.fs.fed.us/support/help/facts/#t=Appendix_B.htm)

Harvest openings over 40 acres in size will be noted by category:

1. Units harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm (FW-STD-VEG-04).
2. Units with documented 60-day public notice and regional forester approval.
3. Units without documented 60-day public notice and regional forester approval.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-05](#)

**Responsible Staff Position**

Forest Silviculturist

**Trigger**

For harvest openings exceeding 40 acres in size that do not fit categories one and two noted above, determine the reason and report it to the regional forester. Take action to ensure that it does not happen again by reviewing open sales and NEPA documents for compliance with NFMA and opening sizes. Determine if mitigation measures are needed.

**Estimated Annual Personnel Days and Other Costs**

Annual data collection and reporting is estimated to take about 2 hours of forest silviculturist time.

Total Cost/Year: \$125

**Comments**

2022 - none

**Question 6—Vegetation- Restocking- MON-VEG-06**

To what extent are regeneration units restocked to trend toward vegetation desired conditions?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-06-01</b>	On lands suitable for timber production, percent of acres with regeneration harvest that are adequately	percent of acres with regeneration harvest that are adequately stocked w/in 5 years	CNF – lands suitable for timber production, regeneration harvests adequately	Annual	FACTS CNF LMP management areas shapefile

	restocked within 5 years of harvest		restocked w/in 5 years of harvest		
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**Method, Protocol, Sample Design**

A query of FACTS would be made that includes all final removal regeneration harvests that occurred within the last five years and would show certification status: planted, natural regeneration, or none. The data would be summarized using a pivot table to determine total acres of regeneration harvest and the total of those acres that were certified within the last five years. Final regeneration harvest means clearcutting, final overstory removal in shelterwood cutting, seed tree removal cut in seed tree cutting, and selection cutting.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-06](#)

**Responsible Staff Position**

Forest Silviculturist with assistance from reforestation foresters

**Trigger**

Identify regeneration harvest units not adequately restocked within 5 years. Assess the reason for failure and determine whether the prescribed stocking was appropriate. If the prescribed stocking was inappropriate, the silviculturist shall revise the prescription. If the prescribed stock was appropriate, initiate restocking while addressing factors that resulted in the restocking failure.

**Estimated Annual Personnel Days and Other Costs**

Annual data collection and reporting is estimated to take about one day of forest silviculturist time.

Total Cost/Year: \$500

**Comments**

2022 - none

**Question 7—Vegetation – Timber Suitability- MON-VEG-07**

Have lands that are not suitable for timber production become suitable?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

**Indicators, Unit of Measure, Scale, Source Database**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-07-01</b>	Acres of land suitable for timber production	Acres	CNF	Every 10 years	WA DNR Forest Health and Resiliency Division modelling outputs for non-forest and areas with concerns for reforestation  CNF LMP management areas geodatabase  GIS files showing areas affected by new statutes, executive orders, or regulations

**Method, Protocol, Sample Design**

Track and record any changes in lands suitable for timber production due changes in one or more of the six factors within 36 CFR 219.11 (a) (1). Some of the main areas where change could occur include:

- Changes in non-forest acres or areas with concerns for reforestation (for example, this might be due to climate change and disturbance interactions).
- Plan amendments affecting management area mapping,
- New statutes, executive orders, or regulations that prohibits timber production on land (for example, the addition of a congressionally designated wilderness area).

FSH 1909.12, 61 provides details on the process for determining lands suitable and not suitable for timber production.

Lands suitable for timber production by management area are shown within Table E-1 on page 206 of the LMP. Additionally, lands unsuitable for timber production (because they are non-forest or areas with no reasonable assurance of being adequately restocked within 5 years after final regeneration harvest) are documented within the feature class “COLTotalUnsuitableLand” found in this geodatabase: T:\FS\NFS\Colville\Project\SO\PlanRevision2015\GIS\Data\DEIS\Vegetation.gdb

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-07](#)

**Responsible Staff Position**

Forest Silviculturist with assistance of the Lands staff

### **Trigger**

If more than 10% of lands have become suitable or unsuitable for timber production, begin the LMP amendment process.

### **Estimated Annual Personnel Days and Other Costs**

Annual data collection and reporting is estimated to take about one hour of forest silviculturist and lands staff time.

Total Cost/Year: \$125

### **Comments**

2022 - none

## **Question 8—Vegetation – Insects and Disease - MON-VEG-08**

Have destructive insects and disease organisms increased to potentially damaging levels following management activities?

### **Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

#### **Indicators, Unit of Measure, Scale, Source Database**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-08-01</b>	Acres affected by insect and disease organisms	Acres	CNF	Every 5 years	Aerial Detection Survey GIS files FACTS Spatial

#### **Method, Protocol, Sample Design**

This is similar to MON-VEG-01-05. Data would include 5 years of GIS shapefiles of aerial detection surveys. The data is stored at: T:\FS\Reference\GeoTool\r06\DatabaseConnection\r06\_default\_as\_myself.sde\S\_R06.InsectDisease

The 5 years of shapefiles would be combined to get all acres influenced every 5 years. The insect and disease data would be combined with treatment units completed within the last 5 years.

#### **Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-08](#)

#### **Responsible Staff Position**

Forest Health Protection with assistance from the Forest Silviculturist

### **Trigger**

**Desired Condition:** Insects and diseases exist in at endemic levels (FW-DC-IPM-01) and new outbreaks are addressed within 1-year of detection (FW-OBJ-IPM-01).

**Trigger:** If acres affected by insects and diseases trends upward in recent areas of harvest, review with Forest Service Forest Health Protection (FHP) and WA DNR Forest Health and Resiliency and identify problem insect(s) and disease(s) and locations. Get recommendation for localized or forest-wide response.

### **Estimated Annual Personnel Days and Other Costs**

Five-year data collection and reporting is estimated to take about one day each of forest health protection and a forest silviculturist, for a total of \$1,000 for 5 years.

Total Cost/Year: \$200

### **Comments**

2022 - none

## **Question 9—Vegetation – Outputs and Services - MON-VEG-09**

Are actual outputs and services consistent with those projected by the plan?

### **Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-VEG-09-01</b>	Acres of active management	Acres	CNF	Annual	FACTS
<b>MON-RPF-01-01</b>	MMBF offered annually	MMBF offered	CNF	Annual	PTSAR

#### **Method, Protocol, Sample Design**

The FACTS query for acres of active management would include vegetation and fuels treatments.

Report annual offered from the Periodic Timber Sale Accountability Reports ([PTSAR](#)). Calculate the volume sold for the allowable sale quantity (ASQ) calculation by subtracting volume from salvage and sanitation treatments and volume from lands unsuitable for timber production from the volume sold reported within PTSAR.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-VEG-09](#)

**Responsible Staff Position**

Forest Silviculturist with assistance from Timber Resource Specialist (ATSA-TIM accounting skills)

**Trigger**

If the percent acres treated is less than 95 percent of 18-25 thousand acres / year (FW-OBJ-VEG-01), assess the causes, identify barriers and create a strategy to achieve the desired conditions. If the barriers are too costly, consider amending the forest plan.

