FY 2015 Monitoring and Evaluation Report

Bighorn National Forest

April 2016

Measuring total vegetation production above Shell Creek.

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CERTIFICATION

The Revised Bighorn National Forest Land and Resource Management Plan Record of Decision was signed September 30, 2005. The forest plan is a dynamic document, subject to change based on annual monitoring and evaluation as we implement. Through monitoring, we determine whether the plan is sufficient to guide management for the subsequent year or whether the plan or our management actions should be modified.

I have reviewed the fiscal year 2015 annual monitoring and evaluation report for the Bighorn National Forest. I believe the results of monitoring and evaluation for fiscal year 2015 meet the intent of chapter 4 of the forest plan and of 36 CFR 219.11. I also believe the monitoring and evaluation requirements in chapter 4 have been met, and the decisions made in the forest plan are still valid.

In 2012, I assigned several forest specialists to a monitoring team. This team is responsible for review of this monitoring report and making recommendations to me regarding any changes to the forest plan. The team provides me with interdisciplinary review of this report and analysis of how well we are meeting expected outputs. That information is included in this 2015 report.

WILLIAM T. BASS
Forest Supervisor

4-11-2016
Date

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2015 Monitoring and Evaluation Report
Overview of the Monitoring Process

The following discussion is an overview of the monitoring process used on the forest. Monitoring results are reported in attachment A. Monitoring is reported annually and on a 2, 3, 5, or 10 year schedule. Only those items due in 2015 are included in this report.

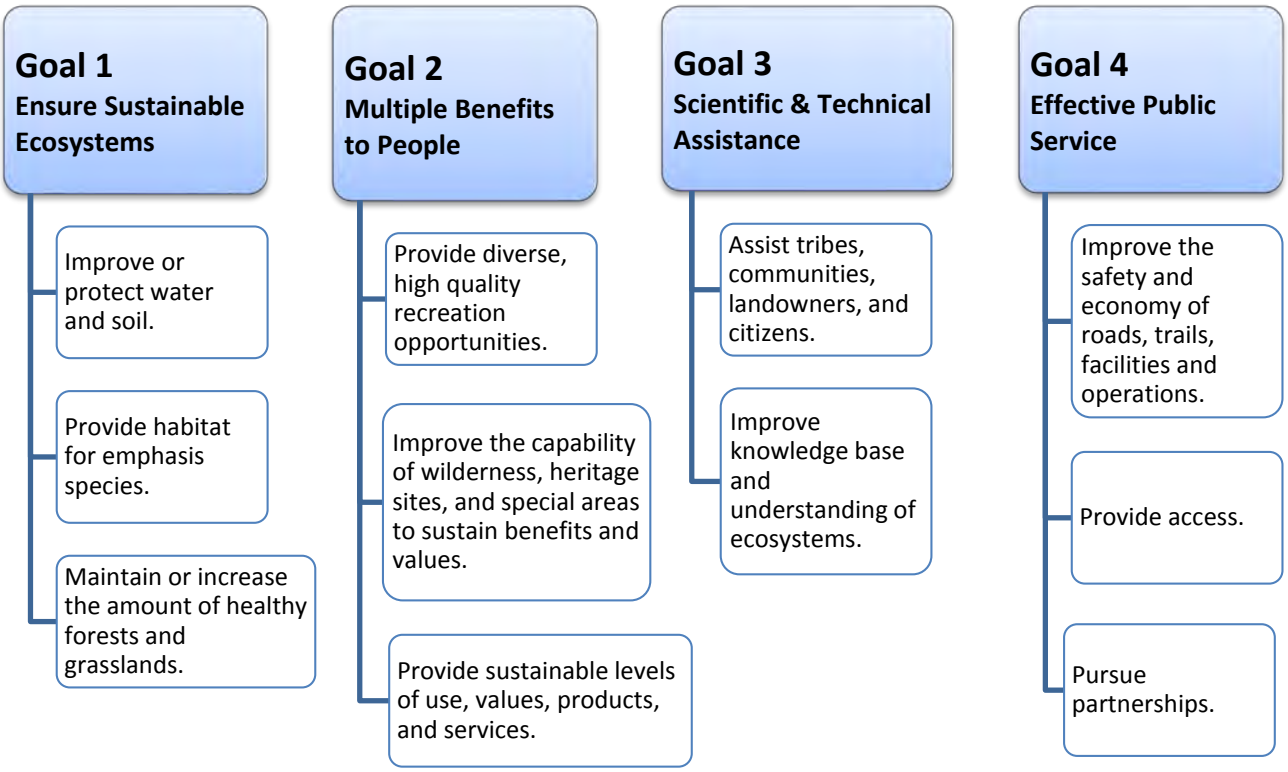
Monitoring and evaluation are important parts of implementing the forest plan. When the plan was revised in 2005, four steps for successful monitoring were established:

1. Setting priorities for monitoring items so budgeting could focus on the highest priority.
2. Identifying who would be responsible for the monitoring items and who potential cooperators might be.
3. Evaluating the collected data.
4. Publishing the data in a report.

Monitoring is the collection of data and information; evaluation is the analysis of the collected data and information. Evaluation answers the monitoring questions, determines whether forest plan revision or amendment is warranted, and shows whether plan implementation should be modified.

Monitoring and evaluation are the backbone of adaptive land management, and there are three primary parts. The first part is making sure the forest plan is being followed during project planning and implementation. That is *implementation monitoring*. Another part is regularly checking in with forest plan objectives to see how well they are being achieved – *effectiveness monitoring*. *Validation monitoring* is done to determine if forest plan expectations and assumptions still hold true.

Implementation Monitoring	Is the forest plan direction being followed during project planning and implementation?
Effectiveness Monitoring	Are management activities effective in achieving forest plan goals, objectives, and strategies?
Validation Monitoring	Is there a better way to meet forest plan goals and objectives and achieve desired conditions? Is there a need to change or amend the forest plan?



The desired conditions for the forest are described in a three-tiered hierarchy of goals, objectives, and strategies. The four main goals (shown above) are the basis for the development of the objectives, and each objective has specific strategies.

The monitoring strategy for the forest looks at all the forest plan objectives and strategies using the three types of monitoring: implementation, effectiveness, or validation. Results for 2015 are shown in the next section – Attachment A.

Attachment A
2015 Monitoring Results

Monitoring Results

For this report, the monitoring items from chapter 4 of the revised forest plan are listed by the resource areas to which they apply. Because of this, the numbering system from chapter 4 is out of sequence. All plan components being monitored are tied to the larger goals shown on page 2. For example, objective 2a relates back to part of goal 2 – multiple benefits to people.

General Monitoring

#1. Are projects being implemented according to Revised Plan direction? This includes both planned actions and actual implementation. Select at least one NEPA project, and conduct a thorough review of all resource areas to see if Revised Plan strategies, management prescription desired conditions, standards, and guidelines were followed and if the treatment/project was effective to improve land management.

Note: Priority projects include prescribed fire, timber harvest, travel management, dispersed recreation, and livestock grazing (these are major revision or implementation topics).

2015 results	In August of 2015, the Forest reviewed implementation of the Swamp Stewardship Contract, a fuels treatment project along Sheridan County road (FSR) 283, the Dome Lake Road. This project was part of the Babione Healthy Forest Restoration Act environmental assessment designed to reduce and alter forest fuels in a community wildland protection plan (CWPP) priority area. This project met multiple goals, objectives and strategies identified in the forest plan from ensuring sustainable ecosystems, working with local governments, placing high priority for fuel reduction on areas identified in CWPPs, use of stewardship contracting, to providing goods and services to the public. This part of the project was in a 4.3 Dispersed Recreation management area. This treatment met the management area desired condition for vegetation with lower fuel hazard in high value areas, forestwide and management area standards and guidelines were followed, and best management practices were utilized to achieve the end result. Observations of the treatment area along Dome Lake Road included an area where the treatments entered the water influence zone. The forest plan standard for managing actions in the water influence zone is to "allow only those actions that maintain or improve long-term stream health and riparian ecosystem condition (pg. 1-26)." The design criteria for the Babione project allowed "harvest of old trees which are susceptible to disease if the need is identified and agreed upon by specialists." This design feature minimized impact to the water influence zone. The water resources specialist observed the post-treatment condition within the water influence zone and concluded that there would be no significant sedimentation deposited within the stream that would exceed the existing levels caused by run-off from the adjacent Dome Lake Road.
How often?	Annually
What plan component is being monitored?	NFMA; multiple goals, objectives, strategies

#2. How well is the Forest interacting and planning in cooperation with communities and local governments?

2015 results For more information, see the narrative in appendix A.	Grants and agreements: The forest entered into fifteen partnership agreements with local community groups, state agencies, and national organizations to complete the program of work in 2015 and in the coming years. In addition to reduced program costs realized through partnerships with the Student Conservation Association, the estimated dollar value to the forest of these partnerships in 2015 is estimated at $ 559,591. Volunteer contributions: Forestwide volunteers provided 8,037 hours of labor valued at $115,314, in 2015 for a variety of recreation and trail projects.
How often?	Annually
What plan component is being monitored?	Objective 2a. Improve the ability of the Bighorn National Forest to provide diverse, high quality outdoor recreation opportunities. Strategy 8. Encourage, establish, and sustain a diverse range of recreational facilities and services on NFS lands. Partnerships are one mechanism for accomplishing this. Objective 4c. Enhance the public services provided by the Bighorn National Forest through the pursuit of cooperation and public and private partnerships. Strategy 4. Cooperate with federal, state, and county agencies, individuals, American Indian tribes, and non-government organizations for control of noxious weeds, pathogens, invasive species, and animal damage.

#3. Are wild and scenic river candidate waters being managed for the desired conditions?

2015 results	No activities affecting the outstandingly remarkable values have been recorded between 2010 and 2015 along the Little Bighorn River, Porcupine Creek or Paintrock Creek. The Gilead fire in 2012 burned about 6,100 acres on national forest system lands (8,200 acres total) in the South Rock Creek drainage near the forest boundary. About 4 miles of the stream course were within the fire perimeter, and timber stands to the north and west of the stream burned. There is an effect on the scenic attractiveness and recreation use as a result of the fire; although, it is not expected to affect the potential for wild or scenic river designation over the long-term. While there is a visual impact, most effects of wildfire on scenery are within the range of naturally occurring or natural appearing landscape character. Heavy equipment was not used by firefighters on the forest. The Twin Buttes 2 prescribed burn involved 118 acres adjacent to the Tongue River in November 2014. The Twin Buttes 3 and Skull Ridge prescribed burns during the same fall involved uplands near the Tongue River. In each case, the vegetation was predominately grassland and shrub lands. The fires did not have long-term effects on the outstandingly remarkable values.
How often?	Every five years.
What plan component is being monitored?	Objective 2b. Improve the capability of wilderness and protected areas to sustain a desired range of benefits and values.

The following tables summarize the evaluation of the five streams included in the Forest Plan EIS-Appendix D and the applicable outstandingly remarkable values.

Little Bighorn River

Segment Description	Miles	Free Flowing	Values	Eligible Miles	Class	Suitable miles
A: Dry Fork Trail Bridge to Wagon Box Creek	9.7	Yes	Scenery	9.7	Scenic	9.7
B: Wagon Box Creek to Fools Gold (FDR 480) crossing	4.11	Yes	Scenery	4.11	Scenic	4.11
C: Fools Gold Crossing to headwaters	2.5[1]	Yes	No	0	n/a	0
D: Dry Fork from Littlehorn to Lake Creek	6.2	Yes	Scenery	6.2	Scenic	6.2
E: Lake Creek to source of Dry Fork	6.0[1]	Yes	No	0	n/a	0

Tongue River

Segment Description	Miles	Free Flowing	Values	Eligible Miles	Class	Suitable miles
A: Bridge at Tongue River Canyon to T56N, R88W, sec 21	8.1	Yes	Scenery, fisheries	8.1	Wild	8.1
B: North Fork of the Tongue from T56N, R88W, sec 21 to Pole Creek	21.75	Yes	Scenery, fisheries, recrea-	21.75	Recreational	21.75
C: South Fork of the Tongue to Johnson Creek	3	Yes	Scenery	3	Scenic	3

South Rock

Segment Description	Miles	Free Flowing	Values	Eligible Miles	Class	Suitable miles
Forest boundary to headwaters in sec 33-34 in Wilderness	16.28	Yes	Scenery, recreation, geology	16.28	Wild (13.04 mi) and scenic (3.24 mi)	16.28

Porcupine

Segment Description	Miles	Free Flowing	Values	Eligible Miles	Class	Suitable miles

Forest boundary to Porcupine falls	6.25	Yes	Scenery, historical	6.25	Wild	6.25

Paintrock

Segment Description	**Miles**	**Free Flowing**	**ORVs**	**Eligible Miles**	**Class**	**Suitable miles**
Headwaters in Wilderness to Forest boundary	14.85	Yes	Scenery, geology	14.85	Wild (9.05 mi), Scenic (5.8 mi)	14.85

#4. Is the Bighorn National Forest assisting in building the capacity of tribal governments, rural communities, and private landowners to adapt to economic, environmental, and social change related to natural resources?

2015 results	Forest personnel participated in meetings with communities and homeowners to discuss fuels reduction projects. The forest held meetings with all four counties to coordinate fire suppression. The forest provided mutual aid assistance on fire incidents to all four counties during 2015. Through a grant to the state of Wyoming, each county surrounding the forest receives wildfire training and equipment preparedness funding. The forest conducted fire prevention training for elementary school children in Buffalo, Sheridan, Lovell, and Greybull and provided media updates throughout the summer apprising the public of wildifire risk conditions. The Big Horn County firewise program continued in 2015 with presentations made to cabin owners on both the Powder River and Medicine Wheel Districts to continue to emphasize the need to create defensible space around structures. Fuels reduction partnerships and treatments also continued with Sheridan, Johnson, and Washakie counties to implement recommendations in their community wildfire protection plans. Through the State and Private Forestry program, administered by the USFS Rocky Mountain Regional Office, grants have been awarded to local counties for hazardous fuel treatments. Some of these projects have included the Canyon Country Estates project, Johnson County wildfire mitigation plan implementation, Story fuels reduction project, Stumpy Ridge fuels reduction project, and Big Horn County community wildfire protection plan implementation and update.
How often?	Annually
What plan component is being monitored?	Objective 3a. Provide assistance in building the capacity of Tribal governments, rural communities, landowners, and private citizens to adapt to economic, environmental, and social change related to natural resources.

Aquatics, Soils, and Fisheries Monitoring

#5. Is water quality on the Forest being maintained according to state water quality standards?

Coordinate with Wyoming Department of Environmental Quality and other stakeholders, to develop a water quality monitoring plan for streams identified in the 305(b) Report and 303(d) List of Impaired Streams.

