USDA

United States Department of Agriculture

Biennial Monitoring Evaluation Report (BMER)

for the Kootenai National Forest

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Summary of Findings and Results

Following is a summary of key findings and conclusions from this report in Table 1.

Table 1. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS 1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION [2] Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT [2] *If a change may be warranted, where may the change be needed?*[2]
VEGETATION				
MON-VEG-01: To what extent are management activities and natural disturbance processes trending toward desired conditions for vegetation composition, structure, and pattern, increasing resistance and resiliency to disturbance factors including climate change? This includes vegetation dominance type and size, old growth, down wood, snags, fire-killed forest, and insect and disease infested forest.	2021	**(B) Uncertain/ (E) YES** – As this is the first and baseline report, more time/data are needed to understand status or progress of the Plan Component(s) as most results show progress towards desired conditions, but some are trending away. Objectives and guidelines are being met.	Yes	**1. Plan Monitoring Recommendation**: **Consider changing to one indicator for this question**: the results of the annual Northern Region Restoration and Resiliency Reports. Restoration and developing resilient vegetation through vegetation treatments each year is an overall goal of the outcomes of treatments that we invest in and accomplish each year. A set of requirements were established to determine if a treatment outcome was projected to be resilient. The requirements in the R1 Restoration and Resiliency Guide list detailed criteria for resilience at the treatment unit level and involve composition,

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				structure, and pattern of vegetation treatments that trend forests to a more resilient desired condition as contained in Forest Plan Desired Conditions. They often involve establishing or maintaining early seral, shade-intolerant vegetation. Appropriate forest density treatments are summarized as a characteristic of resilience, as are characteristic patch sizes. Vegetation treatments other than associated with trees are also assessed for their resilience outcomes. All these outcomes are anticipated to be resilient under current and future climate and changes. These treatments are considered adaptation options that are being implemented under an adaptive management context. Recommend dropping Indicator 2 – Acres burned. Already included as part of Indicator 1. There are **3 old growth**

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				indicators. Recommend dropping or rewording Indicator 6 – Acres of old growth treated. What are the effects of treatments? Answering this question alone does not get to the monitoring question, even in context of the other 7 indicators. **2. Implementation and Outcome Progress Recommendations**: Update the **Standards/Steps for Data Collection**, **Analysis Methods**, and **How Evaluated** for all indicators in the Monitoring Guide (pgs. 13-17) based on the Data Sources/Partners in the MON-VEG-01 report, especially when RO data is provided for consistent methodology, analysis, and protocols across the region. Coordinate with RO ahead of time to get datasets that match the forest to compare like data; potentially include additional data to assist with forest analysis efforts (e.g. MON-

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				VEG-01-01 and 03: dominance type and size class matching KIPZ Forest Plan biophysical settings and R1 Broad PVTs; MON-VEG-01-04: FIA old growth by Geographic Area). **Frequency of Measurement** (Monitoring Guide, pg. 13): Recommend changing wording where it reads "Every 5 years"; the FIA produces FIA estimates after 50% of the data has been refreshed (so on a 5 year basis). **Analysis Methods** (Monitoring Guide, pg. 13): Recommend updating this wording as it references "… acres burned via unplanned ignitions (wildfires)" in Performance Indicator 3 – Acres of forest by dominance type and size class compared to the desired condition. Method doesn't match indicator. **Unit of Measure** (Monitoring Guide, pg. 16): Recommend updating to read "Number of snags ***per acre***."

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				References (Monitoring Guide, pg. 16): Recommend updating/replacing with R1 Snag and Live Tree Denisty reports. Bush and Reyes 2020 is the most current reference and methodology for this indicator. It incorporates the current references listed.
MON-VEG-02: Have management activities met Plan objectives and trended towards desired conditions for invasive terrestrial plant species?	2021	**Yes**	**Yes**	Monitoring intensity and adding indicators tracking effectiveness of treatment
FIRE				
MON-FIRE-01 To what extent are management activities moving hazardous fuels towards desired conditions?	2021	Yes	No	Management activities are progressing towards desired conditions by treating between 5,000 to 15,000 acres annually across the Kootenai National Forest. Hazardous fuels are reduced annually within the WUI and other areas where values are at risk. By reducing hazardous fuels, fire behavior can be classified as low-intensity surface fires with limited crown fire potential

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				while reducing the risk for large scale, stand replacement wildfires. This is further evidenced by a 95 percent success rate of a fire behavior change as a result of treatments
MON-FIRE-02: To what extent is unplanned fire used to trend vegetation towards desired conditions?	2021	Yes - The number of unplanned ignitions managed for the maintenance and/or restoration of fire adapted ecosystems does not provide a measurement of how vegetation is trending towards desired conditions. Additionally, unplanned ignitions are rarely managed on the Kootenai National Forest due to several factors such as seasonality, environmental conditions, national/regional preparedness levels, resource availability, and values at risk. FW-OBJ-FIRE-02 calls for over the life of the plan, manage natural, unplanned ignitions to meet resource objectives on at least 10 percent of the ignitions. Data shows that only 3 percent of natural unplanned ignitions	Yes - The indicator may not be appropriate because the indicator does not directly address the question of how unplanned natural ignitions are trending vegetation towards desired conditions. Additionally, since the development of the plan, terminology for utilizing unplanned natural ignitions has changed which makes for poor quality data extraction from databases and is difficult and cumbersome. Recommendation is to change the indicator for MON-FIRE-02 from number of unplanned ignitions managed for the maintenance and/or restoration of fire-adapted ecosystems, and the number of unplanned natural ignition managed with the primary goal of	Federal policy changed in 2009 allowing fire managers to manage fires for multiple objectives on the same fire. For example, fire managers may be simultaneously managing for resource benefit on one flank of the fire while suppressing another flank that threatens values at risk. In this example, acres of vegetation may be trending towards desired conditions but this fire would be considered a suppression fire.

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		were managed in 2016, 4 percent in 2017, and zero percent in 2018-2020. In contrast, when analyzing acres of natural unplanned ignitions that are trending towards vegetation desired conditions, 58,660.95 acres of natural unplanned ignitions are trending towards vegetation desired conditions from 2016-2018.	suppression to acres of natural unplanned ignitions that are trending towards vegetation desired conditions.	
WATERSHED				
MON-WTR-01 Are soil, water quality, and riparian and aquatic habitats protected and moving towards desired conditions?	2021	Uncertain - Methods inadequate to answer monitoring question. The performance indicator of percent BMPs properly implemented and percent that were effective answers most of the monitoring question. However, the trending aquatic habitat toward desired conditions may need additional information.	Yes Based on the evaluation of monitoring results, it is recommended that either: a) Rewrite the monitoring question so that trends in percent BMP implementation and effectiveness are all that is needed to answer the question. b) Include an additional analysis indicator such as PIBO to add context to whether the Forest trending as desired.	Update the monitoring guide to reflect an approach that would revise the monitoring question or add an additional performance indicator.
MON-WTR-02 To what extent are management	2021	MON-WTR-02-01: Yes, Implementation of Plan	MON-WTR-02-01: None	MON-WTR-02-01: NA

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activities moving watersheds towards desired conditions?		components are trending, progressing, and/or conducted as desired. MON-WTR-02-02: Uncertain - Methods inadequate to answer monitoring question. The monitoring results demonstrate progress toward achieving the plan objectives. However, if we are going to continue its use, the process needs to be re-written using the data and analysis techniques available today. In addition to the issues with the soil detrimental disturbance assumptions and INFRA data, analyzing FACTS data is considerably different then analyzing TSMRS data, therefore, the analysis process needs to be updated and adjusted using the latest techniques, software, and databases available. This would take considerable time and research to be reproducible.	MON-WTR-02-02: a) Re-invest in another GIS/database exercise but there needs to be a long-term commitment to upkeep and scrutinize each factor in the analysis. b) Use the PIBO data and annual reports at the Forest scale and the, perhaps the 5th code HUC (10-digit) scale to monitor changes that are reflected in stream channels	MON-WTR-02-02: Update the monitoring guide to reflect an approach that would provide an answer to the monitoring question
AQUATIC HABITAT				

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MON-AQH-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired condition to reconnect fragmented stream habitat to increase population resilience to disturbance including climate change?	2021	YES -	No	None
SOILS				
MON-SOIL-01 To what extent has coarse woody debris been retained for long-term soil productivity and other ecosystem functions?	2021	Yes	Soils staff work with implementation and fuel treatment staff to identify action items necessary to achieve the Forest Plan guideline based on pre-harvest survey data.	Management activities need to ensure proper retention of CWD. Communication between soils, silviculture, fuels, and sale administration will identify actions to improve guideline compliance.
MON-SOIL-02 To what extent have vegetation management activities prevented irreversible damage to soil conditions?	2021	Yes	None	NA
RIPARIAN				
MON-RIP-01: Have riparian and wetland areas been maintained or improved to	2021	YES - Implementation of Plan Component(s) ARE	No	None

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provide for healthy streams and aquatic environments to increase resiliency to disturbance including climate change?		progressing, toward plan objectives.		
FEDERALLY LISTED SPECIES				
MON-FLS-01-01 –Grizzly Bear: progress towards achieving and maintaining standards for percent core area, OMRD, and TMRD within the Recovery Zones	2021	YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired	Yes	Consider replacing linear miles of open/total motorized routes with secure habitat as the metric for BORZ under FW-STD-WL-02.
MON-FLS-01-02: Canada lynx: changes in lynx habitat as a result of moving towards the desired conditions for vegetation through vegetation management, prescribed fire, or natural disturbance	2021	YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired Most LAUs are better than the standards for the amount of early stand initiation habitat. The one LAU that is not better than the standard is due to several large fires in recent years. The amount of groomed/designated over the snow routes or ski areas is at or better than baseline conditions.	No	

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MON-FLS-01-03: Bull Trout population trends based on redd counts in known spawning reaches	2020	No – Redd count numbers are down in nearly every bull trout stream across the forest	No	None
FOCAL SPECIES				
MON-FOC-01-01: Landbird assemblage (insectivores): a) number of acres where planned ignitions were used to maintain/improve habitat; b) percentage of natural, unplanned ignitions managed for the maintenance or restoration or fire adapted ecosystems	2020	For FW-OBJ-WL-03: (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired With the exception of 2020, we met FW-OBJ-WL-03 by using prescribed fire on 1,000-5,000 acres that benefited species preferring open habitats. Covid-19 precautions prevented prescribed burning in 2020.	Yes	Prioritize accomplishment data entry into WIT. Consider rewording FW-OBJ-WL-03 to clarify which specific focal species are expected to benefit from the use of fire to maintain/restore habitat. Consider rewording MON-FOC-01 to tie more directly to FW-OBJ-WL-03 or FW-DC-WL-19 and clearly showing that we are interested in the amount of prescribed fire that is benefitting landbirds that prefer open habitats. Drop all reference to the other plan components listed in the monitoring plan for MON-FOC-01. Consider dropping the second indicator which looks at the percentage of natural, unplanned ignitions managed

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				for the maintenance or restoration or fire adapted ecosystems. That indicator is already tracked under MON-FIRE-02. As per Latif et al. 2019, consider changing some of the focal species in the landbird assemblage
WILDLIFE				
MON-WDL-01-01: Acres of terrestrial habitat restored or enhanced	2020	(E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired We are easily achieving FW-OBJ-WL-01 by accomplishing at least 1,000-5.000 acres of habitat maintenance and restoration.	Yes	Prioritize accomplishment data entry into WIT. Although the available data on acreages indicates that FW-OBJ-WL-01 is being met, the KNF lacks data on the species benefitted by activities if the data is in FACTS only. Also, the KNF is possibly missing acres of accomplishments that should be in WIT and that aren't normally also tracked in FACTS (e.g. nest boxes, toilet vent caps). Consider rewording the monitoring question MON-WDL-01 to tie more directly to FW-OBJ-WL-01 and the indicators listed for MON-WDL-01-01.

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				Drop all reference to the other plan components listed in the monitoring plan for MON-WDL-01.
MON-WDL-02: Number of planning subunits providing >30% security and >50% security on NFS lands during the hunting season	2021	Uncertain - More time/data are needed to understand status or progress of the Plan Component(s) The 2021 calculations are not directly comparable to the 2012 calculations used in USDA 2013; therefore, it is difficult to discern if conditions are trending towards FW-OBJ-WL-02. The 2021 calculations better align with the elk security direction in the 2015 Forest Plan as identified by Anderson (2015). Going forward, the next several monitoring reports (e.g. 2023, 2025) can be compared to the 2021 numbers to get a better understanding of progress towards FW-OBJ-WL-02 based upon the coarse scale motorized access management calculations.	Yes	Consider rewording this monitoring question to tie more directly to FW-OBJ-WL-02. Drop the reference in the monitoring plan to FW-GDL-WL-10 and focus this monitoring question on FW-OBJ-WL-02
ACCESS & RECREATION				

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MON-AR-01: Have appropriate management actions been taken on recreation sites where opportunities have been identified, use is at or near capacity, or where thereare resource concerns?	2020	Yes – recreational opportunities have increased in several different areas such as rental cabins and campgrounds.	No	None
MON-AR-02: Have management activities trended towards desired conditions for a minimum transportation system that provides recreation opportunities, allows for safe and efficient public and agency access, and is environmentally compatible?	2021	**YES -** Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired. As the monitoring results demonstrate, the road storage, decommissioning, and road maintenance being accomplished as well as the transportation system open for public travel, the KNF continues to contribute to progress of achieving FW-OBJ-AR-03 as well as the desired conditions listed for this monitoring item.	Yes, Increase the reporting interval from every five years to every 2 years.	Some data was hard to find and likely not all accomplishments entered into database of record due to inadequate staffing at different times over the years. Management at all levels needs to recognize need for adequate personnel to keep up with NEPA decisions and accomplishments that need to be tracked in NRM and WIT databases. Better end of year reporting is needed as well as more coordination between watershed and engineering personnel to assure all storage and decommissioning for each year is tracked and entered into the appropriate location

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				of the INFRA and WIT databases. Some updates to the monitoring guide suggested as listed in the more detailed section of this report.
MON-AR-03: To what extent are motorized and non-motorized winter and summer trail recreation opportunities available for a variety of users?	2020	Yes – Opportunities have been maintained with some reduction in summer motorized opportunities.	No	None
MON-AR-04: What are the trends in visitation forest wide, and are visitors satisfied with the facilities, access, services, and perceptions of their safety?	2017	Yes – Trending positively	No	None
WILDERNESS				
MON-WLDN-01: have management activities met Forest Plan desired conditions and standards, and trended towards management area desired conditions for designated wilderness and Wilderness Study Area?	2020	Yes – trending positively.	No	NA

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CULTURAL RESOURCES				
MON-CR-01: To what extent is the Forest meeting forest plan objectives and trending towards desired condition to identify, evaluate, and nominate cultural resources for listing on the National Register of Historic Places?	2021	Yes. The KNF is maintaining identifying and evaluating cultural resources. No. The Forest has not listed any on the National Register of Historic Places. This can be a long process depending on the type of historic property.	Yes	Separate into separate monitoring results. National Register forms are large and require a significant amount of time to complete. Increase staffing to accomplish.
MON-CR-02: To what extent are 1) historic properties protected and 2) public education and 3) interpretation provided to move towards desired conditions?	2021	1) Uncertain. Historic properties are being protected from active management but are not being protected from vandalism. 2) Yes, public education is provided on an annual basis. 3) Yes, but not on a consistent basis.	Yes	Separate into separate monitoring results to easier determine deficiencies.
AMERICAN INDIAN RIGHTS & INTERESTS				
MON-AI-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions for consultation with each Tribe?	2021	Yes, the Forest consults with each Tribe on projects.	Yes	All staff should be sending project proposals to Tribes.
MON-AI-02: To what extent has the agreement for access and acquisition of forest products for traditional cultural	2021	Yes. The 2019 Cultural and Heritage Cooperation Authority authorizes grant of trees, portions of trees, or	Yes	Data bases should be queried to provide numbers on acquisition of forest products by Tribal members.

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uses progressed in consultation with each Tribe?		forest products to federally recognized Indian Tribes for a wide variety of noncommercial uses and "traditional and cultural purposes." There have been no requests for access and acquisition for forest products.		
MON-AI-03: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions for protecting traditional cultural areas?	2021	Yes. Federal agencies have trust responsibilities to American Indian Tribes under treaty and in compliance with various laws and executive orders. The Forest is also required to consult with all federally recognized tribes that had/have traditional uses within the forest boundary. The Forest is knowledgeable on traditional cultural areas. There have been no comments or concerns received from Tribes.	None	N/A
TIMBER				
MON-TBR-01 To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions to provide a mix of timber	2021	No	None	NA

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products in response to market demands?				
MON-TBR-02 To what extent is the Forest meeting NFMA requirements and desired conditions on size of harvest openings.	2021	C) Uncertain, current indicators are not appropriate to assess the status of the plan component. .	Yes, the number and size by biophysical setting would be an appropriate question in determining whether the plan is being met.	Suggest to change the monitoring question and indicators to "What management has occurred to create the pattern of forest conditions to move towards FW-DC-VEG-05. Indicator change to # and size of even-aged regeneration harvest units exceeding 40 acres in size reported by biophysical setting.
MON-TBR-03 To what extent are regeneration units restocked to trend towards vegetation desired conditions?	2021	Yes	No	NA
MINERALS				
MON-MIN-01 Are reclamation activities improving ecological and human health conditions?	2021	AML sites have been and are continuing to be reclaimed.	Yes	KNF will continue to document and reclaim AML sites as they are discovered on the Forest.
SOCIAL AND ECONOMIC SYSTEMS				
MON-SOC-01				

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MON-SOC-02				

1 PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

2 [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

See body of the report for more details regarding any specific recommendations/opportunities for change.

Introduction

Policy and Regulations

Monitoring and evaluation requirements have been established through the National Forest Management Act (NFMA) at 36 CFR 219. Additional direction is provided by the Forest Service in Chapter 30 – Monitoring – of the Land Management Handbook (FSH 1909.12).

The Kootenai National Forest Plan Monitoring Program (PMP) was updated in August 2016 for consistency with the 2012 planning regulations [36 CFR 219.12 (c)(1)]. The Kootenai National Forest Land Management Plan was administratively changed to include the updated plan monitoring program. For a copy of the current monitoring program go to this web link <*https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3826554.pdf* Monitoring questions and indicators were selected to inform the management of resources on the plan area and not every plan component was determined necessary to track [36 CFR 219.12(a)(2)].

The monitoring evaluation implementation guide (monitoring guide) is part of the overall plan monitoring program and provides more specific direction for implementing the more strategic plan monitoring program and details monitoring methods, protocols, and roles and responsibilities. The Monitoring Guide is not part of the plan decision and is subject to change as new science and methods emerge. The Kootenai National Forest monitoring guide is available at Monitoring Guide.

Providing timely, accurate monitoring information to the responsible official and the public is a key requirement of the plan monitoring program. This report is the vehicle for disseminating this information.

In the context of forest management there are three main monitoring goals:

- Are we implementing the Land Management Plan properly? Are we meeting our management targets and project guidelines? (implementation monitoring)
- Are we achieving our Forest Plan management goals and desired outcomes? (effectiveness monitoring)
- Does our hypothesis testing indicate we may need to change the Forest Plan? (validation monitoring)

Purpose of the Monitoring Evaluation Report (MER)

The Biennial Monitoring Evaluation Report (MER) is designed to evaluate the three above monitoring goals for the purposes of providing this information to help the responsible official determine a course of action based on the recommended management adjustments of this MER. This report considers information related to forest plan components to evaluate if recommended changes needed in forest plan direction, such as plan components or other plan content that guide management of resources in the plan area (e.g. forest plan, management activities, monitoring program or forest assessment). The full 2021 biennial monitoring report for the Kootenai National Forest is available at [insert hyperlink].

The biennial monitoring evaluation report is not a decision document—it evaluates monitoring questions and indicators presented in the Plan Monitoring Program chapter of the forest plan, in relation to management actions carried out in the plan area. Reference your forest's monitoring guide and broader-scale monitoring strategy here as applicable.

Monitoring and evaluation are continuous learning tools that form the backbone of adaptive management. For this reason, we will produce an evaluation report every two years. This is our first written report of this evaluation since the Kootenai National Forest Plan was finalized in 2015.

Implementation monitoring is important for tracking progress and accomplishments. However, it is effectiveness and validation monitoring that drive and support the adaptive management process. Effectiveness monitoring evaluates condition and trend relative to desired conditions. Validation monitoring tests hypotheses and provides

information that might necessitate changes to desired conditions in the plan (e.g. is what we think the desired state should be really accurate?

Objectives

To achieve the goals and purposes outlined above, this MER includes the following objectives (*as guided by FSH 1909.12_34*):

- Document implementation of the PMP, including changed conditions or status of key characteristics used to assess accomplishments and progress toward achievement of the selected LMP plan components.
- Evaluate relevant assumptions, changed conditions, management effectiveness, and progress towards achieving the selected desired conditions, objectives, and goals described in the Forest Plan
- Assess the status of previous recommended options for change based on previous monitoring & evaluation reports.
- Document any scheduled monitoring actions that have not been completed and the reasons and rationale why it has not.
- Present any new information not outlined in the current plan monitoring program that is relevant to the evaluation of the selected monitoring questions.
- Incorporate broader scale monitoring information from the Regional Broader Scale Monitoring Strategy that is relevant to the understanding of the selected monitoring question.
- Present recommended change opportunities to the responsible official.

The following sections present the most current information (data and evaluations) for all monitoring questions contained within the Kootenai National Forest Plan. Each monitoring item includes 1) a summary of the monitoring question, its indicator(s), and the plan components the monitoring question is assessing; 2) monitoring results and discussion; and 3) evaluation of the results to determine an adaptive management finding on whether recommended management changes are warranted or not.

Vegetation Evaluation and Adaptive Findings

MON-VEG-01

Table 2. MON-VEG-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact.
MON-VEG-01: To what extent are management activities and natural disturbance processes trending toward desired conditions for	GOAL-VEG-01 FW-DC-VEG-01 FW-DC-VEG-02 FW-DC-VEG-03 FW-DC-VEG-04 FW-DC-VEG-05 FW-DC-VEG-06 FW-DC-VEG-07 FW-DC-VEG-08 FW-DC-VEG-11 FW-OBJ-VEG-01	MON-VEG-01-01: Acres treated to meet FW-OBJ-VEG-01.	Annual/Class A	FACTS database	Forest Silviculturist (Acting) – Megan Strom
		MON-VEG-01-02: Acres burned.	Annual/Class A	FACTS/FAMWEB/ FIRESTAT	
		MON-VEG-01-03: Acres of forest by	Every 5 Years/ Class A	R1 FIA SUMMARY DATA BASE (R1 FIA SDB) is used for	

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact.
vegetation composition, structure and pattern, increasing resistance and resiliency to disturbance factors including climate change? This includes vegetation dominance type and size, old growth, down wood, snags, fire-killed forest and insect and disease infested forest.	FW-STD-VEG-01 FW-STD-VEG-02 FW-GDL-VEG-01 FW-GDL-VEG-03 FW-GDL-VEG-04 FW-GDL-VEG-05 FW-GDL-VEG-06 FW-DC-RIP-04 GOAL-WL-01 FW-DC-WL-10 FW-DC-WL-12 FW-DC-WL-13 FW-DC-WL-14	dominance type and size class compared to the desired condition.		Estimates of Acres by KIPZ Dominance Type Groups (DTGs), acres of KIPZ DTGs by KIPZ Biophysical Settings (BPS), acres of Size Class 15"+, and acres of Size Class by KIPZ BPS. Estimates by Size Class are from R1 Broad Scale Monitoring Strategy (BSMS) Reports (derived from R1 FIA SDB)	
		MON-VEG-01-04: Acres meeting the old growth definition as determined by the FIA program.	Every 5 Years/ Class A	R1 FIA SDB is used for Estimates of Acres by KIPZ BPS, estimates of acres of Old Growth is from R1 Broad Scale Monitoring Strategy (BSMS) Reports (derived from R1 FIA SDB)	
		MON-VEG-01-05: Acres of old growth and acres of recruitment potential old growth, as determined by the Forests' stand inventory and mapping procedures.	Annual/Class A	FSVEG Spatial database	
		MON-VEG-01-06: Acres of old growth treated	Annual/Class A	FSVEG Spatial/FACTS databases	
		MON-VEG-01-07: Snags per acre forestwide.	Every 5 Years/ Class A	R1 FIA SDB R1 Report: Estimates of Snag and Live-Tree Densities for Western Montana	
		MON-VEG-01-08: Number of acres influenced by insects and disease.	Every 5 Years/Class A	R1 FIA SUMMARY DATA BASE (R1 FIA SDB) R1 Broad Scale Monitoring Strategy (BSMS) Reports (derived from R1 FIA SDB)	

Table 3. Monitoring Item 1 - Monitoring Collection Summary

For Monitoring Item 1:	Year
Data was last collected or compiled in:	2021
Next scheduled data collection/compilation:	**2023** (MON-VEG-01-01, MON-VEG-01-02, MON-VEG-01-05, MON-VEG-01-06) / **2027** (MON-VEG-01-03, MON-VEG-01-04, MON-VEG-01-07, MON-VEG-01-08)
Last MER evaluation for this monitoring item:	2021
Next scheduled MER evaluation of this monitoring item:	**2023** (MON-VEG-01-01, MON-VEG-01-02, MON-VEG-01-05, MON-VEG-01-06) / **2027** (MON-VEG-01-03, MON-VEG-01-04, MON-VEG-01-07, MON-VEG-01-08)
For FIA Monitoring Attributes:	**Year**
Data was last collected or compiled in:	Collected up to 2015, compiled in 2021
Next scheduled data collection/compilation:	Collected up to 2020, compiled in 2023
Last MER evaluation for this monitoring item:	2021
Next scheduled MER evaluation of this monitoring item:	2023/2027

Multiple indicators were used to address the question of the extent management activities and natural disturbance processes are trending toward desired conditions for vegetation composition, structure, and pattern, and increasing resistance and resiliency to disturbance factors including climate change? The nature of the question is multi-faceted, including vegetation dominance type and size class, old growth, down wood, snags, fire-killed forest, and insect and disease infested forest [KNF Monitoring Guide - 2015 Forest Plan (Monitoring Guide), pg. 11].

Table 4. KNF Monitoring Guide Indicators for MON-VEG-01 (pgs. 11-12)

Indicator	Description	Corresponding Forest Plan Component
MON-VEG-01-01: Acres treated towards achieving FW-OBJ-VEG-01	The number of acres that are treated on the Forest towards achieving FW-OBJ-VEG-01 is a strong indication of how much active management is occurring to help trend the vegetation towards the desired conditions that are articulated for forest vegetation within the Forest Plan (GOAL-VEG-01 and FW-DC-VEG-01 through 05).	FW-OBJ-VEG-01 [Forest Plan (FP), pg. 18]. Forest Resilience – Over the life of the Plan, the outcome per decade is: Increased relative representation of early seral, shade-intolerant, drought- and fire-tolerant, insect/disease resistant species dominance types (e.g., ponderosa pine, white pine, western larch, whitebark pine, and hardwoods) on approximately 85,000 to 90,000 acres (these acres are also included in those listed in the following bullet). Treatment of approximately 250,000 acres to maintain and/or improve forest resilience, natural diversity, and productivity and to reduce negative impacts of non-native organisms. Treatments may include timber harvest, planting, thinning, management of fire (including planned and unplanned ignitions), mechanical fuel treatments, revegetation with native species, blister rust pruning, integrated tree improvement activities, non-native invasive plant treatments, and other integrated pest management activities including forest health protection suppression and prevention activities.

Indicator	Description	Corresponding Forest Plan Component
		GOAL-VEG-01 (FP, pg. 11). Plant communities are trending toward the desired conditions for composition, structure, patterns, and processes. The ecological integrity of the communities is high, and they exhibit resistance and resiliency to natural and man-caused disturbances and stressors, including climate change.
		FW-DC-VEG-01 (FP, pg. 11-12). The composition of the forest is within the desired ranges for the dominance groups on page 12 of the Forest Plan. More of the forest is dominated by western white pine, ponderosa pine, western larch, and whitebark pine. Conversely, less of the forest is dominated by grand fir, western hemlock, western redcedar, Douglas-fir, and subalpine fir. More hardwood trees occur in the forest such as quaking aspen, black cottonwood, and paper birch.
		FW-DC-VEG-02 (FP, pg. 12). The structure of the forest is within the desired ranges for the size classes on page 12 of the Forest Plan. More of the forest is dominated by stands occurring in the large size class and less of the forest is dominated by stands that occur in the small and medium size classes.
		FW-DC-VEG-03 (FP, pg. 13). The amount of old growth increases at the forest-wide scale. At the finer scale of the biophysical setting, old growth amounts increase for the Warm/Dry and Warm/Moist settings while staying close to the current level for the Subalpine setting. Relative to other tree species, there is a greater increase in old growth stands that contain substantial amounts (i.e., 30 percent or more of the total species composition) of one or more of the following tree species: ponderosa pine, western larch, western white pine, and whitebark pine. Old growth stands are more resistant and resilient to disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. The size of old growth stands (or patches of multiple contiguous old growth stands) increase and they are well-distributed across the five Geographic Areas on the Forest.
		FW-DC-VEG-04 (FP, pg. 13). Tree densities and the number of canopy layers within stands are generally decreased.
		FW-DC-VEG-05 (FP, pg. 13). The pattern of forest conditions across the landscapes consists of a range of patch sizes that have a diversity of successional stages, densities, and compositions. Formerly extensive, homogenous patches of forests that are dominated by species and size classes that are very susceptible to disturbance agents have been diversified. Generally, there is an increase in the size of forest patches that are dominated by trees in the seedling/sapling size class, as well as in the large size class. There is a decrease in the size of the patches that are dominated by trees in the small and medium size classes.

Indicator	Description	Corresponding Forest Plan Component
MON-VEG-01-02: Acres burned	The number of acres that are burned on the Forest (both planned and unplanned) is an indicator of whether or not our desire (FW-DC-FIRE-03) is being met to have wildland fire play an increased role in helping to trend the vegetation conditions towards the desired conditions while serving important ecosystem functions.	FW-DC-FIRE-03 (FP, pg. 21). The use of wildland fire (both planned and unplanned ignitions) increases in many areas across the Forest. Fire plays an increased role in helping to trend the vegetation towards the desired conditions while serving other important ecosystem functions. However, when necessary to protect life, property and key resources, many wildfires are still suppressed.
MON-VEG-01-03: Acres of forest by dominance type (KIPZ DTGs) and size class compared to the desired condition	The number of acres of forest vegetation by KIPZ Dominance Type Groups (DTGs) and Size Class relative to the desired conditions that are expressed in the Forest Plan is directly related to the monitoring question. This indicator will demonstrate to what extent management activities and natural processes are trending the forest vegetation towards desired species composition measured by dominance types (FW-DC-VEG-01) and structure as measured by size class (FW-DC-VEG-02) of the forest vegetation.	FW-DC-VEG-01 (FP, pg. 11-12). The composition of the forest is within the desired ranges for the dominance groups on page 12 of the Forest Plan. More of the forest is dominated by western white pine, ponderosa pine, western larch, and whitebark pine. Conversely, less of the forest is dominated by grand fir, western hemlock, western redcedar, Douglas-fir, and subalpine fir. More hardwood trees occur in the forest such as quaking aspen, black cottonwood, and paper birch. FW-DC-VEG-02 (FP, pg. 12). The structure of the forest is within the desired ranges for the size classes on page 12 of the Forest Plan. More of the forest is dominated by stands occurring in the large class and less of the forest is dominated by stands that occur in the small and medium size classes.
MON-VEG-01-04: Acres meeting the old growth definition (see glossary of the Forest Plan) as determined by the FIA program	The FIA plot based old growth analysis provides a relatively inexpensive means to monitor old growth amounts across the Forest to determine if more old growth is developing over time as desired and articulated in the Forest Plan (FW-DC-VEG-03).	FW-DC-VEG-03 (FP, pg. 13). The amount of old growth increases at the forest-wide scale. At the finer scale of the biophysical setting, old growth amounts increase for the Warm/Dry and Warm/Moist settings while staying close to the current level for the Subalpine setting. Relative to other tree species, there is a greater increase in old growth stands that contain substantial amounts of one or more of the following tree species: ponderosa pine, western larch, western white pine, and whitebark pine. Old growth stands are more resistant and resilient to disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. The size of old growth stands (or patches of multiple contiguous old growth stands) increase and they are well-distributed across the five Geographic Areas on the Forest.

Indicator	Description	Corresponding Forest Plan Component
MON-VEG-01-05: Acres of old growth and acres of recruitment potential old growth, as determined by the Forests' stand inventory and mapping procedures	This monitoring indicator is necessary to spatially track old growth and recruitment potential old growth across the Forest. Unlike the FIA plot based old growth analysis (see MON-VEG-01-04), this stand level inventory and mapping procedure allows one to know where the old growth stands are spatially located on the Forest, and allows for the identification and tracking of recruitment potential old growth stands. For project planning at the site-specific scale, this information is very important, and it also provides another tool in addition to the FIA plot-based system in which to monitor how much and what kind of old growth exists across the Forest.	FW-DC-VEG-03 (FP, pg. 13). The amount of old growth increases at the forest-wide scale. At the finer scale of the biophysical setting, old growth amounts increase for the Warm/Dry and Warm/Moist settings while staying close to the current level for the Subalpine setting. Relative to other tree species, there is a greater increase in old growth stands that contain substantial amounts (i.e., 30 percent or more of the total species composition) of one or more of the following tree species: ponderosa pine, western larch, western white pine, and whitebark pine. Old growth stands are more resistant and resilient to disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. The size of old growth stands (or patches of multiple contiguous old growth stands) increase and they are well-distributed across the five Geographic Areas on the Forest.
MON-VEG-01-06: Acres of old growth treated	This monitoring indicator is needed to track how many acres of old growth stands were treated. FW-DC-VEG-03 includes the desired condition that old growth stands become more resistant and resilient towards disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. Some examples of treatments that may be used in old growth stands for the purpose of trending stands towards the desired conditions are included in the FEIS.	FW-DC-VEG-03 (FP, pg. 13). The amount of old growth increases at the forest-wide scale. At the finer scale of the biophysical setting, old growth amounts increase for the Warm/Dry and Warm/Moist settings while staying close to the current level for the Subalpine setting. Relative to other tree species, there is a greater increase in old growth stands that contain substantial amounts (i.e., 30 percent or more of the total species composition) of one or more of the following tree species: ponderosa pine, western larch, western white pine, and whitebark pine. Old growth stands are more resistant and resilient to disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. The size of old growth stands (or patches of multiple contiguous old growth stands) increase and they are well-distributed across the five Geographic Areas on the Forest.
MON-VEG-01-07: Snags per acre forest-wide	The number and size of snags on the Forest is directly related to how well the Forest is moving towards FW-DC-VEG-07 and FW-DC-WL-12.	FW-DC-VEG-07 (FP, pg. 13). Snags occur throughout the forest in an uneven pattern, provide a diversity of habitats for wildlife species, and contribute to the sustainability of snag dependent species. Snag numbers, sizes, and species vary by biophysical setting and dominance group. Page 13 of the Forest Plan displays the desired range of snag densities. Over time, the number of large-diameter snags (20 inches in DBH or greater) increases in all biophysical settings.
		FW-DC-WL-12 (FP, pg. 29). Trees and snags greater than 20 inches DBH are available throughout the Forest. Wildlife species associated with the warm/dry biophysical setting find large-diameter ponderosa pine, Douglas-fir, and other species of snags for nesting.

Indicator	Description	Corresponding Forest Plan Component
MON-VEG-01-08: Number of acres influenced by insects and disease	As indicated by the forest-wide desired condition plan component FW-DC-VEG-06, the desire is that root disease fungi and certain forest insects have less of an impact in killing trees in the future. Therefore, this indicator will be used to measure how management activities and natural disturbances affect the prevalence of some key forest insects and diseases. Acres of key I&Ds would be tracked, such as mountain pine beetle (killing LP and WP), Douglas-fir bark beetle, fir engraver, spruce bark beetle, white pine blister rust, and armillaria and laminated root diseases.	FW-DC-VEG-06 (FP, pg. 13). Root disease fungi, such as Armillaria and Phellinus, are killing fewer trees as the composition of the forest trends toward less susceptible tree species such as western larch, ponderosa pine, and western white pine. Forest insects, such as Douglas-fir bark beetle, mountain and western pine beetles, fir engraver beetle, and the western spruce budworm, are generally causing less tree mortality. Impacts from the non-native fungus that causes the white pine blister rust disease are reduced as the abundance of rust-resistant western white pine and whitebark pine increases.

Methods

This monitoring evaluation analyzes what extent are management activities implemented and natural disturbance processes occurring on the Kootenai National Forest are trending the forest toward desired conditions for vegetation composition, structure, and pattern for vegetation dominance types and size, old growth, down wood, snags, fire-killed forest, and insect- and disease-infested forest. These conditions are shown in the FEIS to increase resistance and resilience to disturbance, including climate change.

Table 5. MON-VEG-01 Indicators: How evaluated and analysis methods

Indicator	How evaluated (Monitoring Guide, pg. 19)	Analysis Methods (Monitoring Guide, pgs 12-18
MON-VEG-01-01: Acres treated towards achieving FW-OBJ-VEG-01	The number of acres that are treated to meet FW-OBJ-VEG-01 would be evaluated to determine how the Forest is progressing over time towards meeting the objectives noted in FW-OBJ-VEG-01. The desire is that over the life of the plan, at least the numbers noted in FW-OBJ-VEG-01 are treated.	Query FACTS for acres of appropriate treatment types that were accomplished.
MON-VEG-01-02: Acres burned	As articulated in FW-DC-FIRE-03, the desire is to increase the number of acres that are burned on the Forest in recognition that fire plays critical ecological functions and that not enough burning has occurred on the Forest in the recent past. Acres burned (both planned and unplanned) should be depicted over time and the desire is to see a trend of increased acres burned. In addition to reporting acres that burned via planned and unplanned ignitions, a qualitative discussion should address the effectiveness of these burned areas in helping to trend the forest vegetation towards desired conditions.	Query FACTS for acres of appropriate treatment types that were accomplished and run a report for acres burned via unplanned ignitions.
MON-VEG-01-03: Acres of forest by	The number of acres of forested vegetation by dominance type and size class should be	FIA plot data and established regional analysis tools would be used to estimate acres by KIPZ

Indicator	How evaluated (Monitoring Guide, pg. 19)	Analysis Methods (Monitoring Guide, pgs 12-18
dominance type and size class compared to the desired condition	illustrated and compared to the desired amounts and the trends noted. The desire is that over time, the acres within each dominance type and the acres within each size class will trend towards the desired conditions articulated in the Plan. As was done in the Plan, the information should be displayed two ways; for the Forest as a whole, and for each of the biophysical settings.	Dominance Type Groups and a comparison would be made relative to the desired condition that is presented in the Forest Plan. A similar analysis would be conducted for the Size Classes. The Region has standard analysis tools for FIA data using R1 FIA SDB.
MON-VEG-01-04: Acres meeting the old growth definition (see glossary of the Forest Plan) as determined by the FIA program	Old Growth will be assessed on each FIA plot so estimates of the number of acres that meet the definition of old growth on the Forest as well as the number of acres meeting the old growth in each Geographical Area (GA) can be determined. The goal is the amount will increase over time at both the Forest and GA scales.	FIA plot data and the established regional old growth definition are used to determine how many acres (and percent of total) of forested vegetation meet or exceed the minimum criteria that are used to define old growth.
MON-VEG-01-05: Acres of old growth and acres of recruitment potential old growth, as determined by the Forests' stand inventory and mapping procedures	Via the Forests' stand inventory and mapping procedures, the number of acres meeting the definition of old growth, and the number of acres that have been identified as recruitment potential old growth, would be displayed. The desire over time is to see the acres of both old growth and recruitment potential old growth to increase relative to existing amounts	Old Growth Status will be maintained in FSVeg Spatial for stands that are determined to meet Old Growth minimum criteria or will be managed as recruitment potential old growth. Old growth can be determined using Common Stand Exam protocols, loading data into FSVeg, and applying the Green et al 1992 (errata corrected 12/11) Old Growth definition to the inventory data or by walk-through reconnaissance. Compare forest-wide layer, derived from FSVeg Spatial Old Growth Status to earlier version(s) and summarize increased/decreased acres by old growth and recruitment potential old growth.
MON-VEG-01-06: Acres of old growth treated	In the Plan and the FEIS there is an acknowledgement that some types of old growth require disturbances to maintain their structure, composition, and function. Relative to current levels, the desire is to see more stands and acres treated of old growth (in appropriate circumstances) over time in order to maintain them.	A query of FACTS treatment activities that have occurred within FSVeg Spatial stands where Old Growth Status indicates Old growth or potential recruitment old growth within the 2-year reporting interval.
MON-VEG-01-07: Snags per acre forest-wide	Using FIA plot data, the number of snags/acre in two size classes (i.e. >15" and >20" DBH) that occur on the Forest are reported by Snag Analysis Groups. Over time, the desire is to see the number of these larger snags per acre increase.	FIA plot information will be used to derive estimates of snags and live large trees by Snag Analysis Groups. These estimates are delivered in an R1 Report: Estimates of Snag and Live-Tree Densities for Western Montana produced on a 5-year cycle. Note: Snag Analysis Groups are defined in the reports and *are not aligned* with the KIPZ DTGs or BPS.
MON-VEG-01-08: Number of acres influenced by insects and disease	Using datasets provided by FHP, display the acres of hazard by different common forest insects and diseases. The desire is to see the hazard rating lower over time as treatments designed to reduce insect and diseases occurs.	The acreage numbers will be tracked by insect or disease of concern and the hazard rating level on a 5 year cycle. The desire is to see the hazards lower over time.

Performance Indicator 1: Acres treated towards achieving FW-OBJ-VEG-01

The measure and analysis of this indicator is actual acres treated on the forest to increase forest resistance and resiliency. The Monitoring Guide (pgs. 10-11) notes the Forest Service Activity Tracking System (FACTS) as the database standard with the information to do the data collection and analysis for this indicator. Report utilized for data was pulled on February 5, 2021 by Matt Bienkowski. This is summarized in Table 4 and Table 5.

Performance Indicator 2: Acres Burned

The measure and analysis of this indicator is acres burned by planned and unplanned ignitions across the forest as described in FW-DC-FIRE-0 (use of wildland fire, FP, pg. 22). Planned ignitions are those set intentionally for management purposes. Unplanned ignitions are wildfires from an unplanned event such as lightning or accidental human-caused. For planned ignitions, the intent is to include the acres of broadcast burning and under-burning as part of this indicator, rather than include burn activities such as grapple piling or hand-pile burning (Monitoring Guide, pgs. 12-13).

For consistency in analysis, interpretation, and reporting across multiple resources, data was used as compiled in the R1 BSMS Fire Reports SharePoint site for this analysis. Fire Management data for planned and unplanned ignitions is found in FP_FUELS_ALL_12_09_2020_2016to2020 as shared by the KNF Forest Fuels Planner (Jacob Jeresek) and interpreted by the KNF Forest Wildlife Program Manager (Jeremy Anderson). Corresponding Fire Management treatments and activities are in tables 6-7 for this analysis.

Performance Indicator 3: Acres of forest by KIPZ Dominance Type Groups and Size Class compared to the desired condition

The measure and analysis of this indicator is the acres of forest by KIPZ Dominance Type Groups and Size Classes as shown in FW-DC-VEG-01 (forest composition) and FW-DC-VEG-02 (forest structure) (FP, pgs. 11-12). Dominance types describe the tree species composition within a stand. The existing dominant tree species or species groups are aggregated for the forest by KIPZ Biophysical Setting. These groups are ponderosa pine, Douglas-fir, lodgepole pine, western larch, grand fir/western red cedar/western hemlock mix, western white pine, subalpine fir mix, and hardwood mix. Size class defines the average diameter (DBH) of trees within a stand and are grouped into four diameter classes: seedling/sapling (0-4.6 inch DBH), small (5.0-9.0 inch DBH), medium (10.0-14.9 inch DBH), and large (15.0+ inch DBH). Size class is also aggregated for the forest by KIPZ biophysical settings.