When volume sold is below 90 percent of the ASQ (FW-DC-RFP-01, LMP page 87), identify causes and potential barriers. Develop a strategy within the vegetation program board of directors (BoD) to improve towards 100 percent for subsequent years.

**Estimated Annual Personnel Days and Other Costs**

Annual data collection and reporting is estimated to take about five hours of forest silviculturist time.

Total Cost/Year: \$350

**Comments**

2022- none

**Question 10—Watershed- MON-WTS-01**

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-WTS-01-01</b>	Change in number of watersheds that have had a change in condition class	Acres, Miles, sites	Forestwide based on 6 <sup>th</sup> field watersheds	Every 5 years	WCATT

**Method, Protocol, Sample Design**

Watershed Condition Framework – The Watershed Condition Classification update process is generally completed every 5 years. Watersheds are selected for updates based on planned or completed restoration work or to evaluate the effects of major disturbances such as wildfire. The results of the update process will be compared to baseline conditions (Forest Plan FEIS page 318-319) to determine changes in watershed condition within the forests. Watershed Condition Classification data is available at <https://apps.fs.fed.us/nris/wcatt/>. The aquatic specialists will use the Watershed Condition Framework to assess project existing condition and effects. This information will be used to update the WCATT database. The aquatic specialists will develop Watershed Restoration Action Plans for Priority and Key Watersheds. The WRAPS will include essential projects to be completed to move the watershed to proper function. The aquatic specialists will track completion of the essential projects in the Watershed Improvement Tracking database. Upon completion of all essential projects, the watershed rating will be moved to proper functioning condition.

Unit	Forest Plan	2024	Difference
Number of Watersheds in Functioning properly condition	25		
Number of Watersheds in Functioning at risk condition	63		
Number of Watersheds in Impaired Function	1		

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-WTS-01](#)

The data will be downloaded every five years and stored in the monitoring folder listed above.

**Responsible Staff Position**

Natural Resources Program Manager will update the WCATT results and calculate the change in watershed condition class by 6<sup>th</sup> field HUC.

**Trigger**

The trigger for any watershed is when multiple changes in watershed condition class indicators show downward trend. Indicators evaluated will point to activities or resources that management practices must change, lessen or accelerate depending on causal agents.

**Estimated Annual Personnel Days and Other Costs**

This is incorporated into the planning work. It will take 2 days to organize the data each year for the 5-year report.

Total Cost/Year: \$1000

**Comments**

2022 – None

**Question 11—Watershed- Road Impacts - MON-WTS-02**

Are management actions reducing road impacts to watershed and aquatic habitat function and water quality within all watersheds across the Forest? Within Key, Focus, and Priority Watersheds?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-WTS-02-01</b>	Miles of road treated that are at a high risk to watershed and aquatic habitat function	Change in function for the road attributes	CNF; Key, Focus, and Priority Watersheds	Annual	Infra, WIT, WCATT

**Method, Protocol, Sample Design**

Watershed Condition Framework – The Watershed Condition Classification update process is generally completed every 5 years. Watersheds are selected for updates based on planned or completed restoration work or to evaluate the effects of major disturbances such as wildfire. The road and trails results of the update process will be compared to road and trails baseline conditions (Forest Plan FEIS page 318) to determine changes in watershed condition within the forests. Watershed Condition Classification data is available at <http://apps.fs.fed.us/nris/wcatt/>.

Monitoring	Objective	Forest Plan	2024	Difference
Number of Watersheds with a positive change in function for Open Road Density Attributes	Functioning Properly	13		
	Functioning at Risk	50		
	Impaired	26		
Number of Watersheds with a positive change in function for road and trail maintenance	Functioning Properly	18		
	Functioning at Risk	49		
	Impaired	22		
Number of Watersheds with a positive change in function for roads in proximity to water	Functioning Properly	3		
	Functioning at Risk	32		
	Impaired	54		

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-WTS-02](#)

Query the WIT, FACTS and WCATT databases for restoration projects. Calculate cumulative total and compare towards objectives.

**Responsible Staff Position**

Natural Resources Program Manager

**Trigger**

Ten percent reduction in functioning properly watersheds with respect to the road and trail indicator would trigger a reassessment of the work being conducted.

**Estimated Annual Personnel Days and Other Costs**

This would be incorporated into the work for question 10.

Total Cost/Year: \$0

**Comments**

2022 - none

## Question 12—Watershed- Riparian Processes- MON-WTS-03

Are management actions improving **key riparian processes** within Riparian Management Areas?

### **Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-WTR-03-01</b>	acres or miles of watershed restoration activities accomplished	Acres or miles	subwatershed	Annual	WIT, FACTS
<b>MON-WTR-03-02</b>	Percent of sub-watersheds trended toward an improved condition— Answered in Question 10	%	Forest-wide	Every 5 years (WCF)	WCATT

### **Method, Protocol, Sample Design**

Question 10 also answers this.

Watershed Condition Framework – The Watershed Condition Classification update process is generally completed every 5 years. Watersheds are selected for updates based on planned or completed restoration work or to evaluate the effects of major disturbances such as wildfire. The Aquatic Physical-Aquatic Habitat indicator results of the update process will be compared to baseline conditions (Forest Plan FEIS page 318) to determine changes in watershed condition within the forests. Watershed Condition Classification data is available at <http://apps.fs.fed.us/nris/wcatt/>.

Monitoring	Objective	Forest Plan	2024	Difference
Number of Watersheds with a positive change in function for Large Woody Debris	Functioning Properly	18		
	Functioning at Risk	50		
	Impaired	21		
Number of Watersheds with a positive change in function for channel shape and function	Functioning Properly	7		
	Functioning at Risk	78		
	Impaired	4		
Number of Watersheds with a positive change in function for Riparian Vegetation Condition	Functioning Properly	34		
	Functioning at Risk	23		
	Impaired	32		
Number of Watersheds with a positive change in function for roads in proximity to water	Functioning Properly	3		
	Functioning at Risk	32		
	Impaired	54		

### **Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-WTS-03](#)

### **Responsible Staff Position**

Natural Resources Program Manager

### **Trigger**

Reduction in functioning properly watersheds in respect to the WCATT indicators would trigger a reassessment of the work being conducted.

### **Estimated Annual Personnel Days and Other Costs**

2 days of program manager's time. Total Cost/Year: \$1,000

**Comments**

2022: None

**Question 13—Watershed-S&Gs, BMPs- MON-WTS-04**

Are water resources and RMA standards, guidelines, and best management practices (BMPs) being implemented at project sites? Are standards, guidelines, and BMPs effective at achieving desired conditions?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-WTR-04-01</b>	Number of BMPs completed, Number implemented correctly, Number implemented incorrectly, BMP effectiveness	# BMPs	Site Specific	BMP Annual	There is a BMP database being created to replace the current one that is down.