2015 results	The draft 2014 Wyoming Department of Environmental Quality 305(b) and 303(d) integrated report lists the North Tongue River and Granite Creek as Category 5 waters with use(s) impaired. Even though it had been assigned a low priority in the 2012 report, the listed reach of the North Tongue River is upstream of Road 171 to its confluence with Pole Creek. Total maximum daily load development for the North Tongue River began in 2015. The listed Granite Creek reach is from Shell Creek upstream to an undetermined location downstream of Antelope Butte Ski Area which remains closed. A picnic ground, with an outhouse in the Granite Creek floodplain, was removed and reclaimed in 2012 and the ski area remains closed; therefore, two main potential sources for water quality impacts are minimized. A total maximum daily load study for the Bighorn River watershed was completed in 2014. The previously listed reach for North Fork Crazy Woman Creek, above the confluence with Billy Creek to the headwaters, was removed from the list in the 2014 report after BMPs had been implemented over several years and were determined by Wyoming Department of Environmental Quality to be effective. State water quality standards are being maintained on the forest. A few stream reaches where standards for *E. coli* are not being met are being examined.
How often?	Annually
What plan component is being monitored?	Objective 1a, Strategy 1. Attain or maintain water quality necessary to comply with state of Wyoming water quality standards in all streams on the Forest. Water must be of sufficient quality to support state-designated beneficial uses and healthy riparian, aquatic, and wetland ecosystems.

Identify potential sites for long-term water quality monitoring. Monitoring items might include, but are not limited to, temperature, dissolved oxygen, pH, microorganism or benthic macroinvertebrates for refinement of regional databases.

2015 results	Monitoring of the 305(b) and 303(d) listed streams are potential sites for long-term water quality monitoring (North Tongue River and Granite Creek). The North Tongue River Total maximum daily load will address the need for any new monitoring on that stream. Livestock grazing and timber best management practices reviews were conducted annually to assess effectiveness of controlling non-point source pollution from forestlands (see Item #40). In addition, 2015 was the second year of conducting a series of best management practices reviews that included an expanded range of activities on the forest using the national best management practices protocols (See Item 40)
How often?	Every five years
What plan component is being monitored?	Objective 1a, Strategy 1. Attain or maintain water quality necessary to comply with state of Wyoming water quality standards in all streams on the Forest. Water must be of sufficient quality to support state-designated beneficial uses and healthy riparian, aquatic, and wetland ecosystems.

#6. Were watershed improvement projects completed?

2015 results	Watershed improvement project work completed in 2015 include: ▪ Livestock exclosure fence maintenance for several large exclosures that had fallen into severe disrepair ▪ A riparian pasture fence was constructed in cooperation with allotment permittees and Wyoming Game and Fish Department on North Fork Crazy Woman Creek. This fence will allow for more control of livestock grazing impacts to riparian vegetation and streambanks. ▪ A second year maintenance for the wildlife and livestock exclosure was completed in a large meadow reach of Sucker Creek and in the South Tongue watershed. ▪ Range management measures, including shorter grazing seasons and reduced numbers were instituted to improve watershed conditions on various allotments across the forest. ▪ A buck-and-rail fence was installed at the new ATV bridge on Buckskin Ed Creek (FST 360) to reduce trailing and help preserve stream bank stabilization work that helped reduce sediment inflow to the creek and improve fish habitat at this location. This project is the 3rd part of the Soldier Creek and Buckskin Ed Creek aquatic organism passage project which were completed in 2012. Each of these three crossings improve fish passage and watershed conditions for newly reintroduced Yellowstone cutthroat trout.
How often?	Annually
What plan component is being monitored?	Objective 1a Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses. Strategy 2. Complete watershed scale improvement projects, such as road relocations or improvements, on at least three 5th-level hydrologic unit code watersheds within 15 years. Annually complete an average of three watershed improvement projects in priority watersheds, such as road/trail stabilizations, culvert replacements and dispersed campsite management. Prioritize watersheds considered in degraded condition by Winters et al. (2004).

#7. Are disturbed sites being restored using the appropriate vegetation?

2015 results	Disturbed sites are restored using a seed mix composed of native plants. Seed mixes used on wetland areas often incorporate more mesic species. Where stream bank stablization is part of the project willow root stock or willow shoots were planted, and sedge plugs were incorporated (e.g., Soldier Creek and Buckskin Ed Creek crossings, East Fork South Tongue exclosure, North Tongue bank stabilization).
How often?	Every five years
What plan component is being monitored?	Objective 1a. Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses. Strategy 3. Within five years, develop and maintain a Forest Revegetation Guidebook to address seeding practices and other methods of restoring disturbed sites.

#8. Are aquatic habitat conditions being maintained for native plant, invertebrate and vertebrate riparian-dependent species?

Summarize results of long-term, reach-level monitoring sites, including riparian vegetation.

2015 results	A review of long-term monitoring data collected on the forest show that aquatic habitat conditions are generally being maintained. A few locations, such as the experimental reach on the North Tongue River, show channel shifting or migration, but the photo points and greenline data indicate stable or improving riparian conditions.
How often?	Every five years
What plan component is being monitored?	Objective 1a, strategies 4-7. Strategy 4. Measure status and trend of aquatic habitat conditions forestwide to develop baseline habitat objectives that evaluate the relative health or condition of aquatic habitats. Strategy 5. Within five years, identify and maintain at the 6th-level watershed scale, at least one representative area for each ecological subsection (e.g., sedimentary and granitic) on the forest as a barometer for baseline aquatic habitat conditions. Strategy 6. Manage for the structural and compositional diversity of native plant communities in riparian zones and wetlands. Strategy 7. Maintain, protect, and enhance wetland function and value when analyzing or implementing all projects.

Summarize results of habitat improvement projects (acres/miles) by watershed.

2015 results	Aquatic habitat conditions are being maintained or improved on the Forest. A low water crossing was relocated at Willet Creek in 2015 to reduce sediment inflow and improve aquatic habitat. A buck-and-rail fence was installed at the new ATV bridge on Buckskin Ed Creek (FST 360) to reduce trailing and help preserve stream bank stabilization work that helped reduce sediment inflow to the creek and improve fish habitat at this location. This project was the 3rd part of the Soldier Creek and Buckskin Ed Creek aquatic organism passage projects, which were completed in 2012. Each of these three crossings improve fish passage and watershed conditions for newly reintroduced Yellowstone cutthroat trout. Designs were completed in 2015 for aquatic organism passage road-stream crossings improvement on Canyon Creek watershed where Yellowstone cutthroat trout are projected to be reintroduced in the future. Construction is slated for late 2016.
How often?	Annually
What plan component is being monitored?	Objective 1a, strategies 4-7. Strategy 4. Measure status and trend of aquatic habitat conditions forestwide to develop baseline habitat objectives that evaluate the relative health or condition of aquatic habitats. Strategy 5. Within five years, identify and maintain at the 6th-level watershed scale, at least one representative area for each ecological subsection (e.g., sedimentary and granitic) on the forest as a barometer for baseline aquatic habitat conditions.

	Strategy 6. Manage for the structural and compositional diversity of native plant communities in riparian zones and wetlands. Strategy 7. Maintain, protect, and enhance wetland function and value when analyzing or implementing all projects.

#40. Are best management practices effective in meeting water quality standards?

2015 results	Best management practices are effective in meeting water quality standards. The forest conducted four range best management practices reviews in 2015; the Railroad Springs (MWPR), Wolf Creek (TRD), South Fork North (PRRD) and Lower Elgin Park (PRRD) pastures. These pastures were reviewed for best management practices implementation and effectiveness. In each review, range management practices (developed using standards and guidelines) were maintaining or helping to improve watershed conditions, and water quality was not being degraded. One timber best management practices review was conducted for the Garland salvage sale using the new national protocol. 2015 was the second year of conducting a series of best management practices reviews for an expanded range of activities on the forest using the national best management practices protocol. These included dispersed camping and a low water road-stream crossing in the Woodrock guard station area, a dump station at Burgess Junction, a boat ramp and parking lot at Sibley Lake and a boat ramp at Meadowlark Lake. Results of these reviews are located at the Supervisor's Office.
How often?	Annually
What plan component is being monitored?	Objective 1a, strategy 1. Attain or maintain water quality necessary to comply with state of Wyoming water quality standards in all streams on the Forest. Water must be of sufficient quality to support state-designated beneficial uses and healthy riparian, aquatic, and wetland ecosystems.

#42. Are the standards and guidelines effective in meeting regional soil quality standards?

Conduct surveys on a representative sample of areas with management activities and uses.

2015 results	Standards and guidelines were effective in meeting regional soil quality standards. The forest conducted four best management practices reviews in 2015 for range; the Railroad Springs (MWPR), Wolf Creek (TRD), South Fork North (PRRD) and Lower Elgin Park (PRRD) pastures. These pastures were reviewed for best management practices implementation and effectiveness. In each review, range management practices (developed using standards and guidelines) were maintaining or helping to improve watershed conditions, and soils were not being degraded. One timber best management practices review was conducted for the Garland Salvage Sale using the new national protocol, and 2015 was the second year of conducting a series of best management practices reviews for an expanded range of activities on the forest using the national best management practices protocol: these included a dispersed camping and a low water road-stream crossing in the Woodrock guard station area, a dump station at Burgess Junction, a boat ramp and parking lot at Sibley Lake and a boat ramp at Meadowlark Lake. Each review found that best management practices were effective at lim-

	iting soil and water impacts. Results of these reviews are located at the Supervisor's Office.
How often?	Annually
What plan component is being monitored?	Objective 1a. Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses.

Measure the amount of severely impacted areas and compare with regional standards.

2015 results	No severely impacted areas were measured or recorded in 2015.
How often?	Annually
What plan component is being monitored?	Objective 1a, strategy 4. Measure status and trend of aquatic habitat conditions forestwide to develop baseline habitat objectives that evaluate the relative health or condition of aquatic habitats.

#43. Are fisheries and riparian standards and guidelines effective in maintaining or improving fish habitat or do they need revised?

2015 results	Photo monitoring points, greenline surveys, stream channel cross-sections and profile surveys are used across the forest to monitor stream and riparian conditions at specific locations on a 3-5 year interval. Fish habitat conditions across the forest in general are in a stable to improving trend, thus, indicating that fisheries and riparian standards and guidelines are effective in maintaining and improving fish habitat conditions. Habitat monitoring occurs annually but individual sites are visited on a 3-5 year schedule. The compiled results through the rotation are consistent with the annual report findings. The forest plan standards and guidelines are effective.
How often?	Annually
What plan component is being monitored?	Objective 1a, strategy 4. Measure status and trend of aquatic habitat conditions forestwide to develop baseline habitat objectives that evaluate the relative health or condition of aquatic habitats.

Wildlife, Fisheries, Rare Plants Monitoring

Note: Many items depend on coordination with Wyoming Game and Fish Department and reliance on their population/harvest data for big game and fish species.

#9. Is the Bighorn National Forest providing the ecological conditions to sustain viable populations of native and desired non-native species and to achieve objectives for management indicator species?

Number of conservation strategies developed or implemented.

2015 results	No new conservation strategies were developed or implemented for fish species in 2015. The most recent range-wide conservation strategy was developed for Yellowstone cutthroat trout in 2013.
How often?	Annually
What plan component is being monitored?	Objective 1b. Provide ecological conditions and habitat within the ecological capability and disturbance regimes of the Forest to sustain well-distributed viable

	populations of native and desired non-native emphasis species listed in Appendix C of the Revised Plan. Strategy 1. Incorporate published conservation strategies for species at risk into project design … Strategy 2. Proactively conserve populations of emphasis species at risk by maintaining or improving habitat availability and quality … Strategy 3. Improve knowledge of the distribution of species at risk and their habitat by inventorying 10,000 acres or 10 species per decade. Strategy 4. Provide adequate habitat to support populations of big game species according to population objectives developed in concert with the Wyoming Game and Fish Department. Treat 3,000 acres of big game winter range every 5 years to improve habitat value. Strategy 5. Where suitable habitat exists, cooperate with the Wyoming Game and Fish Department to reintroduce beaver (MIS) into three 6th-level watersheds over 10 years to re-establish self-sustaining populations in historical habitats.

Acres/miles of species at risk habitat restored or improved by Forest Service management or permitted activities.

2015 results	Fisheries: No acres or miles of at risk habitat were restored or improved in 2015. Several projects that will benefit Yellowstone cutthroat trout were planned for future execution. Dates of execution will depend on the availability of funding and personnel time. Wildlife ~35 acres of riparian habitat were improved through new fencing and willow planting in the South tongue drainage and ~10 acres of willow planted along the north tongue to potentially benefit water vole and migratory birds. ~120 acres of habitat were improved for a variety of wildlife species through aspen and meadow treatments ~5,000 acres of habitat were improved for a variety of wildlife species through the use of prescribed fire in aspen, sagebrush, and meadow environs. ~50 exclosures totaling approximately 600 acres were maintained to protect aspen and riparian habitats which benefitted water vole and migratory bird species
How often?	Annually
What plan component is being monitored?	Objective 1b, strategies 1 – 5

Acres or miles of species at risk potential habitat inventoried and number of populations discovered.

2015 results	**Fisheries:** No at-risk fish populations were discovered in 2015. No at risk potential habitat inventoried this year. **Groundwater-dependent ecosystems:** The Wyoming Natural Diversity Database (WYNDD) team completed the second full field season of work on Bighorn National Forest fen habitats in 2015. The forest seasonal botanists assisted in the effort. WYNDD entered the groundwater-dependent ecosystem data they col-

	lected for this project into the FS Groundwater-Dependent Ecosystems (GDE) database and continued data analysis. This work will continue in 2016 by completing the final report for submittal to the forest. **Rare plants:** Surveys in 2015 found occurrences of three *Botrychium* taxa, all of which are listed as species of special concern by the Forest Service or WYNDD (*B. lancelolatum , B. minganense,* and *B. paradoxum*). Five *B. pseudomontanum* plants were again verified at the Pole Creek site. The two known occurrences on Sourdough Creek and Muddy Creek of the sensitive species *Rubus arcticus* ssp. *acaulis* were surveyed. Three frequency-of-occurrence monitoring plots were established along Muddy Creek site. Other new elements of occurrence included: *Cypripedium montanum, Penstemon caryi. Parnassia kotzebuei, Botrychium multifidium, Botrychium lanceolatum, Eriophorum chamissonis*, and *Eriophorum gracile*. Each of these surveys helps ensure that the forest provides ecological conditions to preserves the plants and their habitats. **Wildlife** The Forest Service and Wyoming Game and Fish Department (WGFD) continue to cooperatively monitor over 4,000 acres prior to, during, and after trailing of domestic sheep tied to "Big 6" NEPA. Many of these acres were looked at multiple times throughout the process but were only counted once. Monitoring was conducted by sitting at strategic points and glassing for presence of bighorn sheep pre-trailing to clear the way for domestic sheep to pass through. Glassing also occurred for any stray domestic sheep throughout the process. The permittee had 4 herders with the sheep to help with getting all sheep off the forest. The Forest Service also had a person ("sweeper") follow behind the sheep while trailing off to assure no strays were left behind. Northern goshawk surveys (15,000 ac) were in the South Tongue Drainage of the Forest. Two new nests and 4 pairs were discovered. One of the nesting pairs in Poison-Billy drainage moved the nest approximately 100 yards northeast of the prior year's nest. WGFD conducted surveys on 22 sites in 2014 for water vole. Some sites were historic locations; others were new sites. Two new occurrences were documented.
How often?	Annually
What plan component is being monitored?	Objective 1b, strategies 1 – 5

Acres/miles of species at risk occupied habitat inventoried and/or populations discovered.