The KIPZ Dominance Type Groups (KIPZ DTG) and KIPZ Biophysical Settings (KIPZ BPS) are defined in the Region 1 Existing and Potential Vegetation Groupings used for Broad-level Analysis based on information in the Kootenai Forest Plan. KIPZ DTG, KIPZ BPS, and Size Class are attributed for each FIA plot and available for analysis in the R1 FIA Summary Database. The R1 FIA Summary Database and Estimator Form were used to derive estimates of composition (KIPZ DTGs) and structure (Size Class) and estimates of these attributes by biophysical settings (KIPZ BPS). These were then compared to the baseline conditions and the desired condition in the Forest Plan (Monitoring Guide, pg. 13).

Baseline forest composition condition, as expressed by KIPZ DTGs and Size Class, for the Forest Plan was analyzed in the FEIS (pgs. 65-67) (FEIS, pgs. 72-74). Both components are summarized by KIPZ BPS (FEIS, 88-94). In the plan, the composition and structure of the forest vegetation (lifeform, KIPZ DTG, size class, tree canopy cover class) was assessed using both R1-Vmap a spatial depiction of existing vegetation derived from remote sensing and FIA) (FEIS, pg. 52).

Corresponding composition and structure analysis for this report are in table 8 and figures 1-8 Analysis methods and results for composition and size class in the Forest Plan are in the FP FEIS Appendices (pgs. 11-13, 36-37). The Northern Region Inventory and Analysis SharePoint site provides additional

information regarding general R1 analysis using FIA data background and methods and the classifications used in R1 with inventory data.

Performance Indicator 4: Acres meeting the old growth definition as determined by the FIA program

The measure and analysis of this indicator is the total forested old growth acres on the Forest and by geographic areas (GAs) across the Forest using Green et al. 1992 (errata corrected 12/11) for meeting the definition and criteria for old growth. Old growth forests are considered ecosystems distinguished by old trees and related structural attributes. They encompass the later stages of stand development, typically differing from earlier stages in characteristics such as tree age, tree size, number of large trees per acre, and basal area (Monitoring Guide, pgs. 13-14).

The KIPZ Dominance Type Groups (KIPZ DTG) and KIPZ Biophysical Settings (KIPZ BPS) are defined in the *Region 1 Existing and Potential Vegetation Groupings used for Broad-level Analysis* based on information in the Kootenai Forest Plan. They were used to determine how many acres (and percent of total) of forested vegetation meet or exceed the minimum criteria that are used to define old growth:

- Acres and Percent - Old Growth Algorithm is defined in Old Growth Forest Types of the Northern Region, (Green et Al). If a plot meets old growth minimum criteria based on old growth habitat type group, species or species group with plurality of basal area 9"+ dbh, plot basal area, and the number of trees above diameter and age thresholds as defined in the document. 1 indicates plot meets minimum old growth criteria, 0 indicated plot does not meet criteria.

Old growth analysis conducted for the 2015 forest plan revision is explained in the FEIS (pgs. 75-80). Analysis for corresponding old growth acreage estimates in this report are in table 9.

Performance Indicator 5: Acres of old growth and acres of recruitment potential old growth, as determined by the Forests' stand inventory and mapping procedures

The measure and analysis of this indicator is acres of old growth and acres of recruitment potential old growth, as determined by the Forests' stand inventory and mapping procedures. Recruitment potential old growth (RPOG) is defined in the glossary to the Forest Plan and the glossary in the Forest Plan FEIS. The Forest Vegetation section in the FEIS contains an old growth section (pgs. 74-80) providing more information on the Forests' stand inventory and mapping procedures R1 Common Stand Exam (CSE) Old Growth Protocols or walk-through reconnaissance is used to identify old growth and recruitment potential old growth stands. Old Growth Status of a stand, method of field assessment, and date of reconnaissance is stored in FSVeg Spatial. A forest-wide GIS coverage, derived from FSVeg Spatial Old Growth Status, depicting existing old growth and recruitment potential old growth is then created. Along with the GIS coverage, there will be field survey data and stand designations stored in FACTS and FSVeg Spatial (Monitoring Guide, pgs. 14-15

The process used for extracting FSVeg Spatial attributes using the Geospatial Interface, and ArcGIS NRM application available via Citrix which displays current old growth status, method, and date is in Geospatial Interface Content: FSVeg and FSVeg Spatial, Bush and Kirkeminde, 2020 (pgs. 3-11). Subsequent attribute tables were exported to Excel and filtered to the relevant data for this analysis. Analysis for corresponding old growth and recruitment potential old growth acreage estimates are in table 10.

Performance Indicator 6: Acres of old growth treated

The measure and analysis of this indicator is the actual acres of old growth treated on the Forest by vegetation management, including planned ignitions and mechanical means. Old growth stands may be treated with a management activity such as harvest, and/or burning. Some examples of treatments that may be used in old growth stands for the purpose of trending stands towards the desired conditions are included in the Forest Plan FEIS (pgs. 78-79). FSVeg Spatial and the FACTS databases contain the

necessary information to reporting how many acres of old growth have been treated. The treatment would be recorded in the Forest service ACtivity Tracking System (FACTS) and old growth stands are indicated as such in FSVeg Spatial (Monitoring Guide, pgs. 15-16).

The forest has a process established called the 2015 Forest Plan Old Growth Inventory, Monitoring, and Management white paper on the KNF SharePoint. This plan provides:

- Forest Plan direction specific to old growth resources
- Forest-wide old growth spatial data information
    - Including the process and tracking forms for making changes to the forest-wide old growth spatial data
- Old growth management (any management activity that could change old growth or recruitment potential old growth characteristics such as burning, slashing, thinning, etc.)
    - Including required documentation for approving vegetation management activities in old growth or recruitment potential old growth, and monitoring of effects of treatments.
- Information for documenting old growth in project level analyses

The Northern Region Inventory and Analysis SharePoint site provides additional information for R1 Old Growth Classification and that regarding general R1 FSVeg Spatial background and methods, including for old growth. Information on FACTS is on the R1 FACTS SharePoint, the FACTS Program Area Business Documents and FACTS Support (Documentation Tab) of the Natural Resource Manager (NRM) Forest Service Intranet, and the public NRM site which also includes information on Field Sampled Vegetation (FSVeg) and FSVeg Spatial. Analysis for corresponding old growth acreage estimates are in table 11.

Performance Indicator 7: Snags per acre forest-wide

The measure and analysis of this indicator is number of snags per acre forest wide. This indicator utilizes FIA plot data and identifies the number of snags per acre in two size classes (>15" and >20" DBH) occurring on the Forest. Regionally provided reports are used to monitor snag densities by Snag Analysis Groups for the Forest and inside wilderness/roadless and outside wilderness/roadless using established regional protocols.

The original snag density report for western Montana, provides estimates based on FIA data collected in a periodic fashion throughout the 1990's (Bollenbacher et.al. 2009). A more recent report based on a more recent set of FIA data collected on the Kootenai NF (Hybrid 2011 FIA Dataset) is now available (Bush and Reyes 2017). This report contains estimates of snag densities and live trees, derived in a consistent manner, with the previous reports, using the most recent FIA data available for the Region. This analysis enables the Forests of Region 1 to monitor snags and live trees over time at the broad-level and adaptively manage project-level considerations, such as snag density and distribution changes over time. It should be noted that the Snag Analysis Groups that are defined in these reports are not the same as KIPZ DTGs or KIPZ BPSs used in other sections of this report.

Information in the latest report (Monitoring Guide, pg. 16) are compared to the desired condition in the Forest Plan in table 12.

Performance Indicator 8: Number of acres influenced by insects and disease

The performance indicator is not one that can easily be answered, because the primary method to gather that data was planned to be Forest Health Protection Aerial Detection Surveys, unfortunately those surveys have been extremely inconsistent in recent years due to pandemic issues, wildfires, and time and availability of qualified personnel and aircraft. High risk portions of the forest have been surveyed, but

this leads to skewed data if the entire forest has not been surveyed. Since there is no baseline data set to compare to, the Forest has chosen to display the number of acres of forested vegetation that are at risk to common insects and diseases.

The Northern Region Inventory and Analysis SharePoint site provides additional information regarding R1 Insect Hazard Ratings as well as general R1 Analysis Using FIA Data and R1 FSVeg Spatial background and methods.

For consistency in analysis, interpretation, and reporting across multiple forests in the Northern Region, this analysis was completed with data compiled, summarized by acreage and causal agent, and provided by FHP staff via the R1 BSMS Forested Vegetation Hybrid Reports Pinyon Box site:

- FHP_Attributes_Table
- FHP_Output_Table

Analysis for acres at risk to be influenced by insects and disease are in table 16. The 2019 Revised R1 Forest Insect Hazard Rating System User Guide for use with Inventory Data Stored in FSVeg and/or Analyzed with the Forest Vegetation Simulator (FVS) explains FHP protocols. The R1 Broad Scale Monitoring FIA Estimates on the Northern Region Inventory and Analysis SharePoint site provides additional information and also links to the reports, including the R1 BSMS Report for Forested Vegetation. This report includes an overview of FIA data used in the analysis, a summary of the dataset, the classifications used in the reports, analysis techniques (methods), and links to reports used in analysis of this indicator.

Results

MON-VEG-01-01

Table 6. Monitoring Indicator for MON-VEG-01-01: Treatment Acres by Activity and Year moving towards FW-OBJ-VEG-01 – Forest Resilience (2015-2020)

	2016		2017		2018		2019		2020	
Activities	**Acres Increasing Early Seral Representation**	**Acres Maintaining / Improving Forest Resilience**	**Acres Increasing Early Seral Representation**	**Acres Maintaining / Improving Forest Resilience**	**Acres Increasing Early Seral Representation**	**Acres Maintaining / Improving Forest Resilience**	**Acres Increasing Early Seral Representation**	**Acres Maintaining / Improving Forest Resilience**	**Acres Increasing Early Seral Representation**	**Acres Maintaining / Improving Forest Resilience**
Regen & Interm Harvest	---	1,766	---	4,674	---	5,406	---	4,673	---	5,518
Planting	891	891	1,039	1,039	1,237	1,237	2,130	2,130	1,657	1,657
Site Prep	---	1,255	---	860	---	375	---	872	---	351
Natural Regen	---	272	---	320	---	19,849	---	186	---	402
PCT	928	928	1,805	1,805	1,030	1,030	---	0	932	932
Pruning	610	610	429	429	396	396	78	78	202	202
Planned Ignitions	---	3,757	---	3,230	---	2,915	---	4,153	---	2,838
Unplanned Ignitions	---	8,498	---	1,049	---	91,112	---	5,240	---	0
Crushing/ Chipping	---	0	---	0	---	0	---	116	---	37
Native Sp. Seeding	---	0	---	0	---	0	---	28	---	0
Intgrt Tree Improv	449	449	368	368	109	109	135	135	556	556
Invasive Treat & Restoration	---	3,557	---	3,885	---	3,418	---	3,260	---	2,919
Fuels Thinning	---	2,642	---	3,028	---	2,718	---	3,750	---	2,162
Mechanical Fuels	---	3,153	---	3,030	---	2,474	---	8,147	---	6,792
Totals	2,878	27,778	3,641	23,717	2,772	131,039	2,343	32,768	3,347	24,409

Table 7. Monitoring Indicator for MON-VEG-01-01: Total Acres Treated moving Towards FW-OBJ-VEG-01 – Forest Resilience (2016-2020)

Treatment/Activities	Totals (2016-2020) Acres Increasing Early Seral Representation	Totals (2016-2020) Acres Maintaining/ Improving Forest Resilience
Timber Harvest – Regeneration & Intermediate Harvest	---	22,307
Reforestation – Planting	6,451	6,451
Reforestation – Site Prep	---	3,713
Reforestation – Natural Regen/Natural Recovery	---	21,029
Stand Improvement – Precommercial Thinning	4,695	4,695
Stand Improvement – Pruning	1,714	1,714
Fire Management – Planned Ignitions	---	16,893
Fire Management – Natural, Unplanned Ignitions	---	105,899
Fire Management – Crushing/Chipping	---	153
Fire Management – Machine Pile/Whole Tree Yarding	---	23,595
Fire Management – Fuels Thinning	---	14,300
Re-Vegetation with Native Species	---	28
Integrated Tree Improvement Activities	1,659	1,659
Non-Native Invasive Plant Treatments – Sites Treated & Restored	---	17,038
Total	14,519	239,204

All planting acres are included in both metrics (Acres Increasing Early Seral Representation and Acres Maintaining/Improving Forest Resilience) as most seedlings planted are early seral species. Precommercial thinning (PCT) acres are included in the total for "Acres Maintaining/Improving Forest Resilience" as they generally prefer retaining early seral species over other species. White pine blister rust pruning is included in both metrics since most this work occurs in white pine stands, an early seral species. Integrated Tree Improvement Activities include selective breeding, seed orchard work, select trees, Seed Production Areas (SPA), seed zones, and other vegetative material collections. These activities were filtered by seral species (ponderosa pine, western white pine, western larch, and whitebark pine) also including hardwoods, noted in the Forest Plan as desirable along with seral species. Seral and hardwood species are included in first metric; all species are included in second metric.

Overall, confidence in the quantity and quality of the data collected is high, in terms of both accuracy and precision given the national and regional protocols and standards for collection, entry, and tracking. We continue to strive for timely data entry, but the large amount of data entered annually and turnover in key positions could be sources of some data errors. This is a very small percentage and does not affect the general status or data trends.

MON-VEG-01-02:

Table 8. Monitoring Indicator for MON-VEG-01-02: Acres Burned (Planned and Unplanned Ignitions) by Year

	2016	2017	2018	2019	2020	Total Acres
Total acres of natural unplanned ignitions	15	72,008	12,987	14	5	85,029
Total acres of planned ignitions	3,757	3,230	2,915	4,153	0*	14,055
Total Acres	3,772	75,238	15,902	4,167	5	99,084

* - no prescribed burning due to Covid-19 precautions

Table 9. Monitoring Indicator for MON-VEG-01-02 Acres Burned (Planned and Unplanned Ignitions) by Year that Trend Vegetation Conditions Towards Desired Conditions

	2016	2017	2018	2019	2020	Total Acres
Total acres of natural unplanned ignitions trending towards KNF Desired Conditions	15	47,307	11,339	0	0	58,661
Total acres of planned ignitions	3,757	3,230	2,915	4,153	0*	14,055
Total Acres	3,772	50,537	14,254	4,153	0	72,716

* - no prescribed burning due to Covid-19 precautions

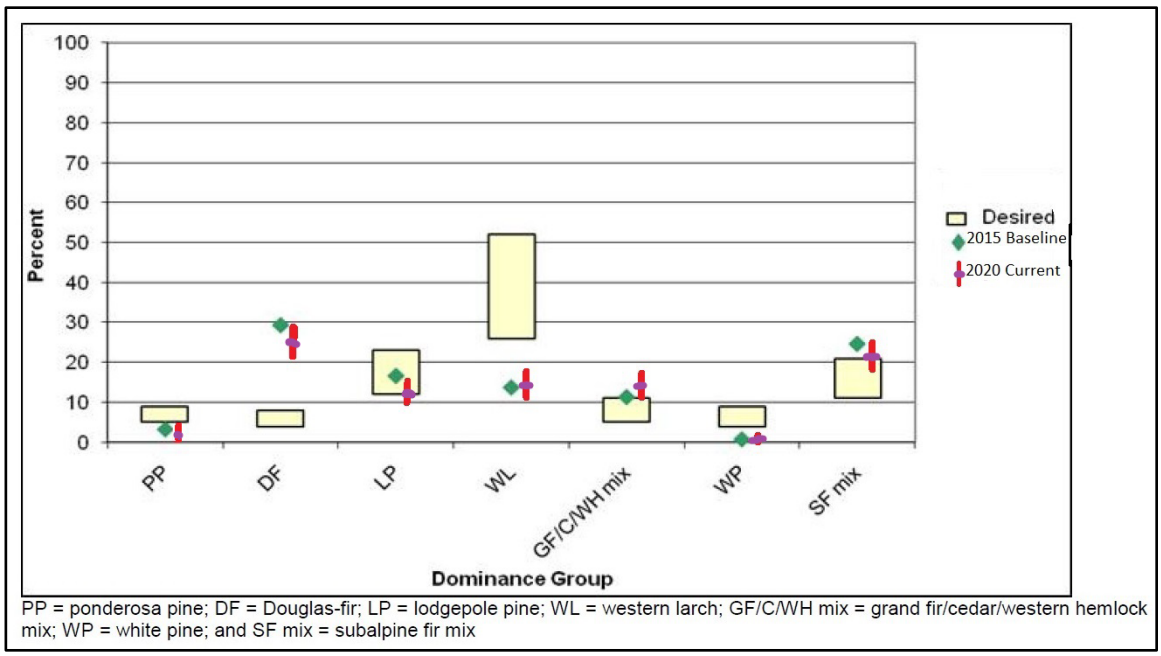
Overall, confidence in the quantity and quality of the data collected is high, in terms of both accuracy and precision given the national and regional protocols and standards for collection, entry, and tracking. We continue to strive for timely data entry, but the large amount of data entered annually could be a source of some data errors. This is a very small percentage and does not affect the general status or data trends.

There is no summary trend table, as there are no numeric targets for this indicator or corresponding quantitative desired condition (FW-DC-FIRE-03; FP, pg. 21).

MON-VEG-01-03:

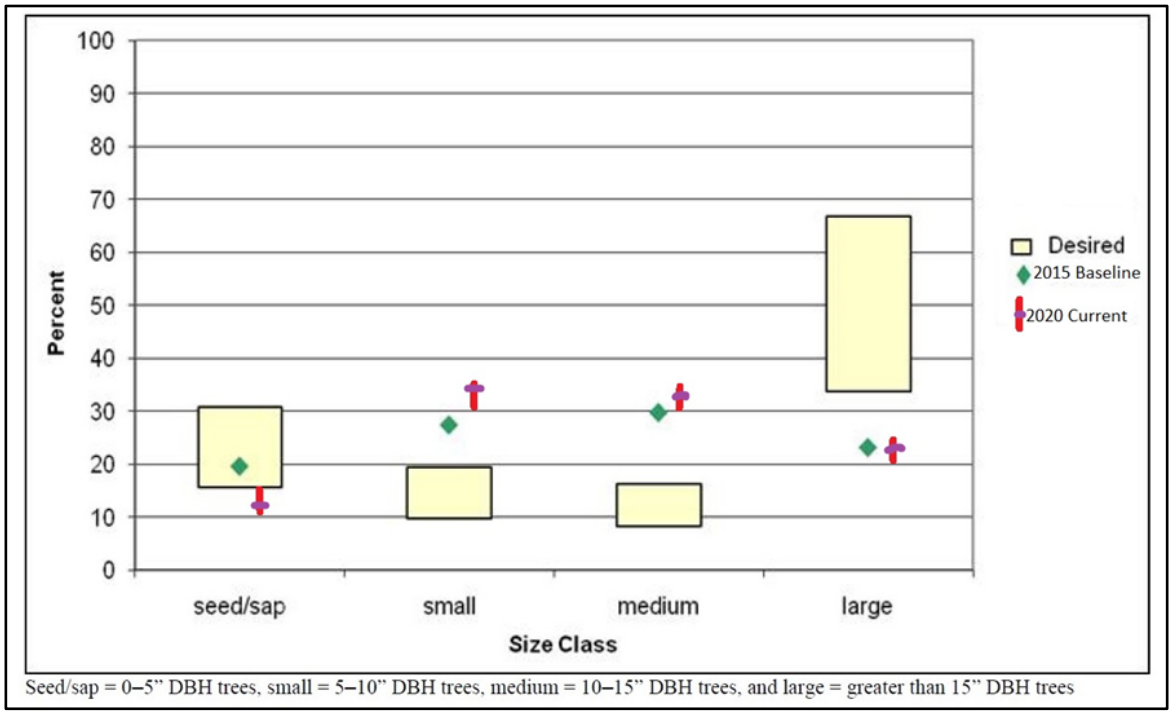
Table 10. Monitoring Indicator for MON-VEG-01-03 Current percent of the Forest by KIPZ DTG and size class compared to 2015 baseline and desired composition. All Forested KNF Acres (FP pg. 11-12)

	Dominance Types and Size Classes	Desired Composition Percent Range	2015 Baseline Composition Percent Mean	2020 Current Composition Percent Mean	2020 Current Composition 90th Percentile Confidence Interval	Desired Size Class Percent Range	2015 Baseline Size Class Percent Mean	2020 Current Size Class Percent Mean	2020 Current Size Class 90th Percentile Confidence Interval
KIPZ Dominance Type Groups	Ponderosa Pine	5-9%	3%	2%	1-4%				
	Douglas-fir	4-8%	29%	25%	22-29%				
	Lodgepole Pine	12-23%	16%	12%	10-15%				
	Western Larch	26-52%	14%	15%	12-17%				
	Fir/Cedar/Hemlock Mix	5-11%	11%	15%	12-17%				
	Western White Pine	4-9%	1%	1%	0-1%				
	Subalpine Fir Mix	11-21%	25%	21%	18-24%				
Size Class	Seedling/Sapling (0-5" DBH)					16-31%	20%	13%	11-14%
	Small (5-10" DBH)					10-19%	28%	34%	31-34%
	Medium (10-15" DBH)					8-16%	30%	33%	31-34%
	Large (>15" DBH)					15-30%	23%	22%	21-24%



PP = ponderosa pine; DF = Douglas-fir; LP = lodgepole pine; WL = western larch; GF/C/WH mix = grand fir/cedar/western hemlock mix; WP = white pine; and SF mix = subalpine fir mix

Figure 1. Desired, Baseline 2015, and Current (2020) composition by KIPZ Dominance Type Group at the Forestwide Scale

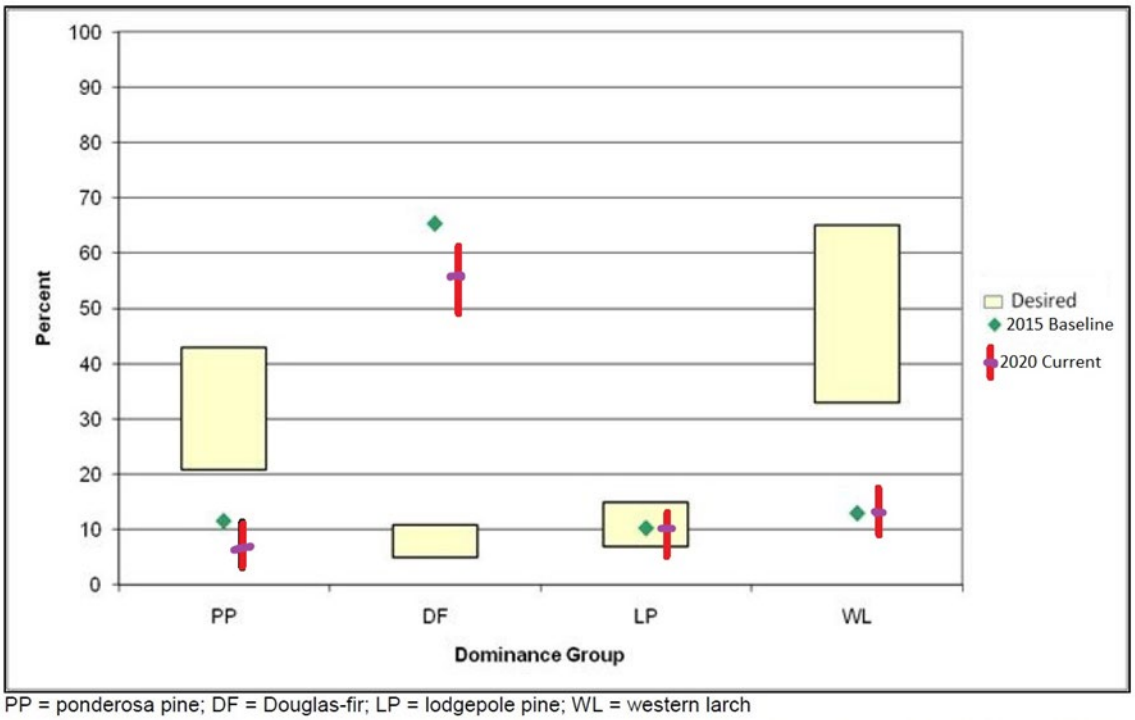


Seed/sap = 0–5" DBH trees, small = 5–10" DBH trees, medium = 10–15" DBH trees, and large = greater than 15" DBH trees

Figure 2. Desired, Baseline 2015, and Current (2020) Forest Structure by Size Classes at the Forestwide Scale

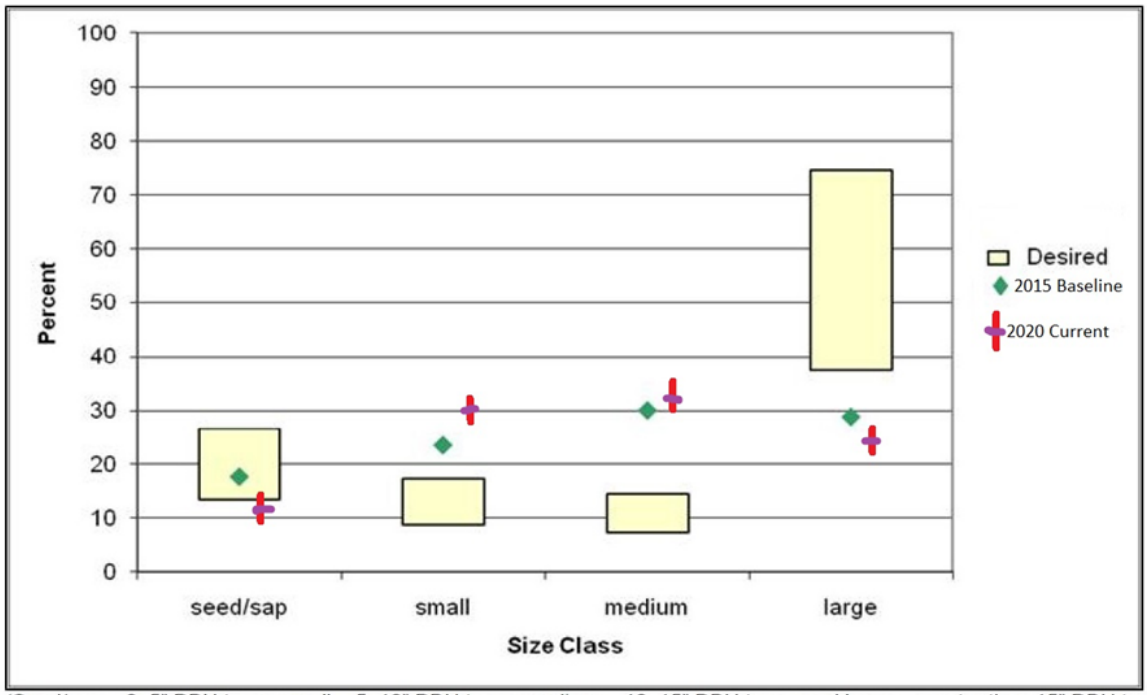
Table 11. Monitoring Indicator for MON-VEG-01-03 Current percent of the Warm/Dry Biophysical Setting by KIPZ DTG and size class compared to 2015 baseline and desired composition. KNF Warm/Dry Biophysical Setting (FP pg. 14-15)

	Dominance Types and Size Classes	Desired Composition Percent Range	2015 Baseline Composition Percent Mean	2020 Current Composition Percent Mean	2020 Current Composition 90th Percentile Confidence Interval	Desired Size Class Percent Range	2015 Baseline Size Class Percent Mean	2020 Current Size Class Percent Mean	2020 Current Size Class 90th Percentile Confidence Interval
KIPZ Dominance Type Groups	Ponderosa pine	21-43%	11%	7%	4-11%				
	Douglas-fir	5-11%	65%	56%	49-62%				
	Lodgepole pine	7-15%	10%	10%	6-14%				
	Western larch	32-65%	12%	13%	9-17%				
Size Class	Seedling/Sapling (0-5” DBH)					13-27%	18%	12%	9-14%
	Small (5-10” DBH)					9-17%	23%	30%	28-33%
	Medium (10-15” DBH)					7-15%	30%	32%	30-36%
	Large (>15” DBH)					37-74%	29%	25%	23-27%



PP = ponderosa pine; DF = Douglas-fir; LP = lodgepole pine; WL = western larch

Figure 3. Desired, Baseline 2015, and Current (2020) Forest Composition by KIPZ Dominance Type Group for the Warm/Dry Biophysical Setting



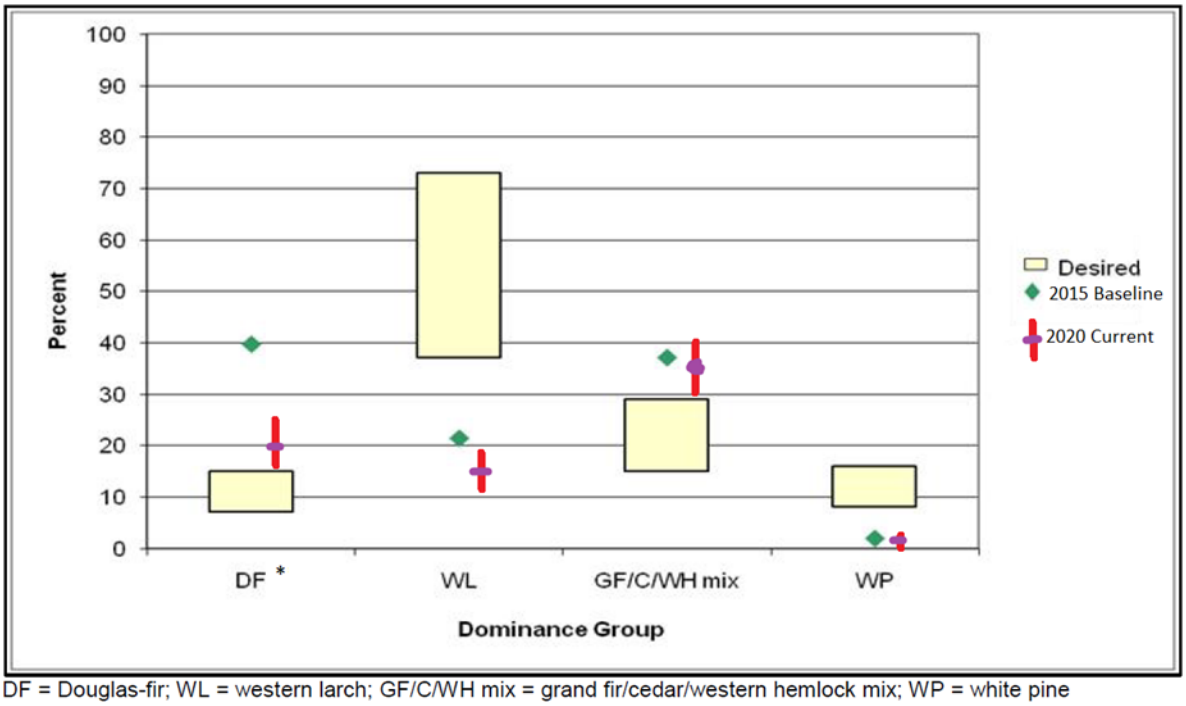
(Seed/sap = 0–5" DBH trees, small = 5–10" DBH trees, medium = 10–15" DBH trees, and large = greater than 15" DBH trees.)

Figure 4. Desired, Baseline 2015, and Current (2020) Forest Structure by Size Class for the Warm/Dry Biophysical Setting

Table 12. Monitoring Indicator for MON-VEG-01-03 Current percent of the Warm/Moist Biophysical Setting by KIPZ DTG and size class compared to 2015 baseline and desired composition. KNF Warm/Moist Biophysical Setting (FP pg. 15-16)

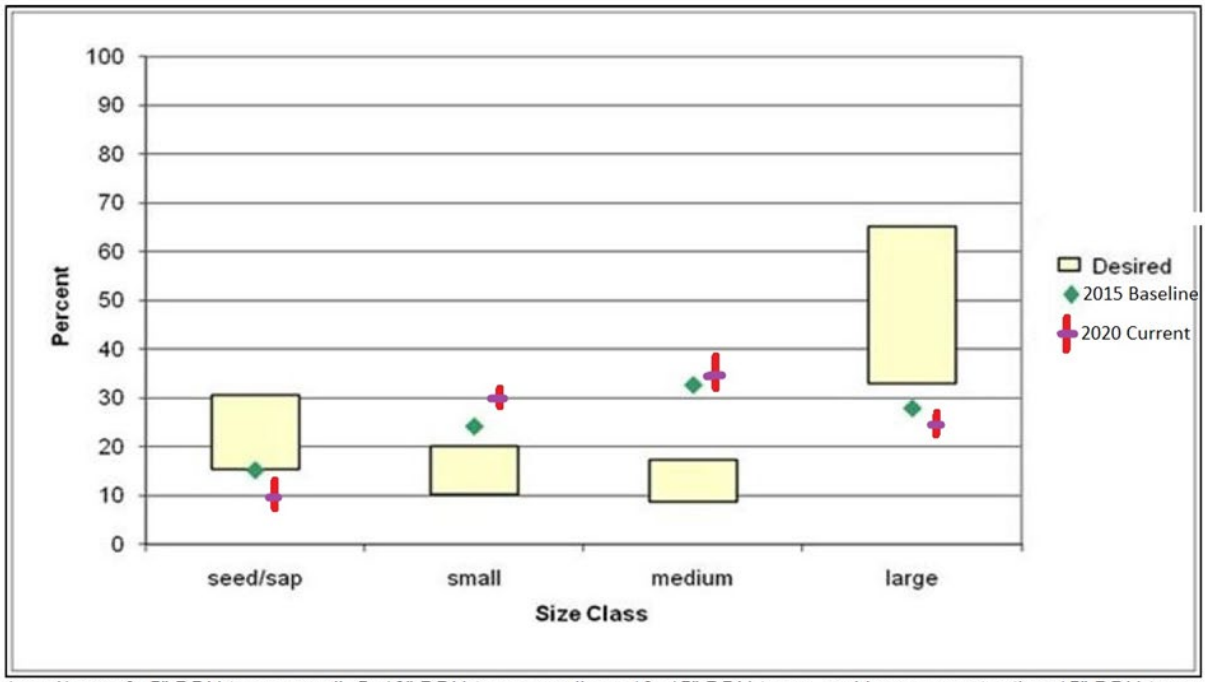
	Dominance Types and Size Classes	Desired Composition Percent Range	2015 Baseline Composition Percent Mean	2020 Current Composition Percent Mean	2020 Current Composition 90th Percentile Confidence Interval	Desired Size Class Percent Range	2015 Baseline Size Class Percent Mean	2020 Current Size Class Percent Mean	2020 Current Size Class 90th Percentile Confidence Interval
KIPZ Dominance Type Groups	Douglas-fir	7-15%	40%	20%	16-25%				
	Western larch	38-72%	22%	15%	12-19%				
	Lodgepole pine*	---	---	12%	8-16%				
	Fir/Cedar/ Hemlock Mix	15-29%	38%	35%	30-40%				
	Western white pine	8-16%	2%	1%	0-2%				
	Subalpine fir mix*	---	---	12%	9-16%				
Size Class	Seedling/Sapling (0-5" DBH)					15-31%	15%	10%	7-12%
	Small (5-10" DBH)					10-20%	24%	30%	29-32%
	Medium (10-15" DBH)					9-18%	32%	35%	32-39%
	Large (>15" DBH)					32-65%	28%	25%	23-27%

*Lodgepole pine and subalpine fir mix are included in the 2020 data as their own dominance type group. There is not baseline or desired composition range as they are not desired within this biophysical setting and the desire is to move these into other dominance groups over the life of the plan.



DF = Douglas-fir; WL = western larch; GF/C/WH mix = grand fir/cedar/western hemlock mix; WP = white pine

Figure 5. Desired, Baseline 2015, and Current (2020) Forest Composition by KIPZ Dominance Type Group for the Warm/Moist Biophysical Setting

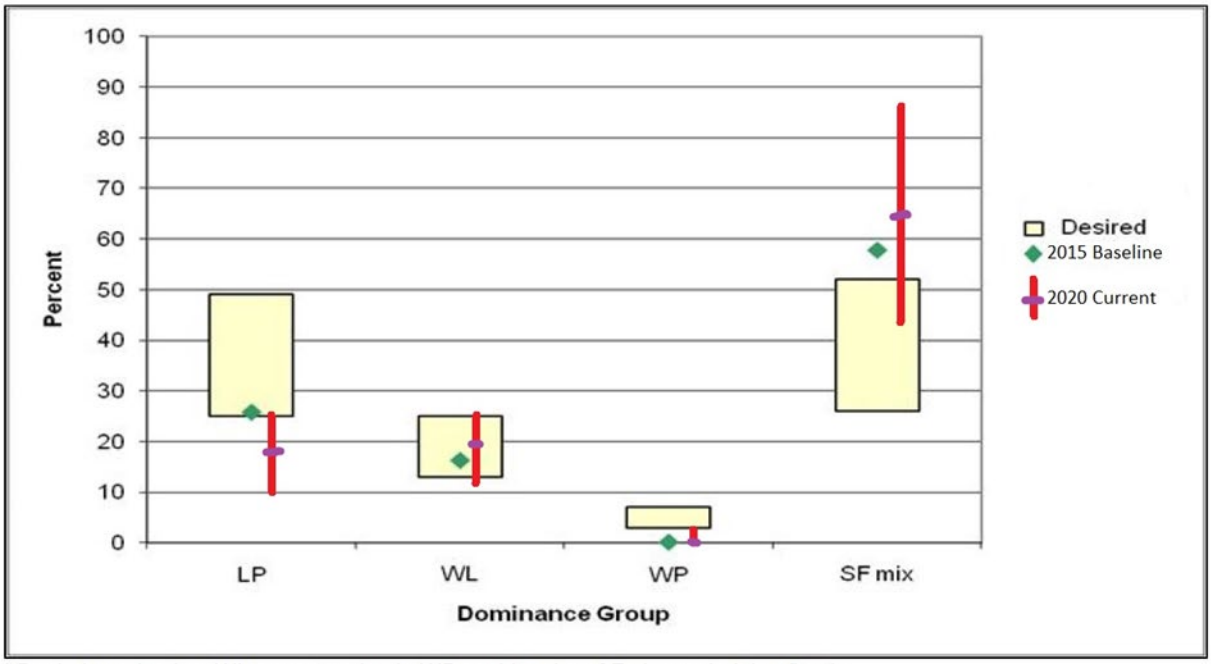


(seed/sap= 0–5" DBH trees, small=5–10" DBH trees, medium=10–15" DBH trees, and large= greater than15" DBH trees.)

Figure 6. Desired, Baseline 2015, and Current (2020) Forest Structure by Size Class for the Warm/Moist Biophysical Setting

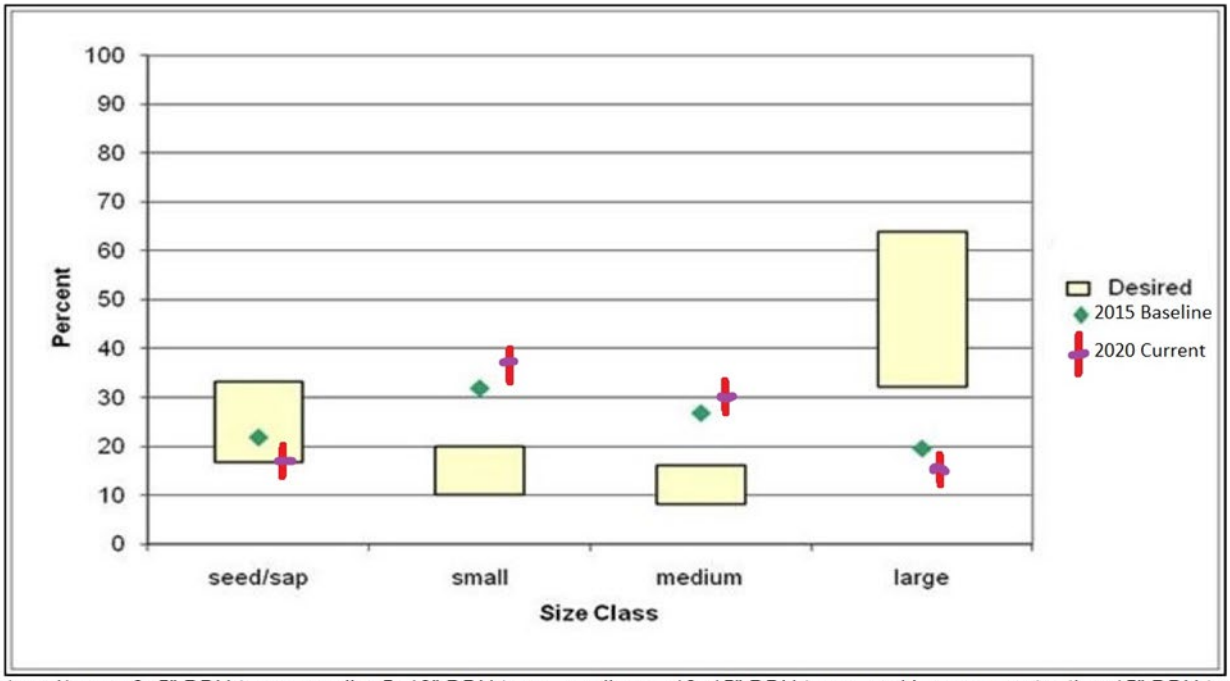
Table 13. Monitoring Indicator for MON-VEG-01-03 Current percent of the Subalpine Biophysical Setting by KIPZ dominance type group and size class compared to 2015 baseline and desired composition. KNF Subalpine Biophysical Setting (FP pg. 17)

	Dominance Types and Size Classes	Desired Composition Percent Range	2015 Baseline Composition Percent Mean	Current 2020 Composition Percent Mean	Current 2020 Composition 90th Percentile Confidence Interval	Desired Size Class Percent Range	2015 Baseline Size Class Percent Mean	Current 2020 Size Class Percent Mean	Current 2020 Size Class 90th Percentile Confidence Interval
KIPZ Dominance Type Groups	Lodgepole pine	25-49%	26%	17%	10-25%				
	Western larch	12-25%	15%	19%	12-26%				
	Western white pine	4-8%	0%	0%	0-1%				
	Subalpine fir mix	26-52%	58%	64%	44-87%				
Size Class	Seedling/Sapling (0-5" DBH)					17-33%	22%	17%	15-20%
	Small (5-10" DBH)					10-20%	32%	37%	34-40%
	Medium (10-15" DBH)					8-17%	28%	30%	28-33%
	Large (>15" DBH)					32-64%	20%	16%	12-18%



LP = lodgepole pine; WL = western larch; WP = white pine; SFmix = subalpine fir mix

Figure 7. Desired, Baseline 2015, and Current (2020) Forest Composition by KIPZ Dominance Type Group for the Subalpine Biophysical Setting



(seed/sap = 0–5" DBH trees, small = 5–10" DBH trees, medium = 10–15" DBH trees, and large = greater than15" DBH trees.)

Figure 8. Desired, Baseline 2015, and Current (2020) Forest Structure by Size Class for the Subalpine Biophysical Setting

Due to the short time interval between the re-measurements of the data, for all forested KNF acres, there has not been much change in estimates of KIPZ dominance type groups from 2015 to 2020:

- Ponderosa Pine is moving slightly away from the desired condition,
- Douglas-fir is slightly towards the desired condition,
- Lodgepole Pine is within the desired condition,
- Western Larch is moving slightly towards the desired condition,
- Grand Fir/Cedar/Western Hemlock Mix is moving slightly away from the desired condition,
- Spruce/Fir mix has moved slightly towards the desired condition range.