**Method, Protocol, Sample Design**

The Forest is assigned BMPs to be completed over 2 years. The Forest follows the national BMP instructions on randomly selecting the sites to be evaluated using protocols located here: [BMPs - National Best Management Practices Program \(fs.fed.us\)](https://www.fs.fed.us/bmp/). The forms are located here: [BMPs - BMP Monitoring Protocols and Forms \(fs.fed.us\)](https://www.fs.fed.us/bmp/). A report is produced every 2 years summarizing the results. The BMP evaluations will be used to evaluate the effectiveness of Forest Wide water resources and Riparian Management Area standards and guidelines.

**Data Location**

The National BMP database is a Citrix application that houses all the assessment data information and is used to generate reports.

Completed individual BMP monitoring forms are located here: \Box\Colville Watershed-2500\BMP\Completed

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-WTS-04](#)

**Responsible Staff Position**

Completing the Summary Report and assigning the BMP monitoring, Natural Resources Program Manager

Implementing the BMP monitoring: Zone Aquatic Specialists with assistance from other specialists.

**Trigger**

Individual BMP monitoring triggers follow up corrective actions.

**Estimated Annual Personnel Days and Other Costs**

On average, the CNF is assigned 7-8 BMPs each year. Each BMP takes approximately 4 hours to complete depending on the location to the other BMP monitoring site selections. At least 2 specialists are involved with each monitoring site. More specialists may be added depending on the topic.

Total Cost/Year: \$5,000

**Comments**

2022- Best Management Practices (BMPs) are prescribed for all management activities to mitigate project effects to soil and water quality and are key provisions of the MOU between the WADOE and FS Region 6 for meeting water quality standards for the Nation’s waters. Monitoring is completed to determine whether BMPs are implemented as designed and whether they are effective. The forest’s application of National BMP Monitoring Protocol will be used as a guide to how our activities are managed to protect water quality. The forests complete National BMP implementation and effectiveness evaluations on an annual basis. The forests determine the number and resource categories of evaluations to be completed to reflect the program of work and meet national targets. Most sites to be evaluated are selected randomly. Monitoring results are entered into the National BMP database, and implementation and effectiveness ratings are generated.

**Question 14—Watershed – Water Quality - MON-WTS-05-01**

What is the status and trend of water quality?

**Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
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<b>MON-WTS-05-01</b>	Miles of state-listed impaired waters, miles of waters under an approved TMDL and WQIP (Annual WADoE 303(d) list, TMDLs, WQIP implementation and monitoring)	Miles	CNF	Annual (WADoE 3030(d) list, TMDLs, WQIP implementation and monitoring)	<a href="https://apps.ecology.wa.gov/waterqualityatlas/wqa/map">https://apps.ecology.wa.gov/waterqualityatlas/wqa/map</a>
		Fecal Coliform and Temperature results(WQIP implementation and monitoring)	CNF		Annual CNF Water Quality Report

### **Method, Protocol, Sample Design**

Water quality monitoring status and trends within the Forest will be evaluated by reviewing WADoE's Clean Water Act Assessment 303(d) Listing Report. The 305(b) report and 303(d) list of impaired waters report will be used as a baseline. These reports are generally released on a biennial basis and are available from the WADoE website <https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d>. The custom map from the ecology.wa.gov site referenced in the table above can be found at:

<https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?CustomMap=y&BBox=-14338616,5395963,-12562831,6503994&RT=0&Layers=27&Filters=y,n,n,n,n,n&F1.4=n,n,n,n,n,y>

### **Data Location**

WADoE's Clean Water Act Assessment Washington's 303(d) Listing Report will be copied to the monitoring folder.

The Forest Water Quality results are stored in [Colville Watershed-2500 > Water Quality > TMDL](#)

The Natural Resources Program Manager or the Zone Aquatics Specialists can field requests to access this folder.

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-WTS-05-01](#)

### **Responsible Staff Position**

Natural Resource Program Manager

### **Trigger**

Changes to the 303D list. Negative changes in status or trends of multiple waterways and/or water bodies within the forests as compared to baseline conditions reported in WADoE's Clean Water Act Assessment Washington's 303(d) Listing Report. The Forest will develop projects to address the changes to the 303D list and report the projects in the annual water quality monitoring report.

### **Estimated Annual Personnel Days and Other Costs**

WADoE water quality biennial review - 1 person day per 2 years, - \$500

Water Quality Monitoring and Annual Report

Total Cost/Year: \$500

### **Comments**

Washington 303D report is published every 2 to 3 years.

## **Question 15—Aquatic Habitat TES and Focal Species- MON-AQH-01**

Are management activities across the Forest contributing to the viability of riparian and wetland dependent TES and focal species?

### **Indicators, Units, Scale, Frequency of Measure, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-AQH-01-01</b>	PIBO EM, updated Aquatic Ecological Condition (AEC), Stream channel morphology surveys in monumented reaches	Updated AEC	Forest wide	(every 5 years, invasive species database)	NRIS - AQS
		PIBO measurements	Forest wide		<a href="http://fsweb.r4.fs.fed.us/unit/nr/pibo/">http://fsweb.r4.fs.fed.us/unit/nr/pibo/</a>

<b>MON-AQH-01-02</b>	Acres or miles of treatments to improve hydrologic, aquatic, and riparian function	Acres or Miles	Forest wide	Annual	WIT / Metrics Management / GPAs
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**Method, Protocol, Sample Design**

Updated AEC – The AEC protocol and past results are located in [Planning-1900 > Forest Plan-Monitoring > Monitoring Protocol > Aquatics and Wildlife](#). The PIBO results will be compared every 5 years.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-AQH-01-01](#)

**Responsible Staff Position**

Natural Resource Program Manager

**Trigger**

The AEC is the Forest viability assessment. This will be redone. If the viability is less than the Forest Plan existing condition, we need to investigate why.

The PIBO results will be compared, if there is a downward trend in the results, we need to investigate why.

**Estimated Annual Personnel Days and Other Costs**

1 week a year  
Total Cost/Year: \$2,222

**Comments**

2022 – None

**Question 16—Aquatic Habitat RMAs where Grazing is Permitted- MON-AQH-02**

Are management actions improving conditions within Riparian Management Areas where livestock grazing is permitted?

**Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-AQH-02-01</b>	Acres of improvement within designated monitoring area locations.	Change in annual indicator measurements	DMA	Annual, Every 5 years in conjunction with MON-WTR-03-02 above (PIBO EM & R6 stream surveys)	MIM
<b>MON-AQH-02-02</b>	Allotments meeting annual grazing management use indicators	Change in PFC Rating		(Annual, PIBO & Forest monitored designated monitoring sites)	MIM Monitoring Data/Site Forms/IWEB Database/GIS

Notes: PFC rating that the IDT assesses sets up the different attributes MA-GDL-RMA-12

**Method, Protocol, Sample Design**

For range permit renewal, the Proper Functioning Condition protocol for lotic systems ([https://efotg.sc.egov.usda.gov/references/public/CO/TR\\_1737-15.pdf](https://efotg.sc.egov.usda.gov/references/public/CO/TR_1737-15.pdf)) will be done at the Designated Monitoring Area (DMA) to assign the annual indicators. After the initial survey, every 10 years we will repeat the PFC rating on the range allotments in conjunction with term grazing permit renewals, or during project level analysis. The DMAs will also have monitoring with the MIM protocol Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation BLM Technical Reference 1737-23 (revised) 2011

([https://www.blm.gov/sites/blm.gov/files/documents/files/TR\\_1737-23.pdf#:~:text=The%20multiple%20indicator%20monitoring%20%28MIM%29%20protocol%20was%20developed,measure%20the%20most%20important%20indicators%20relevant%20to%20detecting](https://www.blm.gov/sites/blm.gov/files/documents/files/TR_1737-23.pdf#:~:text=The%20multiple%20indicator%20monitoring%20%28MIM%29%20protocol%20was%20developed,measure%20the%20most%20important%20indicators%20relevant%20to%20detecting).)). Many MIM sites also receive a PIBO survey every five years by the national PIBO team: <http://fsweb.r4.fs.fed.us/unit/nr/pibo/>. The monitoring report will analyze whether the annual indicators did improve conditions based on the second PFC reading, MIM surveys, and PIBO data.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-AQH-02](#)

**Responsible Staff Position**

Natural Resource Program Manager, Range Program Manager

**Trigger MA-GDL-12**

- Where desired conditions for water quality, aquatic habitat, and riparian vegetation have been attained<sup>1</sup> and riparian vegetation is in late-seral conditions<sup>2</sup>, protect or maintain those conditions by managing annual livestock grazing use and disturbance as follows<sup>3</sup>:
  - maintain a minimum of 4-inch residual stubble height<sup>4</sup> of key herbaceous species on the greenline;
  - utilize no more than 30-45 percent of deep-rooted herbaceous vegetation in the active floodplain<sup>5</sup> and, as needed, in other critical portions of the Riparian Management Area;
  - limit streambank alteration<sup>6</sup> to no more than 20-25 percent; and
  - limit use of woody species to no more than 30-40 percent of current year’s leaders along streambanks and, as needed, in other critical portions of the Riparian Management Area.

**If conditions degrade under these annual indicators, we would reevaluate what annual indicators will maintain desired conditions.**

- Where desired conditions for water quality, aquatic habitat, and/or riparian vegetation have not yet been attained, but conditions are moving towards those desired conditions<sup>22</sup>, enable continued recovery by managing annual livestock grazing use and disturbance as follows:
  - maintain a minimum of 4-inch to 6-inch residual stubble height of key herbaceous species on the greenline<sup>23</sup>;
  - follow the criteria for utilization of deep-rooted herbaceous vegetation, streambank alteration, and use of woody species described in (1).

**If conditions do not move towards desired conditions under these annual indicators, we would reevaluate what annual indicators will move towards desired conditions.**

- Where desired conditions for water quality, aquatic habitat, and/or riparian vegetation have not been attained and conditions are not moving towards those desired conditions<sup>22</sup>, enable recovery by managing annual livestock grazing use and disturbance as follows:
  - maintain a minimum of 6-inch residual stubble height of key herbaceous species on the greenline;
  - utilize no more than 30-35 percent of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the Riparian Management Area;
  - limit streambank alteration to no more than 15-20 percent<sup>25</sup>; and
  - limit use of woody species to no more than 20-30 percent of current year’s leaders along streambanks and, as needed, in other critical portions of the Riparian Management Area.

**If conditions do not move towards desired conditions under these annual indicators, we would reevaluate what annual indicators will move towards desired conditions.**

**Estimated Annual Personnel Days and Other Costs**

Total Cost/Year: \$15,000-20,000

MIM monitoring will take roughly 20 days per year assuming the staff can complete two sites per day with three people visiting each site. Propper Functioning Condition work will take roughly 4 days per year including 5 staff representing range, aquatics, botany, and hydrology. Timing of the work will be influenced by the timing of permit renewals.

**Comments**

2022 – None

**Question 17—Aquatic Habitat – Aquatic Invasives- MON-AQH-03**

Are management actions preventing the spread of aquatic invasive species?

**Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-AQH-03-01</b>	Acres of non-native invasive aquatic habitat treated (annual (R6 stream WIT))	Acres / waterbodies	Forest wide	Annual (R6 stream WIT)	WIT Watershed Improvement Tracking
<b>MON-AQH-03-02</b>	Number of sites of new non-native invasive aquatic species	Acres	Forest Wide	Every 5 years (PIBO, EM)	AQS

**Method, Protocol, Sample Design**

**MON-AQH-03-01:** Acres of non-native invasive aquatic habitat treated (annual (R6 stream WIT))

**MON-AQH-03-02 –** Number of sites of new non-native invasive aquatic species

<sup>1</sup> Assessment of conditions and trends should be based on best available information at a variety of spatial and temporal scales. Site-specific information is particularly important.

<sup>2</sup> Late seral conditions means the existing riparian vegetation community is similar to the potential natural community composition (per Winward 2000).

<sup>3</sup> Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height, streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization.

<sup>4</sup> Stubble height criteria apply at the end of the grazing period, when that period ends after the growing season. When the grazing period ends before the growing season does, stubble height criteria can be applied at the end of the grazing period or the end of the growing season.

<sup>5</sup> Active floodplain is defined as the area bordering a stream inundated by flows at a surface elevation that is two times the maximum bankfull depth (measured at the thalweg).

<sup>6</sup> Streambank alteration criteria apply within 1-2 weeks of removal of livestock from each pasture.

The Forest will monitor 20 lakes every 5 years to detect new populations. 15 of the lakes will be chosen randomly among the lakes with recreation access such as docks, ramps, campgrounds. Five of the lakes will be the same lakes every 5 years. The baseline is the 2020 Lake Survey. Next survey would be 2025.

The 5 repeat lakes include – Swan Lake, Pierre Lake, Gillette Lake, Sullivan Lake, and South Skookum Lake. These lakes are included because of their high recreation use and presence of a boat ramp. Boat ramps are usually the first place that an invasive is detected, since invasives move between lakes in bilge water, on boat trailers, or on boats themselves.

Streams are monitored during project stream surveys using the Region 6 Stream Survey Protocol.

Wetlands will be monitored during project wetland surveys.

Over time, the availability of environmental DNA sampling for detective invasives will increase. Every 5 years, the feasibility will be evaluated and added to this plan when feasible.

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-AQH-03](#)

**Responsible Staff Position**

Natural Resource Program Manager

**Trigger**

New populations would trigger management actions and not necessarily Forest Plan changes.

**Estimated Annual Personnel Days and Other Costs**

2 person crew, 3 weeks - \$10,000

Total Cost @ 5 Years: \$10,000

**Comments**

2022 - None

**Question 18—Soil –MON-SOIL-01**

To what extent have plan components prevented irreversible damage to soil conditions?

**Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-SOIL-01-01</b>	Harvest units surveyed and percent that met Region 6 Soil Quality Standards and Guidelines for detrimental soil conditions post harvest (FSM, R6 Supplement No. 2500.98-1)	% units	Activity Area – Colville National Forest	Annual	FACTs – identification of recently completed (within 1 to 3 years) timber harvest units (units greater than 25 acres).

**Method, Protocol, Sample Design**

**Method:** Ten timber harvest units will be designated and sampled. Data will be summarized in a concise report with basic statistical analysis completed in Microsoft Excel.

**Protocol:** The National Forest Soil Disturbance Monitoring Protocol (Page-Dumroese et al., 2009a and 2009b) and Soil-Disturbance Field Guide (Napper et al. 2009) will be used to categorize soil disturbance and soil factors (forest floor depth, fine and coarse wood amounts, soil compaction, and other disturbance attributes). Soil Disturbances Classes D2 and D3 are considered detrimental soil disturbance.

**Sample Design:** randomly sample ten harvest units completed within the last 12 to 36 months prior to selection. Completed units will be assigned a number and a random number generator is used to select units for survey. If a specific question requires soil monitoring data, a subset of the ten units will be directly targeted at that question.

**Data Location**

Soil monitoring and location data will be kept in the National Forest Soil Disturbance Monitoring Protocol National Database as well as Colville National Forest Pinyon (Box) location at the link below: Soil Monitoring

[Pinon \ Soils-2500\SoilMonitoring](#)

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in:

[Pinon \Planning-1900\Monitoring\MonitoringData\FY20XX\MON-SOIL-01\](#)

**Responsible Staff Position**

Soil Scientists

**Trigger**

Soil disturbance monitoring suggests that forest guidelines are not being met in 50% of surveyed harvest units. Forest soil disturbance thresholds depend on management area and activity objectives.

Two consecutive years of soil monitoring data indicate that 50% of harvest units exhibit detrimental, long-term, management-induced soil impacts, characterized by 20% or more soil disturbance classes D2 and D3 in the units. Of the 4 classes D0, D1, D2, and D3; D2 and D3 are detrimental to long term soil function and soil productivity. These two classes represent 20% or more detrimental soil disturbance.

**Estimated Annual Personnel Days and Other Costs**

**Field** – GS-5 technician for 20 days @ \$150 = \$3,000; GS-7 – technician for five days @ \$250 = \$1,250; GS-11 – technician for five days @ \$350 = \$1,750

Field Total = \$6,000

**Office** – GS-5 technician for five days @ \$150 = \$750; GS-7 – technician for two days @ \$250; GS-11 – Soil Scientist for one day @ \$350 = \$350

Office Total = \$1,350

Total Cost/Year: \$7,350

**Comments**

2022 – none

**Question 19—Federally Listed Species – Habitat Objectives MON-FLS-01**

To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

**Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-FLS-01-01</b>	Grizzly Bear: progress toward achieving and maintaining standards for percent core area, open motorized road density (OMRD) and total motorized road density (TMRD) within each Grizzly Bear Management Unit (Annual)	Road Density	Grizzly Bear Management Unit	Annual	Annual Grizzly Bear Report
<b>MON-FLS-01-02</b>	Canada lynx: changes in lynx habitat as a result of moving toward the desired conditions for vegetation through vegetation management, prescribed fire, or natural disturbance that is consistent with the historical range of variability (Every 5 years by lynx analysis unit)	Acres	Lynx Analysis Unit	(Every 5 years by lynx analysis unit)	ArcGIS
<b>MON-FLS-01-03</b>	Woodland caribou: maintenance of seasonal habitat components of well-connected, large blocks of late-successional forest at or above current levels	Acres	Caribou Management Unit	Every 5 years by forest management projects proposed in recovery area	ArcGIS, Forest Management Wildlife Reports
<b>MON-FLS-01-4</b>	Woodland caribou: management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable	Acres	Caribou Recovery Area	Annual	Annual caribou monitoring report

	habitat within the caribou recovery area				
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### **Method, Protocol, Sample Design**

Indicator	Responsible Position	Report
<b>MON-FLS-01-01</b>	East Zone Wildlife Biologist	Annual Grizzly Bear Report
<b>MON-FLS-01-02</b>	Central Zone Wildlife Biologist	Kettle Crest Core Status Tracking Report
<b>MON-FLS-01-03</b>	East Zone Wildlife Biologist	ArcGIS and project documentation
<b>MON-FLS-01-04</b>	East Zone Wildlife Biologist	Annual caribou monitoring report

#### **MON-FLS-01-01 Grizzly Bear Report**

Using a geographic information system (computerized mapping), we completed a “moving windows” analysis of road densities in each BMU according to established protocol. We buffered open and restricted roads by 500 meters to obtain core habitat levels. The following table displays the 2021 habitat data for each of the three BMUs.

#### **MON-FLS-01-02 Canada Lynx**

We will track habitat changes on the Kettle Crest and Wedge Core areas to evaluate implementation of the FW-STD-WL-03 and FW-STD-WL-05 during project planning. This will be reported for each LAU every 5 years.

#### **MON-FLS-01-03 Woodland Caribou**

We will monitor habitat changes in the Woodland Caribou Recovery Area to evaluate implementation of the FW-STD-WL-09 during project planning. This will be reported every 5 years.

#### **MON-FLS-01-04 Woodland Caribou**

The CNF will monitor illegal snowmobile use on closed roads and in areas closed to motorized travel.

### **Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-FLS-01](#)

Indicator	Source Database
<b>MON-FLS-01-01</b>	Annual Grizzly Bear Report \Box\Colville Wildlife-2600\EZ POV\wildlife_T&E\grizzly_bear\annual_reports
<b>MON-FLS-01-02</b>	The map and layer files of mapping of all LAUs and individual LAUs are saved here: T:\FS\NFS\Colville\Program\Wildlife-2600\GIS\Data\Lynx Mapping\Kettle Crest Lynx Habitat Mapping 2021 The report is here: \Box\Colville Wildlife-2600\SO_Program\2670ThreatenedEndangeredandSensitive\Species\Lynx\Kettle Crest Lynx Habitat Mapping 112021
<b>MON-FLS-01-03</b>	ArcGIS and project documentation
<b>MON-FLS-01-04</b>	Annual caribou monitoring report \Box\Colville Wildlife-2600\EZ POV\wildlife_T&E\caribou\annual reports

### **Responsible Staff Position**

See method, protocol, sample design table.

### **Trigger**

**Grizzly Bear:** If there are human caused grizzly bear mortality, a Forest Plan review would be warranted to see if an additional standard or guideline would need to be added.

**Canada Lynx:** When the thresholds listed in FW-STD-WL-03 and FW-STD-WL-05 are reached, the Forest will stop all treatments that cause unsuitable habitat until the area is below the thresholds.

**Woodland Caribou Habitat:** If treatments are not creating suitable habitat as expected, we will adjust treatment prescriptions.