2015 results	Ten acres of at risk occupied habitat inventoried this year. Yellowstone cutthroat trout populations were surveyed at two fish-bearing lakes in the Powell Lakes area. No new at-risk populations were discovered this year.
How often?	Annually
What plan component is being monitored?	Objective 1b, strategies 1 – 5

Acres of vegetation management projects and natural disturbances that occurred in lynx habitat and winter snowshoe hare habitat during the previous fiscal year. Update vegetation GIS coverage to include these acres and compare with suitable habitat thresholds.

2015 results	Since the last report, approximately, 600 acres of potential denning habitat (habitat structural stage 4C) was altered ~500 acres from a natural wildfire (Reservoir Fire) and ~100 acres from a unit within the Woodrock timber sale. These areas were ~ 1% of the total available denning habitat (habitat structural stage 4C) on the forest. The forest is not currently occupied by lynx. No critical habitat for lynx is designated on the forest. No lynx habitat was adversely affected by fire or projects, and this loss of acreage would not preclude lynx from establishing on the forest if they should choose to do so.
How often?	Every five years unless habitat becomes occupied.
What plan component is being monitored?	Objective 1b, strategies 1 – 5

Summarize species-specific monitoring results.

2015 results	Cutthroat, rainbow, brown, and brook trout populations appear to be stable overall. The forest, in cooperation with the Wyoming Game and Fish Department, continues to monitor fish populations across the forest on a semi-regular rotation. Four new goshawk nests were located. Six new pairs of goshawk were located. One new watervole location was found on the north end of the forest. The Devils Canyon bighorn sheep herd is doing well. WGFD has used them to bolster other herds in the state. The Shell Canyon herd is still maintaining ~20 individuals and is struggling to expand. All peregrines have moved off the forest but remain close by. The peregrine population is doing well in Wyoming. The U.S. Fish and Wildlife Service is no longer providing funding for survey efforts and is now concentrating efforts in other states where the population needs more improvement to be sustainable. The forest acquired an Anabat acoustic monitoring device in 2013. Currently survey designs are being developed to utilize this equipment to best gather use and distribution data for bats on the forest. Rocky Mountain Bird Observatory continues to monitor nesting resident and migratory trends across the forest.
How often?	Every five years
What plan component is being monitored?	Objective 1b, strategies 1 – 5

Rainbow trout (MIS) and Yellowstone cutthroat trout (sensitive species) habitat condition and trend. Report expansions of Yellowstone cutthroat trout populations by stream name and length.

2015 results	These trout populations have been stable during the last 5-year period.
How often?	Every five years
What plan component is being monitored?	Objective 1b, strategies 1 – 5.

#10. Are the habitat trends (and therefore population trends by inference) for MIS and other emphasis species being maintained or improved with respect to management activities conducted?

Acres and condition of habitat on the Forest for each avian and the red squirrel MIS. Associate habitat trend with available population data where feasible. Participate in the interagency statewide avian population monitoring effort (Monitoring Wyoming's Birds).

2015 results	See following tables for red-breasted nuthatch and red squirrel. Brewer's sparrow: There was no habitat capability (HABCAP) model run for this species' habitat in the 2005 FEIS, as the Forest's vegetation database (FSVeg) does not adequately or reliably classify sagebrush habitat. Habitat quantification efforts have been improving at the project scale with regards to sagebrush canopy cover, due to the tie with sage grouse habitat and Forest Plan direction in Wildlife guideline #10 (p. 1-47). A mapping effort was started in 2006 to look at sagebrush densities in the Battle Park area as part of the range NEPA process. This effort was renewed in 2013 with additional data collection occurring in 2013 and 2014 in both the Battle Park C&H allotment and the Sunlight Mesa C&H allotment, based on the initial 2006 canopy cover classes. The initial summary of acres in each sagebrush cover class for these 2 allotments has been done. However, the interpretation and summarization of this data is not complete at this time.
How often?	Annually
What plan component is being monitored?	Objective 1b. Provide ecological conditions and habitat within the ecological capability and disturbance regimes of the Forest to sustain well-distributed viable populations of native and desired non-native emphasis species listed in Appendix C of the Revised Plan. Strategy 5. Where suitable habitat exists, cooperate with the Wyoming Game and Fish Department to reintroduce beaver (MIS) into three 6th-level HUC watersheds over 10 years to re-establish self-sustaining populations in historical habitats … Strategy 6. Maintain or increase the amount of elk (MIS) security areas at the forestwide scale. Current level is 47% of potential. Assess availability of security areas at the geographic area scale, and incorporate security area analysis into travel and vegetation project management decisions to increase availability, where feasible. Strategy 7. Protect significant cave resources and associated wildlife through designation, development and implementation of three cave management plans within five years or until all significant caves have management plans. Strategy 8. Maintain a forestwide system of old-growth habitat to sustain old-growth associated species and resources … Strategy 9. The Revised Plan incorporates the conservation measures of the Lynx Conservation Assessment and Strategy. In occupied lynx habitat, implement applicable management direction for lynx habitat within Lynx Analysis Units on National Forest lands ... Strategy 10. Provide unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species. Strategy 11. Manage riparian and aquatic habitat, including springs and fens, to support well-distributed populations of native plant, invertebrate and vertebrate riparian- and aquatic-dependent species.

Cover value index for red-breasted nuthatch

Geographic Area	HABCAP Model 2003	HABCAP Model 2010	HABCAP Model 2015
Clear/Crazy	37%	38%	38%
Devils Canyon	65%	63%	74%
Goose Cr	39%	37%	37%
Little Bighorn	57%	52%	52%
Paintrock	52%	51%	51%
Piney/Rock	41%	40%	41%
Shell	57%	47%	48%
Tensleep	52%	49%	50%
Tongue	43%	42%	42%
Forestwide Average	47%	45%	45%

Cover value index for red squirrel

Geographic Area	HABCAP Model 2003	HABCAP Model 2010	HABCAP Model 2015
Clear/Crazy	76%	70%	71%
Devils Canyon	75%	75%	76%
Goose Cr	73%	71%	71%
Little Bighorn	72%	71%	65%
Paintrock	72%	70%	69%
Piney/Rock	70%	73%	72%
Shell	70%	60%	58%
Tensleep	70%	69%	69%
Tongue	67%	71%	68%
Forestwide	71%	71%	68%

Results of beaver (MIS) colony reintroduction and aerial survey of number of occupied 6th-level Hydrologic Unit Code (HUC) watersheds. Tie to habitat condition and trend monitoring provided through aquatic and range resource monitoring.

2015 results	The following table displays the 2003, 2010, and 2014 population survey information as summarized in the WGFD report (WGFD 2015).
How often?	Every five years
What plan component is being monitored?	Objective 1b, Strategies 5-11

Wyoming Game and Fish Department population survey data for beaver in 2003, 2010, 2014.

Beaver Survey	2003	2010	2014
Total Caches Seen	30	23	15
Estimated Missed Caches	20	15	10
Total Caches	50	38	25
Beaver Population Estimate on Forest	225	171	113

Acres of elk (MIS) security areas, and association with past amounts available, elk distribution patterns, harvest success, hunt area strategies, herd composition, and population objectives. Updates to road density and vegetation GIS layers to rerun security habitat model.

2015 results	When taking a combined view of the elk security, population, and harvest data information, it is not yet apparent if there have been any changes broad enough on the forest to either improve or worsen habitat conditions that could result in a corresponding change in elk populations. Harvest success could be improved by reducing the road density (more elk security) or improved access on private lands where elk seek refuge; however, hunters are also continuing to change their preference towards more motorized access and not taking advantage of more intact (non-roaded) habitat. In terms of overall forest plan level predictions of effects to elk security, the level of timber harvest predicted to occur in suited timber areas under the revised forest plan has not occurred. The plan projected far more uneven-aged management than has occurred, so while fewer acres have been cut, more volume has been removed. The overall increases in elk population, at this point, are not attributable to either improved or declined habitat conditions on the forest, and there is no apparent correlation to elk security habitat either. Some areas classified as "non-hiding cover" in 2005 have likely grown up to hiding cover since that time but were not accounted for in the vegetation layer. The 2012 Gilead Fire resulted in a loss of existing elk security in the Piney Creek watershed due to several thousand acres burned. This is included in the 2015 model run. A correction to the roads layer occurred for FSR 319 in 2015 which was also in the Piney Creek watershed. This road was shown as open in 2010 but should have been in database as closed. As a result of this correction in 2015, there was a gain in existing elk security of approximately 4,000 acres, which showed a resultant loss in potential security. Additional updates to FSVeg layer need to occur to complete 2010-2015 changes in existing or potential elk security, which could change some of the results. The results include actual changes to the vegetation on the ground, and do not include activities from NEPA decisions that have not been implemented yet.
How often?	Every five years
What plan component is being monitored?	Objective 1b, Strategies 5-11

Continued habitat use by bats at known occupied caves. Survey methods may vary and should include species.

2015 results	One cave on the west side of the forest was surveyed by U.S. Fish and Wildlife Service. Four caves were surveyed for continued use by bats in cooperation with the WGFD. Two caves were occupied by small-footed myotis, Townsend's big-eared bat, big brown bat, little brown myotis, and two unknown myotis species. A second cave was occupied by little brown myotis, and the third cave was unoccupied as a hibernacula but did include some day use by one myotis species.
How often?	Every five years
What plan component is being monitored?	Objective 1b, Strategies 5-11

Continued habitat use by goshawks in known nesting territories where active vegetation management has occurred. Verification through nest search with broadcast calls.

2015 results	Four new nests were located on the east side of the forest over the last 4 years. One nest in the South Tongue drainage was established just outside a harvested timber unit and has been active in 2014 and 2015. Of the four nests located over the past 5 years, two pair have used multiple nests within their territories. Overall, goshawk habitat on the forest is in good condition. The Bench goshawk and Dayton goshawk nests were abandoned. The Bench nest was abandoned likely due to increased tree mortality or from lack of habitat diversity around buffer. The Dayton nest, occupied in 2011, was likely abandoned due to firewood gathering during nesting season. This pair is likely still in the same drainage; however, their new territory has not been located.
How often?	Annually
What plan component is being monitored?	Objective 1b, Strategies 5-11

Continued habitat use by water voles in known locations using live trap or other methods.

2015 results	WGFD resurveyed historic sites in 2012 and included some new sites. One new site was found to be occupied. There will be a large effort beginning in 2016 to document historic and new water vole locations forestwide to identify habitat utilization and develop a probability-of-use model that could be used at a project-specific scale.
How often?	Every five years
What plan component is being monitored?	Objective 1b, Strategies 5-11,

Continued habitat use by amphibians in known locations. Number of reintroductions or expansions of range in stream reaches.

2015 results	A status and distribution report was compiled by WGFD in 2012. Ranges for all forest frog species were expanded; most new locations are a result of increased search effort in area and intensity. At the time of the report, chytrid fungus had not been identified on the forest. Chytrid fungs was verified on the forest in 2014 in the Prune Creek and Sibley Creek portion of the Tongue District. Chytrid fungus has caused high rates of mortality in areas it has affected. If mass mortality should occur in the Bighorn Mountains, populations may not be able to recover (WGFD 2012 Report).
How often?	Every five years
What plan component is being monitored?	Objective 1b, Strategies 5-11

Continued habitat use by raptor and other rare avian species where known nest locations occur. Nest searches and expanded inventories.

2015 results	One peregrine falcon nest moved off the forest but remained in the same canyon. Approximately 30,000 acres were surveyed for goshawk; six new goshawk territories were located, and 4 new nests were located. One goshawk territory was abandoned.
How often?	Every ten years
What plan component is being monitored?	Objective 1b, Strategies 5-11

What have we learned about viability and MIS?

2015 results	Appendix B of this report includes a supplemental report on the status of management indicator species (MIS) monitoring. This section includes a few summary highlights of that report. In general, the very concept of the trend and condition of individual MIS species having a broader implication to either species viability or habitat quality has long been challenged, most notably by the Committee of Scientists in their reports that informed planning rule updates in the early 2000s. Under the 2012 Planning Rule, the MIS concept has been replaced by focal species, which has a different definition and is one of the areas that will be updated by the next forest plan monitoring report. Concerning the Bighorn MIS species specifically, the 10 years of monitoring since the forest plan went into effect has shown that making inferences between a species population estimate and their habitat integrity is problematic, and poses more questions than substantive, actionable management actions. Elk: The elk security model analysis shows that there was a 2% increase in existing elk security as a percent of potential elk security between 2010 and 2015. Much of this increase can be attributed to database updates. Elk populations across the forest remain well above objectives, and 2 of the 3 herds increased in population between 2010 and 2015. However, these population increases have not been correlated to habitat conditions on the forest, nor is there an apparent correlation to elk security habitat. Beaver: Estimated beaver populations on the forest, based upon Wyoming Game and Fish Department aerial cache counts, have declined based on surveys in 2003, 2010, and 2014. Several years ago, the forest began intensive willow monitoring, an important component of beaver habitat, and is expanding that monitoring for FY 2016. Red-breasted nuthatch: The integrated monitoring in bird conservation regions (IMBCR) data indicates fairly stable populations at both the bird region and forest scales. Because other population variables (response to climate, insect populations, and cone crops) affect the nuthatch, and because the IMBCR protocol sampling density is relatively low, there is believed to be a low correlation between nuthatch populations on the forest and implications to the habitat they represent, namely, mature conifer forests. Given that more acres were affected by fire and that overall forest growth has essentially offset habitat decline due to fire events, habitat capability modeling indicates that large fires are a more negative impact to potential nuthatch habitat than timber harvest. Red squirrel: Like the nuthatch, this species habitat association is mature conifer habitat, and both population trends and habitat trends are similar. The IMBCR population numbers between 2009 and 2014 are fairly similar, with a population

	spike for red squirrel noted in 2011 and 2012. Habitat capability numbers are influenced by the same variables as the nuthatch. Brewer's sparrow: The IMBCR monitoring for the forest has not sampled enough of this species to draw any conclusions. At the bird conservation region 10 scale, the population density has been approximately steady between 2010 and 2014. The habitat capability model has not been used for this species.
How often?	Every five years
What plan component is being monitored?	Objective 1b, Strategies 5-11,

#41. Have management strategies (goals, objectives, standards, guidelines) resulted in an improved status for species at-risk and MIS?

Compare existing status to previous status by species.

2015 results	Some conclusions on select management strategies: Objective 1b, strategy 3: Recent surveys by WYNDD and other partners have exponentially increased our knowledge of fen habitats and associated species. Several new species were discovered. In addition, several species, thought to be rare, were found to be quite numerous and secure from a viability perspective and frees inventory and management resources to concentrate on the truly rare or at-risk species. Objective 1b, strategy 2 and 10: Since 2012, the forest has received over $600,000 from internal and external grant sources. These projects have included aquatic organism passage creation; and, steam habitat improvements, including riparian exclosures and willow planting. Objective 1b, strategy 8: See the old growth discussion for question # 11.
How often?	Every ten years
What plan component is being monitored?	Objective 1b, Strategies 5-11

Validate appropriateness of MIS selected, and the management direction associated with them (e.g., elk security).