For the Warm/Dry Biophysical Setting dominance group composition:

- Ponderosa Pine is moving slightly away from the desired condition,
- Douglas-fir has moved towards the desired condition,
- Lodgepole Pine is within the desired condition range,
- Western Larch has moved slightly towards the desired condition.

For the Warm/Moist Biophysical Setting dominance group composition:

- Douglas-fir is undetermined (see footnotes),
- Western Larch is moving slightly away from the desired condition,
- Grand Fir/Cedar/Western Hemlock Mix is moving towards the desired condition,
- White Pine has no change to from the baseline.

For the Subalpine Biophysical Setting dominance group composition:

- Lodgepole Pine has moved outside the desired condition,
- Western Larch is within the desired condition,
- White Pine has no change from the baseline,
- Spruce/Fir Mix is still greater than the desired condition, moving slightly away from the desired range.

Confidence in the accuracy of species composition data is high, given the regional standards for collection and analysis. The precision of this data compared to the forest plan baseline and desired conditions is also high. The metrics of the regional dataset correspond to those used in the forest plan analysis. Note that the Warm/Moist forest type includes estimates for lodgepole pine and subalpine fir mix dominance type groups however, there are no desired conditions for these groups within the BPS in the plan because these dominance types should be converted to more preferred species mixes within this BPS. These are in the 2020 reports and will continue to be in future reports if they occur.

For all forested KNF acres size classes, there has not been much change in any class from 2015-2020:

- Seedling/Sapling (0-5” DBH) is moving slightly away from the desired condition,
- Small (5-10” DBH) is moving away from the desired condition,
- Medium (10-15” DBH) is moving slightly away from the desired condition,
- Large (>15” DBH) is similar to the baseline.

For the Warm/Dry Biophysical Setting size classes:

- Seedling/Sapling (0-5” DBH) is slightly below desired condition range,
- Small (5-10” DBH) is moving slightly away from the desired condition,
- Medium (10-15” DBH) is moving slightly away from the desired condition,
- Large (>15” DBH) is moving slightly away from the desired condition.

For the Warm/Moist Biophysical Setting size classes:

- Seedling/Sapling (0-5” DBH) is moving away from the desired condition,
- Small (5-10” DBH) is moving away from the desired condition,
- Medium (10-15” DBH) is moving away from the desired condition,
- Large (>15” DBH) is moving away from the desired condition.

For the Warm/Moist Biophysical Setting size classes:

- Seedling/Sapling (0-5” DBH) is still within the desired condition range,
- Small (5-10” DBH) is moving slightly away from the desired condition,
- Medium (10-15” DBH) is moving slightly away from the desired condition,
- Large (>15” DBH) is moving slightly away from the desired condition.

Confidence in the accuracy and precision of size class data is high, given the regional standards for collection and analysis. The metrics of the regional dataset are the same as those used in the forest plan analysis, allowing direct comparison.

MON-VEG-01-04:

Table 14. Monitoring Indicator for MON-VEG-01-04: Acres and Percentage of KNF meeting OG definition as determined by FIA program showing 2013/2015 Baseline, 2020 Current, and 2023 Desired

Biophysical Setting	2013 OG Est. (Ac)	2013 OG Est. (%)	2020 OG Est. (Ac)	2020 OG Est. (Confidence Interval)	2020 OG Est. (%)	2020 OG Est. (Confidence Interval)	2023 OG Est. (Ac)	2023 OG Est. (%)
Warm Dry			29,194	15,044-44,677	4.9%	4.9%		
Warm Moist			73,024	48,807-99,584	8.74%	8.74%		
Subalpine			75,315	51,530-100,604	10.74%	10.74%		
Total Forest	194,844*	8.9%	179,081	140,100-217,391			221,115*	10.1%

*Extrapolated from 2020 R1 dataset (see "Methods") acres using the 2013 and 2023 forest-wide percentages (FEIS, pg. 77); not the same metrics, but used for comparison of similar data types to show potential trends.

Confidence in the accuracy of the individual KNF and R1 datasets is high, given the standards for collection and analysis. The precision of metrics compared to each other is low, however. The analysis for the forest plan (done in 2013 as baseline conditions for the 2015 Plan) was based on Geographic Area old growth acres and percent, in addition to that forest wide. The R1 analysis was based on Broad PVT Types which relate well to the forest biophysical settings. These datasets intersect at the forest level; thus, this analysis was conducted for the KNF forested acres, both as total acres and as a percentage of forest acres.

MON-VEG-01-05:

Table 15. Monitoring Indicator for MON-VEG-01-05: Current Acres and Percentage of KNF Managed as Old Growth (2021)

Old Growth Type	Acres	Percent	Acres – "OLD_GROWTH_STATUS" blank; 1 (REOG) in "OLD_GROWTH"	Acres – "OLD_GROWTH_STATUS" blank; 2 (RPOG) in "OLD_GROWTH"	Acres – RPOG in "OLD_GROWTH_STATUS"; 1 (REOG) in "OLD_GROWTH"	Total Acres
Recruitment Potential Old Growth	116,378	5.3%		6,586	1,136	

Old Growth Type	Acres	Percent	Acres – "OLD_GROWTH_STATUS" blank; 1 (REOG) in "OLD_GROWTH"	Acres – "OLD_GROWTH_STATUS" blank; 2 (RPOG) in "OLD_GROWTH"	Acres – RPOG in "OLD_GROWTH_STATUS"; 1 (REOG) in "OLD_GROWTH"	Total Acres
Retained Contributing Old Growth	55	<0.1%				
Retained Existing Old Growth	208,683	9.5%	10,276			
Total on KNF	325,116	14.9%				343,114

Because a similar dataset from 2015 does not exist, there is nothing to which these old growth types and corresponding acres can be compared. Thus, this is the baseline old growth level using forest stand inventory and mapping procedures.

The R1 FIA old growth analysis showed 179,081 acres of old growth in 2020 with a confidence interval of 140,100-217,391 acres. FIA does not map or quantify recruitment potential old growth and there is no desired condition numeric target or range in the Forest Plan. The old growth acreage for the KNF is 208,683 acres of old growth using forest old growth information tracked in FSVeg Spatial. The difference of acres could be due to mapping differences in GIS/spatial boundary designation, differences in data collection methods, and changes to forest-level data since the R1 dataset was run.

MON-VEG-01-06:

Table 16. Monitoring Indicator for MON-VEG-01-06: Acres of old growth planned and treated 2016-2020

	Acres of Treatment Planned	Acres of Treatment Completed
Mechanical Fuel Reduction	81	69
Prescribed Fire	2,456	396*
Commercial Harvest	111	79
Total	2,648	544

*133 acres burned in 2017 Gibralter Fire.

Overall, confidence in the quantity and quality of the data collected is high, in terms of both accuracy and precision given the national and regional protocols and standards for collection, entry, and tracking. We continue to strive for timely data entry, but the large amount of data entered annually and turnover in key positions occasionally hinder these efforts. This is a very small percentage and does not affect the general status or data trends. The forest follows the 2015 Forest Plan Old Growth Inventory, Monitoring, and Management white paper on the KNF SharePoint site. It facilitates a process for accurate old growth and recruitment potential old growth data collection and timely entry into the FSVeg database and FSVeg Spatial and ArcGIS layers.

MON-VEG-01-07:

Table 17. Monitoring Indicator for MON-VEG-01-07: Desired Range of Snags across all Forested Acres on the KNF by Diameter, Biophysical Setting, and Dominance Group (Range per Acre by Diameter Class) as compared to Estimates of snags per acre densities with 90% confidence interval by diameter thresholds, by Snag Analysis Groups in the Corresponding FIA Analysis in Bush and Reyes, 2020 (appendix B, table 1)

Dominance Group (40% plurality)	Snag Analysis Groups	FW-DC-VEG-07 Snags Per Acre 10"+	Snags Per Acre 10"+ Mean	Snags Per Acre 10"+ 90% CI – Lower Bound	Snags Per Acre 10"+ 90% CI – Upper Bound	FW-DC-VEG-07 Snags per Acre 15"+	Snags per Acre 15"+ Mean	Snags per Acre 15"+ 90% CI – Lower Bound	Snags per Acre 15"+ 90% CI – Upper Bound	FW-DC-VEG-07 Snags per Acre 20"+	Snags per Acre 20"+ Mean	Snags per Acre 20"+ 90% CI – Lower Bound	Snags per Acre 20"+ 90% CI – Upper Bound
All except Lodgepole pine	Warm/ Dry	3.3 – 15.9	6.9< >	4.8< >	9.3< >	1.0-6.1	3.1< >	2.0< >	4.3< >	0.3 – 2.2	1.3< >	0.6< >	2.2< >
All except Lodgepole pine	Warm/ Moist	6.3 - 17.1	14.5< >	11.9< >	17.2>	2.4 – 7.2	4.9< >	3.6< >	6.2< >	2.4 – 7.2	1.2<	0.6<	1.8<
All except Lodgepole pine	Cool Moist/ Cold	11.1 – 25.1	13.7< >	10.2<	17.5< >	2.9 – 6.5	4.3< >	2.9< >	5.8< >	2.9 – 6.5	1.2<	0.6<	1.8<
Lodgepole pine (MX-PICO)	PICO	3.6 – 14.0	7.4< >	3.9< >	11.5< >	0.5-4.3	1.3< >	0.4<	2.1< >	0.5-4.3	0.4<	0.0<	1.2< >

The green cells (marked with < >) are the FIA analysis estimates within the Forest Plan snag range desired condition for that dominance group and biophysical setting. The pink cell (marked with a >) is the FIA analysis estimate that is greater than the Forest Plan snag range desired condition for that dominance group and biophysical setting. The yellow cells (marked with <) are the FIA analysis estimates that are below any desired condition range in the Forest Plan.

Overall, confidence in the quantity and quality of the data collected is high, in terms of both accuracy and precision given the national and regional protocols and standards for collection, entry, and tracking.

Projects will continue to follow Forest Plan Guideline VEG-04: Vegetation management activities should retain snags greater than 20 inches DBH and at least the minimum number of snags and live trees (for future snags) that are displayed in Table 17. Recommended Snag and Snag Recruitment Levels to retain (where they exist) after Vegetation Management Activities (including Post-harvest Activities), by Harvest Type (Forest Plan, pg. 20). Where snag numbers do not exist to achieve the recommended ranges, the difference would be made up with live replacement trees. Exceptions occur for issues such as human safety and instances where the minimum numbers are not present prior to the management activities.

MON-VEG-01-08:

Table 18. Diseases found on the Kootenai National Forest – 2020 Estimated Acres Affected split by Hazard Rating, includes 90th percentile confidence intervals

Insect or Disease Hazard Rating of Concern	Hazard Rating	2020 Estimated Acres	90% CI – Lower Bound	90% CI – Upper Bound
Combined Beetle Hazard Rating	L	428,621	370,955	486,491
	M	500,547	439,747	560,812
	H	168,806	129,737	206,768
	M/H (Stand Changing Impacts)	669,353	597,084	737,660
Douglas-fir Beetle Hazard Rating	L	477,061	414,815	536,204
	M	359,631	310,141	415,248
	H	132,109	98,018	165,770
	M/H (Stand Changing Impacts)	491,740	430,121	556,909
Mountain Pine Beetle Hazard Rating – for Lodgepole pine	L	331,741	277,989	385,915
	M	286,237	234,584	335,052
	H	48,440	27,383	71,004
	M/H (Stand Changing Impacts)	334,677	276,319	388,321
Spruce Beetle Hazard Rating	L	427,153	367,606	482,914
	M	252,475	207,939	299,496
	H	333,209	276,384	390,251
	M/H (Stand Changing Impacts)	585,684	514,329	659,090
Root Disease Severity Class	L	1,329,332	1,244,900	1,407,005
	M/H (Stand Changing Impacts)	157,170	118,029	195,732

There can be both beetle hazard and root disease severity impacts on the same acre – each type of insect or disease impact doesn't necessarily impact separate acres.

Because a similar dataset from 2015 does not exist, there is nothing to which the corresponding acres impacted by insects and disease can be compared. Thus, this is the baseline level for the hazard rating on forested acres influenced by major insects and disease found on the Kootenai National Forest.

Discussion

This is the first report for MON-VEG-01, and thus establishes the reporting baseline for this monitoring question and indicator.

The monitoring question for this report is: To what extent are management activities and natural disturbance processes trending toward desired conditions for vegetation composition, structure, and pattern, increasing resistance and resiliency to disturbance factors including climate change?

- **Indicator 1 – MON-VEG-01-01**: Acres treated to achieve FW-OBJ-VEG-01 (data collected since 2015)
    - The trend is towards the target of 120,000 to 150,000 acres of increased relative representation of early seral species by 14,519 acres (10-12 percent of target).
    - The trend is towards the target of 250,000 acres to maintain and/or improve forest resilience, by 239,204 acres (95 percent of target).

- **Indicator 2 – MON-VEG-01-02**: Acres burned (data collected since 2016)
    - Data is too variable to show a trend, mainly due to the unexpected nature of acres burned by wildfires in any given year. Planned ignitions and mechanical fuel treatments have generally been increasing (with variability from year to year) since 2016. There is no target for this indicator.

- **Indicator 3 – MON-VEG-01-03**: Acres of forest by dominance type and size class compared to the desired condition (data collected since 2015)
    - The clearest trends are:
        - Generally, dominance group composition and size classes have not changed dramatically from baseline conditions,
        - Those dominance group compositions that are within desired ranges remain so, though they may have moved to the upper or lower bounds.
        - Size classes in general are moving slightly away from the desired ranges.

- **Indicator 4 – MON-VEG-01-04**: Acres achieving the old growth definition as determined by the FIA program (data collected since 2013)
    - The trend is slightly away from the desired condition of 221,115 acres of old growth by 2023. There were an estimated 194,844 acres of old growth in 2013, and 179,081 acres in 2020 through FIA. Several large fire seasons in 2015, 2017 and 2018 occurred on the forest affecting old growth and recruitment potential old growth in the time between the 2013 and 2020 data sets.

- **Indicator 5 – MON-VEG-01-05**: Acres of old growth and acres of recruitment potential old growth, as determined by the Forests' stand inventory and mapping procedures (data collected since 2013)
    - The trend is slightly away from the desired condition of 221,115 acres of old growth by 2023. There were 208,683 acres of old growth and 116,378 acres of recruitment potential old growth in 2020 using forest stand inventory and

mapping. Several large fire seasons in 2015, 2017 and 2018 occurred on the Forest reducing the amount of old forest available.

- **Indicator 6 – MON-VEG-01-06**: Acres of old growth treated (data collected since 2015)
    - Treatments have been listed by type and planned or completed. There is no other comparable dataset for this indicator, thus, there is no trend, and this establishes the baseline.

- **Indicator 7– MON-VEG-01-07**: Snags per acre forest-wide (data collected since 2008)
    - All FIA estimates of snags per acre for all dominance groups, biophysical settings, and snag size classes are within or above the desired conditions in the Forest Plan. There is no other comparable dataset for this indicator; thus, there is no trend, and this establishes the baseline.

- **Indicator 8– MON-VEG-01-08**: Number of acres influenced by insects and disease (data collected since/in 2020)
    - There is no other comparable dataset for this indicator; thus, there is no trend, and this establishes the baseline.

The Northern Region Restoration and Resiliency Reports are hosted on the Northern Region internet site. Restoration and developing resilient vegetation through vegetation treatments each year is an overall goal of the outcomes of treatments that we invest in and accomplish each year in the Northern Region and on the Kootenai National Forest.

A set of requirements were established to determine if a treatment outcome was projected to be resilient. The requirements in the R1 Restoration and Resiliency Guide list detailed criteria for resilience at the treatment unit level. These criteria involve composition, structure and to some degree, pattern of vegetation treatments that trend forests to a more resilient desired condition as contained in Forest Plan Desired Conditions. They often involve establishing or maintaining early seral, shade-intolerant vegetation such as ponderosa pine, western larch, western white pine, whitebark pine, and hardwoods.

In addition, appropriate forest density treatments are summarized as a characteristic of resilience, as are characteristic patch sizes. Vegetation treatments other than associated with trees are also assessed for their resilience outcomes. All these outcomes are anticipated to be resilient under current climate conditions and are hypothesized to be in the future considering projected mid to late century future climate. In essence these treatments are considered adaptation options that are being implemented under an adaptive management context.

The Northern Region and the Rocky Mountain Research Station have a partnership through which an Adaptive Management Research Framework was developed, enabling research and monitoring to happen in a consistent and deliberative way. This report will help inform opportunities for investments occurring under that framework.

Other plan components not listed in the monitoring plan related to MON-VEG-01 were included in the Monitoring Item Summary table at the beginning of the report, but not listed in the Monitoring Guide as directly relating to an indicator for direct analysis in this report:

- **FW-DC-VEG-08** (FP, pg. 13)**.** Down wood occurs throughout the forest in various amounts, sizes, species, and stages of decay. The larger down wood (i.e., coarse woody

debris) provides habitat for wildlife species and other organisms, as well as serving important functions for soil productivity.

- **FW-DC-VEG-11.** The desired forest composition, structure, and pattern for each biophysical setting are described below:
- **Warm/Dry –** This biophysical setting includes the warmest and driest sites that support forest vegetation.
- **Warm/Moist –** This biophysical setting includes moist forest sites that are relatively warm. This setting includes low-elevation upland sites with deeper soils on north and east aspects, extensive mid-elevation moist upland sites, and most low and mid-elevation wet stream bottoms, riparian benches, and toe-slopes.
- **Subalpine** –This biophysical setting occupies the higher elevations of the forest. This setting ranges from the cool and moist lower subalpine sites, up to the cold and dry high elevation sites that have more open forests.
- **FW-STD-VEG-01** (FP, pg. 19)**.** Within old growth stands, timber harvest or other vegetation management activities shall not be authorized if the activities would likely modify the characteristics of the stand to the extent that the stand would no longer meet the definition of old growth (see glossary for old growth definition).
- **FW-GDL-VEG-01** (FP, pg. 19)**.** Timber harvest or other vegetation management activities may be authorized in old growth stands if the activities are designed to increase the resistance and resiliency of the stand to disturbances or stressors, and if the activities are not likely to modify stand characteristics to the extent that the stand would no longer meet the definition of old growth (see the glossary for the definitions of resistance and resilience).
- **FW-GDL-VEG-03** (FP, pgs. 19-20)**.** Vegetation management activities should retain the amounts of coarse woody debris (including logs) that are displayed in table 3. A variety of species, sizes, and decay stages should be retained. Exceptions may occur in areas where a site-specific analysis indicates that leaving the quantities listed in the table would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources. In addition, exceptions may occur where the minimum quantities listed in the table are not available for retention.
- **FW-GDL-VEG-04** (FP, pg. 20)**.** Vegetation management activities should retain snags greater than 20 inches DBH and at least the minimum number of snags and live trees (for future snags) that are displayed in table 4. Where snag numbers do not exist to achieve the recommended ranges, the difference would be made up with live replacement trees. Exceptions occur for issues such as human safety and instances where the minimum numbers are not present prior to the management activities.
- **FW-GDL-VEG-05** (FP, pg. 20-21)**.** Where vegetation management activities occur and snags (or live trees for future snags) are retained, the following direction should be followed:
    - Group snags where possible,
    - Retain snags far enough away from roads or other areas open to public access to reduce the potential for removal (generally more than 150 feet),
    - Emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, larch, and cedar,

    - Favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife.

- **FW-GDL-VEG-06** (FP, pg. 21)**.** During vegetation management activities (e.g., timber harvest), and in the event that retained snags (or live trees being retained for future snags) fall over or are felled (for safety concerns), they should be left on site to provide coarse woody debris.
- **FW-DC-RIP-04.** Composition, structure, and function of riparian vegetation are appropriate for a given landscape and climatic setting. Riparian vegetation adjacent to larger streams with lower gradients and wide valley bottoms is dominated by conifer stands in late-seral stages. These stands have multiple canopy layers with shrub, forb, and ferns underneath stands dominated by large trees. Native hardwoods such as black cottonwood, paper birch, and/or quaking aspen are found in areas along these larger streams. The narrower riparian zones along smaller, higher gradient streams have vegetation with a wide diversity of seral stages present, from relatively young stands of trees to fairly old stands, with a greater composition of early-seral, shade-intolerant trees species present than found in larger, lower gradient rivers. Natural disturbance regimes occur at intervals that maintain these conditions.
- **FW-DC-WL-10.** A mosaic of aquatic and riparian habitats, with a low level of disturbance, is available for associated species.
- **FW-DC-WL-13.** Down wood, especially down logs, are available throughout the Forest for terrestrial mollusks, reptiles, amphibians, small mammals, and other species whose habitat requirements includes this component (refers to FW-GDL-VEG-03, FW-GDL-VEG-06, FW-DC-WTR-03, FW-DC-SOIL-01, FW-DC-SOIL-02, FW-DC-SOIL-03, FW-DC-RIP-05, FW-DC-AQH-05, FW-GDL-SOIL-02, FW-GDL-SOIL-03).
- **FW-DC-WL-14** (FP, pg. 29)**.** Down wood, especially down logs, are available throughout the Forest for terrestrial mollusks, reptiles, amphibians, small mammals, and other species whose habitat requirements includes this component.

Findings

Table 19. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS 1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-VEG-01: To what extent are	2021	YES – As this is the first and baseline report, more	Yes	Monitoring program 1. Plan Monitoring

MONITORING ITEM	**YEAR UPDATED**	**PLAN IMPLEMENTATION STATUS 1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?**	**RECOMMENDATION** ***Based on the evaluation of monitoring results, may changes be warranted?***	**MANAGEMENT** ***If a change may be warranted, where may the change be needed?[2]***
management activities and natural disturbance processes trending toward desired conditions for vegetation composition, structure, and pattern, increasing resistance and resiliency to disturbance factors including climate change? This includes vegetation dominance type and size, old growth, down wood, snags, fire-killed forest, and insect and disease infested forest.		time/data are needed to understand status or progress of the Plan Component(s) as most results show progress towards desired conditions, but some are trending away. Objectives and guidelines are being met.		Recommendation: Consider changing to one indicator for this question: the results of the annual Northern Region Restoration and Resiliency Reports. Restoration and developing resilient vegetation through vegetation treatments each year is an overall goal of the outcomes of treatments that we invest in and accomplish each year. A set of requirements were established to determine if a treatment outcome was projected to be resilient. The requirements in the R1 Restoration and Resiliency Guide list detailed criteria for resilience at the treatment unit level and involve composition, structure, and pattern of vegetation treatments that trend forests to a more resilient desired condition as contained in Forest Plan Desired Conditions. They often involve establishing or maintaining early seral, shade-intolerant vegetation. Appropriate forest density treatments are summarized as a characteristic of resilience, as are characteristic patch sizes. Vegetation treatments other than associated with trees are also assessed for their resilience outcomes. All these outcomes are anticipated to be resilient under current and future climate and changes. These

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS 1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
				treatments are considered adaptation options that are being implemented under an adaptive management context. Recommend dropping Indicator 2 – Acres burned. Already included as part of Indicator 1. There are 3 old growth indicators. Recommend dropping or rewording Indicator 6 – Acres of old growth treated. What are the effects of treatments? Answering this question alone does not get to the monitoring question, even in context of the other 7 indicators. Recommend changing Indicator 8 to determine hazard rating of insect and disease of concern on the KNF, instead of acres influenced by insects and disease. Monitor this using FHP produced reports instead of using aerial detection survey data. 2. Implementation and Outcome Progress Recommendations: Update the Standards/Steps for Data Collection, Analysis Methods, and How Evaluated for all indicators in the Monitoring Guide (pgs. 13-17) based on the Data Sources/Partners in the MON-VEG-01 report, especially when RO data is provided for consistent methodology, analysis, and protocols across the region. Coordinate with RO ahead of time to get datasets that match the forest to compare like

MONITORING ITEM	**YEAR UPDATED**	**PLAN IMPLEMENTATION STATUS 1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?**	**RECOMMENDATION** ***Based on the evaluation of monitoring results, may changes be warranted?***	**MANAGEMENT** ***If a change may be warranted, where may the change be needed?[2]***
				data; potentially include additional data to assist with forest analysis efforts (e.g. MON-VEG-01-01 and 03: dominance type and size class matching IPNF Forest Plan biophysical settings and R1 Broad PVTs; MON-VEG-01-04: FIA old growth by Geographic Area). Frequency of Measurement (Monitoring Guide, pg. 13): Recommend changing wording where it reads "Every 5 years"; the FIA program re-measures plots on a 10-year cycle, with 10 percent of the total plots re-measured each year. Analysis Methods (Monitoring Guide, pg. 13): Recommend updating this wording as it references "… acres burned via unplanned ignitions (wildfires)" in Performance Indicator 3 – Acres of forest by dominance type and size class compared to the desired condition. Method doesn't match indicator. Unit of Measure (Monitoring Guide, pg. 16): Recommend updating to read "Number of snags *per acre*." References (Monitoring Guide, pg. 16): Recommend updating/replacing with Bush and Reyes 2020 as this is the most current reference and methodology for this indicator. It incorporates

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS 1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
				the current references listed.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON VEG-02 – Terrestrial Invasive Plants and Range

Table 20. Monitoring item summary

Monitoring Question	Plan Components	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-VEG-02: Have management activities met Plan objectives and trended towards desired conditions for invasive terrestrial plant species?	FW-DC-VEG-10 FW-OBJ-VEG-02	MON-VEG-02-01: Acres of non-native invasive plants treated MON-VEG-02-02: Number of sites of new non-native invasive plant species and number of acres treated	Biennial	INFRA Database Field inventories, Forest Employee identification of sites TESP-IS FACTS	Jessica Ressel/John Carlson

Table 21. Monitoring Item VEG-02. Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	2015
Next scheduled MER evaluation of this monitoring item:	2023

Referenced Plan Components:

The 2015 Forest Plan has set Forest Wide Plan Objectives (FS-OBJ-VEG-02) and Desired Conditions (FW-DC-VEG-10) related to the management of non-native invasive plants that speak specifically to the monitoring question.

FW-OBJ-VEG-02. Non-native Invasive Plant Species–Over the life of the Plan, the outcome per decade is:

- All sites that are discovered with newly invading non-native invasive species are treated.
- The treatment of approximately 30,000 to 75,000 acres to reduce non-native invasive plant density, infestation size, and/or occurrence (these areas are also included in FW-OBJ-VEG-01).

FW-DC-VEG-10: Newly invading, non-native invasive plant species are treated and populations are contained or eradicated. The weed program on the Forest uses integrated pest management approaches, including prevention and control measures that limit introduction, intensification, and spread due to management activities. Agreements with cooperative weed management areas assist control efforts across jurisdictional boundaries

Methods

Data Recording Protocols and Requirements for Invasive Species Survey, Inventory and Treatment Records can be found at: Invasive Species Program.

Kootenai National Forest non-native invasive plant species inventory, treatment, and monitoring data is recorded by licensed applicators employed or contracted by the USFSData Entry:

Invasive inventory, treatment, and monitoring data is entered into the Natural Resource Manager (NRM) / Forest Activity Tracking System (FACTS) database via the Threatened and Endangered Species & Invasive Species (TESP-IS)/Arc Map tool by trained staff

Data analysis:

The fiscal 2019 through 2020 invasive species management data was analyzed via reports pulled from the NRM/FACTS database by the Forest Rangeland Management specialist with assistance from the Region 1 invasive program lead.

Terrestrial invasive species data are provided at two scales for this evaluation: acres of nonnative invasive plants treated, and number of sites of new non-native invasive plant species and number of acres treated

- -New nonnative invaders' are noxious weeds discovered on USFS lands that have not been recorded previous to 2015.

Acres of non-native invasive plants treated:

Acres of nonnative invasive plants treated are measured by area of infested acres treated.

Infested Acres

Acres mapped of Montana and Idaho State listed species use protocols from the *National Forest System Invasive Species Management Record Keeping Business Rules and National Standards (v01.10.2014) t*o identify Infested Area. Infested Area is derived by the recorded percent infested of a Total Area. Total Area varies and is determined on site by site basis. Data was extracted from the TESP-IS database. See Invasive Species Database (TESP-IS) Definitions:

- **Infested Area:** An area of land or water, in acres, containing a single invasive species delineated by the actual perimeter of the infestation as defined by the outer edge of the canopy cover of plants or the visible population, home range or stream reach of other taxa, excluding adjacent areas not infested and outside the perimeter of the population.
- **Total Area:** An area, in acres, occupied by an invasive species delineated by a polygon that may represent a general area where the population is found or may represent the spatial extent of the infestation/ population. Total Area is calculated from the area of the spatial feature. Total Area may contain significant areas that are not within the perimeter of the target invasive species infestation in which case “Percent Infested” would be less than 100 percent.
- **Percent Infested:** Percent (%) Infested is the proportion of the Total Area that is infested with the target invasive species. The default will be 100 percent Infested. In other words the application will assume that the spatial feature that represents the infestation is 100 percent infested. If the spatial feature represents a large area that contains significant area that is not within the perimeter of the target invasive species infestation, enter a percent that approximates the proportion that is actually infested based on the definition of “Infested Area”. A “0” may be used to document an infestation that currently contains no detectable individuals. A value of '0' for percent infested is allowed only for re-measured infestations, indicating that treatment has eradicated an infestation or under natural conditions an infestation has been eliminated.

Infested area provides a record of which species have been detected (of the areas surveyed) during a given period of time. It does not provide an indication of which species is occupying the most or least acres, because it is not known what acres have been reduced or grown in size as re-measurements are not routinely conducted to record change. Infested acres also does not provide a trend of increasing or decreasing acres for the same reason.

Information is collected by forest personnel in the Botany and Range Programs, Wilderness Rangers, spray contractors, and Montana Conservation Corp members. It is not a systematic survey of all lands on the Kootenai, but rather reflects opportunity, projects and high priority areas.

Treated Acres

Treated acres data were extracted from the Forest Activities (FACTS) using a standard report (Invasive Species Accomplished Treatment Activities). The following FACTS activities were queried for terrestrial invasive species treatments and new invader species. Acres reported are those accomplished acres by the forest unit.

Results and Discussion

Table 22. Data for 2019

Year	District	Control Mthd	Trt Activities Accomp	Ac. Accomp	Trt activities completed	Ac. Completed	MON events	Ac. MON	% MON	Avg Control	Ac. Restored
2019	01	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0
2019	01	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2019	01	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2019	01	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2019	01	Invasives - Pesticide Application	66	190.4	66	190.4	68	1479.5	777	0.77	146.6
2019	03	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0
2019	03	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2019	03	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2019	03	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0

Year	District	Control Mthd	Trt Activities Accomp	Ac. Accomp	Trt activities completed	Ac. Completed	MON events	Ac. MON	% MON	Avg Control	Ac. Restored
2019	03	Invasives - Pesticide Application	97	218.6	97	218.6	107	1517.7	694.3	0.79	172.7
2019	04	Invasives - Biocontrol, Classic	27	135	27	135	0	0	0	0	0
2019	04	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2019	04	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2019	04	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2019	04	Invasives - Pesticide Application	106	437.1	106	437.1	29	1182.7	270.6	0.92	402.1
2019	05	Invasives - Biocontrol, Classic	8	40	8	40	0	0	0	0	0
2019	05	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2019	05	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2019	05	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2019	05	Invasives - Pesticide Application	179	356.1	179	356.1	339	5912.9	1660.5	0.8	284.9

Year	District	Control Mthd	Trt Activities Accomp	Ac. Accomp	Trt activities completed	Ac. Completed	MON events	Ac. MON	% MON	Avg Control	Ac. Restored
2019	07	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0
2019	07	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2019	07	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2019	07	Invasives - Mechanical /Physical	6	13.2	6	13.2	16	2273.9	17226.5	1	13.2
2019	07	Invasives - Pesticide Application	63	339.8	63	339.8	347	10718.4	3154.3	0.83	282
Total / AVE			552	1730.2	552	1730.2	906	23085.1	951.3	0.20	1301.5

Table 23. Data for 2020

Year	District	Control Mthd	Trt activities Accom	Ac. Accom	Trt activities completed	Ac. Completed	MON Events	Ac. MON	% MON	Avr Control	Ac. Restored
2020	01	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0

Year	District	Control Mthd	Trt activities Accom	Ac. Accom	Trt activities completed	Ac. Completed	MON Events	Ac. MON	% MON	Avr Control	Ac. Restored
2020	01	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2020	01	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2020	01	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2020	01	Invasives - Pesticide Application	81	202.6	81	202.6	43	363.6	179.5	0.77	156
2020	03	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0
2020	03	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2020	03	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0

Year	District	Control Mthd	Trt activities Accom	Ac. Accom	Trt activities completed	Ac. Completed	MON Events	Ac. MON	% MON	Avr Control	Ac. Restored
2020	03	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2020	03	Invasives - Pesticide Application	77	148.4	77	148.4	33	666	448.8	0.77	114.3
2020	04	Invasives - Biocontrol, Classic	3	15	3	15	15	75	500	0.9	13.5
2020	04	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2020	04	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2020	04	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2020	04	Invasives - Pesticide Application	72	396.3	72	396.3	362	7947.8	2005.5	0.94	372.5

Year	District	Control Mthd	Trt activities Accom	Ac. Accom	Trt activities completed	Ac. Completed	MON Events	Ac. MON	% MON	Avr Control	Ac. Restored
2020	05	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0
2020	05	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0
2020	05	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2020	05	Invasives - Mechanical /Physical	0	0	0	0	0	0	0	0	0
2020	05	Invasives - Pesticide Application	133	257.8	133	257.8	146	1232.8	478.2	0.88	226.9
2020	07	Invasives - Biocontrol, Classic	0	0	0	0	0	0	0	0	0
2020	07	Invasives - Biocontrol, Livestock	0	0	0	0	0	0	0	0	0

Year	District	Control Mthd	Trt activities Accom	Ac. Accom	Trt activities completed	Ac. Completed	MON Events	Ac. MON	% MON	Avr Control	Ac. Restored
2020	07	Invasives - Cultural /Fire	0	0	0	0	0	0	0	0	0
2020	07	Invasives - Mechanical /Physical	4	18	4	18	4	11.3	62.8	1	18
2020	07	Invasives - Pesticide Application	67	361.6	67	361.6	239	579.8	160.3	0.82	296.5
Total / AVE			437	1399.7	437	1399.7	842	10876.3	153.4	0.24	1197.7

New invader species:

At new invader species scale, 1 measure was evaluated.

1) Number of new terrestrial invasive detections on Kootenai national forest since 2015.

Table 24. New invader species 2019

New Invader Species	Number of sites	Infested Area Acres Treated
***Ventenata or African grass* (Ventenata Dubia)**	1	.40
***Blueweed (*Echium vulgar)**	6	163.3

Table 25. New invader species 2020

New Invader Species	Number of sites	Infested Area Acres Treated
***Ventenata or African grass* (Ventenata Dubia)**	0	0
***Blueweed* (Echium vulgar)**	4	5.43

MON-VEG-02-01: Acres of non-native invasive plants treated:

In 2019-2020 there was a decrease in the amount of acreage treated. While there was an increase in D1/D3 of treatment acres in 2020, overall the forest was still down from 2019 by 330.5 acres .The FEIS states that there should be at least 6,000 treated acres annually for the KNF (the actual amount of annual treatment would depend on available funding and monitoring results). This reduction of acres from 2019 to 2020 could have been due to budget and treatment costs, as well as 2020 pandemic limitations and restrictions. Activities are currently not implemented at as desired in the plan.

MON-VEG-02-02: Sites of new non-native invasive plant species and acres treated:

Based on the number of new non-native invasive plant species and number of acres treated, it is evident that the number of new invader species decreased by one species from 2019 to 2020. There was also a decrease in the number of acres treated of blueweed in 2020. This would be attributed to rapid response to the treatment in the year 2019.

The results for both indicators have been collected from 2019 and 2020.

Discussion:

To achieve Forest Objective, it is critical for the Kootenai National Forest to maintain native vegetation. Native plants are the foundation upon which the ecosystems of the Forest are built, providing forage and shelter for all native wildlife, bird and insect species, supporting the natural processes of the landscape, and providing the context within which the public find

recreational and spiritual opportunities. All these uses or values of land are hindered or lost by conversion of native vegetation to invasive and noxious plants. *(KNF FEIS Pg. 1-14)*

The results for acres treated, have moved away from target area of 6k acres/ year, and are trending away from the target for the year 2020.

The results for treating new invaders is on target and is being maintained. Continuation of treating new species will ensure this monitoring guideline is followed and successful in decreasing the amount of new invader species on the forest.

Evaluation of Results for Adaptive Management Finding

The Desired Condition contains four components:

1. Newly invading, non-native invasive plant species are being treated
2. Newly invading non-native invasive plant populations are being contained or eradicated
3. The weed program on the Forest uses integrated pest management approaches, including prevention and control measures that limit introduction, intensification, and spread due to management activities.
4. Agreements with cooperative weed management areas assist control efforts across jurisdictional boundaries

The current indicator only answers component #1. It is recommended the following indicators are added: Re-measurements are compared between years to determine if the new invader infestation is being contained or eradicate, acres treated by method and by district, list of prevention design criteria implemented in the evaluation period, and the number of agreements with cooperative weed management areas or other entities associated with the KNF integrated pest management program.

The following findings and recommendations resulted from the evaluation of monitoring results.

Table 26. Summary of findings for Plan Monitoring Item 1

MONITORING ITEM	**YEAR UPDATED**	**PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?**	**RECOMMENDATION** *Based on the evaluation of monitoring results, may changes be warranted?*	**MANAGEMENT** ***If a change may be warranted, where may the change be needed?[2]***
MON-VEG-02: Have management activities met Plan objectives and trended towards desired conditions for	2021	No	Yes.	Montioring Progam Monitoring intensity and adding indicators tracking effectiveness of treatment

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
invasive terrestrial plant species?				Add Indicators: Re-measurements are compared between years to determine if the new invader infestation is being contained or eradicated Acres treated by method and by district List of prevention design criteria implemented in the evaluation period Number of agreements with cooperative weed management areas or other entities associated with the KNF integrated pest management program.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Fire Evaluation and Adaptive Findings

MON-FIRE-01

Table 27. Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-FIRE-01: To what extent are management activities moving hazardous fuels towards desired conditions?	FW-DC-FIRE-02, FW-OBJ-FIRE-01, FW-DC-SES-04, GA-DC-FIRE-BUL-01, GA-DC-FIRE-CLK-01, GA-DC-FIRE-FSH-01, GA-DC-FIRE-KOO-01, GA-DC-FIRE-LIB-01, GA-DC-FIRE-TOB-01, GA-DC-FIRE-YAK-01	Acres of hazardous fuels treatments within the WUI, and in areas outside of the WUI	Annual	Forest Service Activity Tracking System (FACTS), Fuels Treatment Effectiveness Monitoring (FTEM)	Jacob Jeresek

Referenced Plan Components:

FW-DC-FIRE-02. Hazardous fuels are reduced within the WUI and other areas where values are at risk. Fire behavior characteristics and fuel conditions exist in these areas that allow for safe and effective fire management. Fire behavior is characterized by low-intensity surface fires with limited crown fire potential. Forest conditions, and the pattern of conditions across the landscape, exist in these areas such that the risk is low for epidemic levels of bark beetles, high levels of root disease, and large scale, stand replacement wildfires.

FW-OBJ-FIRE-01. The outcome is the treatment of fuels on approximately 5,000 to 15,000 acres annually on NFS lands, primarily through planned ignitions, mechanical vegetation treatments (these acres are also included in FW-OBJ-VEG-01), and unplanned ignitions. NFS lands within the WUI are the highest priority for fuel treatment activities.

FW-DC-SES-04. To the extent possible, the Forest contributes to the protection of communities and individuals from wildfire within the limits of firefighter safety and budgets.

GA-DC-FIRE-BUL-01. Threats of wildfire are reduced for the town of Troy, Highways 2 and 56, and outlying communities and structures.

GA-DC-FIRE-CLK-01. Threats of wildfire are reduced for the towns of Noxon, Trout Creek, Heron, and outlying communities and structures.

GA-DC-FIRE-FSH-01. Threats of wildfire are reduced for dwellings, buildings, and structures within the Fisher River drainage and major tributaries.

GA-DC-FIRE-KOO-01. Threats from unplanned ignitions are reduced for the towns of Rexford, West Kootenai, the Pinkham area, and outlying communities and structures.

GA-DC-FIRE-LIB-01. Threats of wildfire are reduced for the city of Libby and outlying communities and structures.

GA-DC-FIRE-TOB-01. Threats from unplanned ignitions are reduced for the towns of Eureka, Fortine, Trego, Stryker, and outlying communities and structures.

GA-DC-FIRE-YAK-01. Threats of wildfire are reduced for the communities of Yaak, Sylvanite, and outlying communities and structures.

Table 28. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	N/A
Next scheduled MER evaluation of this monitoring item:	2023

Hazardous fuel treatments help ensure that the forest move towards the direction of providing for firefighter and public safety in all fire management activities (FW-DC-SES-04) and reducing hazardous fuels (FW-DC-FIRE-02). By reducing hazardous fuels in the WUI and other areas where values are at risk, fire behavior can be modified to increase the likelihood of low intensity surface fires and limited crown fire potential. This helps provide for a safer fire environment for both firefighters and the public. It also reduces negative impacts to natural resources. This indicator is meant to provide a measure in which to evaluate progress towards these desired conditions. The Forest Objective (FW-OBJ-FIRE-01) is to annually treat 5,000 to 15,000 acres.

Method

Acres of hazardous fuel treatments, including mechanical vegetation treatments and planned ignitions are broken down by inside or outside the Wildland Urban Interface (WUI). Acres of accomplishment are recorded annually in the FACTS database, utilizing standard database protocols. The FACTS database is queried for activities of hazardous fuel treatment.

Fuels Treatment Effectiveness Monitoring (FTEM) was used to display the effectiveness of fuels treatments when a wildfire encounters the treatment. FTEM data is recorded utilizing standard database protocols within 90 days of a wildfire being declared controlled. The FTEM database is queried to determine effectiveness of fuels treatments.

Results

Table 29 shown below displays the acres of hazardous fuels treatments completed on the Kootenai National Forest (KNF) from 2016-2020. FACTS confidence is currently high in data quality used to determine these results. However, for treatments prior to 2019, FACTS confidence is moderate in data

quality due to capturing all eligible Keypoint 6 activities. Table 30 shown below displays fuels treatment effectiveness for wildfires across the KNF from 2016-2019. FTEM confidence is moderate in data quality used to determine these results. This is due to several factors such as FTEM depends on interactions with wildfire and treatments up to 10 years old. Prior to 2019, FACTS reporting may not have captured all eligible Keypoint 6 activities. Additionally, data inputs for FTEM are not collected in the field during a wildfire but entered later leading to collecting the minimum standard required. However, FTEM reporting is improving since the database moved to the Interagency Fuel Treatment Decision Support System (IFTDSS) in 2018.

Table 29. Acres of Hazardous Fuels Treatments on the Kootenai National Forest from 2016-2020

	2016 Acres	2017 Acres	2018 Acres	2019 Acres	2020 Acres
FUELS-NON-WUI	4410.9	3407.1	3848.1	4010.7	8617.4
FUELS-WUI	4132	7373.6	7165.7	7443.1	3230.9
FUELS-TOTAL	**8542.9**	**10780.7**	**11013.8**	**11453.8**	**11848.3**

Table 30. FTEM results for wildfires on the KNF in fire years 2016-2019

	Success Rate of Treatments Contributing to Control and/or Management of the Fire	Success Rate of Fire Behavior Change as a Result of the Treatment	Success Rate of Treatments Strategically Located in Order to Facilitate Control of the Fire
KNF Fires 2016-2019	70%	95%	76%

Discussion

Data for acres of hazardous fuels treatments within the WUI and areas outside of the WUI are entered annually by the end of the fiscal year on September 30th within the FACTS database. This data is available for years 2016-2020 since the last monitoring report. Data for FTEM is collected annually and must be reported within 90 days of a wildfire being declared controlled. The KNF needs to do better at achieving the intent of this policy by completing FTEM reporting as soon as possible and not later. This data is available for years 2016-2019. Other than these two reporting systems historically utilized, no new science or information collected outside of this monitoring program was considered in the evaluation of this monitoring question.