**Woodland Caribou Winter Recreation:** There are currently no caribou in the U.S. The source population in Canada has been relocated to more northern herds. If snowmobiles are accessing caribou habitat on closed roads or other routes, the wildlife biologist will work with engineering to develop sufficient closure devices.

### **Estimated Annual Personnel Days and Other Costs**

East Zone Wildlife Biologist 10 days

Central Zone Wildlife Biologist 5 days

Total Cost/Year: \$6,000

**Comments**

2022: None

**Question 20—Focal Species – Habitat Objectives MON-Focal-01**

Are habitat trends for Focal species consistent with the Desired Conditions and objectives?

**Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Evaluation	Source Database
<b>MON-Focal-01-01</b>	White-headed Woodpecker: number of acres treated to provide large diameter tree habitat and move toward desired vegetation conditions by providing late-open structure	Acres	Annual	Annual	Answered in question 1 through DecAID - MON-VEG-01-03
<b>MON- Focal-01-02</b>	Northern goshawk: number of acres surveyed and nests located	Acres, Number of Nests Surveyed	Annual	Annual	NRIS Wildlife
<b>MON- Focal-01-03</b>	Black-backed woodpecker-Snag habitat: snag densities by size class and vegetation type	DecAID	5 <sup>th</sup> field watershed	Every 5 years	Answered in question 1 - MON-VEG-01-04
<b>MON- Focal-01-04</b>	MacGillivray’s warbler: condition of riparian habitats within grazing allotments.	WCATT	5 <sup>th</sup> field watershed	Every 5 years	Answered in question 16
<b>MON- Focal-01-05</b>	Wildlife General: Monitor progress toward meeting road density desired conditions by watershed/grizzly bear management unit.	WCATT		Every 5 years	Answered in question 11 and 19

**Method, Protocol, Sample Design**

Indicator	Protocol
<b>MON- Focal-01-01</b> White-headed Woodpecker: number of acres treated to provide large diameter tree habitat and move toward desired vegetation conditions by providing late-open structure	Answered in question 1 MON-VEG-01-01
<b>MON- Focal-01-02</b> Northern goshawk: number of acres surveyed and nests located	NRIS Wildlife will be queried for acres surveyed for goshawks.
<b>MON- Focal-01-03</b> Black-backed woodpecker-Snag habitat: snag densities by size class and vegetation type	Answered in question 1
<b>MON- Focal-01-04</b> MacGillivray’s warbler: condition of riparian habitats within grazing allotments.	Answered in question 16
<b>MON- Focal-01-05</b> Wildlife General: Monitor progress toward meeting road density desired conditions by watershed/grizzly bear management unit.	Answered in question 11 Miles of roads treated that are a high risk to watershed and aquatic habitat function (Annual)

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-Focal-01](#)

**Responsible Staff Position**

Natural Resources Program Manager

**Frequency of Evaluation**

MON-FLS-01-01 and MON-FLS-01-04 annually

MON-FLS-01-02, MON-FLS-01-03 and MON-FLS-01-05 every 5 years

**Trigger**

Triggers for MON-Foccal-01-01, 01-03, 01-04, and 01-05 are addressed in other questions, see table above.

For MON-Focal-01-02, the wildlife biologists will monitor at least 10% of the territories within 3 years after the surrounding treatments. If the territories have been abandoned, the wildlife biologist will assess reasons why. If a trend is established that standards and guidelines aren't protecting goshawks, then additional design elements would be added to projects.

**Estimated Annual Personnel Days and Other Costs**

The work is performed as part of other questions, see methods section, above. Pulling data from NRIS for MON- Focal-01-02 will take 1 day of program manager time.

Total Cost/Year: \$1,000

**Comments**

2022 - None

**Question 21—Wildlife – Desired Terrestrial Habitat- Objectives MON-WL-01**

Have management activities met forest plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions?

**Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Evaluation	Source Database
<b>MON-WL-01-01</b>	Acres of terrestrial habitat restored or enhanced. Also see results for MON-VEG-01-01 through MON-VEG-01-05	Acres	Varies by species	Annual	Watershed Improvement Tracking

**Method, Protocol, Sample Design**

We will monitor the five objectives listed under this monitoring item on page 166 in the monitoring plan. The watershed improvement tracking database will be queried for the accomplishment acres.

Objective	2020	2021	Total
FW-OBJ-WL-02. Canada Lynx Habitat Restoration - During the expected 15 years of plan implementation, restore an average of 100 acres per year of snowshoe hare and/or lynx habitat within the lynx analysis units located in the Kettle-Wedge core area.			
FW-OBJ-WL-03. Grizzly Bear Recovery Area – Habitat Restoration During the expected 15 years of plan implementation, maintain or restore grizzly bear seasonal habitats on 900 acres in the following bear management units: LeClerc, Salmo-Priest, Sullivan Hughes.			
FW-OBJ-WL-04. Restoration of Late-Successional Forest Habitat and Associated Surrogate Species During the expected 15 years of plan implementation, restore western hemlock/western red cedar vegetation types within late-successional forest habitats for surrogate wildlife species on 1,400 acres within the following watersheds (table 13). Generally focus activity in previously treated areas that are now early to mid-successional forest to enhance large tree development. Sullivan Creek 800 acres, LeClerc Creek 600 acres			
FW-OBJ-WL-05. White-Headed Woodpecker and Associated Species Habitat – Ponderosa Pine Forest During the expected 15 years of plan implementation, restore or move toward restoration of late structure ponderosa pine forest habitat on 500 acres per year. Restoration projects are emphasized in the following watersheds: Sanpoil, Sherman.			
FW-OBJ-WL-06. Deer and Elk Habitat Restoration During the expected 15 years of plan implementation, restore (i.e., application of prescribed fire, invasive plant management, etc.) habitat on 1,000 acres of deer and elk winter range.			

## **Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-WL-01](#)

## **Responsible Staff Position**

Natural Resources Program Manager will query the results. The Zone Wildlife Biologists will input the accomplishments into NRIS WIT.

## **Trigger**

By 2028, half of the acreage targets, listed in each of the five objectives above, should be accomplished. If the Forest is not halfway to these objectives by 2028, the Forest should provide a strategy to accomplish the objectives.

## **Estimated Annual Personnel Days and Other Costs**

The work is performed as part of other questions. Pulling acres accomplished for (FW-OBJ-WL-02, 03, 04, 05, 06) from NRIS will take 1 day.

Total Cost/Year: \$1,000

## **Comments**

2022- none

## **Question 22—Access & Recreation – Visitation – MON-AR-01**

What are the trends in visitation forest wide, and are visitors satisfied with the facilities, access, services, and perception of their safety?

## **Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Evaluation	Source Database
<b>MON-AR-01-01</b>	Visitor use and trends in use forest wide	% site visits # and % of national forest visits % satisfied % meet expectations	CNF	Every 5 years	NVUM

## **Method, Protocol, Sample Design**

### **Visitation Estimates**

National Visitor Use Monitoring (NVUM) methodology and analysis is explained in detail in the research paper entitled: Forest Service National Visitor Use Monitoring Process: Research Method Documentation; English, Kocis, Zarnoch, and Arnold; Southern Research Station; May 2002 (<http://www.fs.fed.us/recreation/programs/nvum>).