2015 results	The premise of MIS, as evidenced in the 1982 planning rule (36 CFR 219.19 (a) (1) and (6)), was to identify species to estimate the effects of forest plan alternatives (1) and then to monitor those species' population trends and determine relationships to habitat changes (6). The selection process and implementation guidance for MIS were described in appendix C of the forest plan (2005, p. C12-17). MIS analysis for each alternative occurred in the final environmental impact statement (FEIS) associated with the forest plan (2005, pgs. 3-208 thru 3-238), and included the current population and habitat information known for each species. As stated on p. 3-208 of the FEIS, "monitoring [for MIS] is a challenge with significant costs, and many factors other than regular management activities can affect populations of MIS, with climate and prey/forage levels being the most common elements driving population trends." Several literature references that review the difficulties with MIS and the suggested "keystone" species concepts also exist and are prompting further review of this component of the planning regulations. This may change how subsequent forest plans address this topic.

How often?	Every ten years
What plan component is being monitored?	Objective 1b, Strategies 5-11

Fire and Timber Monitoring

#11. Is the Bighorn National Forest increasing the amount of vegetative communities restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases and invasive species?

Compare the acres estimated to be treated in the Revised Plan with actual number of acres treated. Track the results of natural disturbances. Add to actual number of acres treated. Update the GIS vegetation databases with all vegetation changes. See commercial and non-commercial harvest tables below for treatments estimated for this plan period.

2015 results	The forest continues to strive to update the GIS layers of treatments over the years. The tables below show the acres planned for treatment via different means of commercial harvests and non-commercial treatments. The commercial harvest proposed in the forest plan included more clearcutting and uneven-aged harvests than were accomplished in this period. Actual forest harvests emphasized shelterwood overstory removals, sanitation/salvage, and commercial intermediate harvests (thinning). This was a result of an emphasis on scheduling areas previously harvested by removing the commercial overstory from regenerated stands, reacting to natural events, and treating wildland urban interface areas generally through intermediate harvests. Total commercial harvest acres were 40% of the projected amount to achieve the allowable sale quantity levels.
How often?	Every five years
What plan component is being monitored?	Objective 1c. Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. Strategy 5. Continue to strengthen interagency relationships to increase wildland fire protection capabilities to provide for firefighter and public safety. Strategy 6. Place high priority on fuel reduction activities in Fire Regimes I, II, and III (ponderosa pine, sagebrush/grass, mixed conifer) and other strategic areas where high fire hazards exist …

Treatment Type	Clearcutting	Shelterwood Prep. Cut	Shelterwood Seed Cut	Shelterwood Overstory Removal	Uneven-aged, Selection	Commercial Intermediate Harvests	Salvage, Sanitation	Total of Acres
Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Annual Planed	691	82	82	82	764	0	0	1,701

Amount ASQ								
Projected acres to date ASQ	7,601	902	902	902	8,404	0	0	18,711
Actual acres Accomplished	927	461	224	2,063	149	1,507	2,206	7,537
Percent of projected ASQ	12%	51%	25%	229%	2%			40%

Non-commercial treatments are shown below. The Forest exceeded the projected amount of acres treated in almost every category except in prescribed fire.

Treatment Type	Aspen Regeneration, Maintenance	OVM Forested Mechanical	Forested Prescribed fire	Non-Forested Prescribed fire	Wildfire/ Wildland fire use	Blowdown	Insect and disease mortality	Timber Stand Improvement	Reforestation	Total of Acres
Unit	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Annual Planned amount TSPQ	50	300	1,150	2,500	2,500	-	-	501	400	7,401-
Projected acres to date TPSQ	550	3,300	12,650	27,500	27,500			5,511	4,400	63,800
Actual acres Accomplished	889	7,562	100	9,500	36,985	550	16,624	7,026	4,566	88,381
Percent of projected TSPQ	162%	229%	1%	38%	134%			127%	104%	139%

Review vegetation treatments to see if they mimic the scale and effect of natural processes.

2015 results	Since 2005, the forest has planned or implemented stand replacing treatments on various scales, from coppice treatment of single aspen clones for regeneration of 6 acres, to the "Reservoir" prescribed natural wildfire of 2,225 acres. Included in this array of treatments are clearcuts in even-aged Lodgepole stands ranging from a few acres to 180 acres. The average large (10 acres+) wildfire during this period was 2,889 acres, the median size was 121 acres and the largest event during this period was the 13,450 acre "Bone" wildfire. Other natural, stand-replacing events include blowdown events up to over 1,000 acres. The range of treatments accomplished demonstrates the forest's attempt to mimic the scale and effect of natural processes.
How often?	Every five years
What plan component is being monitored?	Objective 1c. Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. Strategy 5. Continue to strengthen interagency relationships to increase

	wildland fire protection capabilities to provide for firefighter and public safety. Strategy 6. Place high priority on fuel reduction activities in Fire Regimes I, II, and III (ponderosa pine, sagebrush/grass, mixed conifer) and other strategic areas where high fire hazards exist …

Summarize acres of aspen treated. Summarize efforts and results of inventory/monitoring for conditions of stands (every five years).

2015 results	The forest plan projected an annual average of 50 acres of aspen regeneration or maintenance. Since 2005, the forest has accomplished 889 acres or 162% of the projected amount. Most of these acres were accomplished by including aspen release treatments (removal of conifer) in stewardship and timber contracts. Monitoring of these treatments has shown some success with increased sprouting in the larger units. The high cost to protect regenerated aspen clones, with fencing, severely limits its use to just a few acres of this total.
How often?	Every five years
What plan component is being monitored?	Objective 1c., strategies 5 and 6

Identify location and amount of old growth and compare to desired amounts. Update vegetation coverage in GIS (every ten years). **It is recommended that the guideline and this monitoring item be removed from the Plan. The effectiveness and need for this Forest Plan Guideline is questionable given that tree cutting is restricted on the majority of the Forest.**

2015 results	The forest contracted surveys for old growth characteristics in the Goose Creek drainage in 2005. Surveys indicated stands that had not received treatments in the past showed old growth characteristics. Project analysis for old growth has shown geographic areas meet and exceed the forest plan guidelines for late-successional (old growth) criteria (FP, pg. 1-27). Since that time, the Roadless Area Conservation Rule (RACR) increased the areas where tree cutting is restricted to over 812,000 acres of the 1,115,161-acre national forest. A GIS coverage has not been completed.
How often?	Every ten years
What plan component is being monitored?	Objective 1c., strategies 5 and 6

#11, continued.

Acres of fuel reduction accomplished in Fire Regimes I, II, and III.

2015 results	The primary emphasis of this activity continues to be near structures to better protect them in the event of wildfire. This is accomplished through commercial timber sales and contracted hand removal (piling and burning) of fuels. The forest also conducts prescribed burning in sagebrush and mixed conifer stands to promote resilience to wildfire. The greater than 2090 acres target was accomplished.
How often?	Annually

What plan component is being monitored?	Objective 1c. Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. Strategy 1. Within 15 years, implement 447,052 acres of vegetation management practices that will move all affected landscapes toward desired vegetation composition and structure … Strategy 2. Strive to limit further expansion or new infestations of invasive species and reduce existing infestations of invasive species. Within 5 years, complete an invasive species management plan. Strategy 3. Manage to retain or increase aspen stands by treating 500 acres over 10 years. Treatments include commercial and non-commercial harvests to remove competing conifer and regenerate aspen; prescribed fire; and fencing, where needed. Strategy 4. Implement suppression strategies as needed to minimize epidemic outbreaks of insect and disease in areas managed for timber production, developed recreation, viewshed (e.g., concern level 1 and 2 roads, cultural sites, and wild and scenic river corridors) and administrative sites as described in management area desired conditions. Strategy 5. Continue to strengthen interagency relationships to increase wildland fire protection capabilities to provide for firefighter and public safety. Strategy 6. Place high priority on fuel reduction activities in Fire Regimes I, II, and III (ponderosa pine, sagebrush/grass, mixed conifer) and other strategic areas where high fire hazards exist, such as communities identified in the Healthy Forest Restoration Act (Federal Register, Vol. 166, No. 160, Aug 17, 2001) or as identified in community wildfire protection plans. Treatments should emphasize condition classes with one or more missed fire cycles and urban/wildland interface areas. Strategy 7. In accordance with the 2009 fire management policy, allow the natural role of fire to be restored in the ecosystem.

#12. What prevention activities and cooperative efforts have been implemented during the last year?

2015 results	The exotic white pine blister rust (*Cronartium ribicola*) continues to expand its range in the native limber pine (*Pinus flexilis*) stands resulting in decline and death of the species. 2015 was not a good seed year for limber pine so no collections were made to stockpile seed for future plantings. Recent research from the Forest Health Management office in Rapid City has shown that stand density is a factor in resistance against both white pine blister rust and mountain pine beetle (*Dendroctonus ponderosae*). Projects submitted to increase resistance have not been funded. The emerald ash borer (*Agrilus planipennis Fairmaire*), an exotic beetle that kills native ash trees, is now in Boulder, Colorado. The forest is working cooperatively with Wyoming State Forestry to inform the public of this pest and to follow "Don't Move Firewood" protocols to reduce the chance of local infection.
How often?	Annually

What plan component is being monitored?	Objective 1.c. Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. Strategy 2. Strive to limit further expansion or new infestations of invasive species and reduce existing infestations of invasive species. Within 5 years, complete an invasive species management plan.

Timber Monitoring

#27. Is the Bighorn National Forest utilizing stewardship contracting appropriately? Is stewardship contracting a benefit to local communities?

2015 results	Stewardship contracts offered in 2015 included an integrated resource timber contract. Poison stewardship was offered and awarded in 2015. Local subcontractors for logging and fencing were included in the proposal awarded.
How often?	Annually
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Stewardship strategy 1. Within the limitation of the small business set-aside program and while stewardship contracting authority exists, evaluate each vegetation management project for its potential and feasibility as a stewardship contract.

#29. Is the Bighorn National Forest providing the desired level of uses, values, products, and services of wood products?

Numbers for forest plan projections are total sale program quantity (TSPQ). TSPQ is the volume we expect to offer based on experience. It includes timber from suited and unsuited land.

2015 results Additional information is presented in appendix A.	**2015 data** Sawtimber: 6,637 CCF Products other than logs: 1,881 CCF Sawtimber from other vegetation management: 122 CCF Personal use firewood: 2,557 CCF The ASQ volume sold during this planning period was 30% of the total projected. Sawtimber sold was 27% and Roundwood or Products Other than Logs (POL) was 44%. The TSPQ volume sold during this planning period was 75% of the projected total (with 72% of the sawtimber and 83% of the POL). The Forest exceeded projected volume of TSPQ in Other Vegetation Management (OVM) Sawtimber with 114%.	**Forest plan projections** 10,688 CCF 1,693 CCF 3,550 CCF 3,000 CCF
How often?	Annually	

What plan component is being monitored?	Objective 2c (see above) Timber strategy 1. Annually offer a reliable sustainable level of forest products (sawtimber, posts and poles, Christmas trees, and fuelwood) on forest lands. Timber strategy 2. Offer not more than the allowable sale quantity of sawtimber from suitable lands. Timber strategy 3. Strive to offer to the public sawtimber, products other than logs, and firewood at the average annual Total Program Sale Quantity.

#32. What is the current condition of the 2005 inventoried roadless areas?

Note: The need to map areas within the 2005 roadless areas that no longer maintain roadless character is questionable, and it is recommended that this monitoring item be changed to track RACR areas vs Forest Plan Roadless or this item be removed from monitoring.

2015 results	The Roadless Area Conservation Rule (RACR) was upheld in courts after the 2005 forest plan was approved. The forest plan roadless area inventory was overridden by the RACR, which includes more acres than the 2005 forest plan inventoried roadless areas. The RACR is also more restrictive on actions that can be taken in those areas than the forest plan. The RACR does have exemptions for some actions within the designated areas and the forest has requested and been granted some exemptions for fuels reduction treatments in wildland urban interface areas and areas that no longer have roadless characteristics due to previous treatments.
How often?	Every five years
What plan component is being monitored?	Objective 3b. Improve the knowledge base provided through research, inventory, and monitoring to enhance scientific understanding of ecosystems, including humans, to support decision-making and sustainable management of the Bighorn National Forest. Strategy 1. Continue and enhance inventory and monitoring systems on the Bighorn National Forest to provide information and decision support.

#44. Were any actions taken to minimize insect/disease epidemics effective?

2015 results	Treatments on the forest for insects and disease fall into three general categories: removal of infection, reducing stand density to increase resistance to insects and disease, or placement of pheromones to catch or repel insects. The forest has used all three of these methods. Removal of infected mistletoe trees above young stands has been effective in reducing the infection. With thinning to remove fuels, we are also gaining stand resilience against many insects such as bark beetles. The pheromone treatments at Shell Falls and Five Springs appear to have minimized local tree mortality in those locations. These projects are localized in scale from a couple to a few hundred acres in roaded areas and local results show they can be very effective. However, at a larger landscape scale, the effectiveness is less apparent partly due to the limited extent of most insects and diseases.
How often?	Every five years

What plan component is being monitored?	Objective 1c. : Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. Strategy 4. Implement suppression strategies as needed to minimize epidemic outbreaks of insect and disease in areas managed for timber production, developed recreation, viewshed (e.g., concern level 1 and 2 roads, cultural sites, and wild and scenic river corridors) and administrative sites as described in management area desired conditions.

#45. Is the Bighorn National Forest improving the knowledge base provided through research, inventory, and monitoring to enhance scientific understanding of ecosystems, including human uses, to support decision-making and sustainable management of the Bighorn National Forest?

2015 results	Currently the forest is updating the FSVeg data to reflect current conditions. Forest inventory and analysis plots are taken on a ten-year cycle. Forest health management has plots to monitor specific pathogen from white pine blister rust to aspen decline with technical reports published from their findings. The forest has improved its knowledge and understanding since the forest plan was approved. Much has to do with the scale and intensity of conditions for standards and guidelines. With so much of the forest under RACR restrictions to activity, what was thought to be necessary guidelines for snags, coarse woody debris, old growth, treatment activities may no longer be applicable or necessary, especially at the landscape scale.
How often?	Every ten years
What plan component is being monitored?	Objective 3b. Improve the knowledge base provided through research, inventory, and monitoring to enhance scientific understanding of ecosystems, including humans, to support decision-making and sustainable management of the Bighorn National Forest. Strategy 1. Continue and enhance inventory and monitoring systems on the Bighorn National Forest to provide information and decision support. Strategy 2. Provide research results and tools through technology transfer to support effective management, and restoration of ecosystems and sustainability of natural resources, for example the Region 2 Aquatic (Winters et al. 2004) and Terrestrial (Regan et al. 2003) assessments. Strategy 3. Pursue partnerships with Forest Service and University research, other agencies, cooperators, and volunteers to acquire high priority information and pursue monitoring needs.