Management activities are progressing towards desired conditions by treating between 5,000 to 15,000 acres annually across the KNF. Hazardous fuels are reduced annually within the WUI and other areas where values are at risk. By reducing hazardous fuels, fire behavior can be classified as low-intensity surface fires with limited crown fire potential while reducing the risk for large scale, stand replacement wildfires. This is further evidenced by a 95 percent success rate of a fire behavior change as a result of treatments. With recent agency direction to increase pace and scale, there is a general trend upwards of acres of hazardous fuels treatments accomplished annually.

Other plan components related to the monitoring question include FW-OBJ-VEG-01. This objective calls for treatment of approximately 250,000 acres to maintain and/or improve forest resilience, natural diversity, and productivity and to reduce negative impacts of non-native organisms. Treatments may

include timber harvest, planting, thinning, management of fire (including planned and unplanned ignitions), mechanical fuel treatments, revegetation with native species, blister rust pruning, integrated tree improvement activities, noxious weed treatments, and other integrated pest management activities including forest health protection suppression and prevention activities.

Natural unplanned ignitions also contribute towards desired conditions by reducing fuels both within the WUI and other areas outside. Fire behavior in recent wildfires can be classified as low-intensity surface fires with limited crown fire potential while creating a barrier to other large scale, stand replacing wildfires. MON-FIRE-02 addresses the acres of natural unplanned ignitions trending towards desired conditions. In summary, 58,660.95acres from 2016 to 2018 are trending towards desired conditions.

Findings

Table 31. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?2
MON-FIRE-01: To what extent are management activities moving hazardous fuels towards desired conditions?	2021	Yes - Management activities are progressing towards desired conditions by treating between 5,000 to 15,000 acres annually across the Kootenai National Forest. Hazardous fuels are reduced annually within the WUI and other areas where values are at risk. By reducing hazardous fuels, fire behavior can be classified as low-intensity surface fires with limited crown fire potential while reducing the risk for large scale, stand replacement wildfires. This is further evidenced by a 95 percent success rate of a fire behavior change as a result of treatments.	No	

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan

component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-FIRE-02

Table 32. MON-FIRE-02 Monitoring item summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source / Partner	Point of Contact
MON-FIRE-02: To what extent is unplanned fire used to trend vegetation towards desired conditions?	FW-DC-FIRE-03, FW-OBJ-FIRE-02	MON-FIRE-02-01: Number of unplanned ignitions managed for the maintenance and/or restoration of fire-adapted ecosystems, and the number of unplanned natural ignition managed with the primary goal of suppression	Annual	FIRESTAT, MTBS/PVT, Forest Service Activity Tracking System (FACTS)	Jacob Jeresek

Referenced Plan Components:

FW-DC-FIRE-03. The use of wildland fire (both planned and natural, unplanned ignitions), increases in many areas across the Forest. Fire plays an increased role in helping to trend the vegetation towards the desired conditions while serving other important ecosystem functions. However, when necessary to protect life, property, and key resources many wildfires are still suppressed.

FW-OBJ-FIRE-02. Over the life of the Plan, manage natural, unplanned ignitions to meet resource objectives on at least 10 percent of the ignitions.

Table 33. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	N/A
Next scheduled MER evaluation of this monitoring item:	2023

As indicated in the Forest Plan, the desire is to increase both planned and natural, unplanned ignitions in many areas across the Forest to help trend the vegetation towards desired conditions while serving other important ecosystem functions. While suppressing undesirable wildfires, at least 10 percent of natural, unplanned ignitions will be allowed to play their natural role in ecosystem function and maintenance.

Methods

This indicator tracks the number of unplanned ignitions and how they were managed. Multiple steps are required to extract data.

FIRESTAT: Annual fires across all lands within the Kootenai Interagency Dispatch Center (KDC) zone is entered and tracked by KDC from initial smoke report through the time a wildfire is declared out. Data is used to determine fire cause, acreage, and suppression strategy. Limitations in data include FIRESTAT only displays wildfire information for fires that start on the Kootenai National Forest (KNF) and not fires that burn onto the KNF. Additionally, fire severity by location and biophysical setting is not displayed.

MTBS/PVT: Data extracted by the Regional Office displaying acreage burned by broad potential vegetation type (PVT) and monitoring trends in burn severity (MTBS). Data is then converted from broad PVT to KNF biophysical setting. Fires that fall within desired patch size by severity are counted as trending towards desired conditions. Limitations in data include MTBS only monitors' fires greater than 1,000 acres in size.

FACTS: Acres of planned and unplanned ignitions are broken down by inside or outside the WUI. Acres of wildfire are recorded annually in the FACTS database, utilizing standard database protocols. The FACTS database is queried for activity codes 1117 (Wildfire – Natural Ignition) and 1119 (Planned Treatment Burned in Wildfire). Limitations in data include fire management decisions are not displayed.

Results

Table 34 shown below displays then number and acres of natural unplanned ignitions managed for resource objectives as well as natural unplanned ignitions managed with the primary goal of suppression. The percent of natural unplanned ignitions managed for resource objectives is also displayed. Confidence is high in the information displayed in Table 34. However, confidence is low displaying information that answers the question of how natural unplanned ignitions are used to trend vegetation towards desired conditions.

Table 34. Natural Unplanned Ignition Information across the Kootenai National Forest from 2016-2020

	2016 Fires	2017 Fires	2018 Fires	2019 Fires	2020 Fires
Total number of natural unplanned ignitions	32	51	38	34	10
Total acres of natural unplanned ignitions	14.9	72,008.25	12,987.2	13.5	5.38
Total number of natural unplanned ignitions managed for resource objectives	1	2	0	0	0
Total acres of natural unplanned ignitions managed for resource objectives	6	7615	0	0	0
Total number of natural unplanned ignitions managed with the primary goal of suppression	31	49	38	34	10

	2016 Fires	2017 Fires	2018 Fires	2019 Fires	2020 Fires
Total acres of natural unplanned ignitions managed with the primary goal of suppression	8.9	64,393.25	12,987.2	13.5	5.38
Percent of natural unplanned ignitions managed for resource objectives	3	4	0	0	0

Discussion

Since the Environmental Impact Statement (EIS) Analysis, there is new science allowing more in-depth analysis into burn severity and PVT converted to biophysical settings. MTBS data was used to determine acres of natural unplanned ignitions compared to KNF biophysical setting for fire years 2017-2018 that is trending towards desired conditions. These are shown in Table 35 and Table 36. It should be noted that MTBS monitors all unplanned natural ignition areas greater than 1,000 acres on the KNF. As such, MTBS total acres may be greater than FIRESTAT acres which only include wildfire acres that start on the KNF. This is further evidenced in 2017 where FIRESTAT shows 72,008.25 acres and MTBS shows 76,375.7 acres which include the Deep Creek fire on the Lolo National Forest which burned 6,696.7 acres on the KNF. This data is available for years 2016-2018. FIRESTAT data is collected from initial smoke report through the time a wildfire is declared out. This data is available from 2016-2020 since the last monitoring report.

Table 35. MTBS Data Converted to Kootenai National Forest (KNF) Biophysical Settings Displaying MTBS Total Burn Acres and Acres Trending Towards Desired Conditions on the KNF in Fire Year 2017

Region 1 Broad Potential Vegetation Type	KNF Biophysical Setting	Monitoring Trends in Burn Severity (MTBS) Type	MTBS Acres	Acres Trending Towards KNF Desired Conditions
Cold	Subalpine	Low Burn Severity	3998.2	3998.2
Cold	Subalpine	Moderate Burn Severity	4025.8	2500
Cold	Subalpine	High Burn Severity	4428.5	2500
Cool/Moist	Subalpine	Low Burn Severity	7417.1	7417.1
Cool/Moist	Subalpine	Moderate Burn Severity	6077.8	2500
Cool/Moist	Subalpine	High Burn Severity	6594.9	2500
Grassland	Warm/Dry	Low Burn Severity	33.8	33.8
Grassland	Warm/Dry	Moderate Burn Severity	12.7	12.7
Grassland	Warm/Dry	High Burn Severity	1.1	1.1
Mesic Shrub	Warm/Moist	Low Burn Severity	9.6	9.6

Region 1 Broad Potential Vegetation Type	KNF Biophysical Setting	Monitoring Trends in Burn Severity (MTBS) Type	MTBS Acres	Acres Trending Towards KNF Desired Conditions
Mesic Shrub	Warm/Moist	Moderate Burn Severity	2	2
Sparse	Warm/Dry	Low Burn Severity	4.9	4.9
Sparse	Warm/Dry	Moderate Burn Severity	0.2	0.2
Warm/Dry	Warm/Dry	Low Burn Severity	13199.3	13199.3
Warm/Dry	Warm/Dry	Moderate Burn Severity	5711.8	200
Warm/Dry	Warm/Dry	High Burn Severity	4070.3	200
Warm/Moist	Warm/Moist	Low Burn Severity	11196.7	11196.7
Warm/Moist	Warm/Moist	Moderate Burn Severity	5605	300
Warm/Moist	Warm/Moist	High Burn Severity	3986	300

Table 36. MTBS Data Converted to KNF Biophysical Settings Displaying MTBS Total Burn Acres and Acres Trending Towards Desired Conditions on the KNF in Fire Year 2018

Region 1 Broad Potential Vegetation Type	KNF Biophysical Setting	Monitoring Trends in Burn Severity (MTBS) Type	MTBS Acres	Acres Trending Towards KNF Desired Conditions
Cold	Subalpine	Low Burn Severity	649.6	649.6
Cold	Subalpine	Moderate Burn Severity	727.9	727.9
Cold	Subalpine	High Burn Severity	716.8	716.8
Cool/Moist	Subalpine	Low Burn Severity	1248.5	1248.5
Cool/Moist	Subalpine	Moderate Burn Severity	1268.8	1268.8
Cool/Moist	Subalpine	High Burn Severity	2082.1	2082.1
Grassland	Warm/Dry	Low Burn Severity	5.3	5.3
Grassland	Warm/Dry	Moderate Burn Severity	1.6	1.6
Sparse	Warm/Dry	Low Burn Severity	37.1	37.1
Sparse	Warm/Dry	Moderate Burn Severity	23.4	23.4
Sparse	Warm/Dry	High Burn Severity	19.8	19.8
Warm/Dry	Warm/Dry	Low Burn Severity	972.1	972.1

Region 1 Broad Potential Vegetation Type	KNF Biophysical Setting	Monitoring Trends in Burn Severity (MTBS) Type	MTBS Acres	Acres Trending Towards KNF Desired Conditions
Warm/Dry	Warm/Dry	Moderate Burn Severity	459	200
Warm/Dry	Warm/Dry	High Burn Severity	72.5	72.5
Warm/Moist	Warm/Moist	Low Burn Severity	2447.5	2447.5
Warm/Moist	Warm/Moist	Moderate Burn Severity	1074.4	300
Warm/Moist	Warm/Moist	High Burn Severity	366.5	300

When analyzing Table 38 alone, natural unplanned ignitions managed for resource objectives are not trending towards desired conditions as the KNF has not managed at least 10 percent of natural unplanned ignitions over the life of the plan. Data shows that only three percent of natural unplanned ignitions were managed in 2016, four percent in 2017, and zero percent in 2018-2020. This is due to several factors such as seasonality, environmental conditions, national/regional preparedness levels, resource availability, and values at risk. Additionally, federal policy changed in 2009 allowing fire managers to manage fires for multiple objectives on the same fire. For example, fire managers may be simultaneously managing for resource benefit on one area of a fire while suppressing another area that threatens values at risk. In this example, this would be considered a suppression fire and would not count as a fire that is trending vegetation towards desired conditions by current Forest Plan definition.

In the EIS analysis, there is a desire for fire to increase across many areas of the forest to trend vegetation towards desired conditions. Acres burned by wildfire across the west are trending upwards and the KNF is no exception. When analyzing MTBS data converted to KNF biophysical setting, many acres are trending vegetation towards desired conditions. Table 37 displays that in 2017, 46,875.6 acres are trending towards desired conditions and in 2018, 11,073 acres are trending towards desired conditions. These acres deemed to be trending towards desired conditions are minimum amounts as MTBS data is only available for unplanned natural ignitions larger than 1,000 acres in size. Smaller natural unplanned ignitions may be trending vegetation towards desired conditions but this is not captured by MTBS data. Table 38 displays that from 2016 to 2018, a total of 58,660.95 acres are trending vegetation towards desired conditions.

Table 37. Summary of Total MTBS Acres by Fire Year and Total Acres Trending Towards Desired Conditions on the KNF

	MTBS Total Acres	MTBS Acres Trending Towards KNF Desired Conditions
2016 Fires	0	0
2017 Fires	76,375.7	46,875.6
2018 Fires	12,172.9	11,073

Footnote. In 2016, there are no MTBS acres because there were no natural unplanned ignitions greater than 1,000 acres on the KNF.

Table 38. Total Acres of Natural Unplanned Ignitions by Fire Year Trending Towards Desired Conditions on the KNF

Fire Year	Acres of Natural Unplanned Ignitions Trending Towards KNF Desired Conditions
2016	14.9
2017	47,306.85
2018	11,339.2

Footnote. In 2017 and 2018, unplanned natural ignitions smaller than 1,000 acres were included that were determined to be trending towards vegetation desired conditions.

Other plan components related to the monitoring question include the following:

FW-DC-VEG-05. The pattern of forest conditions across the landscapes consists of a range of patch sizes that have a diversity of successional stages, densities, and compositions. Formerly extensive, homogenous patches of forests that are dominated by species and size classes that are very susceptible to disturbance agents have been diversified. Generally, there is an increase in the size of forest patches dominated by trees in the seedling/sapling size class, as well as in the large size class. There is a decrease in the size of the patches that are dominated by trees in the small and medium size classes.

FW-DC-VEG-07. Snags occur throughout the forest in an uneven pattern, provide a diversity of habitats for wildlife species, and contribute to the sustainability of snag dependent species. Snag numbers, sizes, and species vary by biophysical setting and dominance group. Over time, the number of large-diameter snags (20 inches in DBH or greater) increases in all biophysical settings.

FW-DC-VEG-11. The desired forest composition, structure, and pattern for each biophysical setting.

FW-OBJ-VEG-01. Treatment of approximately 250,000 acres to maintain and/or improve forest resilience, natural diversity, and productivity and to reduce negative impacts of non-native organisms. Treatments may include timber harvest, planting, thinning, management of fire (including planned and unplanned ignitions), mechanical fuel treatments, revegetation with native species, blister rust pruning, integrated tree improvement activities, noxious weed treatments, and other integrated pest management activities including forest health protection suppression and prevention activities.

FW-DC-WL-09. Productive plant communities, with a mosaic of successional stages, structures, and species, are available for migratory landbirds. These habitats support nesting activities or use during bird migration across the Forest. The use of fire, both planned and unplanned ignitions, improves and maintains this mosaic of habitats.

FW-DC-WL-14. A diversity of patch sizes of fire-killed trees (either natural or prescribed burned and where not a safety concern) exists to provide primary habitat for population expansions for species whose habitat requirements include this structural component (refers to FW-DC-VEG-05, FW-DC-TBR-01, FW-DC-FIRE-03).

FW-DC-WL-19. By trending towards the desired conditions for vegetation, habitat is provided for native fauna adapted to open forests and early seral habitats, or whose life/natural history and ecology are partially provided by those habitats.

Hazardous fuel treatments also contribute to trending vegetation towards desired conditions. MON-FIRE-01 addresses the acres of hazardous fuel treatments completed on the KNF. In summary, 30,337.4 acres of hazardous fuel treatments from 2016 to 2018 are trending towards desired conditions.

It is recommended that the indicator for MON-FIRE-02 be changed from number of unplanned ignitions managed for the maintenance and/or restoration of fire-adapted ecosystems, and the number of unplanned natural ignition managed with the primary goal of suppression to acres of natural unplanned ignitions that are trending towards vegetation desired conditions.

Federal policy changed in 2009 allowing fire managers to manage fires for multiple objectives on the same fire. For example, fire managers may be simultaneously managing for resource benefit on one flank of the fire while suppressing another flank that threatens values at risk. In this example, acres of vegetation may be trending towards desired conditions but this fire would be considered a suppression fire.

Table 39. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-FIRE-02: To what extent is unplanned fire used to trend vegetation towards desired conditions?	2021	Yes - The number of unplanned ignitions managed for the maintenance and/or restoration of fire adapted ecosystems does not provide a measurement of how vegetation is trending towards desired conditions. Additionally, unplanned ignitions are rarely managed on the Kootenai National Forest due to several factors such as seasonality, environmental conditions,	Yes -	Monitoring Program: The indicator may not be appropriate because the indicator does not directly address the question of how unplanned natural ignitions are trending vegetation towards desired conditions. Additionally, since the development of the plan, terminology for utilizing unplanned natural ignitions has changed which makes

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
		national/regional preparedness levels, resource availability, and values at risk. FW-OBJ-FIRE-02 calls for over the life of the plan, manage natural, unplanned ignitions to meet resource objectives on at least 10 percent of the ignitions. Data shows that only 3 percent of natural unplanned ignitions were managed in 2016, 4 percent in 2017, and zero percent in 2018-2020. In contrast, when analyzing acres of natural unplanned ignitions that are trending towards vegetation desired conditions, 58,660.95 acres of natural unplanned ignitions are trending towards vegetation desired conditions from 2016-2018.		for poor quality data extraction from databases and is difficult and cumbersome. Recommendation is to change the indicator for MON-FIRE-02 from number of unplanned ignitions managed for the maintenance and/or restoration of fire-adapted ecosystems, and the number of unplanned natural ignition managed with the primary goal of suppression to acres of natural unplanned ignitions that are trending towards vegetation desired conditions.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Watershed Evaluation and Adaptive Findings

MON-WTR-01

Table 40. MON-WTR-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
Are soil, water quality, and riparian and aquatic habitats protected and moving towards desired conditions?	FW-DC-WTR-02, FW-DC-WTR-04, FW-GDL-WTR-01, FW-GDL-WTR-03, FW-GDL-SOIL-05, FW-DC-RIP-03, FW-DC-AQH-01	MON-WTR-01-01: Number of Best Management Practices (BMPs) evaluations conducted and the percent of BMPs that were implemented correctly and the percent that were effective.	Annually	KNF BMP Monitoring Data; Montana DNRC Forest BMP Monitoring Report	Watershed Program Manager

Referenced Plan Components:

FW-DC-WTR-02. Water quality meets applicable state water quality standards and fully supports beneficial uses. Flow conditions in watersheds, streams, lakes, springs, wetlands, and groundwater aquifers fully support beneficial uses, and meet the ecological needs of native and desirable non-native aquatic species and maintain the physical integrity of their habitats.

FW-DC-WTR-04. Municipal watersheds and public water systems (source water protection areas) meet water quality standards.

FW-GDL-WTR-01. Management activities in impaired watersheds (listed by the state under section 5 of the Integrated 303(d)/305(b) Report) with approved TMDLs are designed to comply with the TMDL. Management activities in watersheds with streams on the 303(d) list are designed to maintain or improve conditions relative to the cause for impairment and will not cause a decline in water quality or further impair beneficial uses. A short-term or incidental departure from state water quality standards may occur where there is no long-term threat or impairment to the beneficial uses.

FW-GDL-WTR-03. Project-specific best management practices (BMPs) will be incorporated in all land use and project plans as a principle mechanism for controlling non-point pollution sources, meet soil and water goals, and protect beneficial uses. To the extent practicable, ditch and road surface runoff should be disconnected from streams and other water bodies.

FW-GDL-SOIL-05. Project specific best management practices (BMPs) should be incorporated into all land management activities as a principle mechanism for protecting soil resources.

FW-DC-RIP-03. Water quality provides stable and productive riparian and aquatic ecosystems. Streams and lakes are free of chemical contaminants and do not contain excess nutrients. Sediment levels are within reference conditions, supporting salmonid spawning and rearing, and cold water biota requirements.

FW-DC-AQH-01. Waterbodies, riparian vegetation, and adjacent uplands provide habitats that support self-sustaining native and desirable non-native aquatic communities, which include fish, amphibians, invertebrates, plants, and other aquatic-associated species. Aquatic habitats are diverse, with channel, lacustrine, and wetland characteristics and water quality reflective of the climate, geology, and natural vegetation of the area. Water quality supports native amphibians and diverse invertebrate communities. Streams, lakes, and rivers provide habitats that contribute toward recovery of threatened and endangered fish species and address the habitat needs of all native aquatic species.

Table 41. MON-WTR-01 - Monitoring Collection Summary

For monitoring item MON-WTR-01:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	This is the first MER
Next scheduled MER evaluation of this monitoring item:	2023

BMPs are designed to reduce or eliminate effects from non-point sources of sediment and to protect or reduce effects to soils and riparian habitat conservation areas (RHCAs). Use of BMPs are intended to move soil and aquatic resources towards the desired conditions in the Forest Plan. Monitoring implementation and effectiveness of BMPs validates that we are meeting the intent of the Clean Water Act and State water quality laws and regulations. In addition, BMP reviews identify BMPs that are not effective and provide a mechanism for adopting a new BMP or modifying an existing BMP. Further guidance for addressing this monitoring question is in the Monitoring Guide for the 2015 Forest Plan (V2) (USFS 2016).

Methods

To determine results of this monitoring item, we record the number of reviews conducted each year and calculate the percent of BMPs implemented correctly and the percent that were effective. BMP monitoring on the KNF used in this determination involves two different efforts: 1) BMP monitoring done by KNF personnel during their normal work activities or as an interdisciplinary team of district and forest level employees; and 2) BMP monitoring completed as part of the Statewide Forestry BMP Audit Program coordinated by the Forestry Division, Department of Natural Resources and Conservation (DNRC). During these monitoring efforts, BMPs were evaluated at multiple sites on various projects across the Forest. Audits done by Montana DNRC include interdisciplinary members from multiple state and federal agencies, conservation groups, timber industry representatives, private landowners, and logging professionals. Forest level BMP reviews are conducted multiple times annually, and Montana DNRC BMP reviews are done biennially. It is important to note the DNRC results include reviews on all federal lands in Montana and includes sites on the KNF every

monitoring cycle. The BMP implementation and effectiveness monitoring evaluation results are displayed in tables 3 and 4.

KNF BMP reviews are stored in the Forest's data files. The Montana DNRC BMP Review Reports are available at: Montana DNRC website.

Results

KNF Internal BMP Reviews

Ninety three percent of 79 KNF BMP reviews (Table 42) completed determined that BMPs were implemented correctly. In addition, 93 percent of the BMPs were effective at achieving the intent of the BMP applied. Overall, the KNF maintains a high level of compliance (> 90 percent) for both implementation and effectiveness.

The KNF also exceed the proposed eight BMP evaluations per year recommended by the Monitoring guide by completing more than 15 per year on average (Table 42).

Table 42. Summary of Internal BMP Reviews Conducted on the KNF

Review Year	Number of Reviews	BMPs: Number Rated	BMPs: % Implemented Correctly	BMPs: % Effective
2016	27	376	93	92
2017	7	96	95	91
2018	19	250	88	92
2019	17	281	95	95
2020	9	173	94	94
Total	79	1,176	93	93

Montana DNRC BMP Reviews

Montana DNRC evaluates BMP implementation and effectiveness on all ownerships. Their data represent monitoring from all federal lands, not just the KNF. Third party results of BMP monitoring on Montana Federal lands (Table 43) found that 95 percent of the BMPs were implemented correctly and 97 percent of the BMPs were effective. Biennial DNRC monitoring showed 95 percent or greater for all years for implementation and effectiveness. The average of DNRC BMP monitoring was also 95 percent or greater for both implementation and effectiveness. Third party monitoring is an important check on the KNF's monitoring showing a high rate of compliance (> 90 percent) as evaluated by an impartial, interdisciplinary group of professionals. Overall, monitoring done by Montana DNRC is comparable to internal monitoring by the Forest Service.

Table 43. Summary of DNRC BMP Reviews Conducted on the Montana Federal Lands

Review Year	Number of Reviews	BMPs: Number Rated	BMPs: % Implemented Correctly	BMPs: % Effective
2016	10	308	95	98
2018	9	463	95	95

Discussion

The BMP field review process is commonly used to evaluate forest practices and effects on water quality, RHCAs, and soils. Overall, the KNF maintains a high level of compliance (> 90 percent) for both implementation and effectiveness. This demonstrates the commitment from the KNF to forest management that protects or improves soil and water resources. The monitoring from both the Forest Service and Montana DNRC shows that BMPs on the KNF are maintaining forest plan desired conditions.

Alternatively, the most frequent departures and/or impacts came from the following BMPs (effectiveness less than 85 percent) and give insight into areas that could be improved upon:

- Provide adequate road surface drainage.
- Road drainage routed through adequate filtration before entering streams.
- Permanently closed roads in condition to provide adequate drainage without further maintenance.
- Stream crossing structures of proper size.
- Stream crossing culverts conform to natural streambed and slope.
- Road surface/ditch water directed away from crossing site or routed through filter, etc.
- Adequate erosion control and drainage for fire lines.
- Exclusion of broadcast burning in SMZ/RHCA.

It is important to note that some of the BMP departure numbers could be misleading due to the effects of a small sample size amplifying a few departures. However, Forest interdisciplinary teams should make an effort to emphasize these BMPs through project design and implementation to improve effectiveness in future projects.

Findings

Table 44. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-WTR-01 Are soil, water quality, and riparian and aquatic habitats protected and moving towards desired conditions?	2021	Uncertain - Methods inadequate to answer monitoring question. The performance indicator of percent BMPs properly implemented and percent that were effective answers most of the monitoring question. However, the trending aquatic habitat toward desired conditions may need additional information.	Yes Based on the evaluation of monitoring results, it is recommended that either: a) Rewrite the monitoring question so that trends in percent BMP implementation and effectiveness are all that is needed to answer the question. b) Include an additional analysis indicator such as PIBO to add context to whether the Forest trending as desired.	Monitoring Program: Update the monitoring guide to reflect an approach that would revise the monitoring question or add an additional performance indicator.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-WTR-02

Table 45. MON-WTR- 02 Monitoring item summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
To what extent are management activities moving watersheds towards	FW-DC-WTR-01, FW-DC-WTR-02, FW-DC-WTR-03, FW-DC-WTR-04, FW-OBJ-WTR-01, FW-OBJ-WTR-02, FW-	MON-WTR-02-01: Acres (or miles) of restoration activities accomplished, by 6th code	MON-WTR-02-01: Annual MON-WTR-02-02: 5 Years	Geo-enabled Performance Accountability System (gPAS). Montana Department of Environmental	Watershed Program Manager

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
desired conditions?	STD-WTR-01, FW-GDL-WTR-01	watershed and acres (or miles) accomplished in 303d/TMDL watersheds. MON-WTR-02-02: Percent of subwatersheds trended towards an improved condition.		Quality (MDEQ) Draft 2020 Water Quality Integrated Report.	

Referenced Plan Components:

FW-DC-WTR-01. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbance without long-term, adverse changes to their physical or biological integrity.

FW-DC-WTR-02. Water quality meets applicable state water quality standards and fully supports beneficial uses. Flow conditions in watersheds, streams, lakes, springs, wetlands, and groundwater aquifers fully support beneficial uses, and meet the ecological needs of native and desirable non-native aquatic species and maintain the physical integrity of their habitats.

FW-DC-WTR-03. Stream flows provide for channel and floodplain dimensions that mimic reference conditions. Stream flows allow for water and sediment conveyance and overall channel maintenance. Sediment deposits from over-bank floods allow floodplain development and the propagation of flood-dependent riparian plant species. Surface and groundwater flows recharge riparian aquifers, provide late-season stream flows, cold water temperatures, and sustain the function of surface and subsurface aquatic ecosystems.

FW-DC-WTR-04. Municipal watersheds and public water systems (source water protection areas) meet water quality standards.

FW-GDL-WTR-02. In order to avoid future risks to watershed condition, ensure hydrologic stability when decommissioning or storing roads or trails.

FW-OBJ-WTR-01. Over the life of the Plan, trend at least 15 percent of subwatersheds toward an improved watershed condition. Improvements in these watersheds may include passive or active restoration efforts, depending on opportunities and/or funding.

FW-OBJ-WTR-02. Annually, implement 50 to 250 acres of watershed improvement activities with an emphasis on 303(d)-listed watersheds, or watersheds with approved Total Maximum Daily Loads (TMDLs).

FW-STD-WTR-01. Management activities shall maintain or improve water quality in public source water areas, and be consistent with applicable state source water protection requirements.

Short-term effects[1] from activities in source water areas may be acceptable when those activities support long-term benefits[2] to aquatic resources.

FW-GDL-WTR-01. Management activities in impaired watersheds (listed by the state under section 5 of the Integrated 303(d)/305(b) Report) with approved TMDLs are designed to comply with the TMDL. Management activities in watersheds with streams on the 303(d) list are designed to maintain or improve conditions relative to the cause for impairment and will not cause a decline in water quality or further impair beneficial uses. A short-term or incidental departure from state water quality standards may occur where there is no long-term threat or impairment to the beneficial uses.

Table 46. Monitoring Item MON-WTR-02 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	This is the first MER
Next scheduled MER evaluation of this monitoring item:	2023

Maintaining and protecting water related resources is a central tenant of the KNF Forest Plan. This analysis quantifies the amount of watershed and aquatic-focused restoration activities that have occurred and the KNF's progress toward the stated goals of improving watershed condition across the planning area. These include watershed conditions of "impaired waters" identified by the state. Guidance for addressing this monitoring question is in the Monitoring Guide for the 2015 Forest Plan (V2) (KNF 2016).

Methods

Item WTR-02 includes two performance indicators (Table 45).

MON-WTR-02-01: Performance indicator 1 quantifies restoration activities including stream channel or riparian habitat restoration, road decommissioning, and road management activities. The primary source for this information in the geo-enabled Performance Accountability System (gPAS) Reports, which combines the annual accomplishment reporting information in the Watershed Improvement Tracking (WIT) database and the INFRA database.

This data was further analyzed by the amount of activities that occurred in waters listed by the state as impaired (303d/Category 4a). Category 4a waters have a water quality improvement plan referred to as total maximum daily load (TMDL). For additional information refer to the MDEQ Draft 2020 Water Quality Integrated Report (MDEQ 2021).

MON-WTR-02-02: Performance indictor 2 is the percent of subwatersheds trending toward an improved physical or biological condition.

[1] Effects that occur during, or immediately following, implementation of activity

[2] Benefits that occur following completion of the activity

To account for physical and biological trends, the Watershed Condition Characterization and the Salmonid Assessment Spreadsheets were updated. The KNF used the data in these spreadsheets for the EIS analysis for Forest Plan revision.

Specifically, we reran the metrics in the Watershed Condition Characterization spreadsheet V3.1 (December 2010) and updated population information codes in the Salmonid Assessment Spreadsheet V3.5 (March 2013). Supporting documentation can be found in appendix D of the Forest Plan.

Watershed Condition Characterization

The Watershed Condition Characterization spreadsheet incorporates results from three processes: watershed sensitivity, watershed disturbance, and riparian disturbance to determine a watershed condition rating (see Appendix D —Aquatics: Analyses and Methodology in the 2015 KNF Revised Land Management Plan FEIS).

Subwatersheds rated as "low" generally have a relatively low inherent sensitivity to disturbances and low level of overall disturbance. These subwatersheds exhibit geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. The drainage network is generally stable. Soil, aquatic, and riparian systems are assumed to be functional, in terms of supporting beneficial uses.

A rating of "moderate" generally indicates a subwatershed with a low to moderate inherent sensitivity and/or a low to moderate level of disturbances. Watersheds exhibit moderate geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. Portions of these subwatersheds may exhibit an unstable drainage network. Soil, aquatic, and riparian systems may or may not support beneficial uses.

In general, subwatersheds rated as "high" have a relatively higher sensitivity to natural and human caused disturbances and relatively higher level of overall disturbances. These subwatersheds may have limited geomorphic, hydrologic, and biotic integrity relative to their natural potential condition. A majority of the drainage network may be unstable.

Salmonid Assessment

We updated fisheries population information and watershed condition rating in the Salmonid Assessment Spreadsheet as outlined in the Monitoring Guide and Appendix D of the KNF Revised Land Management Plan FEIS.

Conservation watersheds were evaluated by selecting subwatersheds that had a strong or stable populations of bull trout, westslope cutthroat trout, interior redband trout (or combination of the three) in subwatersheds rated as "low" for watershed characterization.

Active restoration watersheds were determined by selecting subwatersheds that had small populations or populations of unknown size of bull trout, westslope cutthroat trout, interior redband trout, or combination of the three, present in subwatersheds rated as "moderate."

Passive restoration watersheds were determined by selecting subwatersheds that had small populations or populations of unknown size of bull trout, westslope cutthroat trout, interior redband trout, or combination of the three, present in subwatersheds rated as "high."

Results

MON-WTR-02-01. The KNF restored or enhanced an average nine miles of stream, 15 miles of stored/decommissioned road, and improved soil and water conditions on 151 acres per year through the first 5 years since the Revised KNF Forest Plan was signed (Table 47). The

number of miles or acres may vary by an order of magnitude between years, which is expected as project implementation is dependent on annual funding availability and/or contractor schedules.

Table 47. Watershed Restoration for All Watersheds

Fiscal Year	Stream Restored or Enhanced Miles	Road Stored/ Decommissioned Miles	Soil, Water, Lake or Wetland Improved Acres
2016	7	21	139
2017	8	22	101
2018	22	29	482
2019	3	4	23
2020	3	0	12
Average	9	15	151

Note: Acres and miles of activity may vary from other resources due to differing accomplishment reporting rules.

Of the miles and acres reported in Table 48, an average three miles of stream, two miles of stored/decommissioned road, and improved soil and water conditions on 76 acres per year occurred in impaired watersheds through the first 5 years since the Revised KNF Forest Plan was signed.

Table 48. Watershed Improvement in Subwatershed with Impaired Waters

Fiscal Year	Stream Restored or Enhanced Miles	Road Stored/ Decommissioned Miles	Soil, Water, Lake or Wetland Improved Acres
2016	5	8	91
2017	1	3	29
2018	7	1	252
2019	0	0	1
2020	0	0	6
Average	3	2	76

Note: Acres and miles of activity may vary from other resources due to differing accomplishment reporting rules.

MON-WTR-02-02

Watershed Condition Characterization

The updated Watershed Condition Characterization process resulted in a decrease in watersheds rated as low and rated high and an increase in the number rated moderate (Table 49). Active restoration and/or vegetative recovery led to subwatersheds moving from high to moderate. The KNF experienced major wildfires in 2105, 2017, and 2018 which was the major factor in the low rated subwatersheds moving to moderate.

Table 49. Watershed Condition Characterization

Fiscal Year	Number of Subwatersheds Rated Low	Number of Subwatersheds Rated Moderate	Number of Subwatersheds Rated High
2010	52	62	14
2020	49	72	8

Note: The National Hydrography Dataset (NHD) was updated since the original assessment resulting in 129 total subwatersheds vs 128.

Salmonid Assessment

The limited updates to bull trout, westslope cutthroat trout, and interior redband trout population categories had very little effect on watershed management category. However, the changes made to the watershed rating, which is included in the watershed management categorization, changed several calls, resulting in a larger amount of active restoration subwatersheds (Table 50).

Table 50. Salmonid Assessment

Fiscal Year	Number of Conservation Subwatersheds	Number of Active Restoration Subwatersheds	Number of Passive Restoration Subwatersheds
2013	50	54	14
2020	52	59	7

Discussion

MON-WTR-02-01: The objective of Forest Plan FW-OBJ-WTR-02 is to annually implement 50 to 250 acres of watershed improvement activities with an emphasis on 303(d)-listed subwatersheds or subwatersheds with TMDLs. During the five-year monitoring period, the KNF restored an average of 151 acres per year for all subwatersheds (Table 47) and 76 acres per year for subwatersheds with impaired waters (Table 48). As a result, activities on the KNF over the last five years met the objective of FW-OBJ-WTR-02.

MON-WTR-02-02: The objective of Forest Plan FW-OBJ-WTR-01 is over the life of the Plan, to trend 15 percent of subwatersheds toward an improved condition, through passive or active restoration efforts. The assessment of Watershed Condition (Table 49) showed that six, or five percent, of watersheds improved from high to moderate. However, three, or 2 percent, moved from low to moderate for a net improvement of four percent. As stated previously, large wildfires in three of the five monitoring years are a major factor in moving low subwatersheds to moderate. The Salmonid Assessment (Table 50) showed improvements in nine watersheds or eight percent of the subwatersheds. Seven subwatersheds moved from Passive to Active Restoration and two from Active Restoration to Conservation Subwatersheds. Overall, KNF subwatersheds are trending towards FW-OBJ-WTR-01.

Findings

Table 51. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-WTR-02 To what extent are management activities moving watersheds towards desired conditions?	2021	(C) Uncertain – Thought implementation of watershed improvements are progressing as desired, the methods to assess percent of watershed trending toward improvement is inadequate. The monitoring results demonstrate progress toward the plan objectives. However, if we are going to continue its use, the process needs to be re-written using the data and analysis techniques available today. In addition to the issues with the soil detrimental disturbance assumptions and INFRA data, analyzing FACTS data is considerably different then analyzing TSMRS data, therefore, the analysis process needs to be updated and adjusted using the latest techniques, software, and databases available. This would take considerable time and research to be reproducible.	YES	Monitoring Program: Update the monitoring guide to reflect an approach that would provide an answer to the monitoring question. a) Re-invest in another GIS/database exercise but there needs to be a long-term commitment to upkeep and scrutinize each factor in the analysis. b) Use the PIBO data and annual reports at the Forest scale and the, perhaps the 5th code HUC (10-digit) scale to monitor changes that are reflected in stream channels.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Aquatic Habitat Evaluation and Adaptive Findings

MON-AQH-01

Table 52. MON-AQH-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-AQH-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired condition to reconnect fragmented stream habitat to increase population resilience to disturbance including climate change?	FW-DC-AQH-02, FW-DC-AQS-01, FW-DC-AQS-04, FW-DC-AQS-05, FW-OBJ-AQH-03	MON-AQH-01-01: Miles of reconnected stream habitat	Annually	WIT	Forest Fish Program Manager

Referenced Plan Components:

FW-DC-AQH-02 - . Connectivity between waterbodies provides for life history functions (e.g., fish migration to spawning areas, amphibian migration between seasonal breeding, foraging, and overwintering habitats) and for processes such as recolonization of historic habitats. Stream channels supply the required structure for desired stream habitat features.

FW-DC-AQS-01 - Over the long term, habitat contributes to the support of well-distributed self-sustaining populations of native and desired non-native aquatic species (fish, amphibians, invertebrates, plants, and other aquatic-associated species). In the short term, stronghold populations of native fish continue to thrive and expand into neighboring unoccupied habitats, and depressed populations increase in numbers. Available habitat supports genetic integrity and life history strategies of native fish, macroinvertebrates, and amphibian populations.

FW-DC-AQS-04 - Bull trout – Recovery and delisting of bull trout is the long-term desired condition. Bull trout population trends toward recovery through cooperation and coordination with USFWS, tribes, state agencies, other federal agencies, and interested groups. Recovery is supported through accomplishment of Bull Trout Recovery Plan tasks under Forest Service jurisdiction. On NFS lands spawning, rearing, and migratory habitat is widely available and inhabited. Bull trout have access to historic habitat and appropriate life history strategies (e.g., resident, fluvial, and adfluvial) are supported.

FW-DC-AQS-05 - Bull trout. Habitat conditions improve in occupied bull trout streams and in connected streams that were historically occupied, resulting in an increase in the overall number of stronghold populations. Bull trout habitat and populations continue to be protected through the application of INFISH standards and guidelines.

FW-OBJ-AQH-03 - Over the life of the Plan, reconnect 30 to 55 miles of fragmented habitat in streams where aquatic and riparian-associated species' migratory needs are limiting distribution of those species.

Table 53. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	-
Next scheduled MER evaluation of this monitoring item:	2023

The revised plan included elements believed to be critical to focusing on restored connectivity of spawning and rearing habitat for migratory salmonids.

Results

Methods

Data is entered and stored in the Watershed Improvement Tracking database (WIT). Data was retrieved by query and summarized by year and species.

Results

Bull trout habitat was the primary restoration focus. The bulk of the restoration was related to AOP pipe installations during implementation of KNF vegetation management projects.

Table 54. Miles of connectivity restored annually by species, 2016 through 2019

Species	2016	2017	2018	2019	TOTAL MILES
Bull Trout	4.10	6.67	11.62		22.39
Interior Redband			10.07	0.83	10.90
Westslope Cutthroat	5.18	6.67	1.00		12.85

The types of projects implemented to accomplish restored connectivity are shown in Table 55.

Table 55. Summary by Fiscal Year for HBT-ENH-STRM (MILES) as summarized from WIT database, January 2021

Year	Miles	Species benefited, treatment type
2016	6	AOP Improvement (Bull trout, WSC); Channel Reconstruction (Bull trout, WS cutthroat); Decom TS 4 (Bull Trout, WSC) Road Maintenance (bull trout); Species Population Conservation (Bull Trout – Graves Cr)
2017	7	AOP Barrier Removed-Road (Bull Trout, Rainbow); AOP Improvement Road (Bull Trout, WS Cutthroat); Channel Reconstruction (BT and WSC); Crossing Improvement – NonFish (BT); Decom TS 4 (BT, RBT); Restore Hydrological function (Rainbow); Riparian improvement (BT, WSC); Road Repair (BT, WSC); Road stormproofing (BT, RBT); Species Population Conservation (BT); Storage L1 (BT, WSC)

Year	Miles	Species benefited, treatment type
2018	22	AOP Barrier Removed (BT, RBT); Decom TS 4 (BT, RBT); Riparian Improve (BT, WSC), Road Stormproofing (BT, RBT)
2019	1	Restore Hydrologic Function, Storage Level 1)
2020	0	No entry in WIT, doesn't mean district didn't have any

Discussion

Project work has allowed the restoration of connectivity annually, with the exception of 2020. The pandemic and lack of COR's postponed some planned AOP projects. The Forest has been very successful at restoring connectivity for both adfluvial and resident populations of native salmonids.

Findings

Table 56. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-AQH-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired condition to reconnect fragmented stream habitat to increase population resilience to disturbance including climate change?	2020	YES - Implementation of Plan Component(s) ARE progressing, toward the desired condition and plan objectives.	No	None

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Soils Evaluation and Adaptive Findings

MON-SOIL-01

Table 57. MON-SOIL-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
To what extent has coarse woody debris been retained for long-term soil productivity and other ecosystem functions?	FW-DC-SOIL-01, FW-DC-SOIL-03, FW-DC-SOIL-04, FW-GDL-SOIL-02, FW-GDL-SOIL-03, FW-DC-VEG-08, FW-GDL-VEG-03	Number of harvest units surveyed and percent meeting coarse woody debris criteria post-harvest	Annually	KNF Soil Monitoring Data	Watershed Program Manager, Forest Soil Scientist

Referenced Plan Components:

- **FW-DC-SOIL-01:** Soil organic matter, physical conditions, and down woody debris maintain soil productivity and hydrologic function. Physical, biological, and chemical properties of soils are within the recommended levels by soil type as described in the KNF soil inventory. These soil properties enhance nutrient cycling; maintain the role of carbon storage, and support soil microbial and biochemical processes.
- **FW-DC-SOIL-03:** Soil impacts are minimized and previous activity areas that have incurred detrimental soil disturbance recover through natural processes and/or restoration activities. Organic matter and woody debris, including large diameter logs, tops, limbs, and fine woody debris, remain on site after vegetation treatments in sufficient quantities to retain moisture, maintain soil quality, and enhance soil development and fertility by periodic release of nutrients as they decompose (refer to FW-GDL-VEG-03).
- **FW-DC-SOIL-04:** Soil organic matter and down woody debris support healthy mycorrhizal populations, protects soil from erosion due to surface runoff, and retain soil moisture. Volcanic ash-influenced soil that occur on most of the Forest are not compacted and retain unique properties, such as low bulk density and high water holding capacity, to support desired vegetative growth.
- **FW-GDL-SOIL-02:** Coarse woody debris is retained following vegetation management activities per (FW-GDL-VEG-03).
- **FW-GDL-SOIL-03:** On nutrient-limited landtypes, harvesting organics should remain on site for at least 6 months or over a winter season to allow foliage nutrients to leach into the soil, except where site-specific analysis indicates the fuels would present unacceptable an hazard.