To define the sampling frame, Colville National Forest recreation staff classify all recreation sites and areas into five basic categories called "site types": Day Use Developed Sites (DUDS), Overnight Use Developed Sites (OUDS), Designated Wilderness Areas (Wilderness), General Forest Areas (GFA), and View Corridors (VC). Only the first four categories are counted as national forest recreation visits and are included in the visit estimates. The last category is used to track the volume of people who view national forests from nearby roads; since they do not get onto agency lands, they cannot be counted as visits. For the entire sampling year, each day on each site was given a rating of very high, high, medium, low, or no use according to the expected level of recreational visitors who would be observed leaving that location for the last time (last exiting recreation use) on that day. The combination of a calendar day and a site or area is called a site day. Site days are the basic sampling unit for the NVUM protocol.

In essence, visitation is estimated through a combination of traffic counts (collected through both road and trail traffic counters) and individual surveys of exiting visitors. Both are obtained on a random sample of locations and days distributed over an entire forest for a year. All of the surveyed recreation visitors are asked about their visit duration, activities, demographics, travel distance, and annual usage. About one-third are also asked a series of questions about satisfaction. Another one-third are asked to provide information about their income, spending while on their trip, and the next best substitute for the visit.

Additional NVUM data is collected by proxy (information collected at a recreation site or area that is directly related to the amount of recreation visitation received - the proxy information must pertain to all users of the site and it must be one of the proxy types allowed by the NVUM methodology, such as fee receipts, fee envelopes, mandatory permits, permanent traffic counters, group reservations, ticket sales, and daily use records). Proxy data is usually collected at locations such as permitted resorts, organization camps, and recreation events as well as concessionaire operated or hosted recreation sites where use data is collected daily.

### **Satisfaction**

To describe customer satisfaction, several different measures are used. Recreation visitors are asked to provide an overall rating of their visit to the national forest, on a 5-point Likert scale. About one-third of visitors interviewed on the forest rated their satisfaction with fourteen elements related to recreation facilities and services, and the importance of those elements to their recreation experience. Visitors are asked to rate the specific site or area at which they are interviewed. Visitors rate both the

importance and performance (satisfaction with) of these elements using a 5-point scale. The Likert scale for importance ranges from not important to very important. The Likert scale for performance ranges from very dissatisfied to very satisfied. Although the satisfaction ratings specifically reference the area where the visitor is interviewed, the survey design does not usually have enough responses for any individual site or area on the forest to present information at a site level. Rather, the information is generalized to overall satisfaction within the three site types: Day Use Developed (DUDS), Overnight Use Developed (OUDS), General Forest Areas, and on the forest as a whole.

Satisfaction responses are analyzed in several ways. First, overall satisfaction is measured.

Next, two aggregate measures are calculated from the set of individual elements. The satisfaction elements most readily controlled by managers are aggregated into four categories: developed facilities, access, services, and visitor safety. The site types sampled are aggregated into three groups: developed sites (includes both day use and overnight developed sites), dispersed areas, and designated Wilderness. The first aggregate measure is called "Percent Satisfied Index (PSI)", which is the proportion of all ratings for the elements in the category where the satisfaction ratings had a numerical rating of 4 or 5. Conceptually, the PSI indicator shows the percent of all recreation customers who are satisfied with agency performance. The agency's national target for this measure is 85%. It is usually difficult to consistently have a higher satisfaction score than 85% since given tradeoffs among user groups and other factors.

Another aggregate measure of satisfaction is called "Percent Meet Expectations (PME)". This is the proportion of satisfaction ratings in which the numerical satisfaction rating for a particular element is equal to or greater than the importance rating for that element. This indicator tracks the congruence between the agency's performance and customer evaluations of importance. The idea behind this measure is that those elements with higher importance levels must have higher performance levels. Lower scores indicate a gap between desires and performance.

An Importance-Performance Analysis (IPA) (Hudson, et al, Feb 2004) is calculated for the importance and satisfaction scores. A target level of importance and performance divides the possible set of score pairs into four quadrants. For this work, the target level of both is a numerical score of 4.0. Each quadrant has a title that helps in interpreting responses that fall into it, and that provides some general guidance for management. These can be described as:

1. Importance at or above 4.0, Satisfaction at or above 4.0: **Keep up the good work.** These are items that are important to visitors and ones that the forest is performing quite well.
2. Importance at or above 4.0, Satisfaction under 4.0: **Concentrate here.** These are important items to the public, but performance is not where it needs to be. Increasing effort here is likely to have the greatest payoff in overall customer satisfaction.
3. Importance below 4.0, Satisfaction above 4.0: **Possible overkill.** These are items that are not highly important to visitors, but the forest's performance is quite good. It may be possible to reduce effort here without greatly harming overall satisfaction.
4. Importance below 4.0; Satisfaction below 4.0: **Low Priority.** These are items where performance is not very good, but neither are they important to visitors. Focusing effort here is unlikely to have a great impact.

### **Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-AR-01](#)

### **Responsible Staff Position**

Forest Recreation Program Manager

### **Trigger**

Visitation and satisfaction monitoring data obtained through the NVUM survey will generally not lead to the need to make changes to the forest plan. Instead, this data will inform line officers and program managers of the need to make management changes within the recreation program to better meet the desired conditions, objectives, standards and guidelines for access systems, recreation sites, recommended wilderness, designated wilderness, backcountry and front country recreation opportunities and areas identified within the plan.

### **Estimated Annual Personnel Days and Other Costs**

Personnel days and implementation costs for national visitor use monitoring is divided into two years. During the first year, personnel costs and time are focused on reviewing and updating the site type classifications, site use stratum (very high, high, medium, low, none), safety of designated survey locations, survey site directions, survey site GPS location, and implementation safety plans. During the second year, most costs and personnel time are spent conducting surveys across the forest from October 1st through September 30th of the fiscal year during which the survey is implemented. Additional time and expense are focused on contacting county and state road departments to get permission to use road counters and conduct surveys within these jurisdictions, contacting partners that will provide proxy data, uploading survey data, and supervising survey crews. These year one and two costs are covered through the National Visitor Use Monitoring project and are not unique to forest plan monitoring.

Costs specific to forest plan monitoring will occur every fifth year (unless NVUM protocols change) and will include one day of the Forest's Recreation Program Manager Position to pull the finalized NVUM report, review the data, summarize the monitoring results and upload the results/data to the appropriate folder in the Forest Service data system, currently Pinyon.

Total Cost/Year: \$550/year. One day of Forest Recreation Program Manager time.