#48. Is the Bighorn National Forest inventory of lands suitable for timber production (suited lands) accurate?

2015 results	The Roadless Area Conservation Rule, implemented after the 2005 forest plan, had a significant effect on the suited lands for the forest. While the forest plan decision designated 185,282 acres suitable for timber production, roughly half or 91,312 acres are within RACR areas. Tree cutting is restricted in RACR with limited exceptions provided. One of the exemptions is for previously harvested and roaded areas, and there are a number of these areas on the forest. Until

	the extent of the use of exemptions is known, further analysis of suited lands is premature. The suitability analysis is, therefore, deferred until we understand the RACR effects better. This analysis is critical in determining the allowable sale quantity (ASQ) and total sale program quantity (TSPQ) for the Forest. If only half of the suitable acres are available to harvest, the ASQ and TSPQ in the plan are higher than what can be sustained in the long term. What the sustainable level should be will require RACR implementation questions to be answered and new linear modeling to determine outputs.
How often?	Every ten years
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Timber Strategy 2. Offer not more than the allowable sale quantity of sawtimber from suitable lands.

Recreation Monitoring

#13. Is usage of dispersed campsites negatively impacting watershed conditions?

2015 results	Campsites inventoried in 2002 (one municipal watershed per district) were re-inventoried in 2010 using the rapid assessment process. Results are attached to the 2010 monitoring report. Based on the report, an increase in ground disturbance and resource impacts along Ten Sleep Creek was noted. In response, an environmental analysis was conducted and decision notice completed to implement a series of projects in the Ten Sleep corridor to mitigate impacts from developed and dispersed camping activities. A key measure implemented was the designation of 40 dispersed camping sites and closure of 60 dispersed camping sites.
How often?	Every five years
What plan component is being monitored?	Objective 1a. Improve and protect watershed conditions to provide the water quality and quantity and soil productivity necessary to support ecological functions and intended beneficial water uses. Strategy 2. Complete watershed scale improvement projects, such as road relocations or improvements, on at least three 5th-level Hydrologic Unit Code (HUC) watersheds within 15 years. Annually complete an average of three watershed improvement projects in priority watersheds, such as road/trail stabilizations, culvert replacements and dispersed campsite management. Prioritize watersheds considered in degraded condition by Winters et al. (2004).

#14. Are developed recreation sites/facilities providing diverse, high quality outdoor recreation opportunities?

2015 results	The recreation site analysis (RSA) planning process, an agency-wide initiative, was started on the Bighorn National Forest in 2015. The goal of the RSA will be to define a five-year program of work to reduce deferred maintenance and im-

	plement an annual operation and maintenance program that will guide the forest in maintaining and sustaining a quality developed recreation program within current budget constraints. The draft program of work will be released to the public for review and comment in the spring of 2016. A final program of work will be completed in 2016 and implemented over the next five-year planning period. This plan will build upon the recreation facility analysis implemented in 2008. The first five-year program of work was completed in 2013. In 2012, as a result of the West Ten Corridor environmental analysis, a decision was made to decommission two existing campgrounds (Deer Park and West Tensleep Lake) and replace them with two new campgrounds. The forest will develop a proposal and submit it to the regional capital improvement program (CIP) for consideration. If funding is received through the competitive CIP process, the forest will be able to implement the decision and improve campground facilities and retire a significant amount of deferred maintenance. Results of the 2013 National Visitor Use Monitoring Survey demonstrated that 86.5% of visitors leaving a developed recreation site, at the end of their visit, reported very good or good satisfaction with their experience.
How often?	Every five years
What plan component is being monitored?	Objective 2a. Improve the capability of the Bighorn National Forest to provide diverse, high-quality outdoor recreation opportunities. Strategy 2. Develop criteria and priorities for evaluating developed recreation facilities.

#15. Does the demand for recreation warrant development of additional opportunities (e.g. trails, dispersed campsites, etc.)?

2015 results	During the 2015 fall hunting season, the Bucking Mule Falls Trailhead exceeded its carrying capacity, with trucks and trailers filling all available slots and overflowed down both sides of the road leading into the trailhead. All available sites open for camping were full. Reconstruction of the trailhead, which would include the addition of camping sites, is still needed. The Sheridan Community Land Trust (SCLT) is proposing to fund a non-motorized trail system, with an emphasis on mountain bike opportunities along with other nonmotorized uses. The portions of the trail system proposed on the forest are generally located on the Tongue Ranger District off Forest Service Road 26 (Red Grade Road). The International Mountain Biking Association conducted trail layout and design in FY14. The SCLT purchased a lease on state land and plans to initiate construction on Phase 1 of the system in FY15. The BLM is completing NEPA analysis for their portion of Phases 1 and 2 and plans to have a decision in early 2016. The Forest Service is waiting for the BLM decision before starting analysis on our share of the proposed trails. A significant challenge for the forest will be obtaining funding for the cost of the environmental analysis for the proposed project. One key annual monitoring item is the average occupancy rates for the thirty fee campgrounds on the forest, which reflect the current demand for developed camping on the forest. The annual average occupancy rate for all campgrounds on the Bighorn National Forest for May through September of

	2015 was 49%, which is 6% higher than the 5-year average from 2010-2014. The highest occupancy rates were at West Tensleep Lake and Sibley Lake campgrounds (73%), Middle Fork campground (72%), and North Tongue campground (70%). These four campgrounds have exhibited the highest average occupancy rates for the past 20 years. During the peak use periods of July and August, these campgrounds have reached 100% occupancy rates. A review of occupancy date for the past five years reveals some general trends in usage. Overall, demand for developed camping is increasing. Over half of our fee campgrounds have annual occupancy rates of between 50 and 100%. In addition to a need for additional developed campgrounds sites, our customers are asking for additional or improved amenities. Visitors commonly express the need for more electric hook-ups and longer site parking pads to accommodate larger camping units and additional equipment such as ATVs and associated off-road vehicle trailers. The current downward trend in facility maintenance and recreation operations funding indicates it will be a challenge to meet increased developed camping needs on the forest.
How often?	Every five years.
What plan component is being monitored?	Objective 2a (see #14) Strategy 2 (see #14) Strategy 5. Provide nonmotorized and motorized trails/areas for a wide variety of uses and experiences. Develop travel management plans associated with the conversion of the remaining "C areas" to "A areas" (as shown on the 1998 travel map) within four years of plan revision date. When conducting C area travel management planning, consider the travelway system adjacent to the C area. Provide diverse trails for motorized and nonmotorized recreation opportunities in coordination with Wyoming State Trails. Provide a variety of hunting, fishing, and wildlife viewing opportunities in coordination with the Wyoming Game and Fish Department. Strategy 8. Encourage, establish, and sustain a diverse range of recreational facilities and services on NFS lands. Partnerships are one mechanism for accomplishing this. Strategy 9. Develop or identify one day-use trail system on a scenic byway within 15 years. Strategy 10. Provide for motorized and nonmotorized dispersed recreation opportunities. Strategy 11. Inventory existing rock climbing routes including approach, associated trail locations, and human impact. Within 10 years, develop climbing management plans for two areas on the Forest where routes are established or are being established. Strategy 12. When conducting travel management planning, promote the concept of loop trails, routes to feature destinations, connections between developed and private recreation attractions, and interpretive opportunities. Strive to minimize effects to motorized travel opportunities within the geographic area due to mitigations for elk security related route closures. Objective 2c, Tourism and Recreation. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products,

	and services. Strategy 1. Coordinate with local government entities on tourism or recreation opportunities. Strategy 2. Foster a sense of place unique to the Bighorns by appropriately integrating cultural resources and natural resources into education and recreation opportunities. Strategy 3. Provide a variety of hunting and fishing opportunities in coordination with the Wyoming Game and Fish Department. Objective 4a. Improve the safety and economy of Forest Service roads, trails, facilities, and operations, and provide greater security for the public and employees. Strategy 2. Provide recreation opportunities to accommodate a wide range of abilities and activities and ensure non-discrimination in the delivery of Bighorn National Forest programs.

#16. To what extent were vegetation management plans written for developed recreation sites.

2015 results	The September 2011 NEPA decision (EA/DN/FONSI) for the Johnson Creek vegetation management project authorized thinning and planting at Sibley Lake Recreation Area, Prune Creek Campground, and Pine Island Group Site. An implementation plan and schedule has not been completed. As part of the Historic Preservation Plan for the Medicine Wheel/Medicine Mountain National Historic Landmark, permanent plots and photo points have been established to monitor vegetation annually. Overall vegetation cover is stable, particularly within the immediate vicinity of the Medicine Wheel feature. However, pedestrian foot traffic off designated trails and the disturbance of fragile vegetation cover is a concern. The forest will continue to utilize interpretive staff and signage to minimize off-trail foot traffic and associated ground disturbance.
How often?	Every five years
What plan component is being monitored?	Objective 2a (see #14) Strategy 3. Prepare 2 vegetation management plans for developed recreation sites within 15 years.

#17. Is an adequate range of travel opportunities being offered across the forest?

2015 results	Number of travel management plans completed (annual) In 2015, the forest completed the subpart A analysis for the Travel Management Rule. The purpose of the analysis was to define a minimum road system based on projected funding for annual maintenance, retirement of deferred maintenance, and importance of individual roads for a variety of purposes including forest management and recreational use. Recommendations for road closures, decommissioning or change in use or maintenance levels will be specifically analyzed with full public involvement at the project level for future projects.

	Scenic byway day use trail completed (every five years) Planning for a suggested recreation trail around all or part of Meadowlark Lake has been deferred indefinitely as a result of budget and staff reductions on the district and by a potential project by the state of Wyoming to increase the water levels of the lake for irrigation purposes downstream.
How often?	Annually and every five years
What plan component is being monitored?	Objective 2a (see #14) Strategies 5, 6, 9, 10, and 12 (see #15) Objective 4a (see #15) Strategy 1. Focus efforts to improve travel management education, enforcement, and signing, including designating motorized and nonmotorized travel ways and areas, and identify reasons for restrictions.

#39. Are research, education, and interpretation activities being conducted and in conjunction with partners?

2015 results	The Medicine Wheel National Historic Landmark, which was open from June 20 to September 19, recorded 11,216 visitors with many from other countries around the globe. Also, 404 Native Americans visited the site to hold ceremonies and place offerings. Many of these visitors received interpretive messages from the staff at the site. Numerous school groups were also included in the number of visitors. The Shell Falls Visitor Center, which was open between May 23 to September 7, received the conservative estimate of over 50,000 visitors (we do not record accurate data on numbers). The staff at the site focused on providing forest and area information as well as interpretation, with the main theme being the geology, paleontology, flora, and fauna of the Bighorn Mountains. Volunteers from the Bighorn Basin Geoscience Center provided interpretive displays and training to visitor center staff, which focused on geology and paleontology. The Medicine Wheel Ranger District provides educational and safety message movie slides shown at the Hyart Theater in Lovell from January through September (two shows on Saturday and one show on Fridays). During June through August, an additional show was added on Thursday nights. Slides were forest informational messages with a safety message. Educational activities include the following topics: ATVs, UTVs and motorcycles, antler hunting, fire safety, resource damage, snowmobiles, and hunting season. An estimated 16,200 moviegoers saw the slide show over the year. The forest botany and hydrology team was interviewed by the Powell Tribune on botany and hydrology activities in the forest including seasonal activities in these disciplines. An estimated 500 subscribers read the article. The forest recorded conservation and education outreach activities in 2015 through our Forest Shining Star Environmental Education Report as follows: 5 on-forest presentations to youth: 17 adults, 84 youth 3 on-forest presentations to other groups: 33 adults 10 off-forest presentations to youth: 60 adults, 158 youth 10 off-forest presentations to other groups: 180 adults, 426 youth

	2 special events: 600 adults, 300 youth Total: 890 adults, 968 youth
How often?	Annually
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Tourism and recreation strategy 1. Coordinate with local government entities on tourism or recreation opportunities. Objective 3b. Improve the knowledge base provided through research, inventory, and monitoring to enhance scientific understanding of ecosystems, including humans, to support decision-making and sustainable management of the Bighorn National Forest. Strategy 3. Pursue partnerships with Forest Service and University research, other agencies, cooperators, and volunteers to acquire high priority information and pursue monitoring needs.

Wilderness Monitoring

#18. Are human uses of wilderness allowing for preservation of wilderness resources?

2015 results	Bare ground surveys were conducted during the summer of 2015 of more than 350 known campsites in the Cloud Peak Wilderness. This data was collected in 2000, 2005, and 2015 and will be evaluated in 2016 for any trend in bare ground area at each campsite and overall. This data can be used to determine the trend in soil and vegetative disturbance due to recreational use by observing the change in overall bare ground.
How often?	Annually
What plan component is being monitored?	Objective 2b. Improve the capability of wilderness and protected areas to sustain a desired range of benefits and values. Wilderness strategy 2. Provide for human values and benefits while preserving the wilderness character. Wilderness strategy 3. Control and reduce the adverse physical and social impacts of human use in wilderness through education and regulation as needed. Wilderness strategy 4. Favor wilderness-dependent activities in wilderness. Discourage activities that are not consistent with wilderness values. Wilderness strategy 5. Manage special exceptions provided by wilderness legislation with minimum impact on the wilderness resource.

#18. Is the quantity of dead and down woody debris adequate to maintain natural soil characteristics and functions?

2015 results	NA – see below
How often?	Per recommendation of the wilderness program manager change monitoring schedule for dead and down woody debris to every 20 years (due in 2025 and 2045) in order to collect substitutive data.

What plan component is being monitored?	Objective 2b. Improve the capability of wilderness and protected areas to sustain a desired range of benefits and values. Wilderness strategy 2. Provide for human values and benefits while preserving the wilderness character. Wilderness strategy 3. Control and reduce the adverse physical and social impacts of human use in wilderness through education and regulation as needed. Wilderness strategy 4. Favor wilderness-dependent activities in wilderness. Discourage activities that are not consistent with wilderness values. Wilderness strategy 5. Manage special exceptions provided by wilderness legislation with minimum impact on the wilderness resource.

#18. What level of crowding occurs on trails? Does the wilderness provide opportunities for solitude? Note: Monitoring may indicate if a limited permit system or other restrictions are necessary.