- **FW-DC-VEG-08:** Down wood occurs throughout the forest in various amounts, sizes, species, and stages of decay. The larger down wood (I.e., coarse woody debris) provides habitat for wildlife species and other organisms, as well as serving important functions for soil productivity.
- **FW-GDL-VEG-03:** Vegetation management activities should retain the amounts of coarse woody debris (including logs) that are displayed in Table 59. A variety of species, sizes, and decay stages should be retained. Exceptions may occur in areas where a site-specific analysis indicates that leaving the quantities listed in the table would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources. In addition, exceptions may occur where the minimum quantities listed in the table are not available for retention.

Table 58. Monitoring Item MON-SOIL-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER for this monitoring item:	This is the first MER
Next scheduled MER evaluation of this monitoring item:	2023

Organic matter is a critical component of a productive soil as a contributor to soil structure and stability, hydrologic function, and biological function (Deluca et al. 2019). The forest plan focuses on coarse wood debris (CWD) as the indicator for organic matter. Course woody debris consists of dead woody material larger than 3 inches in diameter primarily derived from tree limbs, boles, and roots (Forest Plan 2015). The Forest Plan (2015) provides retention of CWD in a treatment unit per guideline FW-GDL-VEG-03, listed in table 3.

Table 59. Level of logs and other Coarse Woody Debris to Retain after Vegetation Management Activities for each Biophysical Setting

Biophysical Setting	Total Coarse Woody Debris to Retain (tons/acre)	Number and Size of Logs to Retain:# of Logs/Acres	Number and Size of Logs to Retain: Desired Size
Warm/Dry	Dry Sites: 5-12	6-14	Diameter: >10” with at least 2 pieces >20”
Warm/Dry	Moister Sites: 10-20	6-14	Length: >12’
Warm/Moist	12-33	20-30	Diameter: >12” with at least 10 pieces >20” Length: >12’
Subalpine	Moister Sites: 12-25	Moister Sites: 20-30	Diameter: >10” (8” for lodgepole pine)
Subalpine	Drier Sites: 7-15	Drier Sites: 15-20	Length: >12’

Methods

CWD data is collected using a modified transect intercept technique from the *Handbook for Inventorying Downed Woody Material* (Brown 1974). Woody material larger than 3 inches in

diameter and greater than 6 feet in length is inventoried along 50 ft transects, documenting diameter and decay class (solid or rotten). The Forest collects data on 15-20 transects per unit randomly located and running in a randomly chosen direction from a central point. Information from these transects is then used to report tons per acre of CWD in the unit. CWD data is collected simultaneously with detrimental soil disturbance monitoring data (MON-SOIL-02), which is collected two to five years post-harvest.

This report summarizes the number and percentage of treatment units that achieve CWD guidelines in the Forest Plan (table 3) monitored between 2016 and 2020.

Results

Table 60 shows the number of harvest units meeting CWD recommendations from annual monitoring over the analysis period, with an average of 67 percent of units meeting these recommendations each year. Figure 9 and Figure 10 compare preharvest CWD levels with postharvest levels. CWD samples were not collected for all pre-harvest units as this data was not consistently monitored at the time these units were reviewed. Differences in the monitoring frequency also occurred when widespread wildfire burned on the KNF in 2017-2018.

Pre-harvest existing conditions are represented for 61 units where CWD data was collected in Figure 9 according to biophysical setting. Figure 10 shows the post-harvest conditions of those same units.

Table 60. Post-harvest CWD Monitoring Results

Fiscal Year	Number of Units Monitored	% Meeting CWD Recommendation	% Under CWD Recommendation
2016	13	62	38
2017	52	83	17
2018	11	50	50
*2019**	35	77	23
*2020**	51	61	39
	Total: 181	Average: 67%	Average: 33%

*Note: 13 of the 35 units monitored in 2019 and 30 of the 51 units monitored in 2020 were from wildfire salvage sales. Available material for CWD retention may have been affected by the fire.

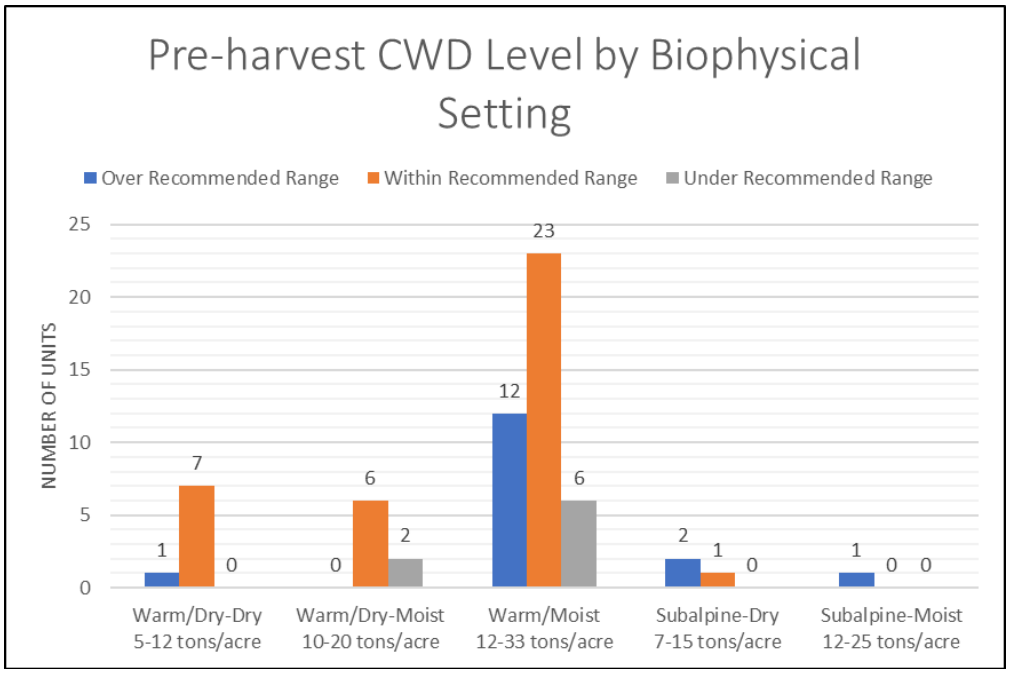


Figure 9. Distribution of CWD by biophysical setting before harvest activities

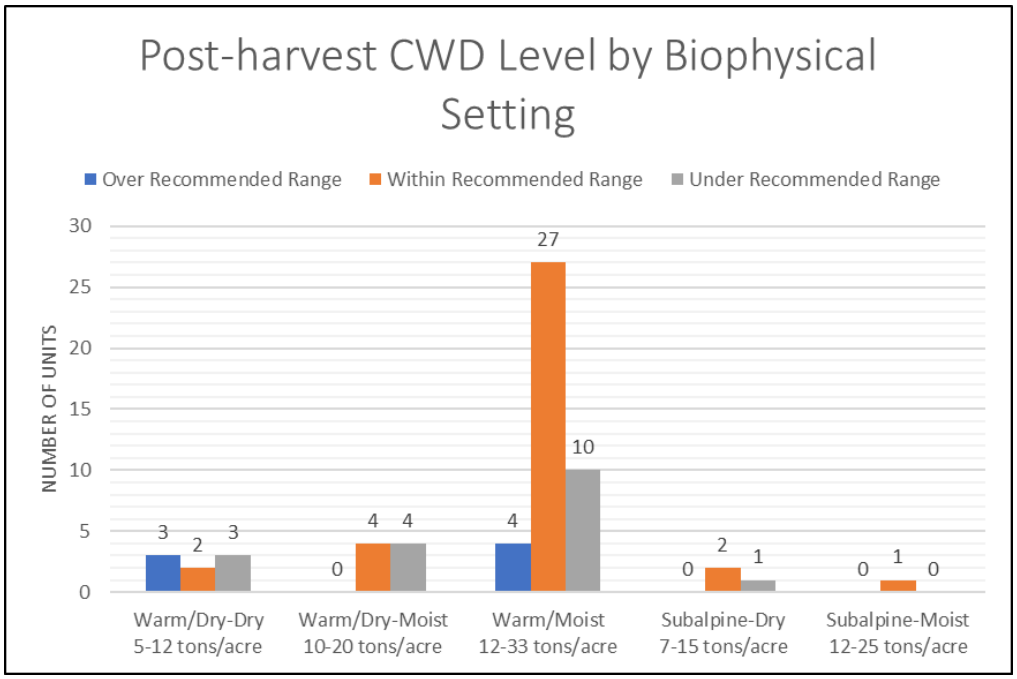


Figure 10. Distribution of CWD by biophysical setting after harvest activities

Discussion

The Forest has been moderately successful at achieving FW-GDL-VEG-03 after vegetation management activities are completed; 67 percent of units monitored met or exceeded the recommended range of CWD. When checked for trends across the forest, units in the Warm/Dry-Dry and Warm/Dry-Moist settings showed a decrease in meeting recommended CWD levels compared to pre-harvest conditions (Figure 9 and Figure 10). The Warm/Moist,

Subalpine-Dry, and Subalpine-Moist settings showed the opposite trend with more units meeting recommended CWD levels compared to pre-harvest conditions. Of 162 units monitored for CWD post-harvest, only 61 units were also monitored pre-harvest. Despite varying sample sizes, the Forest has met or exceeded 50 percent compliance with CWD recommendations each year.

Across all biophysical settings, an overall reduction in CWD after harvest was observed. This is a common trend as harvest activities and fuel abatement can significantly reduce the available CWD concentrations in some units. Timber sale contracts require that non-saw material be removed down to a 3" diameter top and saw logs down to 5.6" diameter inside the bark. Additionally, in units that are whole tree yarded, the entire cut tree is removed from the unit and unused limbs and tops are left at the landing site. While material found dead or down at the time of harvest is left on site, there may be limited opportunity to contribute additional CWD (particularly large diameter material) to units' deficient pre-harvest. Fuel abatement activities after harvest can consume concentrations of logging slash, further reducing CWD levels. The KNF is striving to identify these concerns where present and make adjustments as needed to enhance CWD presence and move towards Forest Plan components.

In some areas, it may not be feasible to retain the recommended levels of CWD. The Forest Plan acknowledges that "exceptions can occur in areas [that] would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources [and] where the minimum quantities listed in the table are not available for retention" (FW-GDL-VEG-03).

This monitoring evaluation identified a need to improve CWD retention in vegetation management units. Recommendations to trend this monitoring element in a positive direction to achieve Forest Plan guidelines involve the following: (1) adjust monitoring to incorporate preharvest CWD data to better indicate where a lack of material may exist and how to plan for long term recruitment; (2) coordinate with silviculture, fuels, and implementation staff to ensure sufficient CWD is left behind, even where CWD levels were low pre-harvest; and (3) expand monitoring to address prescribed burning.

More comprehensive pre-harvest surveys of CWD could help the Forest decide where CWD recruitment may be an issue. Many current forest operations efficiently remove slash with whole tree yarding techniques and regeneration harvest types. Regeneration prescriptions remove a large portion of the forest biomass, leaving retention patches and seed trees as potential CWD recruitment. Regeneration harvest types have contract provisions that allow for removing activity slash along with non-merchantable material treated for fuels and site preparation objectives. Thus, it takes active engagement and coordination of soils, silviculture, fuels, and implementation staff to ensure CWD retention objectives are met.

Findings

Table 61. Summary of findings for Plan Monitoring Item MON-SOIL-01

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-SOIL-01 To what extent has coarse woody debris been retained for long-term soil productivity and other ecosystem functions?	2021	(E)Yes	Yes - Soils staff work with implementation and fuel treatment staff to identify action items necessary to achieve the Forest Plan guideline based on pre-harvest survey data.	Management activities: need to ensure proper retention of CWD. Communication between soils, silviculture, fuels, and sale administration will identify actions to improve guideline compliance.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Planned remedies:

- Adjust monitoring to include preharvest CWD data to better indicate where a deficiency of material may exist and how to plan for long term recruitment
- Coordinate with silviculture, fuels, and implementation staff to ensure CWD objectives are met

MON-SOIL-02

Table 62. Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
To what extent have vegetative management	Region 1 Supplement 2509.18-2005-	Number of harvest units surveyed and percent that	Annually	KNF Soil Monitoring Data	Watershed Program Manager,

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
activities prevented irreversible damage to soil conditions?	1), FW-DC-SOIL-03	meet the Regional Soil Quality Standard, post-harvest (FSM, R1 Supplement No. 2500-99-1)			Forest Soil Scientist

Referenced Plan Components:

- **Region 1 Supplement 2509.18-2005-1):** This supplement provides soil quality standards to assure the statutory requirements of NFMA are met. Manual direction recommends maintaining 85 percent of an activity area's soil at an acceptable productivity potential with respect to detrimental impacts, including the effects of compaction, displacement, rutting, severe burning, surface erosion, loss of surface organic matter and soil mass movement. This recommendation is based on research indicating that a decline in productivity would have to be at least 15 percent to be detectable (Powers, 1990). In areas where more than 15 percent detrimental soil disturbance exists from prior activities, the cumulative detrimental effects from project implementation and restoration should not exceed the conditions prior to the planned activity and should move toward a net improvement in soil quality. These standards do not apply to intensively developed sites such as permanent roads/landings, mines, developed recreation and administrative sites because they have been removed from the productive land base.
- **FW-DC-SOIL-03:** Soil impacts are minimized and previous activity areas that have incurred detrimental soil disturbance recover through natural processes and/or restoration activities. Organic matter and woody debris, including large diameter logs, tops, limbs, and fine woody debris, remain on site after vegetation treatments in sufficient quantities to retain moisture, maintain soil quality, and enhance soil development and fertility by periodic release of nutrients as they decompose (refer to FW-GDL-VEG-03).

Table 63. Monitoring Item MON-SOIL-02 - Monitoring Collection Summary

For monitoring item 2:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	This is the first MER
Next scheduled MER evaluation of this monitoring item:	2023

Monitoring Item Soil-02 was designed to determine if the Forest Plan goal to maintain soil productivity (Forest Plan 2015) is met. To accomplish this task, soils were evaluated using definitions and guidelines provided in the KNF Forest Plan as well as Region 1 Supplement 2500-99-1. One objective is to determine if the activity unit being monitored exceeds the R1

Soil Quality Standard of 15 percent aerial extent of Detrimental Soil Disturbance (DSD). It is important to consider the 15 percent as a trigger point at which more in-depth evaluations would be conducted and soil restoration may be required to meet the Regional Standard.

When evaluating soil quality, a set of factors is used in determining DSD from management activities. By definition, DSD includes (1) compaction in which the bulk density has increased by 15 percent above natural conditions; (2) rutting where wheel ruts are at least 2 inches deep in wet soils; (3) displacement with the removal of 1 inch or more of any surface horizon in a continuous area greater than 100 square feet; (4) severely burned soil; (5) surface erosion; and (6) any mass movement (FSM 2500 2014). Such conditions may indicate site impairment or soil productivity issues and is a quantitative measurement which can easily be tracked and compared. These factors have been considered when completing both pre-implementation and post implementation soil quality monitoring in this report.

Methods

DSD monitoring has historically been completed by the Forest Soil Scientist using a protocol developed by the Rocky Mountain Research Station. The following references below outline this protocol:

- The Region 1 Approach to Soils NEPA Analysis Regarding Detrimental Soil Disturbance In Forested Areas – A Technical Guide (U.S. Department of Agriculture 2011).
- Forest Soil Disturbance Monitoring Protocol, Volume 1 Rapid Assessment, USDA Forest Service. Gen. Tech. Report WO-82A. September 2009 (Page-Dumroese et al. 2009).
- Soil –Disturbance Field Guide. USDA Forest Service. National Technology & Development Program. 0819 1815-SDTDC August 2009. (Napper et al. 2009).

Since 1992, the Forest has collected soil disturbance data using a random stratified quantitative procedure involving soil transects within the harvest unit. Data points collected using this procedure fall into one of three categories: 1) no disturbance; 2) disturbance present but not detrimental; and 3) detrimental soil disturbance.

Pre-implementation soil monitoring determines baseline, existing soil conditions used during the National Environmental Policy Act (NEPA) planning process to guide project design and proposed actions. Soil resource protections include Montana Best Management Practices (BMPs), and project design features and mitigations to protect and maintain soil resources.

Post-implementation soil monitoring of vegetation management activities on the KNF dates back to 1988 when soil disturbance levels were established as a means to achieve Forest Plan standards and the National Forest Management Act (1976). This sampling typically occurs 2-3 years following timber extraction and fuel treatments. If levels of detrimental soil disturbance exceed 15 percent, rehabilitation projects are recommended.

In addition to determining if management activities are maintaining soil quality, post-implementation monitoring provides information regarding the effects of activities on specific landtypes. The monitoring has also led to the development of mitigation or design features that are prescribed to limit detrimental soil disturbance.

Results

In the 2016-2020 field seasons, pre-implementation soil quality monitoring was conducted for 80 percent of proposed commercial timber units, prioritizing monitoring of units with past harvest activity. Post-harvest monitoring was conducted on 181 units across the Forest. During that time, all but 4 units were found to meet R1 SQS after harvest.

Figure 11 shows post-harvest DSD values for all units monitored between 2016 and 2020. In 120 of these units, pre-harvest DSD data was collected. Figure 12 shows both pre- and post-harvest DSD values for those units.

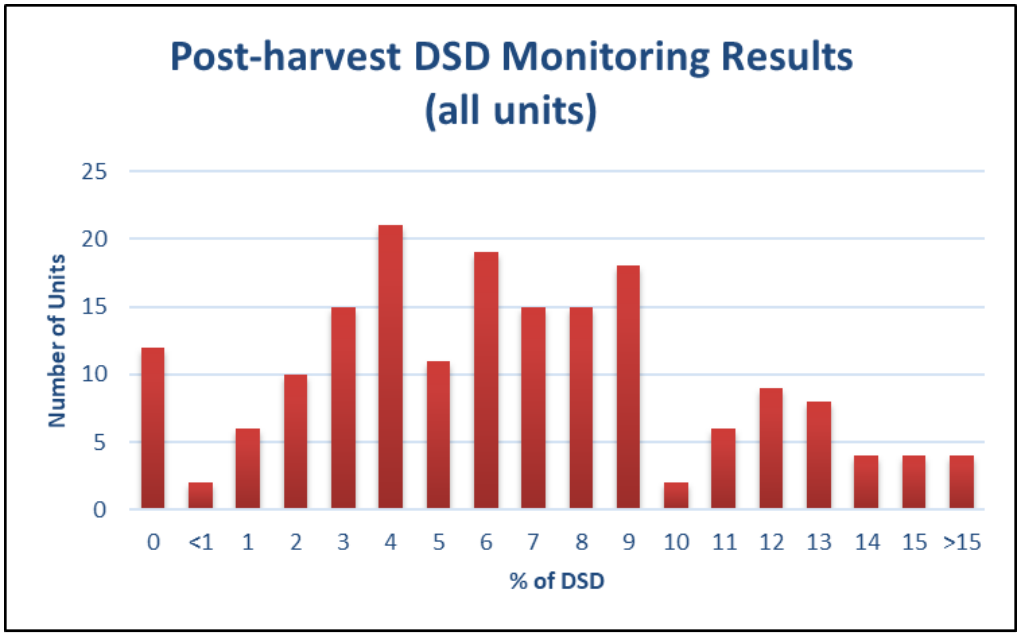


Figure 11. Post-harvest DSD values for all 181 units sampled following timber harvest and fuel abatement

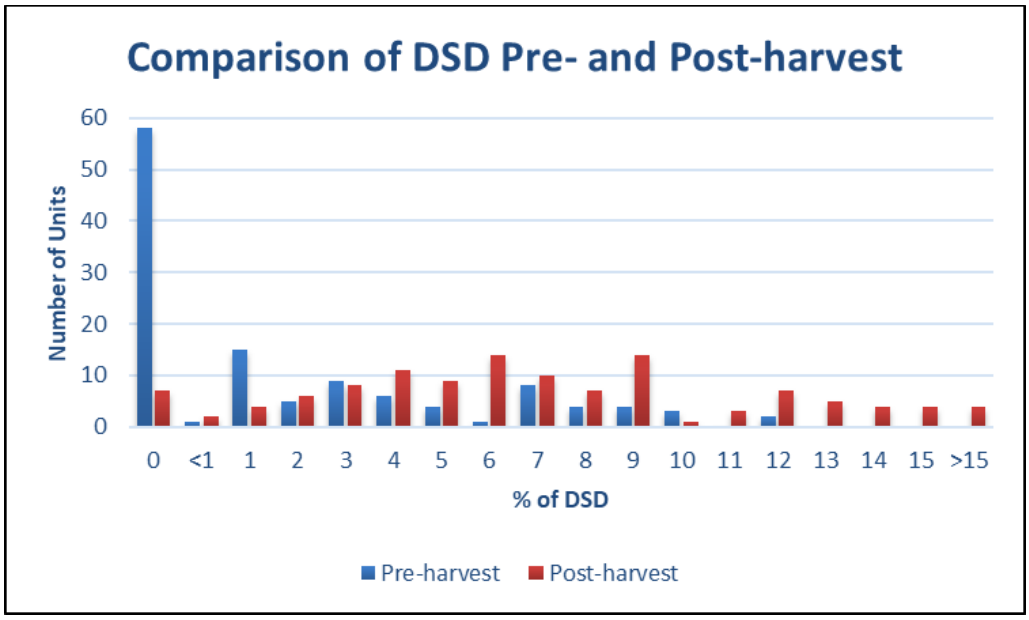


Figure 12. Comparison of DSD for 120 units where both pre- and post-timber harvest data was collected

Discussion

Annual soil monitoring for vegetation management activities from 2016 to 2020 completed post-harvest soil transects on 47 timber sales involving 181 units (5,257 acres). Data collected on the Kootenai National Forest from 2016 to 2020 found that 99 percent of the re-sampled acres were found to have DSD values of 15 percent or less. This shows a strong improvement over historic timber harvest activities where 49 percent of 501 acres monitored in 1992 exceeded 15 percent DSD. These high disturbance values were due to heavy use of true dozer for both timber harvest and piling for fuel abatement activities. Over time, this machinery has been replaced by rubber-tired skidders which have considerably less long-term soil impacts. The four sampled units still found to contain soil disturbance impacts greater than 15 percent DSD in the past 5 years are listed in Table 64 below.

Table 64. Monitoring Results of DSD over 15 percent from Management Activities

Year	Acres	Operation Period	Operation Method	Harvest and Fuels Description
2017	8	Summer	Clipper cut with rubber tired skidder	Whole tree yarding with excavator pile in unit
2019	10	Fall	Clipper cut with rubber tired skidder	Whole tree yarding with excavator pile at landing
2019	7	Winter	Clipper cut with rubber tired skidder	Whole tree yarding with excavator pile in unit
2020	16	Fall	Clipper cut with rubber tired skidder	Whole tree yarding with excavator pile in unit. Skid trails from salvage operation

Year	Acres	Operation Period	Operation Method	Harvest and Fuels Description
				perpendicular to historic dozer bladed harvest

The unit surveyed that was found to be above 15 percent in 2017 contained 17percent DSD. Extensive dozer activity from prior harvest and a large central burn pile from the most recent harvest contributed to soil compaction. This unit was re-sampled in 2020 and DSD levels were found to have dropped to 10 percent. No restoration activities were conducted or planned as this unit now meets Regional Soil Standards.

Two units monitored in 2019 exceeded 15 percent DSD. The first was found to have17 percent DSD. This unit contained widespread skid trails and machinery tracks were noted throughout, contributing to detrimental compaction and rutting. The second unit was found to have 18 percent DSD and contained extensive bladed skid trails leading to increased soil compaction and displacement. Additional surveys are planned for both units to determine the extent of soil restoration activities needed.

In 2020, only one unit exceeded 15 percent DSD and was found to contain 35 percent DSD following fire salvage operations. This unit was extensively harvested in the past with true dozer and bladed skid trails located at 60-70 feet intervals up the slope. The skid trails from recent fire salvage operations run perpendicular to the historic true dozer bladed skid trails. Plans are in place to complete soil restoration activities in this unit and the surrounding area in 2021. Re-monitoring will be conducted 3-5 years after restoration to determine if soil recovery is occurring and DSD is trending toward values of 15 percent or less to meet Regional Soil Standards.

During the 2020 field season, the KNF soils team re-monitored 7 timber sale units (112 acres) which were previously found to exceed 15 percent DSD to determine if soil DSD conditions were recovering over time and to what degree. Of the 7 units re-sampled, all were found to have returned to 15 percent soil disturbance or less. Such improvements occurred over time and did not involve soil restoration activities. This data follows the results of information collected for RMRS-GTR-380 (Gier et al. 2018). This study on the KNF found a decrease in DSD values over time with the greatest soil recovery occurring in the first 3-5 years after harvest. Recovery took place due to natural processes and without restoration activities.

Soil monitoring of other vegetation management activities involving winter skidding, log forwarder, skyline, helicopter, mastication, and prescribed fire has indicated that these activities cause low to moderate disturbance that is well below the 15 percent standard for DSD. Monitoring between 2016 and 2020 of units harvested with these systems found no units exceeding 15 percent DSD.

In addition to current monitoring of commercial harvest units, future goals are to expand monitoring to include units harvested using tethered logging units. Plans are to monitor such units both before harvest activities and within 2 years of harvest completion.

Findings

The following findings and recommendations resulted from the evaluation of monitoring results.

Table 65. Summary of findings for Plan Monitoring Item MON-SOIL-02

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-SOIL-02 To what extent have vegetation management activities prevented irreversible damage to soil conditions?	2021	Yes	Yes	Monitoring Program: expand monitoring to include units harvested using tethered logging units. Plans are to monitor such units both before harvest activities and within 2 years of harvest completion

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Riparian Evaluation and Adaptive Findings

The following section present the most current information (data and evaluations) for all monitoring questions contained within the Kootenai National Forest Plan. Each monitoring item includes 1) a summary of the monitoring question, its indicator(s), and the plan components the monitoring question is assessing; 2) monitoring results and discussion; and 3) evaluation of the results to determine an adaptive management finding on whether recommended management changes are warranted or not.

MON-RIP-01

Table 66. MON-RIP-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-RIP-01: Have riparian and wetland areas been maintained or improved to provide for healthy streams	FW-OBJ-RIP-01	MON-RIP-01-01: Acres (or miles) of riparian habitat maintained or improved.	Annually	WIT	Forest Fish Program Manager

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
and aquatic environments to increase resiliency to disturbance including climate change?					

Referenced Plan Components:

FW-OBJ-RIP-01. Annually, maintain or improve 10 to 50 acres of riparian habitat.

Table 67. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	-
Next scheduled MER evaluation of this monitoring item:	2023

The revised plan included elements believed to be critical to protection of riparian and aquatic habitat function. Implementation of those element has maintained aquatic habitat integrity and maintained watershed condition.

Methods

Data is entered and stored in the Watershed Improvement Tracking database (WIT). Data was retrieved by query and summarized by year and species.

Results

Riparian habitat was managed for the benefit of aquatic related species. Table 68 displays the total by year of acres and miles managed for riparian benefit.

Table 68. Riparian habitat managed or treated to move toward FW-OBJ-RIP-01, 2010 through 2020

Riparian Treated by year	Acres	Miles
2016	37	7
2017	717	7
2018	126	11
2019	0	0
2020	0	0

Discussion

Most riparian management consists of implementing riparian buffers and avoiding negative impacts to aquatic habitats. The project areas summarized in Table 68 consisted predominantly of riparian vegetation plantings to restore willow, black cottonwood and other riparian vegetation. No projects were implemented in 2019 due to shift strictly timber harvest and fuels treatment. No riparian projects were implemented in 2020 due to the Covid-19 Pandemic and subsequent restrictions.

Findings

Table 69. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-RIP-01: Have riparian and wetland areas been maintained or improved to provide for healthy streams and aquatic environments to increase resiliency to disturbance including climate change?	2020	YES - Implementation of Plan Component(s) ARE progressing, toward plan objectives.	YES	Montioring Program: Change the monitoring question to the following to track the implementation objective and not the outcome of the implementation. NEW question: What is the implementation status of riparian habitat?

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Federally Listed Species Evaluation and Adaptive Findings

MON-FLS-01-01

Table 70. MON-FLS-01-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?	FW-STD-WL-02 FW-STD-WL-03	Core; Open Motorized Route Density; Total Motorized Route Density; linear miles of open and total motorized routes	Annual	INFRA; supplemental data for motorized access routes not covered by INFRA	Forest Wildlife Biologist

Table 71. Monitoring Item MON-FLS-01-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	2014
Next scheduled MER evaluation of this monitoring item:	2023

Referenced Plan Components:

FW-STD-WL-02 and FW-STD-WL-03 set standards to minimize the impact of motorized routes on grizzly bears within the Cabinet-Yaak Recovery Zone, the Northern Continental Divide Ecosystem, and the Bears Outside Recovery Zone portions of the KNF. Incidental take was issued by USFWS based upon the KNF's compliance with these standards. This monitoring item tracks progress towards these standards.

> **FW-STD-WL-02.** The Motorized Access Management within the Selkirk and Cabinet Yaak Grizzly Bear Recovery Zone Management Direction and ROD is included in appendix B [note: appendix B in the Forest Plan], and shall be applied.
>
> **FW-STD-WL-03.** Within the Kootenai portion of the NCDE recovery zone, BMU subunits shall maintain or improve the access and habitat parameters as shown in table 6 [note: table 6 in the Forest Plan]. Site-specific motorized access densities and security core habitat are developed at the project level in consultation with the USFWS and through appropriate public involvement and NEPA procedures.

Although not clearly articulated as indicators for MON-FSL-01-01 in the Monitoring Program (USDA 2016b), there are a few other indicators described in the Monitoring Guide (USDA 2016c). These include the linear miles of open and total motorized routes in the Bears Outside Recovery Zone (BORZ) areas, the percentage of closure devices (e.g. gates/barriers) monitored in the Cabinet-Yaak Recovery Zone, and the instances of entry into core for road decommissioning and stabilization work in the Cabinet-Yaak Recovery Zone.

Methods

Core, open motorized route density (OMRD), and total motorized route density (TMRD) within the Bear Management Units (BMU), and linear miles of open and total motorized routes within the BORZ areas are summarized here in this Forest Plan monitoring report. These numbers were pulled from the annual monitoring reports (USDA 2016, 2017, 2018, 2018b, 2019, 2020a, 2020d) submitted to USFWS as required by the Biological Opinion (USDI 2013 and 2020) for the Forest Plan.

Data for motorized routes are pulled primarily from INFRA, however supplemental data needs to be pulled from elsewhere (e.g. for motorized trails, routes along the KNF's boundary) to provide a fuller picture of the impacts of motorized routes on grizzly bears on the KNF. Within the Recovery Zone all ownerships are considered while within the BORZ only NFS lands are used in the analysis. As of bear year 2019, railroad tracks and associated wheeled motorized access routes, and all powerline wheeled motorized access routes have also been included in the route layer and are included in calculating the following grizzly bear metrics:

Definitions:

> **Core –** An area of secure habitat within a BMU that contains no motorized travel routes or high use non-motorized trails during the non-denning season and is more than 500 meters from a drivable road. Core areas do not include any gated roads but may contain roads that are impassable due to vegetation or constructed barriers.
>
> **TMRD (Total Motorized Route Density) –** Calculations made with the moving windows technique that includes open roads, restricted roads, roads not meeting all reclaimed criteria, and open motorized trails. The percent of the analysis area in relevant route density classes is calculated.
>
> **OMRD (Open Motorized Route Density) –** Calculations made with the moving windows technique that includes open roads, other roads not meeting all restricted or obliterated criteria, and open motorized trails. The percent of the analysis area in relevant route density classes are calculated.
>
> **Moving windows -** The analysis area is broken into pixels (grid cells), for which a road density for a set "window" around that pixel is calculated. The KNF moving windows model uses a 60 m grid cell size. The window is circular and uses a 907.9865 m radius (0.56 mi).
>
> **Linear miles of total motorized routes –** this calculation is done for the BORZ areas and is simply a tally of the linear miles of open roads, restricted routes that may receive administrative use, and motorized trails.

Linear miles of open motorized routes – this calculation is done for the BORZ areas and is simply a tally of the linear miles of open roads and motorized trails.

Bear Year – this refers to the time period (i.e. April 1 – November 30) outside of the denning season.

Note, this edition of the monitoring report summarizes these parameters as previously disclosed in the annual monitoring reports submitted to USFWS. Up through the Bear Year 2019 (USDA 2020) monitoring report for the Cabinet-Yaak the numbers reflected combined permanent and temporary changes that occurred in that Bear Year. With the issuance of the 2020 Biological Opinion for the Forest Plan, these parameters will be displayed differently in future reports by differentiating between the current bear year (including database corrections, temporary authorized activities, and a post bear year (all temporary authorized activities that were implemented shown as completed, while routes with ongoing authorized activity reflecting that status).. Consequently, the next monitoring report will not be directly comparable to the numbers displayed in this report, however it will provide a clearer picture regarding any changes to the parameters.

The percentage of closure devices monitored in the Cabinet-Yaak Recovery Zone and the list of entries into core areas for road decommissioning and stabilization within the Cabinet-Yaak Recovery Zone are displayed in each annual report to USFWS. Those results are summarized here.

Results

The series of tables below show the motorized access metrics for the Bear Management Units (BMU) within both the Cabinet-Yaak Ecosystem (CYE) and Northern Continental Divide Ecosystem (NCDE). As this is the first monitoring report since the finalization of the revised Forest Plan, all Bear Years (BY) since that time are displayed for the CYE. The NCDE is on a different reporting schedule (every other year), so only a couple years of data is available for inclusion in this monitoring report. Metrics for the BORZ areas are reported for each year as these areas are associated with the CYE and are submitted to USFWS annually.

Table 72. Displayed are the core area percentages for each Cabinet-Yaak BMU on the KNF in each BY since the finalization of the revised Forest Plan (2015). Core is calculated as a percentage of the entire BMU

BMU	Standard	BY 15	BY 16	BY 17	BY 18	BY 19
1 (Cedar)	80	83	82	83	84	84
2 (Snowshoe)	75	76	77	77	77	77
3 (Spar)	59	62	62	62	62	62
4 (Bull)	63	62	61	61	61	61
5 (St. Paul)	60	58	58	58	58	58
6 (Wanless)	55	54	54	54	54	53
7 (Silver Butte)	63	65	65	65	65	65
8 (Vermilion)	55	58	58	58	58	58
9 (Callahan)	55	58	59	59	59	57
10 (Pulpit)	52	54	54	54	54	54
11 (Roderick)	55	53	53	54	54	56

BMU	Standard	BY 15	BY 16	BY 17	BY 18	BY 19
12 (Newton)	55	53	54	56	56	54
13 (Keno)	59	60	57	60	59	59
14 (NW Peak)	55	56	56	56	56	56
15 (Garver)	55	55	53	55	54	54
16 (EF Yaak)	55	55	53	43	55	54
17 (Big Cr.)	55	57	58	58	55	58

Table 73. Displayed are the Open Motorized Route Densities (OMRD) for each Cabinet-Yaak BMU on the KNF in each BY since the finalization of the revised Forest Plan (2015). OMRD is calculated as a percentage of the BMU in each road density category. OMRD is the percentage of the BMU with a road density ≥1 mi/mi^2

BMU	Standard	BY 15	BY 16	BY 17	BY 18	BY 19
1 (Cedar)	15	15	16	14	14	16
2 (Snowshoe)	20	19	18	18	19	16
3 (Spar)	33	34	32	29	29	29
4 (Bull)	36	37	37	38	38	38
5 (St. Paul)	30	28	28	28	28	28
6 (Wanless)	34	32	32	29	33	32
7 (Silver Butte)	26	22	22	24	29	24
8 (Vermilion)	32	32	32	32	32	32
9 (Callahan)	33	27	27	27	31	29
10 (Pulpit)	44	44	44	45	45	45
11 (Roderick)	28	32	30	29	30	29
12 (Newton)	45	47	45	42	42	43
13 (Keno)	33	34	35	32	35	34
14 (NW Peak)	31	29	29	27	30	29
15 (Garver)	33	30	32	29	30	32
16 (EF Yaak)	33	28	30	43	30	30
17 (Big Cr.)	33	30	30	34	34	30

Table 74. Displayed are the Total Motorized Route Densities (TMRD) for each Cabinet-Yaak BMU on the KNF in each BY since the finalization of the revised Forest Plan (2015). TMRD is calculated as a percentage of the BMU in each road density category. TMRD is the

BMU	Standard	BY 15	BY 16	BY 17	BY 18	BY 19
1 (Cedar)	15	8	9	8	8	10
2 (Snowshoe)	18	16	14	15	15	14
3 (Spar)	26	26	26	26	26	26
4 (Bull)	26	29	29	30	30	30
5 (St. Paul)	23	23	23	23	23	23

BMU	Standard	BY 15	BY 16	BY 17	BY 18	BY 19
6 (Wanless)	32	33	33	34	34	34
7 (Silver Butte)	23	23	23	23	22	23
8 (Vermilion)	21	21	22	22	22	22
9 (Callahan)	26	27	26	26	26	29
10 (Pulpit)	34	27	26	27	26	28
11 (Roderick)	26	28	27	27	27	26
12 (Newton)	31	34	34	32	32	32
13 (Keno)	26	24	24	24	25	24
14 (NW Peak)	26	24	25	24	24	24
15 (Garver)	26	25	26	25	27	27
16 (EF Yaak)	26	25	26	33	25	25
17 (Big Cr.)	26	15	15	16	17	15

Table 75. Displayed are the linear miles of open motorized routes within the BORZ on the KNF. The existing condition for each BY is shown, and the corrected baseline (standard) is displayed in parentheses

BORZ	BY 15	BY 16	BY 17	BY 18	BY 19
Cabinet Face	129.96 (129.5)	130.5 (129.5)	138.0 (133.6)	140.2 (133.6)	134.7 (133.6)
Clark Fork	171.2 (176.9)	183.8 (176.9)	173.3 (176.9)	173.6 (176.9)	183.3 (184.7)[1]
Tobacco	864.1 (867.0)	860.0 (867.0)	868.0 (867.0)	864.9 (872.0)	954.5 (914.0)[2]
West Kootenai	342.3 (343.0)	340.4 (343.0)	353.53 (359.2)	360.6 (359.7)	464.1 (456.1)[3]

[1] – There are an additional 1.7 miles of railroad in the Clark Fork BORZ.

[2] – There are an additional 22.4 miles of railroad tracks in the Tobacco BORZ.

[3] – Additional Recurring Use Areas (RUAs) added to the West Kootenai BORZ. There is also an additional 0.8 miles of railroad tracks in this BORZ.

Table 76. Displayed are the linear miles of total motorized routes within the BORZ on the KNF. The existing condition for each BY is shown, and the corrected baseline (standard) is displayed in parentheses.

BORZ	BY 15	BY 16	BY 17	BY 18	BY 19
Cabinet Face	165.0 (165.0)	165.0 (165.0)	166.5 (165.0)	169.2 (165.0)	166.2 (165.0)
Clark Fork	236.5 (256.1)	240.9 (256.1)	250.3 (256.1)	250.4 (256.1)	255.7 (265.7)[1]
Tobacco	1108.1 (1123.9)	1104.1 (1123.9)	1110.86 (1124.7)	1107.0 (1127.4)	1182.5 (1170.3)[2]
West Kootenai	641.2 (654.4)	638.1 (654.4)	671.9 (656.8)	639.7 (657.3)	784.5 (789.3)[3]

[1] – There are an additional 1.7 miles of railroad in the Clark Fork BORZ.

[2] – There are an additional 22.4 miles of railroad tracks in the Tobacco BORZ.

[3] – Additional Recurring Use Areas (RUAs) added to the West Kootenai BORZ. There is also an additional 0.8 miles of railroad tracks in this BORZ.

Table 77. Displayed are the core area percentages for each NCDE BMU subunit on the KNF for BY 17 and 19. Core is calculated as a percentage of the entire BMU. The baseline conditions represent the standard.

Subunit Name	Core Baseline Conditions[1]	Core BY 17	Core BY 19
Krinklehorn	75	75	75
Terriault	71	71	71

1 – updated. See USDI 2020, USDA 2020c.

Table 78. Displayed are the Open Motorized Route Densities (OMRD) for each NCDE BMU subunit on the KNF for BY 17 and 19. OMRD is calculated as a percentage of the BMU in each road density category. OMRD is the percentage of the BMU with a road density ≥1 mi/mi^2. The baseline conditions represent the standard.

Subunit Name	OMRD Baseline Conditions[1]	OMRD BY 17	OMRD BY 19
Krinklehorn	22	22	22
Terriault	26	26	26

1 – Updated. See USDI 2020, USDA 2020c.

Table 79. Displayed are the Total Motorized Route Densities (TMRD) for each NCDE BMU subunit on the KNF for BY 17 and 19. TMRD is calculated as a percentage of the BMU in each road density category. TMRD is the percentage of the BMU with a road density ≥2 mi/mi^2. The baseline conditions represent the standard.

Subunit Name	TMRD Baseline Conditions[1]	TMRD BY 17	TMRD BY 19
Krinklehorn	14	14	14
Terriault	12	12	12

1 – Updated. See USDI 2020, USDA 2020c.

Table 80. Displayed are the closure devices monitored for motorized routes within the Cabinet-Yaak Recovery Zone portion of the KNF. Closure devices are gates or barriers.

Bear Year	Number of Closure Devices	Number Monitored	Percent Monitored
2015	603	513	85
2016	603	452	75
2017	605	398	66
2018	605	229	38
2019[1]	931	619	66

[1] As of 2019, the total number of devices has been updated to reflect conditions on the ground due to data collected during 2018 and 2019 on the Libby RD. This has further refined the number of impassible roads (due to vegetation) that actually had a barrier in place. On the Rexford RD slight adjustments were made for a gated road that was bermed. On the Three Rivers RD due to ongoing approved project activities, including creation of in-kind-core and harvest and watershed improvement work, barriers have been installed on roads previously impassible due to vegetation, or previously gated roads, while some previously barriered roads are now gated, and the total number of closure devices and the number of routes being gated, barriered, or impassible due to vegetation have fluctuated over time, and this is true for 2019.

Table 81. List of locations, dates, duration, and circumstances for invoking the allowance for entering core area for the purposes of road decommissioning or stabilizations in the Cabinet-Yaak Recovery Zone.

BMU	Location	Date	Duration	Circumstances
1-Cedar	Southwestern corner of the BMU in the Madge Creek area.	Summer 2017	~ 2 wks	Combination of storage and decommissioning of roads 691, 691E, and 14705, Sparring Bulls Project
9-Callahan	In finger of core between north and south Callahan creeks, east of Smith Patrol (mountain).	July-16-August 10, 2012	~3 ½ wks	Road 4521 – combination of decommissioning and storage work under West Troy Project

Discussion

The NCDE metrics of core, OMRD, and TMRD have not changed from the baseline (standard). No further discussion is necessary for these indicators.

The metrics for the Cabinet-Yaak ecosystem need further clarification. The annual monitoring reports that are submitted to USFWS, which are summarized here in this Forest Plan monitoring report, include not only permanent changes within the BMUs or BORZ but also temporary changes in each Bear Year. These temporary changes were due to project activities, administrative use levels that exceeded allowable limits, or known illegal use. Lumping all these authorized and unauthorized temporary changes together makes it difficult to determine whether the condition within the BMU or BORZ is achieving or progressing toward the standards. The recent Forest Plan consultation (USDA 2020b and USDI 2020) took a different approach and separated out the illegal unauthorized use from the metric calculations, and further divided the bear year metrics into a current bear year (including all database corrections made that year and all authorized activities) and a post bear metric (all authorized activities implemented and completed, while routes with continuing ongoing project activity reflect that status). These post bear year metrics reflect the actual on-the-ground progress toward the standard in the BMU, or where the BORZ linear miles are in relation to the baseline.