### **Comments**

2022- NVUM protocols are determined at the national level and may change over the life of the forest plan. The Colville National Forest (CNF) has assumed in this monitoring plan that the Forest's NVUM monitoring budget and monitoring results will include the

Tonasket Ranger District which was administratively combined with the CNF in fiscal year 2020 and is therefore not currently managed under the 2019 CNF Forest Plan. Whether or not the NVUM budget and visitor use results for the Tonasket RD are included as part of the CNF NVUM monitoring results will be identified in the annual monitoring report.

Results of NVUM surveys are typically released one year after the data is collected. However, delays in analyzing and consolidating data by the national data team may cause the results to be released two years after the survey is implemented. Therefore, NVUM results may not always be available to be included in the forest monitoring report every five years.

### Question 23—Access and Recreation – Mountain Bike Use in Recommended Wilderness -MON-AR-02

What is the trend in mountain bike use in recommended wilderness and is that use impacting the wilderness characteristics of the forest’s recommended wilderness areas?

#### **Indicators, Units, Scale, Frequency of Evaluation, Source Database (table 39 in CNF LMP)**

Monitoring Item	Indicator	Unit of Measure	Scale	Frequency of Measure	Source Database
<b>MON-AR-02-01</b>	Assess mountain bike use through trail registration trend analysis.	Total estimated amount of mountain bike use within Recommended Wilderness. Establish 3-year baseline average within each recommended wilderness area.	CNF	Annual	Not applicable
<b>MON-AR-02-02</b>	Identify new user-created mountain bike trails or impacts (i.e. hill climbs, accelerated growth of banked turns) to natural or special features along existing trail systems in recommended wilderness caused by mountain bike use.	Total number of identified new user-created <b>off-trail</b> mountain bike impact areas clearly established by bikes that impacts the natural and undeveloped wilderness characteristics of each recommended wilderness area.  Establish a 3-year baseline average for off-trail mountain bike impacts within each recommended wilderness area.	CNF	Annual – approximately 20% of all trail miles open to mountain bikes within recommended wilderness per year.	Not applicable

#### **Method, Protocol, Sample Design**

Trail registration data combined with trail camera user counts will be used to establish a current baseline of average mountain bike use for each recommended wilderness over the next three years. If there is an anomaly year (such as the extremely high use that occurred in 2020 because of COVID-19; or lower than expected use resulting from local fire area closures or extended periods (greater than two weeks) of unhealthy air quality) during this three-year period, then an additional year will be added to the baseline period and the data from the irregular year will be removed and not used to determine the baseline level of mountain bike use. Trail registration data and trail camera user counts will be used on an annual basis to determine trends in mountain bike use once the baseline level of use is established.

Trail cameras will be used to document actual user visits on at least one primary access trail entering the three recommended wilderness areas across the forest each year. Photo-documented user counts will be compared with trail registration data for the corresponding trail(s) to determine the percent of visitors that use the trail register system. By determining the ratio of trail users that utilize the registration system, the forest will be able to better estimate total annual mountain bike use for each recommended wilderness area by adjusting the estimated use documented on trail registration forms by the percentage of visitors that typically do not use the trail register system.

New or recurring user-created off-trail mountain bike impacts will be identified by monitoring approximately 20% (on average) of all trail miles open to mountain bike use within recommended wilderness annually following the monitoring schedule in Table 1. Monitoring reports will include the monitoring date, name of the person completing the monitoring activity, a narrative description of any impacts identified, digital photos of identified impacts and GPS point or linear data associated with the impact.

**Table: Trail Monitoring Schedule**

Trail #	Trail Name	Trail Length in RW (miles)	Total Trail Length (miles)	1 <sup>st</sup> Year Monitored for Mountain Bike Impacts and then every 5 years
3	Edds Mountain	3.4	7.0	1 – 2022
13S	Kettle Crest South	8.3	14.0	1 – 2022
117	Abercrombie	1.8	3.0	2 – 2023
119	North Fork Silver Crk.	4.1	6.2	2 – 2023
503	Flume Creek	1.7	3.9	2 – 2023
139	Sherlock Peak	2.0	3.4	2 – 2023
123	South Fork Silver Crk.	7.2	7.2	3 – 2024

526	Thunder Creek	0.7	5.1	3 – 2024
507	North Fork Sullivan Crk.	2.1	5.9	4 – 2025
522	Halliday	1.9	4.2	4 – 2025
525	Slate Creek	2.6	4.3	4 – 2025
553	Red Bluff	5.0	5.2	4 – 2025
7	Barnaby Buttes West	4.9	6.9	5 – 2026
70	Barnaby Buttes East	2.3	2.8	5 – 2026
	Total Miles	48.0	79.1	
	Year 1 Miles	11.7	21	
	Year 2 Miles	9.6	16.5	
	Year 3 Miles	7.9	12.3	
	Year 4 Miles	11.6	19.6	
	Year 5 Miles	7.2	9.7	

**Data Location**

LMP Monitoring Results should be written and summarized as they are interpreted, and kept filed in: [Pinon \1900Planning\Monitoring\MonitoringData\FY20XX\MON-AR-02](#)

**Responsible Staff Position**

Forest Recreation Program Manager

**Frequency of Evaluation**

Annually

**Trigger**

Resource impacts resulting from mountain bike use are determined to be causing a reduction in the natural or undeveloped wilderness characteristics of a recommended wilderness.

Is the trend in mountain bike use in recommended wilderness impacting wilderness characteristics?

- 1) Mountain bike use is determined to be occurring on NFS trails closed to mountain bike use within a recommended wilderness area.
- 2) Monitoring determines that **off-trail** impacts attributed to mountain bikes that cannot be successfully mitigated are causing negative impacts to the natural and undeveloped wilderness characteristics of a recommended wilderness area.

In each of these cases, MA-GDL-RW-02 indicates that either the affected trail system(s) or the entire recommended wilderness may be closed to mountain bike use in order to maintain the wilderness characteristics of each recommended wilderness.

**Estimated Annual Personnel Days and Other Costs**

It is estimated that 20 personnel days a year will be required to implement the field placement and maintenance portion of the trail register and trail camera monitoring program within recommended wilderness. An additional three days will be required each year to monitor for mountain bike impacts on 20% of the trail mileage within recommended wilderness. Finally, it is estimated that an additional 20 days will be required to log and summarize the data collected via trail registers and trail cameras each year.

During the first three years of monitoring an additional 12 days (\$3,500) will be required to complete annual monitoring to identify the baseline average of existing off-trail mountain bike impacts.

Total Cost/Year: \$10,750 after the baseline for use and mountain bike impacts have been determined. \$14,250/year during the three-year baseline period.

**Comments**

2022 comments: It may be possible to monitor additional trail miles for mountain bike impacts depending on staffing levels and other forest priorities. If the forest can procure additional trail cameras, the forest would be able to confirm actual mountain bike use on additional trails within recommended wilderness. However, additional monitoring will increase annual personnel days and costs.

Mountain bike impacts identified through annual monitoring and the management actions (closures, naturalization, resource protection) taken to maintain the wilderness characteristics (undeveloped, and natural) of each recommended wilderness area that may be impacted by mountain bike use will be documented in the annual monitoring report.