2015 results	Slight changes in percentages of use by trailhead (see appendix A) from previous years. The majority of all wilderness use is by way of trailheads that are accessible by low clearance vehicle on two lane gravel roads. Required registration compliance for 2015 is estimated at approximately 96%. This is based on the 355 contacts made by the wilderness rangers this summer with only 15 contacts noted for not registering in the wilderness rangers' daily encounter tallies. Trail encounters by management area prescription: Management area 1.11, Pristine: Encounters averaged 1.93 per day. This is under the Forest Plan standard of less than 2 per day. Management area 1.13, Semi-primitive: Encounters averaged 4.33 per day. Eight days of the individual daily encounter totals exceeded the Forest Plan guidelines for MA 1.11. Law enforcement contacts: Incidents/warning notices/violation notices totaled 195 for the Cloud Peak Wilderness during 2015. This is a decrease of 58 reported incidents/warning notices/violation notices from 2014. Educational presentations Leave No Trace (LNT): An estimated 50 participants completed the self-study training. A photo display at the Jim Gatchell Museum throughout the summer of 2015 commemorated the 50th anniversary of the signing of the Wilderness Act by taking viewers on a historic display of the Cloud Peak Wilderness. Outdoor sessions, classrooms, Girl and Boy Scout troops, Healthy Kids Day YMCA- Intro to LNT: 150 youth, 30 adults Local 4-H Kids camp-Intro to LNT: 15 youth, 8 adults Sagebrush Elementary School Intro to LNT: 16 youth, 5 adults Internal Forest Service trainings: 50 adults An additional 3,800+ contacts were made with the required registrations for groups visiting the Cloud Peak Wilderness. Registrants for the Cloud Peak Wilderness were provided with Leave No Trace, website communications, and a

	toll free phone number.
How often?	Annually
What plan component is being monitored?	Objective 2b. Improve the capability of wilderness and protected areas to sustain a desired range of benefits and values. Wilderness strategy 2. Provide for human values and benefits while preserving the wilderness character. Wilderness strategy 3. Control and reduce the adverse physical and social impacts of human use in wilderness through education and regulation as needed. Wilderness strategy 4. Favor wilderness-dependent activities in wilderness. Discourage activities that are not consistent with wilderness values. Wilderness strategy 5. Manage special exceptions provided by wilderness legislation with minimum impact on the wilderness resource.

#18. Are special exceptions affecting the wilderness resource?

2015 results	One motorized intrusion was authorized under a memorandum of understanding with County Search and Rescue organizations during FY 2015. A helicopter landing was conducted to rescue a 28-year-old hiker on July 4, 2015 near Firehole Lake. The MOU preauthorizes the County Sheriff and Search and Rescue to use helicopters and/or four wheelers to search or rescue with a follow-up report of the details.
How often?	Annually
What plan component is being monitored?	Objective 2b. Improve the capability of wilderness and protected areas to sustain a desired range of benefits and values. Wilderness strategy 2. Provide for human values and benefits while preserving the wilderness character. Wilderness strategy 3. Control and reduce the adverse physical and social impacts of human use in wilderness through education and regulation as needed. Wilderness strategy 4. Favor wilderness-dependent activities in wilderness. Discourage activities that are not consistent with wilderness values. Wilderness strategy 5. Manage special exceptions provided by wilderness legislation with minimum impact on the wilderness resource.

#19. Are air and water quality being improved, maintained, or degraded in the Cloud Peak Wilderness, and on the Forest as a whole?

2015 results	Historical data showed no evidence of degradation of air or water quality in the Cloud Peak Wilderness or on the Forest as a whole. Photo data collected at the Cloud Peak monitoring site (Hunter Mesa) was discontinued in 2015. The Wyoming Department of Environmental Quality discontinued IMPROVE activities at this site in 2013. Historical data from this station can be viewed or downloaded at WDEQ's air quality monitoring website (http://www.wyvisnet.com/plot.asp). A general review of water quality data in 2015 by the Region 2 specialists did not reveal new large-scale water quality or air quality concerns on the Forest as

	a whole. The long-term lake sampling work continued in 2015, collecting three samples each from Emerald Lake and Florence Lake during the summer. Quality assurance is conducted by the Rocky Mountain Research Station in Fort Collins, CO. 2015 sample analyses had not been received at the time of report preparation. No incidences of air quality impairment were reported by WDEQ, and forest activities were such that they did not instigate further data reviews in 2015. A summary of 2015 air quality data has not been received at the time of report preparation. An overall review of air and water quality was completed in 2015 by the Rocky Mountain Regional Office air quality specialist.
How often?	Annually
What plan component is being monitored?	Objective 2b, wilderness strategy 1. Monitor air and water quality, particularly in alpine lakes in coordination with appropriate state agencies.

Scenery Resources Monitoring

#30. Are Scenic Byway landscapes being managed to maintain scenic quality through time?

2015 results	Work is underway on a set of scenic byway corridor plans funded by WYDOT under a scenic byway grant agreement with a 20% match from the forest. Project-specific facility and vegetation management actions have been undertaken. Developed Recreation Facilities: Meadowlark Lake facilities on Cloud Peak Skyway (US 14) – Lakeview Campground, Lake Point Picnic Ground, North Cove Parking and Veterans Cove Parking were redeveloped between 2014 and 2016 on the Cloud Peak Skyway (US Hwy 16) was redeveloped in 2010 with Forest Service capital improvement funds. Shell Falls Wayside on Big Horn Scenic Byway (US Hwy 14) has been redeveloped. Plans are being made to redevelop the associated interpretive trail. Burgess Junction Visitor Center – Limited deferred maintenance work was completed. The center was not operated during the 2014 or 2015 summer seasons. Vegetation Management: A modified forest edge was marked and cleared as part of the WYDOT project to reconstruct 2.3 miles of US 16 (County Line West – Washakie County Project N361055) from Deer Haven Resort south to the Tensleep Creek bridge. Revegetation in the corridor was limited to seeding grasses, forbs and big sagebrush. FY 2011-12. Shrubs and trees were grown out from locally collected sources at the Coeur d'Alene Forest Service nursery and planted in the Steamboat section of US 14 with funding from WYDOT. NEPA analysis was completed for timber management projects – Johnson Creek on US 14, Poison Caribou on US 16, and Billy Creek on US 16. Implementation in the foreground view of the byways has not been undertaken to date. Other facilities and activities along the byways (2011-2015):

	An old gravel pit adjacent to US 16 was reshaped and planted as part of WYDOT's County Line West-Washakie County Project. A corral was built of drillstem pipe in the foreground view of US 14 on the Hunt Mountain Road (FSR 10) A communication tower was built in the middleground view of US 14 near Duncan Lake on FSR 233. A bridge across the South Fork of Clear Creek for the motorized Clear Crazy Trail (FST #117) was built in the foreground zone of US 16. A drainage system to address seasonal frost heave was built on US 16 near Caribou Creek. A drainage system to address landslide hazards was built on US 14 in Shell Canyon. A run-away truck ramp was built in Shell Canyon above Shell Falls Wayside. A water diversion for the pond at the YMCA of the Bighorns organizational camp was redeveloped in the foreground view of US 16.
How often?	Every five years.
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Scenery Strategy 1. Manage to rehabilitate and enhance landscapes viewed from the scenic byways. Within scenery management areas (MA 4.2), treat an average of 700 acres of forested vegetation every 10 years to maintain scenic quality through time. Coordinate treatment of the viewed area across management area boundaries.

#31. Are resource activities and forest uses consistent with the landscape character goals and scenic integrity objectives?

2015 results	Review a sample of management activities, and compare forest plan direction with actual outcomes: None to report. Map and measure total acres and % of geographic area at each scenic integrity level: The existing level of scenic integrity has not been inventoried since 2000. Map areas needing restoration and areas restored: A map was prepared showing areas where the inventoried level of scenic integrity (circa 2000) is below the forest plan scenic integrity objective. It indicates that twenty-four percent of the forest; approximately, 269,360 acres were inventoried with scenic integrity below the scenic integrity objective (SIO). These areas have an interim objective of rehabilitation. Change has occurred since 2000 in some previously harvested areas where new forest stands have reached 6 to 25 feet or more in height and scenic integrity has improved. The acres of improvement have not been inventoried. Specific projects and priorities for rehabilitation (forest plan, pg. 1-57) have not been established. Many areas with a rehabilitation objective are in the

	highly developed scenic byway corridors where higher levels of scenic integrity are desirable. There may be an opportunity to identify some projects as part of the Scenic Byway Corridor plans currently being developed. Compose a narrative and photographic description of the area's landscape character and character changes: Landscape character descriptions based on positive attributes (biological, physical and cultural) of an identifiable area are a tool for describing the existing and desired condition of scenery. Descriptions are currently being developed as part of the Scenic Byway Corridor plans. Existing and desired condition descriptions appear by geographic area in Chapter 3 of the Forest Plan for recreation, wildlife, watershed, disturbance processes, and forested vegetation. Chapter 3 of the forest plan should be amended with scenery and cultural resource sections in the future.
How often?	Annually
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Scenery strategy 2. Outside MA 4.2, manage for high quality scenic landscapes consistent with forest plan desired conditions and scenic integrity objectives. Restore 10% of landscapes that do not meet scenic integrity objectives.

Heritage Resources Monitoring

#21. Have programmatic agreements for heritage resources been negotiated and implemented for Forest programs?

2015 results	Identify other program needs and reduce backlog (annual): No additional program needs have been identified. Summarize if terms of agreements are being met (annual): The programmatic agreement requires an annual report to the State Historic Preservation Office (SHPO) to summarize all section 106 investigations conducted under provisions of the agreement. This report was submitted and accepted by the SHPO. All non-programmatic agreement investigations were also submitted to the SHPO in compliance with the National Historic Preservation Act. The Forest implements the Medicine Mountain/Medicine Wheel Historic Preservation Plan to manage the Medicine Wheel National Historic Landmark. The plan requires three annual consultation meetings with the seven consulting parties. This year we held two meetings at the Medicine Wheel, and the Big Horn County Commissioners hosted the third meeting in Lovell Wyoming.
How often?	Every two years and annually
What plan component is being monitored?	Objective 2b, heritage strategy 1. Negotiate programmatic agreements with State Historic Preservation Office (SHPO) and the Advisory Council for the timber and fire programs and historic administrative sites to emphasize inventory and management strategies within 15 years.

#22. Is the Bighorn National Forest preparing and implementing Historic Preservation Plans?

2015 results	As part of the program managed to standard the Forest is preparing a historic

	preservation plan for the Bighorn National Forest.
How often?	Annually
What plan component is being monitored?	Objective 2b, heritage strategy 2. Assess identified sites eligible for the National Register of Historic Places (NRHP) in conjunction with SHPO and Tribal Historic Preservation Office (THPO) and provide interpretation for NRHP sites where appropriate and consistent with developed preservation plans. Reduce backlog of unevaluated sites by evaluating 50 sites in 15 years.

#23. What progress has the forest made for inventorying areas having a high probability for heritage resources?

2015 results	Total acres inventoried in FY 2015 = 1,196 Cumulative acres inventoried since 2005 = 18,090 Total new sites evaluated = 28 (21 forest + 6 state + 1 contractor) Number of backlogged unevaluated sites = 11 Total sites sent to the state or national register of historic places = 39
How often?	Annually
What plan component is being monitored?	Objective 2b, heritage strategy 3. Inventory and evaluate 500 acres per year of the highest probable lands for cultural resources. Identify examples of the most important heritage site types, incorporate into a programmatic agreement, and nominate to NRHP.

#24. Is the forest meeting its consultation responsibilities for American Indian traditional cultural properties? Includes responsibilities under Sections 110 and 106 of the National Historic Preservation Act.

2015 results	The Medicine Mountain/Medicine Wheel National Historic Landmark contains 23 elements that contribute to the significance including the Wheel, trails, and landscape and that are traditional cultural places. Forest interpretive staff is present at the landmark during the summer and the cultural resource staff monitors the landmark regularly. The forest consults three times annually regarding the landmark and invites local tribes to consult on other projects at these meetings. Number of sites consulted on = 22.
How often?	Annually
What plan component is being monitored?	Objective 2b, heritage strategy 4. Establish and maintain effective consultation with federally recognized American Indian tribes on traditional cultural properties as specified in 36 CFR 800.2 and National Register Bulletin 38.

#25. What actions has the forest taken to increase public awareness and education of heritage resources?

2015 results	Number of heritage projects conducted = 7. Includes overviews of resource types and resource-specific contextual studies. Number of heritage programs presented = 5 Number of interpretive signs/brochures maintained = 6

How often?	Annually
What plan component is being monitored?	Objective 2b, heritage strategy 5. In partnership with American Indian tribes and state, county, and local government, increase public awareness, protect heritage resources, and further the goals of research through education and interpretation. Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Tourism and recreation strategy 2. Foster a sense of place unique to the Bighorns by appropriately integrating cultural resources and natural resources into education and recreation opportunities.

Invasive Species Monitoring

#12. How many acres of priority noxious weeds have been treated this year by what means? How many total acres of noxious weeds have been treated this year?

2015 results	Acres of priority weeds treated = 33 Total acres of noxious weeds treated = 1,533
How often?	Annually
What plan component is being monitored?	Objective 1.c. Increase the amount of forests and rangelands restored to or maintained in a healthy condition with reduced risk and damage from fires, insects and diseases, and invasive species. Strategy 2. Strive to limit further expansion or new infestations of invasive species and reduce existing infestations of invasive species. Within 5 years, complete an invasive species management plan.

#12. What prevention activities and cooperative efforts have been implemented during the past year?

2015 results	Continued cooperative agreements with Big Horn, Johnson, and Washakie counties for treatment of noxious weeds on the forest. Sheridan County has begun to partner with the forest to address noxious weed treatment. Global Positioning System points or polygons are provided for some treatment and inventory data. An increased level of weed awareness on the forest through educational programs presented to seasonal crews has led to identification of new populations of noxious weeds and follow-up treatment has occurred or is planned. Noxious weed prevention and control is considered in NEPA projects on the forest, including timber harvest, grazing activities, and dispersed and developed recreation. A growing concern is the dispersal of noxious weeds through ATVs and 4x4 passenger vehicle travel originating from other areas. Surveys have begun to identify areas of Russian and spotted knapweed in and along some roads, and it is suspected that the weed seed is dropping off undercarriages. The weed-seed-free feed program continues to be monitored, and compliance by forest users in general is very good.
How often?	Annually
What plan component is being monitored?	Objective 1.c, strategy 2 (see above).

Livestock Grazing Monitoring

#26. What total AUMs were permitted through term permit this grazing season? What total AUMs were authorized through term permit this grazing season?

2015 results Permitted and authorized numbers from 2010 through 2013 are charted in appendix A.	Permitted Cattle: 78,328 Sheep: 10,818 Horses: 860 Total = 90,006	Authorized Cattle: 67,201 Sheep: 7,593 Horses: 942 Total = 75,736
How often?	Annually	
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired sustainable level of uses, values, products, and services. Livestock grazing strategy 1. Provide forage for livestock while managing to meet desired conditions. Provide forage for livestock at a level that strives to maintain or exceed the year 2004 permitted stocking level of 113,800 animal unit months (AUMs), while recognizing that stocking levels may be adjusted through the implementation of allotment management plans (AMPs) and administration of grazing permits.	

#26. Total number of active allotments (this includes temporary grazing in vacant allotments)? Number of active allotments monitored? Percent of monitored allotments that exceeded forage utilization standards to the point of discussing / implementing actions to resolve the situation?

2015 results	Active allotments = 74 Allotments monitored = 50 Percent exceeding utilization standards = 30
How often?	Annually
What plan component is being monitored?	Objective 2c, livestock grazing strategy 1 (see above).

#26. How many suitable acres are meeting or moving toward desired conditions?