USDA 2020b and USDI 2020 show that most Cabinet-Yaak BMUs on the KNF currently meet the Forest Plan standards. There are four BMUs that currently do not meet standards and need access management changes in the next few years to move towards the standards. Implementation is expected to occur in 2021 for BMU 8, 2022 for BMUs 5 and 6, and 2023 for BMU 4 and by the end of 2023 all KNF BMUs within the Cabinet-Yaak are expected to meet or exceed (i.e. be better than) the standards.

Furthermore, the recent Forest Plan BO (USDI 2020) changed the metric for incidental take within the BORZ from linear miles of open and total motorized routes to secure habitat. As summarized in USDI 2020, secure habitat more adequately represents the potential effects related to motorized access as it provides a more accurate indication of the spatial mix of motorized routes and areas outside the influence of motorized routes. This new metric was only used in the BO as a metric for incidental take, and it will be used in project level consultations. However, it did not change FW-STD-WL-02, and linear miles of open and total motorized routes remains the metric in the BORZ for determining Forest Plan compliance.

Findings

Table 82. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?[2]*
MON-FLS-01-01 –Grizzly Bear: progress towards achieving and maintaining standards for percent core area, OMRD, and TMRD within the Recovery Zones	2021	YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired The Forest is either at or better than the BMU standards or is trending towards the standards and expected to achieve them in the next few years. BORZ metrics show temporary increases above the standards, which is allowed for project activities. Illegal use was included in the calculations which is generally temporary in nature. Illegal use should be displayed separately because it is not a FS authorized activity.	Yes	Monitoring Program: Consider replacing linear miles of open/total motorized routes with secure habitat as the metric for BORZ under FW-STD-WL-02.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Literature Cited

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MON-FLS-01-02

Table 83. MON-FLS-01-02 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward	FW-STD-WL-01	Standards Veg S1 and S2 (changes in lynx habitat as a result of moving towards the desired conditions for vegetation through	Biennially for Standards Veg S1 and S2; every 5 years for snow compacting activities	Vmap; FACTS; GIS layers of over-snow routes	Forest Wildlife Biologist

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
habitat objectives?		vegetation management, prescribed fire, or natural disturbance); Snow compacting activities			

Table 84. Monitoring Item MON-FLS-01-02 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2021 (veg); 2017 (snow compacting)
Next scheduled data collection/compilation:	2023 (veg); 2022 (snow compacting)
Last MER evaluation for this monitoring item:	2014
Next scheduled MER evaluation of this monitoring item:	2023

Referenced Plan Components:

FW-STD-WL-01 states that the Northern Rockies Lynx Management Direction (NRLMD) ROD (USDA 2007) shall be applied. Standards Veg S1 and S2 in the NRLMD limit activities in Lynx Analysis Units (LAU) if the amount of lynx habitat in an early stand initiation stage (i.e. lynx habitat in an unsuitable condition) exceeds thresholds.

> **FW-STD-WL-01.** The Northern Rockies Lynx Management Direction (2007) and ROD is included in appendix B [note: appendix B in the Forest Plan], and shall be applied.

The NRLMD ROD also required monitoring of snow compacting activities, to be done every 5 years. Although this was not clearly articulated as an indicator with MON-FLS-01-02 in the KNF Monitoring Program (USDA 2016b), it was identified as an indicator in the Monitoring Guide (USDA 2016c).

Methods

Lynx habitat (i.e. boreal forest) and structural stage within LAUs on the KNF is mapped primarily using vegetation data in VMAP, with information in FACTS used to determine the amount of regeneration treatments on KNF lands in the last decade. Snow compacting activities are identified by KNF recreation specialists and mapped in GIS.

The KNF's lynx habitat query was updated in 2021 to account for improvements in technology and data.

Definitions (from USDA 2007):

Standard VEG S1 – Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages limit disturbance in each LAU as follows:

> If more than 30 percent of lynx habitat in an LAU is in a stand initiation structural stage that does not provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects (USDA 2007 attachment 1, pages 2 and 3).

Standard VEG S2 – Timber management projects shall not regenerate more than 15 percent of lynx habitat on NFS lands within an LAU in a ten year period (USDA 2007 attachment 1, page 3).

Vegetation Management – Vegetation management changes the composition and structure of vegetation to achieve specific objectives, using such means as prescribed fire and timber harvest. For purposes of this decision, the term does not include removing vegetation for permanent developments like mineral operations, ski runs, roads and the like, and does not apply to fire suppression or to wildland fire use (USDA 2007 attachment 1, page 15).

Timber Management – Timber management consists of growing, tending, commercially harvesting, and regenerating crops of trees (USDA 2007 attachment 1, page 14).

Project – All or any part or number of the various activities analyzed in an EIS, EA, or DM. For example, the vegetation management in some units or stands analyzed in an EIS could be for fuel reduction. Therefore, those units or stands would fall within the term fuel treatment project even if the remainder of the activities of the EIA is being conducted for other purposes, and the remainder of those units or stands have other activities prescribed for them. All units in an analysis do not necessarily need to be for fuel reduction purposes for certain units to be considered a fuel reduction project (USDA 2007 attachment 1, page 13).

Regenerate (regeneration harvest in the glossary) – The cutting of trees and creating an entire new age class, an even-age harvest. The major methods are clearcutting, seed tree, shelterwood, and group selective cuts (Helms, 1998 in USDA 2007 attachment 1, page 14).

Stand Initiation Structural Stage – The stand initiation stage generally develops after a stand replacing disturbance by fire or regeneration timber harvest. A new single story layer of shrubs, tree seedlings, and saplings establish and develop, reoccupying the site. Trees that need full sun are likely to dominate these even-aged stands (Oliver and Larson, 1996 in USDA 2007 attachment 1, page 14).

Winter Snowshoe Hare Habitat – Winter snowshoe hare habitat consists of places where young trees or shrubs grow densely (thousands of woody stems per acre) and tall enough to protrude above the snow during winter, so snowshoe hare can browse on the bark and small twigs (LCAS in USDA 2007). Winter snowshoe hare habitat develops primarily in the stand initiation, understory re-initiation and old forest multistoried structural stages (USDA 2007 attachment 1, page 15).

Lynx Habitat in an Unsuitable Condition (i.e. early stand initiation stage) – Lynx habitat in an unsuitable condition consists of lynx habitat in the stand initiation structural stage where the trees are generally less than approximately 10 to 30 years old and have not grown tall enough to protrude above the snow during winter. Stand replacing fire or certain vegetation management projects can create unsuitable conditions. Vegetation management projects that can result in unsuitable habitat include clearcuts and seed tree harvest, and sometimes shelterwood cuts and commercial thinning depending on the resulting stand composition and structure (LCAS in USDA 2007 attachment 1, page 12).

Designated over-the-snow routes – Designated over-the-snow routes are routes managed under permit or agreement or by the agency, where use is encouraged, either by on-the ground marking or by publication in brochures, recreation opportunity guides or maps (other than travel maps), or in electronic media produced or approved by the agency. The routes identified in outfitter and guide permits are designated by definition; groomed routes also are designated by definition. The determination of baseline snow compaction will be based on the miles of designated over-the-snow routes authorized, promoted or encouraged during the period 1998 to 2000 (USDA 2007 attachment 1, page 10).

Lynx habitat within LAUs on the KNF was updated in 2021 to account for changes since the last time it was updated (2014). This update accounts for vegetation changes through 2020, including vegetation management, fire, and other natural disturbances. It also accounts for the passage of time as lynx habitat grows from one stage (e.g. early stand initiation) to another (e.g. stand initiation). To determine the percentage of lynx habitat currently in an early stand initiation stage (Standard Veg S1), divide the acres of lynx habitat in the early stand initiation stage in a LAU by the total acres of lynx habitat within that LAU. To calculate the percentage of lynx habitat that has been regenerated by timber management projects on KNF lands in a LAU over the last decade (Standard Veg S2), divide the acres of timber management regeneration on NFS lands by the total lynx habitat on NFS lands within that LAU.

Miles of designated over-snow routes and ski areas were mapped by the recreation specialists on the KNF.

Results

Table 85 shows the results of the Veg S1 and S2 calculations. Table 86 compares the miles of over-snow routes and ski areas the last time monitoring was conducted (2017) to what was used in the consultation for the NRLMD.

Table 85. Displayed are the percentages for the NRLMD standards Veg S1 and S2. The threshold identified in Veg S1 is 30% of lynx habitat in an early stand initiation stage, and 15% of lynx habitat regenerated on NFS lands in the last decade for Veg S2

LAU Number	LAU Name	Veg S1 %	Veg S2%
14101	Young-Dodge	28	9
14102	Bounder-Sullivan	4	<1
14103	Good	2	2
14104	North Fork Big	<1	<1
14105	Lookout	10	8

LAU Number	LAU Name	Veg S1 %	Veg S2%
14106	South Fork Big	8	0
14107	Parsnip	3	<1
14108	McGuire-Tenmile	6	5
14109	Sutton	6	4
14110	Pinkham	1	<1
14301	Therriault	6	0
14302	Grave	14	0
14303	Krinklehorn	16	0
14304	Edna	6	1
14305	Swamp	8	2
14306	Fortine	8	1
14307	Sunday-Trego	2	1
14401	Robinson	11	1
14402	Hawkins	8	<1
14403	Baldy	1	1
14404	Lost Horse	<1	0
14405	Skookum	2	<1
14406	Thunder	2	<1
14407	China	<1	0
14408	Callahan	3	<1
14409	Crowl	<1	<1
14410	Keeler	6	<1
14411	Ross	13	<1
14501	McElk	26	0
14502	Silver Butte	0	0
14503	West Fisher	1	<1
14504	Crazy	<1	0
14505	Treasure	6	0
14506	Lower Quartz	11	1
14507	Upper Quartz	<1	0
14508	Upper Pipe	1	<1
14509	Lower Pipe	31	2
14510	Bristow	3	1
14511	Cripple	2	1
14512	Dry Fork-Weigel	<1	<1
14513	Upper Wolf	7	<1
14701	Bull	12	0
14702	Rock	<1	0
14703	Vermillion	16	<1

LAU Number	LAU Name	Veg S1 %	Veg S2%
14704	Beaver-Whitepine	4	2
14705	Trout-Marten	9	<1
14706	Elk-Pilgrim	4	3

Table 86. Displayed are the groomed/designated over-snow route miles and ski area acres (Turner Mountain) from 2017. Also displayed are the miles and acres in the same categories as of 2007

Year	Groomed/Designated Over-snow Routes (miles)	Ski Areas (Acres)
2007	242	527
2017	233	527

Discussion

As shown in Table 85 only one LAU is estimated to exceed the 30 percent threshold for NRLMD standard VegS1. LAUs that are at the 30 percent threshold or above would trigger the restrictions on activities in those LAUs described in the NRLMD. No LAU exceeds the 15 percent threshold for early stand initiation acres due to regeneration treatments on KNF lands in the last decade.

Table 86 shows that groomed/designated over-snow routes (miles) and ski areas (acres) in the year 2017 did not exceed those in the baseline (2007) for the NRLMD.

Findings

Table 87. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-FLS-01-02: Canada lynx: changes in lynx habitat as a result of moving towards the desired conditions for vegetation through vegetation management, prescribed fire, or natural disturbance	2021 (veg), 2017 (snow compacting activities)	YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired. Most LAUs are better than the standards for the amount of early stand initiation habitat. The one LAU that is not better than the standard is due to several large fires in recent years. The amount of	No	--

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
		groomed/designated over the snow routes or ski areas is at or better than baseline conditions.		

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Literature Cited

USDA Forest Service. 2007. Northern Rockies Lynx Management Direction – Record of Decision. National Forests in Montana, and parts of Idaho, Wyoming, and Utah. 71 pp.

USDA Forest Service. 2016b. Monitoring Program for the 2015 Forest Plan. Kootenai National Forest. 15 pp.

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USDI Fish and Wildlife Service. Biological Opinion on the Northern Rockies Lynx Management Direction. 85 pp.

USDI Fish and Wildlife Service. Attachments for the Biological Opinion on the Northern Rockies Lynx Management Direction. 40 pp.

MON-FLS-01-03

Table 88. MON-FLS-01-03 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed	FW-DC-AQS-01, FW-DC-AQS-04	MON-FLS-01-03: Bull Trout population trends based on redd counts in known spawning reaches	Annually	MT Fish Wildlife & Parks	Forest Fish Program Manager

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
species and moving toward habitat objectives?					

Referenced Plan Components:

FW-DC-AQS-01. Over the long term, habitat contributes to the support of well-distributed self-sustaining populations of native and desired non-native aquatic species (fish, amphibians, invertebrates, plants, and other aquatic-associated species). In the short term, stronghold populations of native fish continue to thrive and expand into neighboring unoccupied habitats, and depressed populations increase in numbers. Available habitat supports genetic integrity and life history strategies of native fish, macroinvertebrates, and amphibian populations.

FW-DC-AQS-04. Bull trout – Recovery and delisting of bull trout is the long-term desired condition. Bull trout population trends toward recovery through cooperation and coordination with USFWS, tribes, state agencies, other federal agencies, and interested groups. Recovery is supported through accomplishment of Bull Trout Recovery Plan tasks under Forest Service jurisdiction. On NFS lands spawning, rearing, and migratory habitat is widely available and inhabited. Bull trout have access to historic habitat and appropriate life history strategies (e.g., resident, fluvial, and adfluvial) are supported.

Table 89. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	-
Next scheduled MER evaluation of this monitoring item:	2023

The revised plan included elements believed to be critical to the recovery of bull trout and the protection of designated critical habitat. The plan was also shaped by input from the US Fish & Wildlife Service through formal consultation and the resulting biological opinion which is incorporated into the plan.

Methods

Redd data is collected annually by Montana Fish, Wildlife and Parks (MTFWP) personnel. Redd surveys are conducted on known bull trout spawning reaches from September through October from tributaries to the Kootenai and Clark Fork rivers. Survey reaches are identified in those watersheds that historically support spawning on the Kootenai National Forest.

Data is then validated and compiled by MTFWP then stored online in the Montana River Information System at:
geoinfo.msl.mt.gov/geography/water_information_system/fisheries.aspx.

Results

Table 90. Redd Counts for Lower Clark Fork River Tributaries, 2010 through 2020

Lower Clark Fork:	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
East Fork Bull River	8	7	15	1	21	11	10	2	11	4	5
South Fork Bull River	0	2	0	0	0	-	-	-	-	-	0
Marten Creek	0	0	1	2	0	2	0	0	0	0	0
Rock Creek	1	2	6	-	1	2	0	1	1	0	2
Swamp Creek	2	10	2	1	3	0	1	0	1	1	1
WF Trout Creek	2	25	10	9	4	4	3	6	1	5	0
Vermilion River	25	29	16	7	23	8	6	6	12	3	11

Table 91. Redd Counts for Kootenai River Tributaries, 2010 through 2020

Kootenai River	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
North Callahan Creek	9	1	6	9	7	1	-	-	-	-	-
South Callahan Creek	1	2	0	2	0	0	-	1	-	-	-
Keeler Creek	45	29	23	3	13	14	-	5	14	8	4
NF Keeler Creek	19	29	32	21	14	4	-	3	5	0	1
SF Keeler Creek	11	10	16	9	7	0	-	-	1	0	5
O'Brien Creek	27	32	18	35	34	22	35	-	34	27	25
West Fisher	12	3	5	4	14	4	-	8	4	2	1
Bear Creek	8	3	4	8	11	7	4	1	3	4	4
East Fork Pipe Creek	-	-	-	-	-	-	-	-	-	-	-
Pipe Creek	16	2	12	8	8	0	0	2	8	0	0
Quartz Creek	12	7	14	9	5	17	10	9	13	22	8

Kootenai River	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
WF Quartz Creek	27	30	4	5	19	5	6	18	0	7	6

Table 92. Redd Counts for Kootenai River Tributaries upstream of Libby Dam and Canada, 2010 through 2020

Kootenai above Libby Dam	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Wigwam River (Canada)	1114	1198	1367	1441	1420	1601	1561	1607	1408	888	1042
Blue Sky Creek	9	3	12	15	5	0	-	10	3	0	0
Clarence Creek	9	10	23	20	13	8	-	17	14	1	10
Grave Creek	102	51	82	55	56	84	-	85	83	43	54
Wigwam River (U.S.)	4	8	3	6	7	1	-	5	2	-	-

Discussion

Redd count numbers have been in decline for bull trout since their listing in 1998. Originally the forest emphasized road decommissioning to reduce sediment delivery to spawning streams along with active restoration of historic bull trout streams such as the Vermilion River. Additionally, known fish barriers were removed and connectivity restored in tributaries like Grave Creek outside Eureka MT. The historic Glen Lake Irrigation District water diversion was replaced and screened to prevent entrainment of bull trout. Spawner numbers increased up to three-fold over previous numbers in Grave Creek but even those numbers are now in decline. Most telling are counts from the Wigwam River in Canada which have been down by roughly one-third.

Impacts of forest management have been greatly ameliorated by the implementation of the forest plan aquatic conservation strategy INFISH but bull trout redd counts continue to diminish. The obvious answer to this monitoring question is that bull trout numbers continue to decline in spite of more restrictive forest plan standards put in place to prevent impacts to aquatic and riparian habitats from forest management practices. The better question is “what is the current status of bull trout?”

Non-native fish species continue to be a threat to bull trout across the Kootenai. The primary threats are hybridization by eastern brook trout, red superimposition by brown trout, and predation by northern pike, bass, lake trout, and walleye.

Findings

Table 93. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?	2020	No – Redd count numbers are down in nearly every bull trout stream across the forest	YES	Monitoring Program: change monitoring question to better reflect how the indicator is used to understand the two plan components. Change to: What is the status of bull trout?

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Focal Species Evaluation and Adaptive Findings

MON-FOC-01-01

Table 94. MON-FOC-01-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-FOC-01: Are habitat trends for the landbird assemblage and macroinvertebrate assemblage consistent with the objectives?	FW-OBJ-WL-03, FW-DC-VEG-01, FW-DC-VEG-02, FW-DC-VEG-03, FW-DC-VEG-04, FW-DC-VEG-05, FW-DC-VEG-07, FW-DC-VEG-11, FW-OBJ-VEG-01, FW-STD-VEG-01, FW-GDL-VEG-01, FW-GDL-VEG-04,	Landbird assemblage (insectivores): a) number of acres where planned ignitions were used to maintain/improve habitat; b) percentage of natural,	Annually	WIT, FACTS	Forest Wildlife Biologist

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
	FW-GDL-VEG-05, FW-GDL-VEG-06, FW-DC-FIRE-03, FW-OBJ-AQH-02	unplanned ignitions managed for the maintenance or restoration or fire adapted ecosystems			

Referenced Plan Components:

FW-DC-VEG-01. The composition of the forest is within the desired ranges for the dominance groups illustrated in figure 2. More of the forest is dominated by western white pine, ponderosa pine, western larch, and whitebark pine. Conversely, less of the forest is dominated by grand fir, western hemlock, western redcedar, Douglas-fir, and subalpine fir. Although they are not depicted in figure 2, more hardwood trees occur in the Forest such as quaking aspen, black cottonwood, and paper birch.

FW-DC-VEG-02. The structure of the forest is within the desired ranges for each size class illustrated in figure 3. More of the forest is dominated by stands occurring in the large size class. Less of the forest is dominated by stands that occur in the small and medium size classes.

FW-DC-VEG-03. The amount of old growth increases at the forestwide scale. At the finer scale of the biophysical setting, old growth amounts increase for the Warm/Dry and Warm/Moist settings while staying close to the current level for the Subalpine setting. Relative to other tree species, there is a greater increase in old growth stands that contain substantial amounts (i.e., 30% or more of the total species composition) of one or more of the following tree species: ponderosa pine, western larch, western white pine, and whitebark pine. Old growth stands are more resistant and resilient to disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. The size of old growth stands (or patches of multiple contiguous old growth stands) increase and they are well- distributed across the five Geographic Areas on the Forest.

FW-DC-VEG-04. Tree densities and the number of canopy layers within stands are generally decreased.

FW-DC-VEG-05. The pattern of forest conditions across the landscapes consists of a range of patch sizes that have a diversity of successional stages, densities, and compositions. Formerly extensive, homogenous patches of forests that are dominated by species and size classes that are very susceptible to disturbance agents have been diversified. Generally, there is an increase in the size of forest patches dominated by trees in the seedling/sapling size class, as well as in the large size class. There is a decrease in the size of the patches that are dominated by trees in the small and medium size classes.

FW-DC-VEG-07. Snags occur throughout the forest in an uneven pattern, provide a diversity of habitats for wildlife species, and contribute to the sustainability of snag dependent species. Snag numbers, sizes, and species vary by biophysical setting and dominance group. Table 1 displays the desired range of snag densities. Over time, the number of large-diameter snags (20 inches in DBH or greater) increases in all biophysical settings.

FW-DC-VEG-11. The desired forest composition, structure, and pattern for each biophysical setting are described below:

Warm/Dry – This biophysical setting includes the warmest and driest sites that support forest vegetation.

Warm/Moist – This biophysical setting includes moist forest sites that are relatively warm. This setting includes low-elevation upland sites with deeper soils on north and east aspects, extensive mid-elevation moist upland sites, and most low and mid-elevation wet stream bottoms, riparian benches, and toe-slopes.

Subalpine –This biophysical setting occupies the higher elevations of the forest. This setting ranges from the cool and moist lower subalpine sites, up to the cold and dry high elevation sites that have more open forests.

FW-OBJ-VEG-01. Forest Resilience—Over the life of the Plan, the outcome per decade is:

- Increased relative representation of early seral, shade-intolerant, drought- and fire-tolerant, insect/disease resistant species dominance types (e.g., ponderosa pine, white pine, western larch, whitebark pine, and hardwoods) on approximately 120,000 to 150,000 acres (these acres are also included in those listed in the following bullet).
- Treatment of approximately 250,000 acres to maintain and/or improve forest resilience, natural diversity, and productivity and to reduce negative impacts of non-native organisms. Treatments may include timber harvest, planting, thinning, management of fire (including planned and unplanned ignitions), mechanical fuel treatments, revegetation with native species, blister rust pruning, integrated tree improvement activities, noxious weed treatments, and other integrated pest management activities including forest health protection suppression and prevention activities.

FW-STD-VEG-01. Within old growth stands, timber harvest or other vegetation management activities shall not be authorized if the activities would likely modify the characteristics of the stand to the extent that the stand would no longer meet the definition of old growth (see glossary for old growth definition).

FW-GDL-VEG-01. Timber harvest or other vegetation management activities may be authorized in old growth stands if the activities are designed to increase the resistance and resiliency of the stand to disturbances or stressors, and if the activities are not likely to modify stand characteristics to the extent that the stand would no longer meet the definition of old growth (see the glossary for the definitions of resistance and resilience).

FW-GDL-VEG-04. Vegetation management activities should retain snags greater than 20 inches DBH and at least the minimum number of snags and live trees (for future snags) that are displayed in table 4. Where snag numbers do not exist to meet the recommended ranges, the difference would be made up with live replacement trees. Exceptions occur for issues such as human safety and instances where the minimum numbers are not present prior to the management activities.

FW-GDL-VEG-05. Where vegetation management activities occur and snags (or live trees for future snags) are retained, the following direction should be followed:

- Group snags where possible;
- Retain snags far enough away from roads or other areas open to public access to reduce the potential for removal (generally more than 150 feet);
- Emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, larch, and cedar;

- Favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife; and

FW-GDL-VEG-06. During vegetation management activities (e.g., timber harvest), and in the event that retained snags (or live trees being retained for future snags) fall over or are felled (for safety concerns), they should be left on site to provide coarse woody debris.

FW-DC-FIRE-03. The use of wildland fire (both planned and natural, unplanned ignitions), increases in many areas across the Forest. Fire plays an increased role in helping to trend the vegetation towards the desired conditions while serving other important ecosystem functions. However, when necessary to protect life, property, and key resources many wildfires are still suppressed.

FW-OBJ-AQH-02. Over the life of the Plan, the assemblage of macroinvertebrates present across the planning area as measured by the KNF River Invertebrate Prediction and Classification System (RIVPACS) analysis Observed/Effect (O/E) Model maintains a score of between 0.80 and 1.20 at all sites monitored on individual water bodies within the planning area.

Table 95. Monitoring Item MON-FOC-01-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

FW-OBJ-WL-03 states that, "Landbird assemblage (insectivores). The outcome is the management of planned ignitions on 1,000 to 5,000 acres, annually, to provide habitat for olive-sided flycatchers, hairy woodpeckers, chipping sparrows, and Hammond's and dusky flycatchers. (Also see FW-OBJ-FIRE-02, which provides additional habitat for these species.)"

Several other plan components for this monitoring item were originally listed in the monitoring plan, although the primary focus was the first one listed (FW-OBJ-WL-03). We are clarifying that MON-FOC-01 was intended to track our accomplishments in relation to FW-OBJ-WL-03. The other plan components were listed because they provided some of the background as to why we were tracking FW-OBJ-WL-03.

The wildlife analysis supporting the revised Forest Plan relied heavily on the desired conditions for vegetation and the importance of using fire to move towards those desired conditions (USDA 2013, Anderson 2014). FW-DC-FIRE-03 and FW- OBJ-FIRE-02 are particularly important pieces for providing wildlife habitat on the KNF as per the desired conditions for vegetation.

FW-DC-FIRE-03 states, "The use of wildland fire (both planned and natural, unplanned ignitions), increases in many areas across the Forest. Fire plays an increased role in helping to trend the vegetation towards the desired conditions while serving other important ecosystem functions. However, when necessary to protect life, property, and key resources many wildfires are still suppressed."

FW-OBJ-FIRE-02 states that, "Over the life of the Plan, manage natural, unplanned ignitions to meet resource objectives on at least 10 percent of the ignitions."

Although it was recognized that not every wildlife species benefits from fire, overall, the Forest Plan analysis showed that habitat would be maintained for most species through the coarse filter for viability (USDA 2013, Anderson 2014, ERG 2012).

Methods

Although the Forest Service no longer assigns targets for accomplishing restoration or maintenance of wildlife habitat, accomplishments are still tracked using the WIT database. Acres of terrestrial habitat restored or maintained are expected to be entered into WIT annually.

The WIT database was queried to determine the acres of terrestrial habitat restored or maintained with prescribed fire since the start of implementation of the revised Forest Plan. Where WIT data was lacking for a particular year, then the FACTS database was queried to find acres where prescribed fire activities had a wildlife habitat benefit.

MON-FIRE-02-01 tracks the number of unplanned natural fire ignitions managed for maintenance and/or restoration of fire-adapted ecosystems. That monitoring item is referenced here.

Results

Table 96 shows the acres of prescribed burning on the KNF where migratory birds benefited. WIT was queried to get this information, however, in some years not all accomplishments were entered into WIT. FACTS was secondarily queried to get a fuller picture of the use of prescribed fire for wildlife benefit. However, FACTS doesn't track species benefitted as WIT does. Although, even with WIT the accomplishments were attributed generically to "migratory birds" and not specifically to individual species in the landbird assemblage.

Table 96. Displayed are the acres of prescribed burning on the KNF where migratory birds benefited.

Fiscal Year	Prescribed burning benefiting migratory birds
2016	3,757
2017	3,230
2018	2,915
2019	4,153
2020	0[1]

[1] - no prescribed burning due to Covid-19 precautions

Table 34 in the section for MON-FIRE-02 displays the information from the years 2016-2020 for unplanned ignitions on the KNF. As shown in that table, there were a total of 165

unplanned ignitions during that timeframe, with 3 of them managed for resource objectives while 162 were managed with the primary goal of suppression. This amounts to 2 percent of unplanned ignitions being managed to meet resource objectives over that 5-year timeframe. Also displayed in the same table are the acres of unplanned ignitions managed for resource objectives versus the primary goal of suppression. There were approximately 85,029 acres of unplanned ignitions over those same 5 years, with 7,621 acres managed for resource objectives (9 percent of the total acres). However, even with the fires that escaped initial suppression efforts and weren't managed for resource objectives there were still benefits for wildlife habitat and moving towards desired conditions on the KNF (i.e. providing the coarse filter for viability). As can be calculated from the acres shown in table 3 in the MON-FIRE-02 section, which displays the summary of MTBS acres for the two biggest fire years (2017 and 2018), approximately 68 percent of the total MTBS acres trended the KNF towards desired conditions.

Discussion

The KNF is easily achieving the minimum 1,000 acres of prescribed burning, except in 2020, as identified in FW-OBJ-WL-03. However, the KNF has chosen not to prioritize entering accomplishment data into the WIT database and that is reflected in the need to query FACTS as well. Unfortunately, FACTS doesn't track species benefitted as WIT does. Additionally, WIT only identifies the general "migratory birds" category rather than specific species under the landbird assemblage.

FW-OBJ-WL-03 is poorly worded by indicating that all the landbird assemblage would benefit from prescribed fire. As identified in the Forest Plan analysis (USDA 2013 and Anderson 2014), the habitat for each of the five species in the landbird assemblage varies. Movement towards the desired conditions for vegetation would maintain or restore habitat adequate for these species. Fire would create open habitat which would benefit some species but not others. However, overall, the desired conditions for vegetation would still provide habitat for all five species. This trade-off and dynamic are not adequately reflected in the wording of FW-OBJ-WL-03.

As shown in the MON-FIRE-02 section, the KNF is currently less than the 10 percent of unplanned ignitions managed to move toward resource objectives identified in FW-OBJ-FIRE-02. However, that section also shows that when initial fire suppression efforts failed it resulted in progress towards desired conditions on much of the acreage burned.

Although the landbird assemblage were selected to help monitor progress towards the desired conditions for vegetation, not all of these species may work as focal species as intended. Latif et al. 2019 looked at breeding bird data from the Integrated Monitoring in Bird Conservation Regions (IMBCR) program and vegetation data from the USFS Northern Region's Existing Vegetation Mapping Program (VMAP). They analyzed population abundance or occupancy in relation to vegetation covariates, then evaluated whether covariate relationships matched the expected direction (e.g. positive, negative) implied in the habitat descriptions for the five focal species in the landbird assemblage (chipping sparrow, dusky flycatcher, Hammond's flycatcher, olive-sided flycatcher, and hairy woodpecker).

As stated in Latif et al. 2019 (p. 6):

> "The 2012 Planning Rule requires monitoring focal species to address desired conditions (36 CFR § 219.19). Focal species are intended to inform ecological

integrity and the presence or quality of ecological characteristics that are difficult to measure or monitor directly. As such, focal species should relate functionally with ecological characteristics of interest (e.g., vegetation attributes that provide important habitat features for a species). The current planning rule mandates monitoring of at least one focal species by each forest, with local resource specialists and forest planners being responsible for determining which species to monitor and which ecological characteristics they are supposed to represent.

Restoring wildfire and associated vegetation conditions represent central management goals for both the Kootenai and Idaho Panhandle National Forests (hereafter KIPZ forests). Acres burned by wildfire and prescribed fire therefore represent key metrics in monitoring plans for these forests... Wildfire is central to maintaining canopy openings and landscape heterogeneity, which provide critical habitat components for many species of wildlife…"

Population abundance data for the five focal species in the landbird assemblage were graphed in Latif et al. 2019.

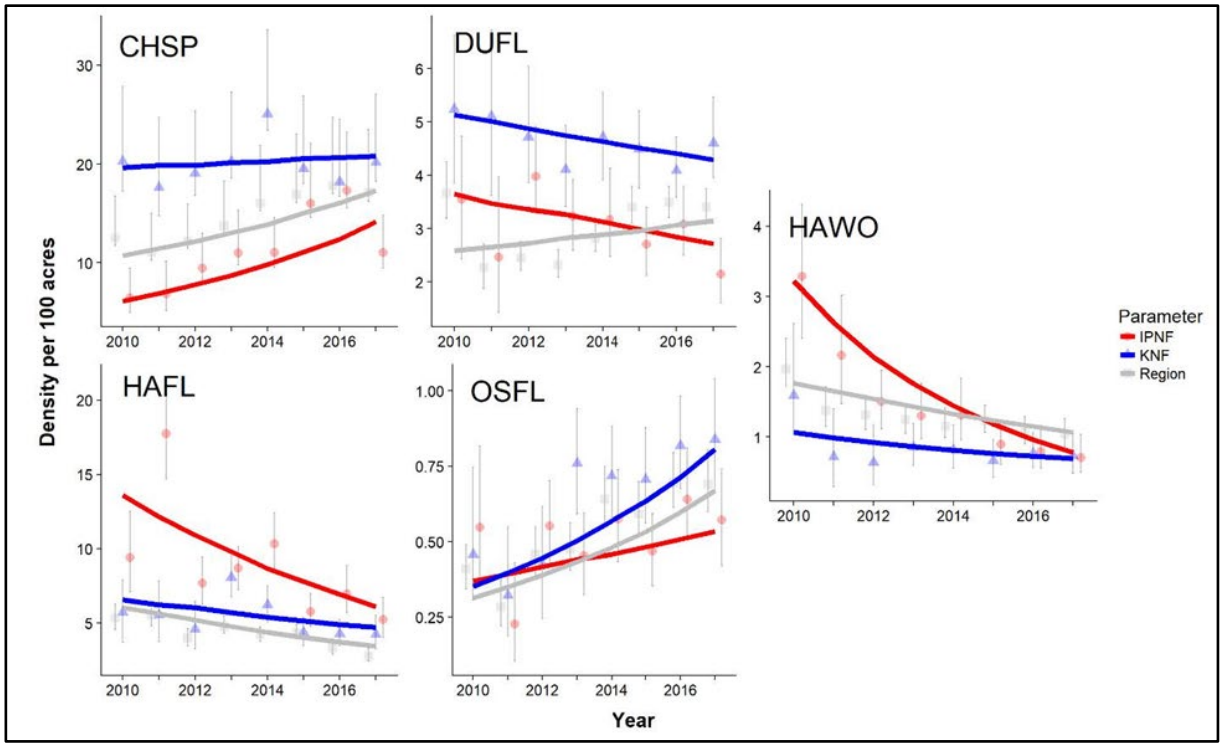

Figure 13. These graphs are from p. 25 in Latif et al. 2019. Regional and forest-level population trends (lines) and year-specific abundance estimates with 95% credible intervals (points and error bars) for KIPZ focal species in 2010–2017. Focal species are Chipp

Note that the IMBCR data used in Latif et al. 2019 was from 2010-2017. This means that only the data from 2015-2017 were after the revised Forest Plan was finalized. Only projects with decisions in 2015 and afterwards implement the revised Forest Plan.

Latif et al. 2019 (p. 16-17) found chipping sparrow abundance was negatively related to tree size and canopy cover, as predicted. Dusky sparrow abundance was positively related to riparian and shrublands, again consistent with predictions. Most of the predictions for

Hammond's flycatcher received mixed support or were contradicted by the data, including the prediction that Hammond's flycatchers were associated with greater canopy cover. Olive-sided flycatchers were related to low amounts of canopy cover as predicted; however other predictions were not supported by the data. Hairy woodpecker occupancy increased with prevalence of dead canopy; however other predictions were contradicted by the data.

Latif et al. 2019 concluded (p. 27):

> "We suggest reevaluating KIPZ focal species for monitoring desired conditions in light of our study. Reevaluation could include reexamining which focal species adequately represent desired habitat conditions, and which conditions are of interest for focal species monitoring (e.g., which conditions are difficult to measure directly). Leveraging existing data (e.g., IMBCR, VMAP) could facilitate a more rigorous selection of focal species (or guilds) informed by empirically determined habitat relationships along with published habitat descriptions."

Latif et al. 2019 also found that (p. 26):

> "Focal species' monitoring could particularly inform management of heterogeneity, a key habitat feature of management interest that is difficult to measure directly. Disturbance maintains heterogeneity by generating forest canopy openings. Homogenization via loss of openings is widely attributed to anthropogenic impacts that alter natural disturbance processes…"

Findings

Table 97. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-FOC-01-01: Are habitat trends for the landbird assemblage and macroinvertebrate assemblage consistent with the objectives?	2020	For FW-OBJ-WL-03: (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s). The landbirds were not conclusive in their associations with vegetation conditions. Even though FW-OBJ-WL-03 was met we don't know if all the other DCs for veg conditions or the DC for fire are being achieved because the landbird data are not providing the info we need to make those associations.	Yes	Prioritize accomplishment data entry into WIT. Consider rewording FW-OBJ-WL-03 to clarify which specific focal species are expected to benefit from the use of fire to maintain/restore habitat. Consider rewording MON-FOC-01 to tie more directly to FW-OBJ-WL-03 or FW-DC-WL-19 and clearly showing that we are interested in the amount of prescribed fire that is benefitting landbirds that prefer open habitats. As per Latif et al. 2019, consider changing some of the focal species in the landbird assemblage.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Literature Cited

Anderson, Jeremy L. 2014. Wildlife Specialist Report for the KNF Forest Plan Revision. Kootenai National Forest. 475 pp.

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USDA Forest Service. 2013. Final Environmental Impact Statement for the Revised Land Management Plan. Kootenai National Forest. 682 pp.

Wildlife Evaluation and Adaptive Findings

MON-WDL-01-01

Table 98. MON-WDL-01-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-WDL-01: Have management activities met Plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions?	FW-OBJ-WL-01 Also: FW-DC-VEG-01, FW-DC-VEG-02, FW-DC-VEG-03, FW-DC-VEG-04, FW-DC-VEG-05, FW-DC-VEG-07, FW-DC-VEG-08, FW-DC-VEG-11, FW-OBJ-VEG-01, FW-STD-VEG-01, FW-GDL-VEG-01, FW-GDL-VEG-03, FW-GDL-VEG-04, FW-GDL-VEG-05, FW-GDL-VEG-06, FW-DC-FIRE-03	Acres of terrestrial habitat restored or enhanced	Annually	WIT, FACTS	Forest Wildlife Biologist

Referenced Plan Components:

FW-OBJ-WL-01. The outcome is the maintenance or restoration of wildlife habitat on 1,000 to 5,000 acres of NFS lands, annually, with an emphasis on restoration of habitats for threatened and endangered listed species and sensitive species.

FW-DC-VEG-01. The composition of the forest is within the desired ranges for the dominance groups illustrated in figure 2. More of the forest is dominated by western white pine, ponderosa pine, western larch, and whitebark pine. Conversely, less of the forest is dominated by grand fir, western hemlock, western redcedar, Douglas-fir, and subalpine fir. Although they are not depicted

in figure 2, more hardwood trees occur in the Forest such as quaking aspen, black cottonwood, and paper birch.

FW-DC-VEG-02. The structure of the forest is within the desired ranges for each size class illustrated in figure 3. More of the forest is dominated by stands occurring in the large size class. Less of the forest is dominated by stands that occur in the small and medium size classes.

FW-DC-VEG-03. The amount of old growth increases at the forestwide scale. At the finer scale of the biophysical setting, old growth amounts increase for the Warm/Dry and Warm/Moist settings while staying close to the current level for the Subalpine setting. Relative to other tree species, there is a greater increase in old growth stands that contain substantial amounts (i.e., 30% or more of the total species composition) of one or more of the following tree species: ponderosa pine, western larch, western white pine, and whitebark pine. Old growth stands are more resistant and resilient to disturbances and stressors such as wildfires, droughts, insects and disease, and potential climate change effects. The size of old growth stands (or patches of multiple contiguous old growth stands) increase and they are well- distributed across the five Geographic Areas on the Forest.

FW-DC-VEG-04. Tree densities and the number of canopy layers within stands are generally decreased.

FW-DC-VEG-05. The pattern of forest conditions across the landscapes consists of a range of patch sizes that have a diversity of successional stages, densities, and compositions. Formerly extensive, homogenous patches of forests that are dominated by species and size classes that are very susceptible to disturbance agents have been diversified. Generally, there is an increase in the size of forest patches dominated by trees in the seedling/sapling size class, as well as in the large size class. There is a decrease in the size of the patches that are dominated by trees in the small and medium size classes.

FW-DC-VEG-07. Snags occur throughout the forest in an uneven pattern, provide a diversity of habitats for wildlife species, and contribute to the sustainability of snag dependent species. Snag numbers, sizes, and species vary by biophysical setting and dominance group. Table 1 displays the desired range of snag densities. Over time, the number of large-diameter snags (20 inches in DBH or greater) increases in all biophysical settings.

FW-DC-VEG-08. Down wood occurs throughout the forest in various amounts, sizes, species, and stages of decay. The larger down wood (i.e., coarse woody debris) provides habitat for wildlife species and other organisms, as well as serving important functions for soil productivity.

FW-DC-VEG-11. The desired forest composition, structure, and pattern for each biophysical setting are described below:

Warm/Dry – This biophysical setting includes the warmest and driest sites that support forest vegetation.

Warm/Moist – This biophysical setting includes moist forest sites that are relatively warm. This setting includes low-elevation upland sites with deeper soils on north and east aspects, extensive mid-elevation moist upland sites, and most low and mid-elevation wet stream bottoms, riparian benches, and toe-slopes.

Subalpine –This biophysical setting occupies the higher elevations of the forest. This setting ranges from the cool and moist lower subalpine sites, up to the cold and dry high elevation sites that have more open forests.

FW-OBJ-VEG-01. Forest Resilience—Over the life of the Plan, the outcome per decade is:

- Increased relative representation of early seral, shade-intolerant, drought- and fire-tolerant, insect/disease resistant species dominance types (e.g., ponderosa pine, white pine, western larch, whitebark pine, and hardwoods) on approximately 120,000 to 150,000 acres (these acres are also included in those listed in the following bullet).
- Treatment of approximately 250,000 acres to maintain and/or improve forest resilience, natural diversity, and productivity and to reduce negative impacts of non-native organisms. Treatments may include timber harvest, planting, thinning, management of fire (including planned and unplanned ignitions), mechanical fuel treatments, revegetation with native species, blister rust pruning, integrated tree improvement activities, noxious weed treatments, and other integrated pest management activities including forest health protection suppression and prevention activities.

FW-STD-VEG-01. Within old growth stands, timber harvest or other vegetation management activities shall not be authorized if the activities would likely modify the characteristics of the stand to the extent that the stand would no longer meet the definition of old growth (see glossary for old growth definition).

FW-GDL-VEG-01. Timber harvest or other vegetation management activities may be authorized in old growth stands if the activities are designed to increase the resistance and resiliency of the stand to disturbances or stressors, and if the activities are not likely to modify stand characteristics to the extent that the stand would no longer meet the definition of old growth (see the glossary for the definitions of resistance and resilience).

FW-GDL-VEG-03. Vegetation management activities should retain the amounts of coarse woody debris (including logs) that are displayed in table 3. A variety of species, sizes, and decay stages should be retained. Exceptions may occur in areas where a site-specific analysis indicates that leaving the quantities listed in the table would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources. In addition, exceptions may occur where the minimum quantities listed in the table are not available for retention.

FW-GDL-VEG-04. Vegetation management activities should retain snags greater than 20 inches DBH and at least the minimum number of snags and live trees (for future snags) that are displayed in table 4. Where snag numbers do not exist to meet the recommended ranges, the difference would be made up with live replacement trees. Exceptions occur for issues such as human safety and instances where the minimum numbers are not present prior to the management activities.

FW-GDL-VEG-05. Where vegetation management activities occur and snags (or live trees for future snags) are retained, the following direction should be followed:

- Group snags where possible;
- Retain snags far enough away from roads or other areas open to public access to reduce the potential for removal (generally more than 150 feet);
- Emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, larch, and cedar;
- Favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife; and

FW-GDL-VEG-06. During vegetation management activities (e.g., timber harvest), and in the event that retained snags (or live trees being retained for future snags) fall over or are felled (for safety concerns), they should be left on site to provide coarse woody debris.

FW-DC-FIRE-03. The use of wildland fire (both planned and natural, unplanned ignitions), increases in many areas across the Forest. Fire plays an increased role in helping to trend the vegetation towards the desired conditions while serving other important ecosystem functions. However, when necessary to protect life, property, and key resources many wildfires are still suppressed.

Table 99. Monitoring Item MON-WDL-01-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

FW-OBJ-WL-01 states that, "The outcome is the maintenance or restoration of wildlife habitat on 1,000 to 5,000 acres of NFS lands, annually, with an emphasis on restoration of habitats for threatened and endangered listed species and sensitive species."

Several other plan components for this monitoring item were originally listed in the monitoring plan, although the primary focus was the first one listed (FW-OBJ-WL-01). We are clarifying that MON-WDL-01 was intended to track our accomplishments in relation to FW-OBJ-WL-01. The other plan components were listed because they provided some of the background as to why we were tracking FW-OBJ-WL-01.

Methods

Although the Forest Service no longer assigns targets for accomplishing restoration or maintenance of wildlife habitat, accomplishments are still tracked using the WIT database. Acres of terrestrial habitat restored or maintained are expected to be entered into WIT annually. Examples of qualifying activities include prescribed burns, installation of wildlife resistant dumpsters, vent screens on vault toilets, nest boxes, and road closures to improve wildlife security.

The WIT database was queried to determine the acres of terrestrial habitat restored or maintained since the start of implementation of the revised Forest Plan. Where WIT data was lacking, then the FACTS database was queried to find acres where treatment activities had a wildlife habitat benefit.

Results

Table 100 shows the acres of terrestrial habitat restored or maintained on the KNF while managing under the 2015 revised Forest Plan. Although there were approximately 900-3,000 acres a year entered in WIT for the years 2016-2019, there was limited WIT data entry in some years, including no WIT data entry in 2020. FACTS was queried for acres each year where prescribed fire and vegetation treatments benefitted wildlife to gain a fuller picture of activities benefitting wildlife. Accomplishments that were found in both WIT and FACTS were not double counted in the table below. Additionally, the KNF experienced natural fire in several years since implementation of the revised Forest Plan. Although those acres also

benefitted some wildlife, they are not counted below (i.e. the 24,460 acres of natural fire in 2017 that were entered into WIT as benefitting wildlife).

Table 100. Displayed are the acres of terrestrial habitat restored or maintained on the KNF under the implementation of the 2015 revised Forest Plan

Fiscal Year	Acres Restored/ Maintained	Species Benefited
2016	12,915	Vegetation treatments harvest, prescribed fire: Cabinet-Yaak grizzly bear, gray wolf, western toad, Townsend's big-eared bat, owls, woodpeckers, cavity nesters Route decommissioning: grizzly bear Mine-cave protection: Townsend's big-eared bat, fringed Myotis, long-eared myotis, long-legged Myotis Chanel reconstruction: harlequin duck Wildlife habitat improved NonGame: peregrine falcon closure area *Emphasis groups* were migratory birds, bats, Threatened/Endangered/Sensitive species habitat, cavity nesters, fire dependent species, game species, winter range
2017	10,974	Vegetation treatments, harvest, prescribed fire: Cabinet-Yaak and Northern Continental Divide Ecosystem grizzly bear, gray wolf, Canada lynx Route storage: Cabinet-Yaak grizzly bear Pipe capping: flammulated owl *Emphasis Groups*: cavity nesters, migratory birds, bats, Threatened/Endangered/Sensitive species habitat, winter range, fire dependent
2018	9,375	Nest Platform – common loon Vegetation Treatment – flammulated owl Bear Resistant container- Cabinet-Yaak grizzly bear *Emphasis Groups*: game species, winter range, Threatened/Endangered/Sensitive species habitat, migratory birds, fire dependent species
2019	14,216	Limited WIT entry in 2019. Wetland Protection: Northern leopard frog Bear resistant container: Cabinet-Yaak grizzly bear *Emphasis Groups*: Threatened/Endangered/Sensitive species habitat, cavity nesters, game species, winter range, migratory birds, fire dependent
2020	9,763	No WIT data entry, acres are from FACTS

Discussion

The KNF is easily achieving the minimum 1,000 acres of habitat restored or maintained identified in FW-OBJ-WL-01. However, the KNF has not entered all accomplishment data into the WIT database and that is reflected in the need to query FACTS as well. Unfortunately, FACTS doesn't track species benefitted as WIT does. FACTS also doesn't record all of the activities that would normally be in WIT, so it is possible that the KNF is missing some accomplishment data if it wasn't recorded in WIT.

Findings

Table 101. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-WDL-01-Have management activities met Plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions?	2020	(E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired We are easily achieving FW-OBJ-WL-01 by accomplishing at least 1,000-5.000 acres of habitat maintenance and restoration.	Yes	Monitoring Program: Prioritize accomplishment data entry into WIT. Although the available data on acreages indicates that FW-OBJ-WL-01 is being met, the KNF lacks data on the species benefitted by activities if the data is in FACTS only. Also, the KNF is possibly missing acres of accomplishments that should be in WIT and that aren't normally also tracked in FACTS (e.g. nest boxes, toilet vent caps). Consider rewording the monitoring question MON-WDL-01 to tie more directly to FW-OBJ-WL-01 and the indicators listed for MON-WDL-01-01. Suggested Change: What maintenance or restoration actions have occurred to benefit habitats for threatened and endangered listed species and sensitive species?" Drop all reference to the other plan components listed in the monitoring plan for MON-WDL-01.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-WDL-02-01

Table 102. MON-WDL-02-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-WDL-02: Are habitat trends for elk consistent with the objectives?	FW-OBJ-WL-02, FW-GDL-WL-10	Number of planning subunits providing >30% security and >50% security on NFS lands during the hunting season	Biennially	INFRA; GIS layers of motorized routes on other ownerships	Forest Wildlife Biologist

Table 103. Monitoring Item MON-WDL-02-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2021
Next scheduled data collection/compilation:	2023
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

FW-OBJ-WL-02 states that, "Over the life of the Plan, increase by 1 the number of planning subunits that provide at least 30 percent elk security (see glossary) and increase by 1 the number of high emphasis planning subunits (determined in cooperation with Montana Fish, Wildlife, and Parks; see FW-DC-WL-16) that provide at least 50 percent elk security."

Although the monitoring plan points to both FW-OBJ-WL-02 and FW-GDL-WL-10, the intent was to monitor our progress towards FW-OBJ-WL-02.

Methods

An elk security intent/consistency paper (Anderson 2015) was completed to accompany the 2015 Forest Plan. Anderson (2015) explains that the intent of the elk security direction in the 2015 Forest Plan is to limit motorized access (e.g. pickups, ATVs, motorcycles) to reduce elk vulnerability during the hunting season. The paper also explains the balance between managing motorized access to provide elk security, while also providing openings (e.g. forage). The intent paper explains the need for more openings on the landscape to move towards the Desired Conditions for vegetation, which provide the coarse filter for species viability under the 2015 Forest Plan. As indicated in the intent paper, the impacts to the effectiveness of security habitat blocks can be qualitatively assessed at the project level by examining non-motorized access, topography, and cover/forage.

Motorized access routes (i.e. roads and motorized trails) open to the public during the general hunting season were used to map elk security at the coarse scale (e.g. planning subunits on the

KNF). These routes were identified by using the access/travel management codes which identify the season of use. These routes were buffered by ½ mile and those areas outside the buffer on KNF lands that were at least 250 acres in size were identified as potential security areas. Although routes on other ownerships were buffered, only elk security on KNF lands was identified as potential security areas. Note, at the fine scale (e.g. project level analysis), topography and the juxtaposition of cover/forage would be qualitatively assessed to determine the effectiveness of security area blocks (Anderson 2015). At this coarse scale, only the quantitative analysis based on motorized access was done for this 2021 monitoring report.

Results

Table 104 shows the current calculations of elk security based upon motorized routes open to the public during the general hunting season. Also displayed are the initial coarse-scale calculations done in 2012 and displayed in the Forest Plan FEIS (USDA 2013) and accompanying specialist's report (Anderson 2014). Table 105 shows the number of planning subunits meeting the thresholds identified for high emphasis (≥50 percent security) and low/medium emphasis (≥30 percent Security) subunits

Table 104. Shown is elk security for each planning subunit on the KNF compared to those calculated in 2012 and displayed in USDA 2013 and Anderson 2014.

KNF Planning Subunit	Priority	USDA 2013 % Security	2021 % Elk Security
Alexander	High	22	31
Beaver	High	45	48
Big	Medium	31	42
Billiard	High	43	64
Boulder	Medium	20	31
Bristow	Medium	13	19
Buckhorn	High	42	61
Bull	High	40	75
Callahan	Medium	42	59
Crazy	Medium	23	45
Cripple	Medium	17	29
Dodge	Medium	23	34
Elk	High	31	33
Fortine	Low	19	34
Grave	Medium	56	64
Green	High	48	73
Grizzly	Medium	49	57
Ksanka	Medium	43	45
Lake	Medium	56	77
LYaak	Medium	35	43
Marten	High	36	41

KNF Planning Subunit	Priority	USDA 2013 % Security	2021 % Elk Security
McElk	Medium	29	30
McGregor	Low	0	0
McSutten	Medium	36	50
McSwede	Medium	19	14
Meadow	Low	1	1
Murphy	Medium	44	49
NEYaak	Medium	47	63
NWYaak	Medium	48	60
OBrien	Medium	21	32
Parsnip	Medium	45	61
Pilgrim	Medium	23	26
Pine	Medium	35	39
Pinkham	Low	7	12
Pipestone	Medium	17	23
Pleasant	Low	7	9
Quartz	Medium	19	27
Riverview	Medium	9	10
Rock	High	36	56
Seventeenmile	High	55	70
SFYaak	Medium	47	62
Sheep	Low	17	33
Silverfish	High	46	58
Spar	High	34	60
Stillwater	High	45	65
Sunday	Medium	37	45
Swamp	Low	9	21
Treasure	High	44	71
Trego	Low	45	55
Trout	High	57	61
Twentyodd	High	54	64
UBig	High	65	81
Vermilion	Medium	45	49
Whitepine	High	19	21
Wigwam	Medium	56	66
Wolf	Low	17	33

Table 105. Shown are the number of planning subunits meeting the thresholds identified for high emphasis (≥50% security) and low/medium emphasis (≥30% Security) subunits.

Priority Level	Original Calculated Number of Subunits Meeting Threshold (USDA 2013)	Current Number of Subunits Meeting Threshold
High Emphasis (≥50% security)	4	13
Low/Medium Emphasis (≥30% Security)	18[1]	26

[1] – This number is corrected from what is found in the mock tables in USDA 2016c, which had errors identifying the emphasis level for some planning subunits.

Discussion

The 2021 calculations are not directly comparable to the 2012 calculations used in USDA 2013; therefore, it is difficult to discern if conditions are trending towards FW-OBJ-WL-02. The 2021 calculations better align with the intent of the elk security direction in the 2015 Forest Plan as identified by Anderson (2015). Those from 2012 attempted to take a coarse scale look at the vegetation component (e.g. cover/forage) which is better analyzed qualitatively at the fine scale (e.g. project level), in conjunction with other factors such as topography, to determine its impact on the effectiveness of security area blocks. Going forward, the next several monitoring reports (e.g. 2023, 2025) can be compared to the 2021 numbers to get a better understanding of progress towards FW-OBJ-WL-02 based upon the coarse scale motorized access management calculations. Additionally, the Forest was unable to use the same process to get data regarding cover/forage as was used in 2012, thereby preventing a direct comparison of cover/forage changes by 2021. Errors were also found in some of the roads data used in 2012, such as buffering of roads erroneously identified as open when they branched off a road that was gated or barriered.

Findings

Table 106. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-WDL-02: Are habitat trends for elk consistent with the objectives?	2021	(B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s) The 2021 calculations are not directly comparable to the 2012 calculations used in USDA 2013; therefore, it is difficult to discern if conditions are trending towards FW-OBJ-WL-02. The 2021 calculations better align with the intent of the elk security direction	Yes	Consider rewording this monitoring question to tie more directly to FW-OBJ-WL-02. Suggested change: "What is the progress towards FW-OBJ-WL-02?" Drop the reference in the monitoring plan to FW-GDL-WL-10 and focus this

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
		in the 2015 Forest Plan as identified by Anderson (2015). Going forward, the next several monitoring reports (e.g. 2023, 2025) can be compared to the 2021 numbers to get a better understanding of progress towards FW-OBJ-WL-02 based upon the coarse scale motorized access management calculations.		monitoring question on FW-OBJ-WL-02.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Literature Cited

Anderson, Jeremy L. 2014. Wildlife Specialist Report for the KNF Forest Plan Revision. Kootenai National Forest. 475 pp.

Anderson, Jeremy. L. 2015. Elk Security – Consistency with the 2015 Forest Plan. Kootenai National Forest. 6 pp.

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Access & Recreation Evaluation and Adaptive Findings

MON-AR-01

Monitoring Question (MON-AR-01): Have appropriate management actions been taken on recreation sites where opportunities have been identified, use is at or near capacity, or where thereare resource concerns?

Table 107.MON-AR-01 Monitoring summary table

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
Monitoring Question (MON-AR-01): Have appropriate management actions been taken on recreation sites where opportunities have been identified, use is at or near capacity, or where there are resource concerns?	FW-DC-AR-01 MA6-DC-AR-01 MA7-DC-AR-01 MA7-DC-AR-05 GA-DC-AR-BULL-01 GA-DC-AR-CLK-01 GA-DC-AR-KOO-01 GA-DC-AR-LIB-01 GA-DC-AR-TOB-01 GA-DC-AR-YAK-01 FW-OBJ-AR-01 FW-OBJ-AR-02	MON-AR-01-01: Number and type of recreation sites; MON-AR-01-02: Number of Persons at One Time developed sites (PAOT); MON-AR-01-03: Deferred maintenance amount needed by forest; MON-AR-01-04: Number of recreation partnerships; and MON-AR-01-05: Percent of the Forest and locations managed in the various Recreation Opportunity Spectrum (ROS) classes.	Every 5 years. Each recreation site is surveyed (Condition of Facility Survey) once every 5 years with approximately 20 percent surveyed each year.	Natural Resource Manager database	Laura Jungst

Referenced Plan Components:

FW-DC-AR-01. Quality, well-maintained recreation facilities exist at key locations to accommodate concentrations of use, enhance the visitor's experience, and protect the natural resources of the area. Day use access is available for relaxation, viewing scenery and wildlife, and for water and snow-based play. Recreation rental cabins and lookouts provide safe, comfortable, overnight facilities that allow visitors to experience and learn about the rich history of the area. Dispersed camping opportunities are available for a wide variety of users while considering

resource concerns, activity conflicts, or over-use. Food and garbage storage do not contribute to conflicts between recreation users and wildlife.

FW-OBJ-AR-01. Dispersed Recreation Sites – Over the life of the Plan, the outcome is:

- Improve conditions by implementing three Interpretation and Education (I&E) programs (e.g., brochures, public contact, signing) focused on two heavily used areas (Vermilion River corridor and Lake Koocanusa Reservoir).
- Improve conditions at 50 to 75 dispersed sites. Improved conditions would mitigate critical recreation standards such as; visitor education, sanitation, define camping area impacting vegetation or stream banks, define parking area where site is expanding, or abate high-risk conditions such as bug killed trees.

FW-OBJ-AR-02. Developed Recreation Sites – The outcome is:

- Over the life of the Plan, 5 to 10 percent reduction of deferred maintenance at cabin and lookout rental sites and at water-based sites.

MA6-DC-AR-01. Existing recreation facilities are managed to accommodate public use and provide safe recreation experiences.

MA7-DC-AR-01. These recreation areas and sites are maintained or improved to serve the forest visitor and provide a specific recreation experience. Major site modifications and facility installations (both private and public) are present in some of these areas. These installations and improvements appear individually or in a combination within recreational complexes.

MA7-DC-AR-05. Many facilities are designed for specific activities used by large numbers of people and are fully accessible. These facilities blend in with the forest surroundings and provide the necessary services for forest visitors. Buildings and structures serve administrative and historic preservation purposes.

GA-DC-AR-BUL-01. Improvements are made to maintain or increase recreational opportunities, including the establishment of winter non-motorized trails in lower elevations.

GA-DC-AR-CLK-01. Partnerships or cooperative agreements are pursued with local schools; Avista Corporation; Montana Fish, Wildlife and Parks; and other potential partners, in development and maintenance of access and recreational sites including the Adopt-A-Trail program.

GA-DC-AR-KOO-01. Recreation opportunities are maintained or improved in areas adjacent to Lake Koocanusa.

GA-DC-AR-LIB-01. Opportunities to utilize partnerships and user groups to evaluate, plan, and improve trail systems and other recreational developments are pursued and maintained (e.g., Lincoln County Snowkats, Cabinet Backcountry Horsemen, Kootenai Ridgeriders ATV Club, Kootenai Winter Sports, etc.).

GA-DC-AR-TOB-01. Recreation opportunities are maintained or improved in the Ten Lakes area. An updated study for the Ten Lakes Wilderness Study Area is completed including the identification of specific areas and routes to provide a variety of winter and summer non-motorized and winter motorized recreation opportunities. Monitoring of use is an integral part of the recreation program for the Ten Lakes area.

GA-DC-AR-YAK-01. Improvements are made to maintain or increase recreational opportunities. Historic structures are considered for restoration. Private funding and volunteer partnerships are pursued to accomplish these improvements for the Upper Ford and Sylvanite Ranger Stations, Garver, Mount Henry, Northwest Peak, Baldy Mountain, and Lost Horse Mountain Lookouts and

other areas. Sylvanite Ranger Station, Lost Horse Mountain Lookout, and other areas are considered for addition into the cabin rental program.

Method

National standards have been developed through meaningful measures (MM) for all recreation sites. Meaningful measures standards provide for consistent operation and maintenance of sites as well as providing a base for evaluating capacity and resource impacts (RHVR Integrated Business Systems).

Recreation site condition surveys document the field inventory and condition of facilities. Design, preparation, and implementation of changes identified are accomplished through maintenance funding, capital improvement (CI) programs, partners, or grants.

MON-AR-01-01 through 03 is derived from the Natural Resource Management (NRM) database.

MON-AR-01-01: Number and type of recreation sites (dispersed and developed). The major difference between these sites is management actions in dispersed sites are primarily to protect other resources, while in developed sites management actions are focused on user comforts.

The Forest started an inventory of dispersed sites (development scale 0-2) in 2011. We anticipate the forestwide inventory to be complete by 2014. The inventory will capture approximately 80 percent of the existing dispersed sites along roads. Additional sites will be added as they are inventoried.

Developed sites (development scale 3-5) were inventoried in 1999, and are field surveyed every 5 years. Individual recreation sites may move from dispersed to developed (and vice versa) based on management decisions.

MON-AR-01-02: Number of Persons at One Time (PAOT) for developed sites. PAOTs are the designed capacity of the site, which takes into consideration national design criteria, other resources, and user comforts.

For example, the national standard for individual camping unit is five people at one time. Picnic tables are designed to accommodate five people, the parking areas are designed for one to two vehicles, and the number of toilets provided is one toilet per 25 PAOTs. Total capacity for a site reflects the amount of use that can be accommodated without resource impacts or user conflicts.

MON-AR-01-03: Deferred maintenance amount needed by forest tracks maintenance needed to meet national standards for developed recreation sites.

As facilities reach their designed life major repairs are common; and annual maintenance that does not occur can add to deferred maintenance needs. As site condition surveys are completed the amount needed may go up, while as projects are completed the amount needed would be reduced.

MON-AR-01-04: Number of partnerships (signed agreements). Review of forest partnership agreements for recreation or trails projects. Note number of partnerships and type of services provided.

MON-AR-01-5: Percent Forest by Recreation Opportunity Spectrum category. Analyzed on a forestwide basis, through National ROS Protocol located at http://www.fs.fed.us/eng/ros. Map and tabulate current ROS and compare to desired distribution of forestwide recreation opportunity spectrum settings for winter and summer.

Results

Indicator 1, number of developed recreation sites and PAOTs as shown in Table 108.

Table 108. Number of Developed Recreation Sites (Dev Scale 3-5) by Year

Example Fiscal Year 2014	Forest Plan Baseline	Forest Plan Baseline PAOT	No Rec Sites	PAOT	2020 No sites	2020 PAOT	2025 No Sites	2025 PAOT
Boating Site	**17**	1000	**22**	1637	21	1511		
Campground	26	2600	28	2573	29	2598		
Group Sites/Picnic	11	1050	6	835	7	660		
Resort/Marina	2*	**500**	2	**1000**	2	1000		
Lookout/ Cabin	12	57	13	73	15	93		
Picnic Site			5	349	4	314		
Ski AreaAlpine	1*		1	275	1	275		
Ski AreaNordic	1*		2	95	1	70		
Snow park	4*		5	238	5	238		
SwimmingArea	4	340	4	326	5	336		
Target Range	4*		2	123	2	123		
Trailhead	3	373	3	128	4	165		
TOTAL	**72**	**5420**	**94**	**7652**	**97**	**7350**		

*Privately developed

PAOT – Persons at one time, a measure of capacity

Opportunities that changed from baseline to 2020 was the addition of two rental cabins- Minton Peak Lookout and Fairview Cabin. The cabin and lookout rental program continues to be a popular opportunity, with most lookouts 90-100 percent rented. While there is a need for this opportunity, there is limited supply of cabins and lookouts.

Other minor changes in the table for developed opportunities was due to minor edits and correction of data in NRM.

Table 109. Number of Dispersed Recreation Sites by Year

Baseline Fiscal Year 2014	Dispersed Rec Sites(DS 0-2) Baseline # ManagedRec Sites (DS 1-2)	Dispersed Rec Sites(DS 0-2) Baseline # Rec Sites (DS -0)	Dispersed Rec Sites(DS 0-2) Baseline TotalSite Types	Dispersed Rec Sites(DS 0-2) 2020 # Managed Rec Sites (DS 1-2)	Dispersed Rec Sites(DS 0-2) 2020 # Rec Sites (DS -0)	Dispersed Rec Sites(DS 0-2) 2020 TotalSite Types
Boating Site	6	7	13	4	6	10
Campground	12		12	11		11
CampingArea	122	433	555	95	519	614
Climbing Area	2		2	2		2
Day Use	86	88	174	78	90	168
Fishing Site	1	2	3	1	2	3
Horse Camp	1		1	1		1
Interpretative Site	3		3	8		8
Lookout/ Cabin	2		2	3		3
Observation Site	66	22	88	67	25	92
Snow park	9		9	36		36
Trailhead	86	163	249	246		246
TOTAL						

Dispersed Recreation Opportunities (Table 109) that changed from base line include construction of sites including Big Spar trailhead, Cougar Ridge Snow Park, additional inventory of camping areas, as well minor edits and correction of data in NRM.

Campground receipts show an increase from 2015 to 2019 of 24 percent ($198,358 to $246,747). An increase of approximately 25 percent use across the forest was validated by observations in the field across the forest. CG occupancy has been increasing, additional dispersed sites had been used, both marinas have been full, parking at high use sites such as Kootenai Falls, and Ross Creek Cedars routinely exceed capacity most days of the week.

In 2020 campground fees and cabin/lookout rental fees were increased, and due to COVID use across the forest increased significantly in both fee site and dispersed sites. From 2019 to 2020 collections increased by 50 percent forest wide. Receipts at some sites indicate that the fee increases may account for 12-20 percent of this increase, with use accounting for approximately 30 percent increase.

Campground use is at or exceed capacity, with many popular sites having over 80 percent occupancy. Use at dispersed site is similar, with new dispersed sites being created. There are reports of dis-satisfaction with Recreation.gov for reservation, mainly that sites are being book so quickly they cannot get a reservation.

Table 110. Recreation Deferred Maintenance

Deferred Maintenance	Baseline 2014	2020	2024	2029
Minor Constructed Features	$101,400	$2,007,980		
Buildings	$1,015,800	$2,467,000		
Drinking Water	$364	$68,200		
Wastewater	0	$70,400		
Total				

The deferred maintenance (Table 110) amount needed by the Forest tracks maintenance needed to achieve national standards for developed recreation sites. Significant increase in deferred maintenance was due to a focus on recording information in NRM, not necessarily a change in the field. With the passage of the Great America Outdoor Act in 2020, projects proposed were detailed in NRM for maintenance needed.

Evaluation of recreation partnerships (Table 111) will include all aspects of partners in recreation and trail projects. Use the following table to track opportunities that are provided through partnerships. Partnership across the forest increased, both with the number of outfitter and guides and partners through grants and agreements. New outfitter and guides included non-consumptive uses such as climbing, fishing, youth schools, and boating. New partner agreement included Avalanche, Montana Fish Wildlife and Parks, private individuals, mountain biking group, Forest Fire Lookout association. Additional agreements were also made with existing partners due to new funding and reporting – such as RAC funds.

Table 111. Partnerships

Partnerships/Private Development	Baseline 2014	2020	2024	2029
Groomed Cross-country Ski	1	1		
Groomed Snowmobile area	4	4		
Marina	2	2		
Outfitter and Guides	37	49		
Ski Area	1	1		
Target Range	4	4		
Grant/agreements with organizations (no. agreements)	10	19		
Volunteers (hours)	28,700	29,648		

The Recreation Opportunity Spectrum (ROS) will be evaluated on a forest wide basis, through National ROS Protocol located at http://www.fs.fed.us/eng/ros. The summer ROS is trending toward the FP desired condition, primarily due to the Special Closure order signed as a result of the FP ROD (14-088-L-15).

Table 112. Summer Recreation Opportunity Spectrum

Summer ROS Class	% of KNF Forest Acreage 2013 baseline	% of KNF Forest Acreage RFP desired condition	% of KNF Forest Acreage 2020	% of KNF Forest Acreage 2024
Primitive	10%	8%	8%	
Semi-Primitive Non-motorized	57%	54%	54%	
Semi-Primitive Motorized	10%	16%	16%	
Roaded Natural/Rural	23%	22%	22%	
Total	100%	100%	100%	

Winter ROS has not changed. The current Winter ROS does not achieve FP desired conditions. This is primarily because the forest has not completed Over Snow Travel Management. The forest has made a commitment (USFWS BO) to complete Over Snow Travel Management by 2024.

Table 113. Winter Recreation Opportunity Spectrum

Winter ROS Class	% of KNF Forest Acreage 2013 baseline	% of KNF Forest Acreage RFP desired condition	% of KNF Forest Acreage 2019	% of KNF Forest Acreage 2024
Primitive	<1%	<1%	<1%	
Semi-Primitive Non-motorized	5%	14%	5%	
Semi-Primitive Motorized	87%	78%	87%	
Roaded Natural/Rural	8%	8%	8%	
Total	100%	100%	100%	

Discussion

MON-AR-01 Appropriate management actions have been taken at sites were opportunities have been identified. These actions were proposed and analyzed through NEPA in either individual decisions or in the context of larger vegetation projects.

While use at sites across the forest is at or near capacity, there have been few resource concerns noted. Issues that arise from high use at developed sites include: decreased in experience, increase in operational needs and cost, and creep of users into dispersed sites. As use is anticipated to continue to increase additional capacity should be considered in certain areas. The desired recreation opportunity should be maintained.

Table 114. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-AR-01: Have appropriate management actions been taken on recreation sites where opportunities have been identified, use is at or near capacity, or where there are resource concerns?	2020	Yes – recreational opportunities have increased in several different areas such as rental cabins and campgrounds.	No	None

1 PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

2 [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-AR-02

Table 115. MON-AR-02 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
(MON-AR-02): Have management activities trended towards desired conditions for a minimum transportation system that provides recreation opportunities,	FW-DC-AR-03 FW-DC-AR-04 FW-DC-AR-05 FW-DC-AR-07 FW-OBJ-AR-03 MA6-DC-AR-03Suggest updating Monitoring Guide for the following: ~~GA-DC-AR-BUL-01~~	MON-AR-02-01: Miles of road open year-long; MON-AR-02-02: Miles of road open seasonally; MON-AR-02-03: Miles of roads maintained by maintenance level;	Collect data annually and evaluation report every 5 years.	INFRA Database, WIT Database and the MVUM	Forest Transportation Planner, Shelly Anderson

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
allows for safe and efficient public and agency access, and is environmentally compatible?	*This is in the Monitoring Guide but not sure it pertains to this transportation system question, as it more pertains to rec/non-motorized winter trails.* ~~GA-DC-AR-TOB-03~~ *This one appears to be an error in the Monitoring Guide as it doesn't exist in the Forest Plan. Maybe it was meant to be this one instead:* GA-DC-AR-TOB-02	MON-AR-02-04: Miles of roads decommissioned; and MON-AR-02-05: Miles of roads put into intermittent storage.			

Table 116. Monitoring Item MON-AR-02 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	This is the first MER
Next scheduled MER evaluation of this monitoring item:	3

The collection of the monitoring information is required by the following authorities, and assists with identifying and responding to changing conditions, changing public desires, and new information, such as that obtained through research and scientific findings.

- The Multiple-Use Sustained-Yield Act of 1960 and the Federal Land Policy and Management Act of 1976 require that the National Forests be managed for outdoor recreation and human occupancy and use while protecting other resources.
- Monitoring management effectiveness and progress toward achieving or maintaining the Forest Plan's desired conditions or objectives is required by 36 CFR 219.
- National Forest road management direction is found at 36 CFR 212 and Forest Service Manual (FSM) 7703.

FW-DC-AR-03. Opportunities for outdoor recreation, such as hunting, fishing, wildlife viewing, berry picking, firewood gathering, and bird watching are available for a wide variety of users. Interpretation and education opportunities enrich the visitors experience and promote a land ethic that preserves the cultural and natural resources of the Forest for future generations.

FW-DC-AR-04. Provide year-round outdoor recreation opportunities and experiences in a range of settings as described by the recreation opportunity spectrum (ROS). The desired distribution of forestwide ROS settings are displayed in the following table.

Table 117. Desired Distribution of Forestwide Recreation Opportunity Spectrum Settings (% of KNF)

	Primitive	Semi-Primitive Non-Motorized	Semi-Primitive Motorized	Roaded Natural	Rural
Summer	186,215 acres (8%)	1,194,465 acres (54%)	358,976 acres (16%)	451,079 acres (21%)	26,542 acres (1%)
Winter	3,192 acres (<1%)	319,834 acres (14%)	1,719,286 acres (78%)	145,059 acres (7%)	30,178 acres (1%)

FW-DC-AR-05. A variety of motorized and non-motorized winter and summer recreation opportunities are available. Well-designed and maintained trailheads exist and offer adequate parking and turnaround areas. Trails are designed and maintained for the given users (saddle stock, snowmobiles, OHV users, hikers, mountain bikers, etc.).

FW-DC-AR-07. A transportation system is in place that provides safe and efficient public and administrative access to the Forest for recreation, special uses, forest resource management, and fire management activities. It is efficiently maintained, environmentally compatible, and responsive to public needs and desires. The transportation system and its use have minimal impacts on resources including threatened and endangered species, sensitive species, heritage and cultural sites, watersheds, and aquatic species. Newly constructed or reconstructed roads do not encroach into streams and riparian areas in ways that impact channel function, geometry, or sediment delivery. Roads in intermittent stored service pose minimal risks to water quality and aquatic ecosystems. Drainage structures have minimal risk of failure, and provide adequate drainage that prevents accelerated runoff, erosion, and sediment delivery to streams. In addition, stream crossings provide for passage of aquatic organisms. Unauthorized roads and trails are no longer created.

FW-OBJ-AR-03. National Forest System Road Maintenance. The outcome is:

- Annually, meet maintenance level requirements on 20 to 30 percent of Operational Maintenance Level 3, 4, and 5 roads (roads that are drivable by passenger vehicles and provide primary access to many recreation opportunities).
- Annually, meet maintenance level requirements on 10 to 20 percent of Operational Maintenance Level 2 roads (roads that are drivable by high clearance vehicles and provide additional access to recreation opportunities).
- Over the life of the Plan, decommission or place into intermittent stored service 150 to 350 miles of road.

MA6-DC-AR-03. A range of recreational opportunities (e.g., motorized and non-motorized) are provided within this MA while route conditions are maintained or improved.

~~**GA-DC-AR-BUL-01**. Improvements are made to maintain or increase recreational opportunities, including the establishment of winter non-motorized trails in lower elevations.~~ *This is in the Monitoring Guide but not sure it pertains to this transportation system question, as it more pertains to rec/non-motorized winter trails.*

~~**GA-DC-AR-TOB-03**~~ *This one appears to be an error in the Monitoring Guide as it doesn't exist in the Forest Plan. Maybe it was meant to be this one instead:*

GA-DC-AR-TOB-02. High-use recreation routes, such as Grave Creek Road, are maintained through dust abatement and grading.

Methods

- Road data is tracked in two data sets, tabular and spatial data. Road maintenance accomplishments are recorded yearly as required by national road accomplishment reporting requirements.
- The Travel Routes module within the national Infra database is the repository for the tabular data about roads. Natural Resource Manager and the INFRA database were used to collect information. Data was supplemented from reports from the WIT database. The method of collection is described in the 2015 KNF Monitoring Guide.
- The MVUM layer contains information about which roads are open seasonally and yearlong. The MVUM layer is dynamic and needs to be saved at the end of each year. The MVUM data was not being saved at the end of each year, a few years were missing. Recommendations are listed in the Finding and Results section.

Results

Table 118. Miles of Road Open Yearlong and Seasonally by Fiscal Year

Indicator	Forest Plan Baseline (miles from 2010)	2016 (miles)	2017 (miles)	2018 (miles)	2019 (miles)	2020 (miles)
Miles of Road Open Year-long	2,832	2802	not available	not available	2770	2754
Miles of Road Open Seasonally	721	711	not available	not available	715	710

Table 119. Miles of Road Maintained and Decommissioned/Intermittent Storage by Fiscal Year

Indicator	Forest Plan Objective	2016	2017	2018	2019	2020
Miles of ML 3-5 Roads Maintained	Annually, meet maintenance level requirements on 20-30% of OPML 3-5 roads.	408	295	233	104	238
Miles of ML 2 Roads Maintained	Annually, meet maintenance level requirements on 10-20% of OPML 2 roads.	119	228	185	64	137
Miles of Non-System Road Decommissioned		5.7	4.5	21.2	0.4	0.0
Miles of System Road Decommissioned		7.1	8.0	7.3	1.2	0.0
Miles of Road Stored		7	8	22	3	3

Indicator	Forest Plan Objective	2016	2017	2018	2019	2020
Total Miles of Roads Decommissioned and/or put into Intermittent Storage	Over the life of the Plan, decommission or place into intermittent stored service 150-350 miles of road.	19.8	20.5	50.5	4.6	3

Discussion

- **MON-AR-02-01 and MON-AR-02-02**: Although there is no target number of miles of road open to the public, there is a small downward trend in miles of road open yearlong and seasonally, Table 118. The Forest's open road system continues to contribute to the forest plan desired conditions that include providing access for administrative access to manage NFS lands and access to a variety of outdoor recreation activities for a wide variety of users. Most of the decrease shown is likely a result of database edits and clean-up over time, as there hasn't been NEPA decisions to remove that many miles of public access. See Findings section for more details.
- **MON-AR-02-03**: There is a downward trend in miles of road maintained at all maintenance levels, Table 119 which could appear to indicate decreasing access, safety, and efficiency, which trends away from the forest plan desired condition FW-DC-AR-07. However, some years may not have had all accomplishment data entered into the database and therefore the downward trend may not be an accurate picture. Additionally, FW-OBJ-AR-03 states that the objective is to *meet the maintenance level requirements* on the listed percentage of roads, not to necessarily maintain a certain percentage of road miles. Therefore, with our accomplished maintenance that is completed annually through completion of service contracts for things such as blading and brushing as well as maintenance work done via force account/forest employees along with the maintenance completed to roads for log hauling for timber sale contracts, the forest is contributing to moving towards FW-OBJ-AR-03, Roads often do not require annual maintenance to achieve maintenance level requirements. Visual inspections of roads occur regularly to guide maintenance priorities for the year. Road managers on each district rotate maintenance performed based on assessing the road conditions each year as they plan for that year and future years' maintenance needs.
- **MON-AR-02-04** and **MON-AR-02-05**: There has been steady progress towards the forestwide objective to decommission or place into stored service 150-350 miles of road, Table 119 which results in trending toward the forest plan desired condition of enhancing environmental compatibility of the overall road system by reducing environmental impacts over the long term.

Findings

Table 120. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?[2]*
(MON-AR-02): Have management activities trended towards desired conditions for a minimum transportation system that provides recreation opportunities, allows for safe and efficient public and agency access, and is environmentally compatible?	2021	YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired. As the monitoring results demonstrate, the road storage, decommissioning, and road maintenance being accomplished as well as the transportation system open for public travel, the KNF continues to contribute to progress of achieving FW-OBJ-AR-03 as well as the desired conditions listed for this monitoring item.	Yes	Increase the reporting interval from every five years to every 2 years. Monitoring Program: Recommended changes below

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-AR-02-01 and **MON-AR-02-02**: The MVUM layer is dynamic and needs to be saved at the end of each year. It was not being saved at the end of each year, so data was difficult to acquire for past years. No static MVUM data was found for 2017 or 2018. No static MVUM data was found for 2020, but used existing data as of February 2021 for 2020, as there haven't been any changes since end of FY 2020. Changes in open miles to the public occur with NEPA decisions but the changes shown in this report are generally a result of data clean-up over time.

- Miles of open road to the public lowered as shown but much can be attributed to changes in road system from NFSR to County or to private due to private road special use permits (it was discovered that many private driveways with permits were coded as NFSR and therefore showing on MVUM maps when in fact they weren't meant to be open to public.) When changing System to private (while keeping jurisdiction as FS) the roads no longer are on the MVUM or counted in our open road totals.

- Another item worth noting is due to lack of personnel at some districts, database work was not kept up for many years, as things are noticed they are fixed. To ensure data is kept current,

assure that there are adequate personnel to understand, track and complete the database work as project decisions that affect the road data occur.

- Our GIS coordinator will setup a task to archive the MVUM every year. If there are no changes, we don't recreate the spatial layer and the map is just reprinted, but the spatial layer will be archived even if there are no changes.

- Better end of year reporting is needed. The recommended folder does not exist, and the data has not been saved at the end of each year. Recommend updating Monitoring Guide to state just after September 30th of each year a copy of the II_MVUM_ROAD_ALLOW file for the Forest will be placed in a file folder created for each year in the following Pinyon/Box folder: *7700TravelMgmt~7710TravelPlng\SO\Monitoring_2015ForestPlan*. Additionally, a folder for GIS data used for reporting has been created here: *T:\FS\NFS\Kootenai\Program\7700TravelMgmt\GIS\SO\7710TravelPlanning\Workspace\Monitoring_2015ForestPlan*

MON-AR-02-03: Better end of year reporting is needed. Due to personnel shortages, some years may not have had all the completed maintenance work entered into the database therefore maintenance mileages shown may appear lower than what was actually completed on the ground. In addition, the recommended folder in the monitoring guide does not exist.

- Add to monitoring guide steps for data collection and storage including a list of suggested reports to run.

- Update Monitoring Guide to recommend yearly road accomplishment reports be filed electronically in a file folder created for each year in the following Pinyon/Box folder: *7700TravelMgmt~7710TravelPlng\SO\Monitoring_2015ForestPlan*.

- To assist the miles of road being maintained, and miles of road being stored to continue to progress toward the forest plan desired condition, it is recommended to increase funding of maintenance activities. Increase personnel resources, both for completing the work on the ground and/or contracts for the work, but also to assure there is personnel with time to enter accomplished work into the INFRA roads database before fiscal year end deadlines.

MON-AR-02-04 and **MON-AR-02-05**: Better end of year reporting is needed as well as more coordination between watershed and engineering personnel to assure all storage and decommissioning for each year is tracked and entered into the appropriate location of the INFRA and WIT databases. Some data was hard to find and due to inadequate staffing, hasn't been entered into database until discovered and entered years later and therefor may not appear in accomplishment reports that were captured at fiscal years' end.

- Update monitoring guide steps for data collection and storage to be more current and accurate including suggested reports to run.

- To ensure data is tracked and entered as required, assure that there is adequate personnel to understand and complete the database work at each district or at least forward proper data to someone that can do that entry for them before fiscal year end deadlines.

- Update Monitoring Guide to recommend yearly decommissioning and storage reports will be filed electronically in a file folder created for each year in the following Pinyon/Box folder: *7700TravelMgmt~7710TravelPlng\SO\Monitoring_2015ForestPlan.*

Plan Components listed in Monitoring Guide that may need edited:

GA-DC-AR-BUL-01 This is in the Monitoring Guide but not sure it pertains to this transportation system monitoring question, as it more pertains to rec/non-motorized winter trails. Confirm and edit monitoring guide as needed.

GA-DC-AR-TOB-03 This one appears to be an error in the Monitoring Guide as it doesn't exist in the Forest Plan. Maybe it was meant to be this one instead: GA-DC-AR-TOB-02. Confirm and edit monitoring guide as needed.

MON-AR-03

Mon-AR-03: To what extent are motorized and non-motorized winter and summer trail recreation opportunities available for a variety of users?

Table 121. Summary of findings for all Plan Monitoring Items

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-AR-03 What motorized and non-motorized winter and summer trail recreation opportunities have been provided?	FW-DC-AR-03 FW-DC-AR-04 FW-DC-AR-05 FW-OBJ-AR-04 FW-OBJ-AR-05 MA6-DC-AR-03 MA7-DC-AR-03 GA-DC-AR-BUL-01 GA-DC-AR-CLK-01 GA-DC-AR-KOO-04 GA-DC-AR-LIB-01 GA-DC-AR-LIB-03 GA-DC-AR-LIB-04	MON-AR-03-01: Acres open to over-snow vehicle use; acres non-motorized winter use MON-AR-03-02: Miles of managed over-snow motor vehicle trails; MON-AR-03-03: Miles of managed cross-country ski trails; MON-AR-03-04: Miles of trails designated for motor vehicle use yearlong or seasonally; miles of trail designated for non-motorized use	Annually	Trail data is tracked in two data sets, spatial and tabular. Trail maintenance accomplishments are recorded yearly as required by national trail accomplishment reporting requirements.	Laura Jungst

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
		yearlong; and MON-AR-03-05: Miles of trails maintained to standards for a variety of managed uses			

FW-DC-AR-03. Opportunities for outdoor recreation, such as hunting, fishing, wildlife viewing, berry picking, firewood gathering, and bird watching are available for a wide variety of users. Interpretation and education opportunities enrich the visitors experience and promote a land ethic that preserves the cultural and natural resources of the Forest for future generations.

FW-DC-AR-04. Provide year-round outdoor recreation opportunities and experiences in a range of settings as described by the recreation opportunity spectrum (ROS). The desired distribution of forestwide ROS settings are displayed in table 7.

FW-DC-AR-05. A variety of motorized and non-motorized winter and summer recreation opportunities are available. Well-designed and maintained trailheads exist and offer adequate parking and turnaround areas. Trails are designed and maintained for the given users (saddle stock, snowmobiles, OHV users, hikers, mountain bikers, etc.).

FW-OBJ-AR-04.Winter trails – Annually, groomed trails are available on:

- • 250 to 290 miles of motorized trails.
- • 25 to 45 miles of non-motorized trails.

FW-OBJ-AR-05. Summer trails – Annually, maintenance is performed on:

- • 10 to 20 miles of motorized trails
- • 250 to 750 miles of non-motorized trails.

MA6-DC-AR-03. A range of recreational opportunities (e.g., motorized and non-motorized) are provided within this MA while route conditions are maintained or improved.

MA7-DC-AR-03. Trails are developed and maintained to a high standard.

GA-DC-AR-BUL-01. Improvements are made to maintain or increase recreational opportunities, including the establishment of winter non-motorized trails in lower elevations.

GA-DC-AR-CLK-01. Partnerships or cooperative agreements are pursued with local schools; Avista Corporation; Montana Fish, Wildlife and Parks; and other potential partners, in development and maintenance of access and recreational sites including the Adopt-A-Trail program.