2015 results	Total acres meeting or moving toward = 120,858 Riparian acres meeting or moving toward = 12,212 Total acres not meeting or moving toward = 33,457 Riparian acres not meeting or moving toward = 10,514 Total undetermined acres = 158,691 Riparian undetermined acres = 32,554
How often?	Annually
What plan component is being monitored?	Objective 2c, livestock grazing strategy 1 (see above).

#26A. How was information sharing and cooperation with livestock permittees, state and private agriculture organizations, universities, and research partners demonstrated?

2015 results	Appendix A describes the meetings with other agencies, organizations, and permittees; Society for Range Management meeting attendance; and cooperative monitoring efforts.
How often?	Annually
What plan component is being monitored?	Objective 2c (see above). Livestock grazing strategy 2. Share information and cooperate with livestock permittees, state and private agriculture organizations, universities, and research partners to communicate improved technology and other applications associated with resource uses, utilizing livestock as a management tool.

Paleontology and Minerals Monitoring

#28A. Have impacts to paleontological resources resulted in a need to revise/amend the plan for additional direction?

2015 results	There were no new impacts to paleontological resources, and no new paleontological sites were identified in 2015.
How often?	Annually
What plan component is being monitored?	Objective 2c. Improve the capability of the Bighorn National Forest to provide a desired level of uses, values, products, and services. Geologic and paleontological resources strategy 1. Inventory for paleontological resources during cultural or other surveys.

#28B. Are the effects of mining activities on surface resources consistent with Revised Plan expectations, as allowed in approved Plans of Operations?

2015 results	All effects of mining were consistent with the expectations of the forest plan. The Pascalite mining operation continued in 2015 under their approved plan of operations near the headwaters of South Paintrock Creek on the Powder River Ranger District (PRRD). The effects of the mining activities are consistent with the revised forest plan. The Peaches lode claim in the Poison Creek drainage on the PRRD operated according to the filed approved plan of operations. The effects of the mining activities are consistent with the revised forest plan. In 2015, there was minimal activity at the Escapee #1 Mine, a placer claim in the headwaters of Porcupine Creek on the Medicine Wheel Ranger District (MWRD).
How often?	Annually
What plan component is being monitored?	Objective 2c, geologic and paleontological resources strategy 1 (see above).

Facilities/Infrastructure Monitoring

#33. Are all system roads being maintained as desired on the Bighorn National Forest?

2015 results	93% (226 miles) of maintenance level 3, 4, and 5 roads received full maintenance. These roads were on all three ranger districts of the Bighorn National Forest. 69 miles (10%) of Level 2 roads received full maintenance. The majority of these were on the Medicine Wheel Ranger District. 63.3 miles (12%) of Level 1 roads received maintenance. The majority of these were on the Powder River Ranger District Approximately, 90% of the road maintenance was accomplished by the Forest Service road maintenance crews and 10% was accomplished by contract/agreements.
How often?	Annually
What plan component is being monitored?	Objective 4a. Improve the safety and economy of Forest Service roads, trails, facilities, and operations, and provide greater security for the public and employees. Strategy 3. Maintain all objective maintenance Level 3, 4, and 5 roads to standard annually. Strategy 4. Maintain 20 percent of all objective maintenance Level 2 roads to standard annually. Strategy 5. Maintain 25 percent of all objective maintenance Level 1 roads to standard annually.

#34. Are unclassified roads and trails being decommissioned?

2015 results	After being discovered, unclassified or unauthorized roads are put on a decommissioning schedule and removed from the forest road system when practical. In 2015, the forest road crews decommissioned 5.6 miles of system road and of 3.3 miles unauthorized roads. The majority of this decommissioning took place on closed level 1 roads on at Bench Road, Snowshoe Bech Road, and Medicine Mountain roads on the Medicine Wheel Ranger District. All decommissioning was in compliance with forest travel management decisions. The trail crew monitored previously decommissioned trail routes. When openings in closures were found, the crew felled dead trees across them.
How often?	Annually
What plan component is being monitored?	Objective 4a (see above) Strategy 6. Decommission or incorporate unclassified Forest roads and motorized trails into the travel system through travel management planning.

#35. Are new construction and maintenance projects being done to reduce maintenance backlogs and are they being done consistent with the current master plan, and meeting the current image guide?

2015 results	Wyoming state trails summer work (participating agreement): The state trail crew completed the installation of drains and pullouts on the Story Penrose

	Trail #033, heavy maintenance on the Geddes Lake Trail #023, heavy maintenance on the Granite Creek Trail #421, and upgraded 3 trail cattle guards on the Powder River Ranger District. The Black Mountain Nordic Club completed heavy maintenance on the Sibley Nordic trails to reduce side slope. The trails program, including the forest trail crew, state trail crew summer and winter crews, and volunteers, completed 625.57 miles of trail maintenance; 609.5 miles are to standard (55% of forest trail miles meet standard). The trail strategy is updated and used annually to determine trail priorities and Forest Service handbook and manual standards were implemented. Condition surveys are conducted annually on assigned and trails as deemed necessary by mangers. The results of the surveys are passed on to the crew for maintenance and recorded in INFRA NRM. Developed Recreation Facilities: In 2015, Lakeview Campground, Lake Point Picnic Ground, North Cove Recreation Area, and Veterans Cove Recreation Area were reconstructed as part of the Ten Sleep Canyon capital improvement project. These developed recreation sites were brought to current standards, improving the developed recreation opportunities around Meadowlark Lake and retiring a significant amount of deferred maintenance. Infrastructure: The following projects reduced forest deferred maintenance backlog by approximately $110,000. All projects complied with the Forest Master Plan recommendations and met Built Environmental Image Guidelines. 5 toilet replacements and new structures at Lake View Campground, Veterans Cove and North Cove parking areas. Exterior painting project completed at Tyrrell Ranger Station on numerous buildings. New flooring installed at Tyrrell Ranger Station office. Interior improvements including new flooring and paint at Hunter Ranger Station dwelling. Exterior, interior, and utility system improvements to Shell Falls Visitor Center. Energy conservation and sustainability enhancements completed Greybull Work Center, which included a complete, high efficiency shop furnace. Compliance improvements made to the Shell and Burgess Ranger Station public water systems. Various other sites received necessary annual and deferred maintenance.
How often?	Annually
What plan component is being monitored?	Objective 4a (see above) Strategy 7. Prioritize capital improvement, maintenance, construction, and reconstruction projects to reduce deferred maintenance backlog on all forest infrastructure. Strategy 8. Perform all facility and building construction and reconstruction, maintenance, disposal, and capital improvement consist with the Forest Facility Master Plan and the Built Environment Image Guide.

#36. What is the current open road and motorized trail density as an indicator of maintenance backlog, recreation opportunity, and wildlife habitat needs?

2015 results	There have been no cumulative changes in miles of motorized trails over the five-year monitoring period. GIS coverage of motorized trails is current.
How often?	Every five years
What plan component is being monitored?	Objective 4a. Improve the safety and economy of Forest Service roads, trails, facilities, and operations, and provide greater security for the public and employees. Strategy 1. Focus efforts to improve travel management education, enforcement, and signing, including designating motorized and nonmotorized travel ways and areas, and identify reasons for restrictions. Strategy 2. Provide recreation opportunities to accommodate a wide range of abilities and activities and ensure non-discrimination in the delivery of Bighorn National Forest programs.

#37. How many miles of system or non-system road were decommissioned?

2015 results	3.3 miles of system and non-system roads were decommissioned in 2015. The majority of this decommissioning included the removal of small portions of user-created roads in the Medicine Mountain area on the Medicine Wheel Ranger District.
How often?	Annually
What plan component is being monitored?	Objective 4a. Improve the safety and economy of Forest Service roads, trails, facilities, and operations, and provide greater security for the public and employees. Strategy 11. Identify and decommission 4 miles of system or non-system road, annually.

#38. To what extent are forest access needs being met?

2015 results	Legal public access continues to be at a premium on the Bighorn National Forest. Of the 1,107,571 acres of national forest system lands, approximately 150,000 have been identified as having inadequate public access. While the public often has verbal access to hike popular trails, landowners are hesitant to grant legal public access. The forest also continues to get requests from private landowners for legal access across the forest to their private land. In August 2012, the forest negotiated a reciprocal right-of-way with several landowners through private lands on Forest Service Road #368, perfecting public legal access to hundreds of acres of national forest system lands. Currently, the forest is negotiating two reciprocal rights of ways through state lands.
How often?	Every five years
What plan component is being monitored?	Objective 4b. Provide appropriate access to the National Forest. Ensure proper verification of Forest boundaries. Strategy 1. Maintain or increase legal access to the Bighorn National Forest.

List of Contributors

The following individuals participated in the monitoring and preparation of this report:

Name	Position
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Amy Ortner	GIS specialist
Bernie Bornong	Resources staff officer
Beth Bischoff	Medicine Wheel Ranger District wildlife biologist
Luke Decker	Wildlife biologist (east zone)
Bill Mathews	Archeologist (west zone)
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Bob Cochran	Medicine Wheel Ranger District recreation program manager
Cheri Jones	Tongue Ranger District recreation program manager
Chris Williams	Forest hydrologist
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Brian Boden	Powder River Ranger District recreation/wilderness program manager
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Ruth Beckwith	Landscape architect
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Appendix A – Narrative Description of Monitoring Items

General Monitoring

2. How well is the forest interacting and planning in cooperation with communities and local governments?

A cost share partnership with the Rocky Mountain Elk Foundation began in 2015 for a two-year period to improve wildlife habitat conditions through prescribed burning. The foundation will contribute $20,000 in a matching agreement with the forest to implement planned burns. In 2015, approximately 300 acres in the Beaver Creek South project on the Medicine Wheel Ranger District were treated with this funding.

The forest continued a long-term partnership with Wyoming State Trails through participating agreements to provide education and travel management enforcement during summer and winter motorized recreation seasons. Through two participating agreements, the state contributed $110,000 in funding support, as well as use of two snowmobiles and six off-road vehicles to perform patrols. During snowmobile season, 2,123 contacts were made. During summer and fall off-road vehicle season, 12,786 contacts were made. Compliance with the Wyoming State Trails sticker program is over 99%. Education included providing directions, safety and Tread Lightly educational messages, and copies of the forest motor vehicle use map. The forest patrollers cleared roads and trails, blocked user-created trails, and assisted users with vehicle problems or health emergencies.

Through a participating agreement, the Wyoming state trail crew completed the installation of drains and pullouts on the Story Penrose Trail #033, heavy maintenance on the Geddes Lake Trail #023, heavy maintenance on the Granite Creek Trail #421, and upgraded three trail cattle guards on the Powder River Ranger District. The state provided 200 hours of summer trail work valued at $6,446.

Through a participating agreement, the Wyoming state trails program crew provided two contracts for the grooming of snowmobile trails with a total value of $270,000. In addition, the state trail crew provided 1,800 hours of winter trail work valued at $58,014.

Under four Wyoming State Trails maintenance/construction/planning (MCP) grants (collection agreements), planning work began on the FSR #329 conversion to trail project ($10,500). In addition, the Willet Creek trail reroute planning ($8,800) and construction projects ($7,800) were completed. Work on the North Lodge Connector trail project ($8,900) continues with an expected completion in the spring of 2016.

Under a participating agreement with the Student Conservation Association, the forest added a Student Conservation Association trail crew intern to the forest trail crew. The intern provided 450 hours of labor to the trail program.

Medicine Wheel Ranger District utilized grants from the Bighorn County Resource Advisory Committee ($20,161) and Wyoming State Trails ($24,000) to complete reconstruction of the Porcupine Falls Trail (FST #135). The district utilized a participating agreement with the Student Conservation Association to fill four of the crew positions for this project.

Under a participating agreement with the Student Conservation Association, four interns worked at the Medicine Wheel National Historic Landmark for 13 weeks during the 2015 season.

Redevelopment of the popular Shell Falls Wayside was completed in 2015 under a series of Scenic Byway grant agreements between the Wyoming Department of Transportation (WYDOT) and the Forest Service. Between 2000 and 2009 a total of $1,662,900 was invested (WYDOT $1,267,464 and FS $395,436). Between 2009 and 2015 a total of $436,800 was invested (WYDOT $349,440 and FS $87,360). The work completed in FY15 included replacement of the shutters on the information building, installation of an accessible interpretive panel, repair of a panel frame and development of design documents for rebuilding of the Shell Falls Trail.

The Powder River Ranger District entered into a participating agreement with the Buffalo Bureau of Land Management (BLM) Field Office in 2013 for maintenance of two BLM recreation sites for a total contribution of $5,000, which aided in the funding of forest recreations seasonals.

Powder River Ranger District entered into a new cost-share agreement with the Big Horn Climbers Coalition during 2015. Through this partnership, the Big Horn Climbers Coalition will provide technical expertise and possible funding during the Tensleep Canyon master development plan and has already begun to provide a large amount of volunteer labor maintaining the integrity of Tensleep Canyon.

The Cloud Peak Chapter of Wilderness Watch was organized in 1996 to work for stewardship of the Cloud Peak Wilderness of the Bighorn National Forest, while adhering to the principles of the Wilderness Act. During 2015, the chapter hired two interns to conduct bare ground campsite assessments throughout the Cloud Peak Wilderness. A total of 480 hours of labor was contributed by the interns with a value of $15,470 to the forest.

Under an Archaeological Resource Protection Act (ARPA) permit, the Wyoming State Archaeologist's Office conducted archaeological surveys along the Lost Twin Lakes trail corridor in the Cloud Peak Wilderness. Assistant state archaeologist Marcia Peterson led three volunteers in the project resulting in the intensive survey of 224 acres, the documentation of six prehistoric sites, and evaluation of those sites for eligibility to the National Register of Historic Places. The State Archaeologist's Office contributed labor, transportation, field per diem, and artifact curation costs to the project for a value of $4,500 to the Forest.

Medicine Wheel Ranger District:

Two volunteers donated approximately 25 hours to the Porcupine Trail project on the Medicine Wheel Ranger District at a value to the Forest Service at $400.00.

One volunteer work at the Medicine Wheel site for 18 days for a total of 180 hours with a value to the Forest Service of approximately $2,500.00.

Two volunteers worked at the Shell Falls Visitor Center, contributing 824 hours for a value of $11,124 to the forest.

2015 marked the tenth year of the Cloud Peak Wilderness Archaeological survey project led by west zone archaeologist Bill Matthews. The purpose of the project is to survey acres, record archaeological resources, and make management recommendations for these resources. In 2015, Bill led six volunteers who contributed 770 hours of labor for a value of $10,396 to the project. A total of 966 acres were surveyed and 21 sites were recorded and evaluated. The project provided significant data on prehistoric and historic lifeways at high elevations in the Bighorn Mountains which can be shared through educational programs and contributed to the scientific studies of our past.

Powder River Ranger District:

The Powder River Ranger District has been able to utilize the C.O.R.E. youth program from Casper, Wyoming to accomplish valuable projects on the district for well over a decade. The C.O.R.E group continued their legacy this year by removing a half mile of unnecessary fence, building a quarter mile of fence to protect a grassland and by cleaning up trash along the West Tensleep Corridor contributing 550 hours of volunteer labor for a value of $7,425 to the forest.