GA-DC-VEG-KOO-01. Populations of new noxious weed species are treated promptly and eradicated. Established noxious weed infestations are reduced and habitat conditions are improved for native grasses, forbs, and shrubs. Private, county, state, and federal organizations work cooperatively

to prevent, control, and manage noxious weed infestations. Noxious weed infestations are reduced in areas of large scale natural disturbance such as Dodge and Pinkham planning unit.

GA-DC-VEG-LIB-01. The south-facing slopes adjacent to the Kootenai River provide habitat for concentrations of Geyer's Biscuitroot that have adapted to low-intensity, frequent fire disturbance.

GA-DC-VEG-LIB-03. Populations of new noxious weed species are treated promptly and eradicated. Established noxious weed infestations are reduced and habitat conditions are improved for native grasses, forbs, and shrubs. Private, county, state, and federal organizations work cooperatively to prevent, control, and manage noxious weed infestations. Weed infestations on big game winter range and in the Cabinet Mountains Wilderness area are emphasized. Established rush skeltonweed sites in the Quartz Creek area are eradicated.

Methods

Review the trend in trail recreation opportunities. Determine if increase or decrease in miles or area over the monitoring period are trending towards forest plan objectives: winter annual access available on 250-290 miles of motorized and 25-45 miles of non-motorized and summer annual maintenance performed on 10-20 miles motorized and 250 -750 miles non-motorized trail.

To evaluate movement towards the desired conditions, review acres open to over-snow and non-motorized, miles of trail designated for motor vehicle use and non-motorized. Describe the trend and whether there is movement towards, away from, or neutral to forest plan desired conditions.

MON-AR-03-01: A standard acreage calculation on the spatial data containing information where over-snow vehicle use is allowed will provide the data;

MON-AR-03-02 and MON-AR-03-03: A standard query of the tabular data in II_TRAIL_ATM_MNG_DSGN_RRFF_V will produce the results needed for these performance indicators.

The query for trail managed uses is:
a. Route_status = EX – Existing;
b. Jurisdiction = FS – Forest Service; and
c. System = NFST – National Forest System Trail.

MON-AR-03-04: A standard query of the tabular data in II_MVUM_TRAIL_ALLOW will produce the results needed for this performance indicator.

The query for trail designation is:
- Route_status = EX – Existing;
- Jurisdiction = FS – Forest Service;
- System = NFSR – National Forest System Road; and
- Seasonal = yearlong or seasonal.

MON-AR-03-05: Yearly trail maintenance accomplishment reports are filed electronically in the NRM Trails Reports Trail Module titled Trail Annual Accomplishments.

Results

Results are based on accomplishments reported annually for miles managed and maintained of trails or areas, NEPA decision for areas open or closed to uses, and minor data clean up. Additional miles managed cross country ski trails was updating data base to include Black Butte and Deep Creek trails on Eureka Ranger District, and addition of Historic Trout Creek Ranger Station trails.

Table 122. Motorized and non-motorized recreation opportunities

	Baseline 2014	2020	2025
Acres open to over-snow vehicles	1,961,100	1,920,500	
Miles of managed over snow trails (motorized and non)	327	331	
Miles of managed cross-country ski trails	36	49	
Miles of designated motorized trail	144	120	
Miles open to mechanized uses	1,718	1,254	
Miles of trail maintained	1,036	1,075	

Balancing trail recreation opportunities with wildlife habitat conservation needs is an important public concern. Increases in recreation demand, decreasing maintenance budgets, habitat protection measures necessary for species protection, and restoration needs for improving watershed health are all factors influencing the level of winter and summer trail opportunities. Monitoring these items is a method for the agency and public to see the trends in trail management, and movement towards, away, or neutral to desired conditions.

The purpose of monitoring trail maintenance accomplishments, trails maintained to standard is to determine if budgets for trail maintenance are adequate to maintain trails for their managed uses in order to meet recreation demand.

Discussion

Opportunity for over snow motor vehicle use and mechanized trail use has been reduced as a direct effect of the Forest Plan ROD – with site specific closures (F14-088-L-15) in Research and Natural Areas and recommended wilderness areas (with exception of Ten Lakes area).

The miles of managed over snow groomed snowmobile trails remained the same on the ground, change in numbers are due to data clean up.

Opportunities for summer motorized trail opportunity has been reduced, although some reduction is due to data clean up.

Table 123. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-AR-03: To what extent are motorized and non-motorized winter and summer trail recreation opportunities available for a variety of users?	2020	Yes – Opportunities have been maintained with some reduction in summer motorized opportunities.	No	None

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-AR-04

MON-AR-04: What are the trends in visitation forest wide, and are visitors satisfied with the facilities, access, services, and perceptions of their safety?

Table 124. Summary of findings for all Plan Monitoring Items

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-AR-04: What are the trends in visitation forest wide, and are visitors satisfied with the facilities, access, services, and perceptions of their safety?	FW-DC-AR-04 MA6-DC-AR-01 MA7-DC-AR-01 MA7-DC-AR-05	MON-AR-04-01: Visitor use and trends in use forestwide; and MON-AR-04-02: Percent Satisfaction Index for developed facilities, access, services, and perception of safety.	Every five years, post National Visitor Use Monitoirng (2017, 2022, 2027)	National Visitor Use Monitoring	Laura Jungst

FW-DC-AR-01. Quality, well-maintained recreation facilities exist at key locations to accommodate concentrations of use, enhance the visitor's experience, and protect the natural resources of the area. Day use access is available for relaxation, viewing scenery and wildlife, and for water and snow-based play. Recreation rental cabins and lookouts provide safe, comfortable, overnight facilities that allow visitors to experience and learn about the rich history of the area. Dispersed camping opportunities are available for a wide variety of users while considering resource concerns, activity conflicts, or over-use. Food and garbage storage do not contribute to conflicts between recreation users and wildlife.

MA6-DC-AR-01. Existing recreation facilities are managed to accommodate public use and provide safe recreation experiences.

MA7-DC-AR-01. These recreation areas and sites are maintained or improved to serve the forest visitor and provide a specific recreation experience. Major site modifications and facility installations (both private and public) are present in some of these areas. These installations and improvements appear individually or in a combination within recreational complexes.

MA7-DC-AR-05. Many facilities are designed for specific activities used by large numbers of people and are fully accessible. These facilities blend in with the forest surroundings and provide the necessary services for forest visitors. Buildings and structures serve administrative and historic preservation purposes.

Methods

Comparison of collection from fee sites across the forest is an indirect method of measuring visitor use trends. Collections are deposited through the POSS system (local collection) or Recreation.gov (reservations).

In response to need for improved information on the recreational use of National Forest System lands, a nationwide, systematic monitoring process has been developed, which estimates annual recreational use of National Forest System lands. The basic unit of measure is the existing volume of visitors from a recreation site on a given day. Sites are stratified according to the type of site. Days are stratified according to the expected volume of exiting recreation visitors. A double-sampling strategy is the primary means used to obtain measures of exiting recreation traffic. Where possible, observable counts of other measures that are highly correlated with visitation; such as fee envelopes, ski lift tickets, or concessionaire reports are used in order to reduce variation in the visitation estimates. (2001 Forest Service National Visitor Use Monitoring Process: Research Method Documentation).

NVUM can be used to measure visitor use. However, for measuring trend in visitor use, caution must be used in comparing previous year's data. Changes in use numbers previous to round 3 data (2012) was influenced by changes in data collection protocol and data stratification. Caution should be used in interpreting any comparison of results between Rounds, due to several method changes.

Results

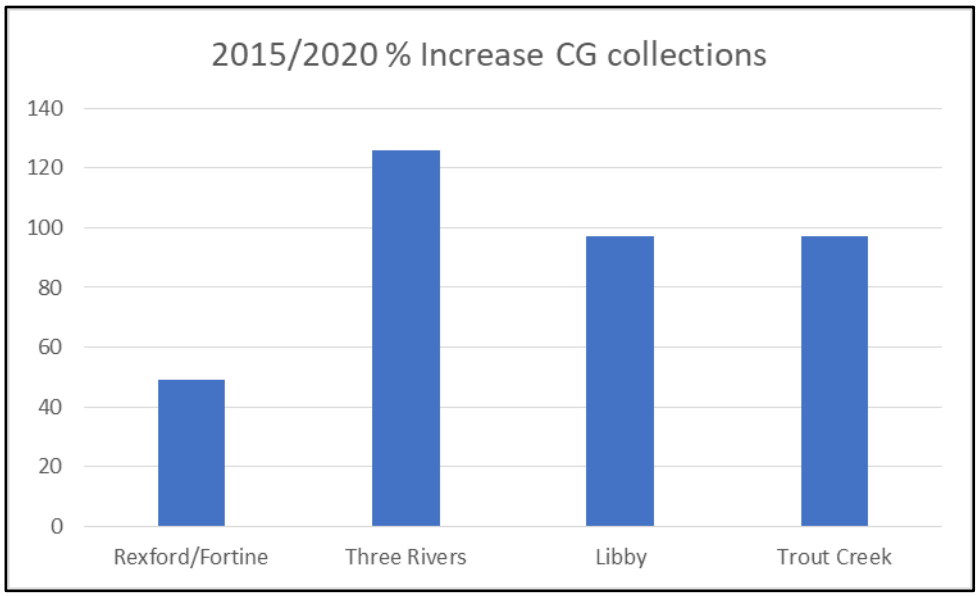

Figure 14. 2015/2020 percent increase CG collections

From 2015 to 2020 there has been an increase in Campground collections of 87 percent across the forest. The increase in collections is an indicator of increased use overall. NOTE: fees were increased in 2020, which accounts for some of the increase, as well as COVID observed increase in use. Collections increased from 2015-2019 by 25 percent.

Round 3 of the National Visitor Use survey occurred in 2017. At that time percent satisfaction was high, with the lowest areas of satisfaction in the general forest areas, or areas with little to no facilities or services.

Percent Satisfied

Percent Satisfied Index† Scores for Aggregate Categories

Satisfaction Element	Satisfied Survey Respondents (%)		
	Developed Sites‡	Undeveloped Areas (GFAs)	Designated Wilderness
Developed Facilities	93.8	66.6	100.0
Access	88.3	78.4	96.0
Services	87.2	64.4	88.1
Feeling of Safety	100.0	99.2	100.0

Selected Forests:
Kootenai NF (FY 2017)

Figure 15. Percent satisfied index+ scores for aggregate categories 2017

From 2012 to 2017 satification increased in developed site facilities and services, Wilderness access, feeling of safety, and services. Satification decreased in general forest area services and facitlies.

Percent Satisfied

Percent Satisfied Index† Scores for Aggregate Categories

Satisfaction Element	Satisfied Survey Respondents (%)		
	Developed Sites‡	Undeveloped Areas (GFAs)	Designated Wilderness
Developed Facilities	85.0	68.4	100.0
Access	89.8	77.1	81.7
Services	74.2	75.0	51.5
Feeling of Safety	100.0	95.2	29.6

Selected Forests:
Kootenai NF (FY 2012)

Figure 16. Percent satisfied index+ scores for aggregate categories 2012

Discussion

Use at cabins and lookouts is at capacity, however there is little opportunity to increase these sites. Minton Peak LO was brought online, and Meadow Peak Lookout will be online in 2020. Dispersed use was on a gradual increase, then exploded in 2020 due to COVID. We predict this will continue to expand and increase as out of area visitors (Kalispell, north Idaho, and Washington) have discovered the area. Use at developed sites (Campground and higher use trails – Kootenai Falls and Ross Creek) continue to increase as well. With the Great America Outdoor Act, the Forest has the opportunity to reconstruct and upgrade several campgrounds. This would be replacing and enlarging campsite to better accommodate todays vehicles.

User satisfaction continue to be high.

Table 125. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS1 Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION Based on the evaluation of monitoring results, may changes be warranted?	MANAGEMENT If a change may be warranted, where may the change be needed?2
MON-AR-04: What are the trends in visitation forest wide, and are visitors satisfied with the facilities, access, services, and perceptions of their safety?	2017	(E)Yes – Trending positively, as visitor use satisfaction continues to be high.	No	None

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-WILD-01

MON-WILD-01: have management activities met Forest Plan desired conditions and standards, and trended towards management area desired conditions for designated wilderness and Wilderness Study Area?

Table 126. Summary of findings for all Plan Monitoring Items

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-WILD-01: have management activities met Forest Plan desired conditions and standards, and trended towards management area desired conditions for designated wilderness and Wilderness Study Area?	FW-DC-AR-06 MA1a-DC-AR-01 MA1c-DC-AR-01	MON-WLDN-01-01: Designated Wilderness managed to standard; and MON-WLDN-01-02: Montana Wilderness Study Area wilderness character is not diminished beyond what existed in 1977.	Yearly	Natural Resource Monitoring	Laura Jungst

FW-DC-AR-06. Solitude and non-motorized experiences are available in remote settings. Non-motorized areas are of sufficient size and configuration to minimize disturbance from other uses. Non-motorized use is also available in more developed areas, but provides less opportunity for solitude and challenge than in the more remote settings. A well-maintained non-motorized trail network accesses locations of interest for a variety of users.

MA1a-DC-AR-01. Designated wilderness areas provide non-motorized and non-mechanized opportunities for exploration, solitude, risk, challenge, and primitive recreation.

MA1c-DC-AR-01. This area primarily offers opportunities for primitive recreation, although uses established and allowed prior to the legislation are retained if they maintain the wilderness character and the potential for inclusion in the National Wilderness Preservation System that existed in 1977.

Methods

The Chief's Ten-Year Wilderness Strategy outlines that all designated wildernesses to be managed to standard by 2015. The performance measure "wildernesses managed to a minimum stewardship level", commonly referred to as the "10-Year Wilderness Stewardship

Challenge", had been in place, and largely unchanged, since 2001. The 50th Anniversary of the Wilderness Act and the culminating year of the 10-Year Wilderness Stewardship Challenge in 2014 provided an opportune time to reassess the current performance measure and determine if changes were needed looking ahead to the next 10-years and beyond. In FY 2016, Wilderness Stewardship Performance became the official (and only) performance measure for the Wilderness Program. At year's-end, accomplishment reporting will again be entered into NRM, but this time the "number of wildernesses managed to standard" will be fed into the Performance Accountability System.

Wilderness Study Area, MA1c, will be monitored to ensure that the wilderness character is not diminished beyond what existed in 1977, and to ensure that the areas are maintained for potential inclusion in the National Wilderness Preservation System (R1Supplement FSM 2329, 4. Monitoring). Wilderness characteristics include; natural integrity, apparent naturalness, opportunities for primitive recreation experience, and opportunities for solitude. Recent efforts to standardize wilderness character monitoring (Landres et al. 2008, Schlenker and Filardi, 2012) have provided an improved structure and template for building wilderness character monitoring assessments.

Results

The annual reporting for WSP of the Cabinet Mountains Wilderness are:

Table 127. Annual reporting for WSP of the Cabinet Mountains Wilderness

Year	Standard	Cabinet Mountains Wilderenss WSP Score
2015	60	32
2016	60	38
2017	60	52
2018	60	54
2019	60	56
2020	60	56

Discussion

While the Cabinet Mountains Wilderness did not meet baseline performance for preserving wilderness character from 2015 through 2020, the score has been trending up. The Wilderness Stewardship performance score starting in 2015 has been: 32, 38, 52, 54, 56, and 56. The jump in score in 2016 was due to signing of the forest plan and inclusion of key language for management of wilderness. Since this progress has been made each year, with completion of the baseline solitude monitoring in 2018.

Review the Ten Lakes Montana Wilderness Study Act area is part of the Ten Lakes Travel Management Project. The Draft EIS has been completed and posted on the Kootenai National Web site, the FEIS and Record of Decision has been put on hold.

Table 128. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-WLDN-01: have management activities met Forest Plan desired conditions and standards, and trended towards management area desired conditions for designated wilderness and Wilderness Study Area?	2020	(E) Yes – trending positively. While the Cabinet Mountains Wilderness did not meet baseline performance for preserving wilderness character from 2015 through 2020, the score has been trending up	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Heritage Evaluation and Adaptive Findings

The following section present the most current information (data and evaluations) for all monitoring questions contained within the Kootenai National Forest Plan. Each monitoring item includes 1) a summary of the monitoring question, its indicator(s), and the plan components the monitoring question is assessing; 2) monitoring results and discussion; and 3) evaluation of the results to determine an adaptive management finding on whether recommended management changes are warranted or not.

MON-CR-01

Table 129. MON-CR-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-CR-01: To what extent is the Forest meeting forest plan objectives and trending towards desired condition to identify, evaluate, and nominate	FW-DC-CR-01, FW-OBJ-CR-01, FW-OBJ-CR-02,	01: Unit of Measure is the number of properties identified, 02: Unit of Measure is the number of properties evaluated, 03: Unit of	Annually	National Register of Historic Places	Forest Archaeologist

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
cultural resources for listing on the National Register of Historic Places?		Measure is the number of properties nominated			

FW-DC-CR-01. Cultural resources are inventoried, evaluated for inclusion on the National Register of Historic Places, and managed according to their allocation category, including preservation, enhancement-public use, or scientific investigation. National Register ineligible cultural resources may be released from active management. Until evaluated, cultural resources are treated as National Register eligible. Historically and archaeologically important cultural resources and traditional cultural properties are nominated to the National Register.

FW-OBJ-CR-01. Annually complete an inventory of 50 to 100 acres containing, or predicted to contain, highly valuable, threatened, or vulnerable cultural resources (non-project acres).

FW-OBJ-CR-02. Over the life of the Plan, evaluate and nominate 5 to 10 significant cultural resources to the National Register of Historic Places.

Table 130. Monitoring Item MON-CR-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

How Evaluated: Document the number of acres inventoried outside of project areas. Determine if inventories are trending towards the forest plan objective of 50 to 100 acres completed annually. Document the number of properties identified, the number evaluated, and the number nominated for listing on the National Register of Historic Places. Determine if evaluation and nomination are trending towards the forest plan objective of 5-10 properties over the life of the Plan. Describe the extent of progress towards the forest plan desired condition. If movement is neutral or away from the desired condition, document why.

Methods

Standard site survey.

Results and Discussion

MON-CR-01-01: The Forest is not surveying 50 to 100 acres annually outside of project areas. Zero acres outside of a project area are being surveyed. This is a deficiency.

MON-CR-01-02: The Forest identified 17 new sites since 2016.

The total number of sites is 1,151. Of those sites, 544 are eligible, seven nominated to the NRHP, and 261 unevaluated.

Of the total unevaluated sites on Forest, the KNF evaluated 87 since 2016. None are eligible to the NRHP. Evaluation needs to continue to decrease the number and create a more effective, efficient Heritage Program.

The Forest is exceeding their objective (**FW-OBJ-CR-02)**.

The Forest is exceeding the evaluation of sites as part of the forest plan objective.

MON-CR-01-03: No new cultural resources have been nominated to the National Register of Historic Places due to lack of personnel. This is a deficiency.

Findings

Table 131. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-CR-01: To what extent is the Forest meeting forest plan objectives and trending towards desired condition to identify, evaluate, and nominate cultural resources for listing on the National Register of Historic Places?	2021	(D) No, based on lck of surveys outside of project areas and lack of cultural resources nominations.	YES	Management Activity: Increase staffing to accommodate existing workload.

MON-CR-02

Table 132. MO-CR-02 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-CR-02: To what extent are historic properties protected and	FW-DC-CR-02, FW-OBJ-CR-04,	01: Number of properties protected/preserved, 02: Number of newly	Annually	NA	Forest Archaeologist

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
public education and interpretation provided to move towards desired conditions?		interpreted or updated historic properties			

FW-DC-CR-02. Cultural resources are safeguarded from vandalism, looting, and environmental damage through monitoring, condition assessment, protection, and law enforcement measures. Interpretation and adaptive use of cultural resources provide public benefits and enhance understanding and appreciation of KNF prehistory and history. Cultural resource studies provide relevant knowledge and perspectives to KNF land management. Artifacts and records are stored in appropriate curation facilities and are available for academic research, interpretation, and public education.

FW-OBJ-CR-04. Annually complete one public outreach or interpretive project that enhances public understanding and awareness of cultural resources and/or history of the Plan area.

Table 133. Monitoring Item MON-CR-02- Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

How Evaluated: Document the number of historic property sites protected and the number interpreted. Also document any public outreach that has been conducted to enhance public education of cultural resources and/or history of the KNF. Determine if the number of new interpretations, updated interpretations, or public outreaches is trending towards the forest plan objective of one enhancement to public education completed annually. Describe the trend and whether there is movement towards, away from, or neutral to the forest plan desired protect and interpret historical sites. Provide rationale for movement that is neutral or away from the desired condition.

Results and Discussion

Between 2016 and 2020, the total number of historic property sites protected preserved is five.

The total number of sites interpreted for the public is 45.

Total sites monitored is 227.

The total number of public education projects is 12.

The Forest is exceeding their objective of one enhancement to public education annually.

Findings

Table 134. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-CR-02: To what extent are historic properties protected and public education and interpretation provided to move towards desired conditions?	2020	(E)Yes, based on total # of protected sites (5) and education projects (12).	None	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-AI-01

Table 135. MON-AI-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-AI-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions for consultation with each Tribe?	FW-DC-AI-01, FW-OBJ-AI-03,	01: Number of approved consultation protocols	NA	NA	Forest Archaeologist

FW-DC-AI-01. The KNF recognizes and maintains culturally significant species and the habitat necessary to support healthy, sustainable, and harvestable plant and animal populations to ensure that rights reserved by Tribes in the Hellgate Treaty of 1855 are protected or enhanced.

FW-OBJ-AI-03. Over the life of the Plan, the outcome is ongoing government-to-government and staff consultation for each federally recognized Tribe with historical or treaty interests in KNF lands, through a cooperatively established tribal consultation protocol.

Table 136. Monitoring Item MON-CR-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2011
Next scheduled data collection/compilation:	--
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	--

Forest Plan Rationale and Explanation: The performance measure is directly related to the desired condition to develop consultation protocols with each Tribe. The fundamental relationship between the federal government and the individual American Indian tribe is characterized as a government-to-government relationship (Region 1 Policy). This measure will assure that the Forest fulfills its government-to-government responsibilities to Tribes as sovereign nations.

Number of approved consultation protocols.

How Evaluated: Describe the extent of progress towards a consultation protocol for each Tribe with historical or treaty interests in KNF lands. Document if a consultation protocol is being worked on or has been established. If work is underway, describe the progress. Describe consultation that has occurred annually with the Tribes. If movement is neutral or away from desired conditions, document why.

Results

The Forest completed a consultation protocol with the Confederated Salish and Kootenai Tribe in 2011. The Forest has completed their Forest Plan objective.

Discussion

Findings

Table 137. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-AI-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions for consultation with each Tribe?	2021	(E)Yes – bases on completed consultation protocol	Drop this monitoring item.	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-AI-02

Table 138. MON-A!-02 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-AI-02: To what extent has the agreement for access and acquisition of forest products for traditional cultural uses progressed in consultation with each Tribe?	FW-DC-AI-01, FW-OBJ-AI-01,	01: Number of approved product use agreements, a) Standards/Steps for Data Collection: Tribal forest product use agreements will be developed in consultation with each Tribe to assure that the protocol reflects each Tribe's concerns	On hold	Tribal resource specialists	Forest Archaeologist

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
		regarding forest product use.			

FW-DC-AI-01. The KNF recognizes and maintains culturally significant species and the habitat necessary to support healthy, sustainable, and harvestable plant and animal populations to ensure that rights reserved by Tribes in the Hellgate Treaty of 1855 are protected or enhanced.

FW-OBJ-AI-01. Over the life of the Plan, the outcome is continued access and acquisition of forest products for each federal recognized Tribe with historical or treaty interests in KNF lands for traditional cultural uses by tribal members, through a cooperatively established agreement.

Table 139. Monitoring Item MON-CR-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2017
Next scheduled data collection/compilation:	--
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

How Evaluated: Describe the extent of progress towards a product use agreement for each Tribe with historical or treaty interests in KNF lands. Document if a product use agreement is being worked on or has been established. If work is underway, describe the progress. If movement is neutral or away from desired conditions, document why.

Results

The product use agreement has not begun. Movement is neutral because of the lack of a Heritage Program Manager from September 2017 until October 2020.

Discussion

Findings

Table 140. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-AI-02: To what extent has the agreement for access	2021	(D) No, based on lack of progress in product use agreement	YES	Management Activity: Need adequate staffing to

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
and acquisition of forest products for traditional cultural uses progressed in consultation with each Tribe?				implement Heritage program

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-AI-03

Table 141. MON-AI-03 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-AI-03: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions for protecting traditional cultural areas?	FW-DC-AI-03, FW-OBJ-AI-02,	01: Number of approved management plans for traditional cultural areas.	Annually	NA	Forest Archaeologist

FW-DC-AI-03. The KNF recognizes and protects traditional cultural areas as associated with the traditional beliefs of a Tribe about its cultural history.

FW-OBJ-AI-02. Over the life of the Plan, the outcome is management of traditional cultural areas, through the development of 6 to 25 management plans, in consultation with the tribes.

Table 142. Monitoring Item MON-CR-01 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2021

For monitoring item 1:	Year
Next scheduled data collection/compilation:	--
Last MER evaluation for this monitoring item:	--
Next scheduled MER evaluation of this monitoring item:	2023

Forest Plan Rationale and Explanation: The performance measure is directly related to the desired condition to complete management plans for Tribal traditional cultural use in compliance with laws and executive orders. The fundamental relationship between the federal government and the individual American Indian tribe is characterized as a government-to-government relationship. This measure will assure that the Forest fulfills its government-to-government responsibilities to Tribes as sovereign nations.

Number of approved management plans for traditional cultural areas.

a) **Description:** The performance measure is to complete management plans for the traditional cultural areas identified as Traditional Cultural Areas by the Confederated Salish and Kootenai Tribes (CSKT). These areas are not management area in the Forest Plan. However, they are delineated areas kept on file at the Supervisor's Office. See the GIS data stored in the KNF library for delineation of these areas. Management plans will outline measures to protect resources reserved to the Tribes under treaty, including wildlife habitat and traditional used plants. In addition to treaty resources there are traditional cultural use areas identified as traditional cultural areas by the CSKT that reflect non-resource gathering use by Tribal traditionalists. Several of the individually identified areas may effectively be combined into one management plan, so the number of management plans range from 6 to 24.

b) **Unit of Measure:** Number of approved management plans.

How Evaluated: Describe progress towards development of management plans for the traditional cultural areas and document the number completed. Describe any problems with protection of traditional cultural areas and how they are being dealt with. If movement is neutral or away from desired conditions, document why.

Results

The Forest has two draft traditional cultural area documents. Because we know the locations, there are no problems protecting traditional cultural areas.

Discussion

Findings

Table 143. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-AI-03: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions for protecting traditional cultural areas?	2021	(E) Yes, based on progress made on two draft traditional cultural area documents.	None	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Timber Evaluation and Adaptive Findings

The following section present the most current information (data and evaluations) for all monitoring questions contained within the Kootenai National Forest Land Management Plan. Each monitoring item includes 1) a summary of the monitoring question, its indicator(s), and the plan components the monitoring question is assessing; 2) monitoring results and discussion; and 3) evaluation of the results to determine an adaptive management finding on whether recommended management changes are warranted or not.

MON-TBR-01

Table 144. MON-TBR-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-TBR-01: To extent is the Forest meeting Forest Plan objectives and	FW-DC-TBR-01, FW-OBJ-TBR-01	MON-TBR-01-01: MMBF offered and	Annual (Quarterly)	Corporate Data Warehouse	Matt Bienkowski

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
trending towards desired conditions to provide a mix of timber products in response to market demands?		MMBF sold annually.			

FW-DC-TBR-01. Production of timber contributes to ecological, social, and/or economic sustainability, and associated desired conditions. A sustainable mix of timber products (including both sawtimber and non-sawtimber) is offered under a variety of harvest and contract methods in response to market demand. Salvage of dead and dying trees captures as much of the economic value of the wood as possible while retaining the amount needed for wildlife habitat, soil productivity, and ecosystem functions.

FW-OBJ-TBR-01. Annually offer timber for sale at the estimated predicted volume sold of 47.5 MMBF.

Table 145. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2023
Last MER evaluation for this monitoring item:	2015
Next scheduled MER evaluation of this monitoring item:	2023

This question is appropriate to determine whether or not the unit is moving towards the desired conditions and objectives of the plan. It ensures that the demand for wood products is being met while integrating other resource values into the results on the ground. Additionally, it assesses whether the forest is responding correctly to large scale disturbance events such as fire, insects & disease, and wind throw.

Methods

- Data for this monitoring questions was pulled from the CDW Almanac PSTAR reports on 02/23/2021 by Matt Bienkowski.
- The data was summarized in the tables below.

Results

Table 146. Data of volume type by year

Volume Type	2016	2017	2018	2019	2020
Green	29,998.63	67397.88	60,149.04	60,081.24	38,353.25

Volume Type	2016	2017	2018	2019	2020
Salvage	1,338.60	1,540.76	7,212.84	23,447.17	3,717.84
GNA	0	0	0	2,699.11	4,545.56
Total Offered	31,337.22	68,938.64	67,361.88	86,227.52	46,720.11
Total Sold	26,738.13	66,256.81	62,613.66	62,088.57	46,720.11

- The data used for this analysis is actual recorded volume queried from the CDW.
- The data is taken directly from scale tickets after trucks are weighed, data is high quality.

Discussion

- Volume offered and sold is updated on a monthly basis.
- Reported volume is compiled quarterly.
- The KNF has been reporting volume since the 1960s.
- The general trend in volume offered and sold since the revised plan has been implemented has been a significant increase.
- 2018-2019 show increases due to salvage sales needed to recover value from natural fires.
- Since 2017, the KNF has exceeded the forest plan target of 47.5 MMBF per year.
- Salvage was a contributing factor to exceeding the forest plan target for 2018 & 2019.
- GNA will continue to account for a part of our program moving forward.
- The current volume offered is strictly based on the Regional Office requirements and is not based on forest plan desired conditions.
- It is unclear if we are achieving FW-DC-TBR-01 in terms of sustainability. We are exceeding the Long Term Sustained Yield (LTSY) described in the revised LMP EIS.
- Volume offered has been target driven.

Findings

Table 147. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-TBR-01: To what extent is the Forest meeting Forest Plan objectives and trending towards desired conditions to provide a mix of timber products in response to market demands?	2021	NO	None	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-TBR-02

Table 148. MON-TBR-02 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-TBR-02: To what extent is the Forest meeting NFMA requirements and desired conditions on size of harvest openings.	FW-DC-VEG-05, FW-STD-TBR-02	Number of even-aged regeneration harvest units exceeding 40 acres in size and category for exceeding.	Annual	FACTs/Citrix	Matt Bienkowski

FW-DC-VEG-05. The pattern of forest conditions across the landscapes consists of a range of patch sizes that have a diversity of successional stages, densities, and compositions. Formerly extensive, homogenous patches of forests that are dominated by species and size classes that are very susceptible to disturbance agents have been diversified. Generally, there is an increase in the size of forest patches dominated by trees in the seedling/sapling size class, as well as in the large size class. There is a decrease in the size of the patches that are dominated by trees in the small and medium size classes.

FW-STD-TBR-02. If individual harvest openings created by even-aged silvicultural practices are proposed that would exceed 40 acres, then NFMA requirements regarding public notification and approval shall be followed. These requirements do not apply to the size of areas harvested because of catastrophes such as, but not limited to, wildfire, insect and disease attacks, or wind storms.

Table 149. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2021
Next scheduled data collection/compilation:	2022
Last MER evaluation for this monitoring item:	2015
Next scheduled MER evaluation of this monitoring item:	2022

The 1982 Planning Rule, 219.12(k)(5)(iii), requires: Maximum size limits for harvest areas are evaluated to determine whether such size limits should be continued.

The 2015 Revised LMP for the KNF identifies ranges of patch sizes by biophysical setting based on NRV. This analysis will determine how many treatment units are trending towards the DFC.

Methods

- The data used for this analysis are unit treatment polygons. The initial data was collected by field foresters with GPS units who traversed treatment units in the field to accurately map them.
- GPS data is converted into GIS data and entered into FACTs and FACTs Spatial.
- The EDW was queried for all regeneration harvest accomplished between years 2015-2020 and for all regeneration harvest completed between years 2015-2020 on 02/23/2021 by Matt Bienkowski.. Accomplished equates to contract award, completed is work on the ground finished and accepted.
- The data was then filtered for treatment units greater than 40 acres and by year.

Results

Table 150. Number of openings greater than 40 acres accomplished by year

Category	2016	2017	2018	2019	2020
Salvage	37	0	184	60	9
Forest Plan	7	109	47	83	43

Category	2016	2017	2018	2019	2020
Total	44	109	231	143	52

Table 151. Number of openings greater than 40 acres completed by year

Category	2016	2017	2018	2019	2020
Salvage	0	0	9	143	96
Forest Plan	5	24	10	55	73
Total	5	24	19	198	169

The data used in this analysis is not spatially explicit. This is purely a query based on the type of harvest and the size of the harvest unit. Treatment units whose individual size is less than 40 acres but are adjacent to a treatment unit of similar type or an existing opening whose combined size is greater than 40 acres are not included in this analysis.

The data is accurate in terms of individual unit size. The number of units exceeding 40 acres is empirical and accurately recorded in FACTs. The part that is missing is a spatial analysis of units to determine adjacency to openings whose combined size would exceed 40 acres.

The KNF experienced significant fire events on the suitable base during the 2017 and 2018 fire years. Planning efforts involving salvage account for the increased number of openings accomplished the following years. Similarly, the number of completed units exceeding 40 acres follows the same pattern a year delayed. As the KNF transitions away from the salvage efforts, numbers of openings exceeding 40 acres will decrease.

Discussion

This was the first year quantifying the number of even-aged openings greater than 40 acres since the revised LMP for the KNF has been implemented. This report should establish the baseline for openings related to implementing the forest plan. Salvage is included but will only be significant during years following large scale disturbance events such as the fire years of 2017-2018.

Findings

Table 152. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-TBR-02: To what extent is the Forest meeting NFMA requirements and	2021	(C) Uncertain, current indicators are not appropriate to assess the status of the plan component. .	Yes	Monitoring Plan: Suggest to change the monitoring question and indicators to “What management has

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
desired conditions on size of harvest openings.				occurred to create the pattern of forest conditions to move towards FW-DC-VEG-05. Indicator change to # and size of even-aged regeneration harvest units exceeding 40 acres in size reported by biophysical setting.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

MON-TBR-03

Table 153. MON-TBR-03 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-TBR-03: To what extent are regeneration units restocked to trend towards vegetation desired conditions?	FW-DC-VEG-04, FW-DC-VEG-11, FW-DC-TBR-02, FW-DC-TBR-03 FW-STD-TBR-03	MON-TBR-03-01: On lands suitable for timber production, percent of acres with regeneration harvest that are adequately stocked within 5 years of harvest.	Quarterly	CDW	Matt Bienkowski

Please add PC language here: OK

FW-DC-VEG-04. Tree densities and the number of canopy layers within stands are generally decreased.

FW-DC-VEG-11. The desired forest composition, structure, and pattern for each biophysical setting.

FW-DC-TBR-02. Lands identified as suitable for timber production5 have a regularly scheduled timber harvest program. Where appropriate, thinning or other types of stand treatments are used to increase tree growth and create additional growing space for the desirable tree species, to address forest resilience objectives, and reduce mortality and fuel loading. Lands are adequately restocked within 5 years of final regeneration harvest, following a site-specific silvicultural prescription.

FW-DC-TBR-03. Timber cutting on other than suitable for timber production lands occurs for such purposes as salvage, fuels management, insect and disease mitigation, protection or enhancement of biodiversity or wildlife habitat, or to perform research or administrative studies, or recreational and scenic-resource management consistent with other management direction. Restocking of these lands varies, based on the purpose and need for the project, and is determined through the project-level interdisciplinary process and the silvicultural prescription. Based on the site-specific silvicultural prescription and desired conditions, lands may be restocked within 5 years. In some instances, such as when lands are harvested to create openings for fuel breaks and vistas or to prevent encroaching trees, these lands may not be restocked.

FW-STD-TBR-03. Timber harvest activities shall only be used when there is reasonable assurance of restocking within 5 years after final regeneration harvest. Restocking level is prescribed in a site-specific silviculture prescription for a project treatment unit and is determined to be adequate depending on the objectives and desired conditions for the Plan area. In some instances, such as when lands are harvested to create openings for fuel breaks, wildlife habitat, and vistas or to prevent encroaching trees, it is adequate not to restock.

Table 154. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2020
Next scheduled data collection/compilation:	2021 1st quarter
Last MER evaluation for this monitoring item:	2015
Next scheduled MER evaluation of this monitoring item:	2022

The 1982 Planning Rule, 219.12(k)(5)(i), requires: Lands are adequately restocked as specified in the forest plan.

The 2015 revised KNF LMP requires stands regenerated: retain sufficient snags, restock stands with desired species structure, and create patches within the desired range.

Methods

- The primary data source used for this analysis are FACTs and the Reforestation Indices Summary Report produced by the R1 Depot..

- Spatial and tabular data for regeneration harvest is recorded in FACTs.
- Reforestation activities, both natural and artificial, are recorded in FACTs.
- Reforestation Indices are calculated in the R1 Depot for all four districts and the KNF as a whole.

Results

Table 155. Regen data collected during stocking surveys

Description	Rate
Recent Plantation Success following Regen Harvest	79%
Recent Natural Regeneration Success following Regen Harvest	56%
Satisfactory Stocking 5 years after Regen Harvest	68%
Reforestation Status after Regen Harvest	75%
Average Years to Satisfactory Stocking After Regen Harvest – Plantations	2.19 Years
Average Years to Satisfactory Stocking After Regen Harvest – Natural Regen	2.78 Years
Average Years to Certification after Regen Harvest – Plantations	5.16 Years
Average Years to Certification after Regen Harvest – Natural Regen	5.22 Years
Plantations with a Regen Harvest in Progressing Status for more than 5 Years	6.0 Years
Natural Regeneration Stands with a Regen Harvest in Progressing Status for more than 5 Years	33%
Lack of Satisfactory Stocking for 5 Years or more	17%

The data used in this analysis was collected during stocking survey's and stake row exams. The data is empirical and is representative of actual conditions post-harvest and can be considered accurate and reliable.

The collected data is entered into FACTs and is compiled into the Reforestation Indices Summary Reports. This report summarizes reforestation establishment success harvest units treated with regeneration harvest.

Plantations are a surrogate for artificial regeneration, success assumes that the desired species composition and number of trees per acre have move towards the needs of the DC as outlined in the 2015 revised KNF LMP.

Natural regeneration assumes that there was an adequate seed source of the appropriate tree species remaining on site, post regeneration harvest. Success assumes natural regeneration was established in the appropriate species and trees per acre to move towards the needs of the DC as outlined in the 2015 revised KNF LMP.

Discussion

- On Average, the success rate for artificial regeneration on the KNF is 79 percent
- For all stands treated with regeneration harvest, regardless of reforestation method, the KNF has a 75 percent success rate.

- The average number of years to achieve full stocking on stands reforested artificially is 2.19 with 5.16 years to certification.
- The average number of years to achieve full stocking on stands reforested naturally is 2.78 with 5.22 years to certification.
- Approximately 17 percent of our stands treated with regeneration harvest exceed the 5 year minimum to certify as fully stocked.

Findings

Table 156. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-TBR-03: To what extent are regeneration units restocked to trend towards vegetation desired conditions?	2021	(E) Yes, based on the regeneration rates of 75-79%. This means that we successfully established desired species composition on 75-79% of the acres we planted.	No	NA

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

Minerals Evaluation and Adaptive Findings

MON-MIN-01

Table 157. MON-MIN-01 Monitoring Item Summary

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
MON-MIN-01: Are reclamation activities improving	FW-DC-MIN-01, FW-OBJ-MIN-01	MON-MIN-01-01: Number of reclaimed abandoned mine sites over	Annual	Field, District Geologist, Forest Geologist, Mine permittee	Craig Towery

Monitoring Question	Plan Component(s)	Indicators	Data collection interval	Data Source/Partner	Point of Contact
ecological and human health conditions?		a five-year period. Number reclaimed to reduce the risk to human health.			

FW-DC-MIN-01. The Forest continues to contribute to the economic strength and demands of the nation by supplying mineral and energy resources while assuring that the sustainability and resiliency of other resources are not compromised or degraded. Mineral materials are made available based upon public interest, material availability, in-service needs, and protection of other resource values, including consistency with desired conditions for other resources. Geologic features are conserved for their intrinsic values and characteristics. Reclamation of abandoned mine sites occurs where human health and environmental degradation risks should occur, with reclamation priority given to mine sites with human health risks.

FW-OBJ-MIN-01. Annually, the outcome is the reclamation of one abandoned mine site.

Table 158. Monitoring Item 1 - Monitoring Collection Summary

For monitoring item 1:	Year
Data was last collected or compiled in:	2019
Next scheduled data collection/compilation:	2021
Last MER evaluation for this monitoring item:	2015
Next scheduled MER evaluation of this monitoring item:	2022

The primary reason for this monitoring question is the health and human safety of forest visitors and employees.

Additional benefits to effective closures benefit wildlife species, improving ecological conditions.

Methods

- The KNF has completed six Abandoned Mine Land (AML) reclamation sites during the 2015 – 2020 time period.
- District Geologists were unable to complete any AML activities during 2021 due to Covid – 19.
- AML reclaimed sites on the KNF consist of both vertical shafts, and horizontal adits/portals.
- These are legacy sites that are pretty typical throughout the Forest Service. All AML sites listed were closed using foam, grates, or backfill methods.

- All sites were closed to reduce the risk to human health.

Results

Table 159. Abandoned mine land reclamation sites with closure type

Year	Name	District	Closure Type	Human Safety	Wildlife
2015	Friday Hill	D4	Grate	X	X
2016	Switzer	D5	Grate	X	X
2016	Grizzly	D5	Foam	X	
2019	Lenexx	D4	Grate	X	X
2019	Big Eight	D4	Grate	X	X
2019	Helwick	D7	Backfill	X	

Discussion

Historic Abandoned Mine Lands (AML) sites are found throughout the Forest Service. The KNF documents sites when they are discovered and initiates the appropriate closures for each site based on ground conditions. Documenting and reclaiming historic AML sites is an ongoing effort. KNF Geologist will complete a yearly inspection of AML sites listed in 2021.

Findings

Table 160. Summary of findings for all Plan Monitoring Items

MONITORING ITEM	YEAR UPDATED	PLAN IMPLEMENTATION STATUS[1] Do monitoring results demonstrate intended progress (i.e., maintaining, trending, or advancing) of the associated plan components listed with this monitoring item?	RECOMMENDATION *Based on the evaluation of monitoring results, may changes be warranted?*	MANAGEMENT *If a change may be warranted, where may the change be needed?*[2]
MON-MIN-01: Are reclamation activities improving ecological and human health conditions?	2021	(E) YES, AML sites have been and are continuing to be reclaimed.	No	KNF will continue to document and reclaim AML sites as they are discovered on the Forest.

[1] PLAN IMPLEMENTATION STATUS: (A) Uncertain - Interval of data collection beyond this reporting cycle (indicate date of next time this monitoring item will be evaluated); (B) Uncertain - More time/data are needed to understand status or progress of the Plan Component(s); (C) Uncertain - Methods inadequate to assess the status or progress toward achieving plan component(s).(D) NO - Implementation of Plan Component(s) ARE NOT trending, progressing, and/or conducted as desired; (E) YES - Implementation of Plan Component(s) ARE trending, progressing, and/or conducted as desired.

[2] [36 CFR 219.12(d)(2)] - The monitoring evaluation report must indicate whether or not a change to the (1) plan, (2) management activities, (3) the monitoring program, or a (4) new assessment, may be warranted based on the new information. The monitoring evaluation report must be used to inform adaptive management of the plan area.

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