The Bighorn Climbers Coalition (BCC) is the newest member of the Powder River District volunteer team. The Bighorn Climbers' Coalition is a 501(c)(3) nonprofit organization dedicated to preserving, protecting and promoting access to climbing resources in the Bighorn Mountains and Bighorn Basin of Wyoming. The BCC was very active this year in the Tensleep Canyon corridor of the PRRD. The BCC provided and maintained two portable toilets in the canyon to help manage future issues with human waste disposal. The BCC also organized two highway cleanup days, which removed large amount of refuse from the national forest. The BCC was engaged with the public in Tensleep canyon informing climbers of Leave No Trace principles. The BCC contributed 601 hours of volunteer labor with a value of $8,114 to the Forest.

Various other volunteers donated over 893 hours for a value of $15,225 in project work on the Powder River District including maintenance at the Willow Park Nordic ski area trail system, hosts at both trailhead and campgrounds and toilet cleaning and sign repair.

The Powder Pass Nordic Skiers and Snowshoe club provided 720 hours of labor ($12,276) throughout the year at the two Nordic ski areas on the Powder River Ranger District. Their efforts included trail marking, clearing, packing, repairs to recreation facilities and grooming ski trails throughout the winter. They also hosted a free to the public chili feed to inform the public about the Nordic ski areas.

Tongue Ranger District:

The Black Mountain Nordic Ski Club completed its 15th winter of volunteer efforts on Sibley and Cutler Hill Nordic ski areas. Volunteers donated 216 hours grooming and packing the trails in the winter, valued at $3,683.

An Iowa based Boy/Girl Scout volunteer group completed trail maintenance on Trails 592, 038, and 025, donating 768 hours valued at $10,422.

The Wyoming Wilderness Association (WWA) conducted a project to remove fencing at Sibley Picnic Area and along associated Nordic ski trails. The WWA volunteers donated 18 hours of labor valued at $211 to remove 0.2 tons of downed barbed wire and fence posts from an abandoned fence line crossing the ski trails and in the picnic area.

Volunteers from the Cloud Peak Chapter of Backcountry Horsemen donated 10 hours valued at $136 to install a new stock gate and improve the fence on the Shutts Flats Trail (#430).

Seven volunteers donated a total of 340 hours valued at $4,607 to clear and perform maintenance on forest non-motorized system trails.

Four long-time summer volunteers contributed 2,044 hours for dispersed camping patrols valued at $27,737.

A Leave No Trace master educator class reconstructed approaches on a bridge at the Sibley Dam and Picnic Area. They donated 78 hours valued at $1,058.

4. Is the Bighorn National Forest assisting in building the capacity of Tribal governments, rural communities and private landowners to adapt to economic, environmental, and social change related to natural resources?

The forest held meetings with all four counties for to coordinate fire suppression. The forest provided mutual aid assistance on fire incidents to all four counties during 2015. In addition, through a grant to the state of Wyoming, each county surrounding the forest receives wildfire training and equipment preparedness funding. The forest maintains agreements with both Johnson County and Big Horn County for prescribed fire assistance and training opportunities. The forest conducted fire prevention training for elementary school children in Buffalo, Sheridan, Lovell, and Greybull and provided media updates throughout the summer apprising the public of wildfire risk conditions. Smokey Bear fire danger signs are maintained at each major highway entry point into the forest to inform the public of fire danger.

The Big Horn County firewise program continued in 2015 with presentations made to cabin owners on both the Powder River and Medicine Wheel Districts to continue to emphasize the need to create defensible space around structures. Fuels reduction partnerships and treatments also continued with Sheridan, Johnson, and Washakie counties to implement recommendations in their community wildfire protection plans. Through the State and Private Forestry program, administered by the USFS Rocky Mountain Regional Office, grants have been awarded to local counties for hazardous fuel treatments. Some of these projects have included the Canyon Country Estates project, Johnson County wildfire mitigation plan implementation, Story fuels reduction project, Stumpy Ridge fuels reduction project, and Big Horn County community wildfire protection plan implementation and update.

Timber

29. Is the Bighorn National Forest providing the desired level of uses, values, products and services of wood products?

The timber/lumber markets were down in 2015, which affects the desirability of timber offered on the Forest. All sales offered in 2015 sold, but operators limited or delayed harvests in hopes of better market conditions in the future.

The following tables compare allowable sale quantity (ASQ) and total sale program quantity (TSPQ) outputs to those projected in the forest plan. ASQ is considered the maximum timber quantity by cubic measure (Cunits or CCF for 100 cubic feet of solid wood) that can be harvested from lands designated as suitable for timber production over the planning period. TSPQ is the CCF volume we expect to offer based on past experience, which includes wood from Other Vegetation Management (OVM), firewood and other products, and adjusts ASQ volume for logistical, financial and economic realities. Corrections to these tables were made this year due to some volume being double counted between OVM and ASQ in the past.

The ASQ volume sold during this planning period was 30% of the total projected. Sawtimber sold was 27% and Roundwood or Products Other than Logs (POL) was 44%.

The TSPQ volume sold during this planning period was 75% of the projected total, with 72% of the sawtimber and 83% of the POL. The Forest exceeded projected volume of TSPQ in OVM

Sawtimber with 114%, primarily due to fuels projects in the Wildland Urban Interface, outside of lands designated as suitable for timber production, and sold 47% of the OVM POL volume.

In projecting future treatments to achieve the Desired Future Conditions in the Forest Plan harvest in the abundant acres of smaller pole sized stands (POL) was sought to provide more size and age class diversity. The Forest has treated or removed a higher percentage of this size class than larger classes towards this end.

The forest continues to monitor the effects of the Roadless Area Conservation Rule (RACR), 36 CFR 294 on the forest's long-term timber output. Half of the lands identified as suitable for timber production in the Forest Plan are within RACR areas, with restrictions on tree cutting. Some of these areas may meet exceptions in this rule and be available for harvest activities. Analysis is continuing to identify whether or not a forest plan amendment is needed to revise the ASQ and TPSQ in light of current sale volume and the RACR.

Annual outputs of ASQ compared to forest plan projections.

Activity	ASQ Sawtimber Vol. (7"+)	ASQ Sawtimber Vol. (7"+)	ASQ POL (Live 5"- 6.5")
Unit of Measure	est. MMBF	CCF	CCF
ASQ 2005 Forest Plan Projection	9.8	23,467	3,716
2005	0.0	0	400
2006	6.8	15,101	442
2007	0.1	279	353
2008	1.9	3,533	1,488
2009	0.0	20	483
2010	3.0	6,694	6,191
2011	0.0	0	248
2012	0.0	0	317
2013	6.4	13,804	383
2014	14	25,653	6,074
2015	4.1	6,637	1,881
Total Actual Output	36	71,721	18,260
Total Projected ASQ Output	108	258,137	40,876
% of Projected ASQ Output	33%	27%	44%
ASQ = allowable sale quantity. TSPQ = total sale program quantity			

Annual outputs of TSPQ compared to forest plan projections.

Activity	Total volume equivalent MBF	Total Volume Sold	ASQ Sawtimber Vol. (7"+)	ASQ Sawtimber Vol. (7"+)	ASQ POL (Live 5"-6.5")	Personal Use Firewood	OVM Volume, Sawtimber	OVM Volume, POL
Unit of Measure	est. MMBF	CCF	est. MMBF	CCF	CCF	CCF	CCF	CCF
TSPQ 2005 Forest Plan Projection	7.3	18,931	4.5	10,688	1,693	3,000	3,065	485
2005	11.1	22,498	0.0	0	400	2,200	19,898	0
2006	8.2	18,073	6.8	15,101	442	2,432	95	4
2007	4.6	9,335	0.1	279	353	2,105	6,574	24
2008	4.0	7,726	1.9	3,533	1,488	1,340	1,354	12
2009	1.8	3,773	0.0	20	483	3,205	0	64
2010	11.5	24,583	3.0	6,694	6,191	3,070	7,323	1,305
2011	1.6	3,330	0.0	0	248	2,660	422	0
2012	1.6	3,238	0.0	0	317	2,628	232	61
2013	8.1	17,222	6.4	13,804	383	2,404	625	6
2014	16.9	34,221	14	25,653	6,074	2,486	9	0
2015	6.4	11,291	4.1	6,637	1,881	2,557	122	94
Total Actual Output	75.7	155,291	36	71,721	18,260	27,086	36,653	1,570
Total Projected TSPQ Output	80	208,241	50	117,568	18,623	33,000	33,715	5,335
% of Projected TSPQ Output	94%	75%	73%	61%	98%	82%	109%	29%

Christmas tree sales and other Special Forest Products permits (fuelwood, post and poles, teepee poles…) have been steady at a level near or above Forest Plan projections, see table below, without any noted adverse consequences. Quality Teepee Poles are in high demand from local and adjacent States; the Forest struggles to find accessible Teepee pole areas that can be harvested with personal use permits.

Activity	Personal Use Firewood	Christmas Trees	Total Special Forest Product Permits
Unit of Measure	CCF	Each	Each

TSPQ 2005 Forest Plan Projection	3,000	2,100	3,000
2005	2,200	1,699	2,713
2006	2,432	2,012	2,976
2007	2,105	1,845	2,820
2008	1,340	5,787	10,103
2009	3,205	1,946	3,066
2010	3,070	2,054	3,328
2011	2,660	2,010	2,376
2012	2,628	1,948	3,020
2013	2,404	1,928	2,977
2014	2,486	1,861	2,844
2015	2,557	2,063	3,081
Total Actual Output	27,086	25,153	39,304
Total Projected TSPQ Output	33,000	23,100	33,000
% of Projected TSPQ Output	82%	109%	119%

Wilderness

18. What level of crowding occurs on trails? Does the wilderness provide opportunities for solitude?

Eight days of the individual daily encounter totals exceeded the forest plan guidelines for the 1.13 management area prescriptions. This is less than last year when fifteen days exceeded the forest plan guidelines. Five of the over guideline days were on the trails from West Tensleep Trailhead. Three of the days were on trail 046 (Circle Park Trailhead). The dates for over daily encounters were June 20, July 4, July 12, July 18, and August 6, 7, and 8. Fifty-two contacts were made in the pristine management area prescription. Six of those days' contacts exceeded the forest plan guidelines for MA 1.11. Two of those days were in the West Tensleep area, one each around Firehole Lakes, Lost Twin lakes, Coney Creek and Lake Solitude areas.

Law Enforcement Contacts: Incidents/warning notices/violation notices totaled 195 for the

Cloud Peak Wilderness during 2015. This is a decrease of 58 reported incidents/warning notices/violation notices from the 2014 total of 253.

Four violation notices were issued during the 2015 season including; three for "261.52a – campfire above 9200 feet" and one for "261.52a- Using a campfire below 9200 feet other than on a fire blanket." This was a decrease from thirteen violation notices in 2014. This decrease in violations is primarily due to the lack of a third wilderness ranger used for backcountry patrol.

Warning notices were issued to eleven individuals for the following violations:

1 for 261.52(a) – building or maintaining campfire above 9200'

2 for 261.52(a) - building or maintaining a campfire below 9200' other than on a fire blanket

3 for 261.57(a) being in CPW without registration

4 for 261.58(e) camping within 100' of water

1 for 261.58(aa) horses restrained within 100' of live water.

Incident reports for violations in the Cloud Peak Wilderness: Total = 180

5 for 261.6a - damaging or cutting live trees

10 for 261.9a –damaging natural features

10 for 261.10a –constructing, maintaining a trail

1 for 261.11b- leaving human waste in an exposed condition

90 for 261.52a- building campfire within 300 feet of water/above 9200 feet (new in 2000) or building a campfire above 9200 feet

4 for 261.55e- shortcutting a switchback

11 for 261.57a – entering Cloud Peak Wilderness without registration.

28 for 261.57g- failure to dispose of garbage

17 for 261.58e- camping within 100 feet of water or closed area

1 for 261.58aa-hitching a horse less than 100 feet from water

Educational presentations

Leave No Trace: As in previous years, the self-study Leave No trace sessions were available for groups stopping at the ranger district offices during regular business hours. An estimated 50 participants completed the self-study training.

A photo display at the Jim Gatchell Museum throughout the summer of 2015 commemorated the 50th anniversary of the signing of the Wilderness Act by taking viewers on a historic display of the Cloud Peak Wilderness.

Outdoor sessions, classrooms, Girl and Boy Scout troops, Healthy Kids Day YMCA- Intro to LNT: 150 youth, 30 adults

Local 4-H Kids camp-Intro to LNT: 15 youth, 8 adults

Sagebrush Elementary School Intro to LNT: 16 youth, 5 adults

Internal Forest Service trainings: 50 adults

In addition to personal contacts for Leave No Trace orientation, an additional 3800+ contacts

were made with the required registrations for groups visiting the Cloud Peak Wilderness. The Cloud Peak Wilderness required registrations have Leave No Trace information and website and toll free phone numbers contacts for more information.

Cloud Peak Wilderness recreation visitor days (RVDs) by trailhead:

Trailhead	RVDs	Trailhead	RVDs
-West Tensleep/Lost Twin TH	11293	-Little Goose/East Fork	337
-Hunter /North Clear Creek TH	6255	-Trigger Lake	189
-Circle Park TH	5555	-Cross Creek/Bighorn	170
-Battle Park/Adelaide TH	3692	-Shell Reservoir/Lake	90
-Coffeen Park TH	3233	-Middle Paintrock/Lily Lake	83
-Paintrock/Tepee Pole	986	-Kearney Lake	40
-Twin Lakes/Stull/Coney TH	955	-Angeline/Middle Clear Creek	40
-Edelman TH	829	-Elk Lake	27
-Ranger Creek/Adelaide TH	408	-Bald Ridge	18
-Buffalo Park	382	**Total RVDs**	**34,582**

Livestock Grazing

26. How was information sharing and cooperation with livestock permittees, state and private agriculture organizations, universities, and research partners demonstrated?

Powder River Ranger District range specialists, forest hydrologist, forest resource staff officer, wildlife biologist, natural resource specialist and permittee conducted best management practices reviews on one pasture each of two allotments on the district and associated management in relation to hydrology, soils, ground cover, etc.

Bighorn National Forest employees worked together with Wyoming Department of Transportation on the Pole Creek Gravel Pit expansion project on the Powder River Ranger District. Together we developed a plan to expand the gravel pit and to start re-claiming the existing pit while best mitigating effects to rangeland vegetation, allotment permittees, botany, invasive species, recreation, and other resources.

Forest range specialists attended Wyoming Section of the Society for Range Management in Laramie, WY. Specialists also attended the 2015 annual Society for Range Management meeting in Sacramento, CA. Specialists and the Resources Staff Officer attended the summer and winter Wyoming Stock Growers Association meetings.

The resource staff officer is the coordinator of the Wyoming range service team, which is comprised of representatives from the U.S. Forest Service, BLM, NRCS, University of Wyoming Extension, Wyoming Department of Agriculture, and other range management professionals within the state of Wyoming. The group meets twice a year (June and December) to coordinate on topics such as consistent rangeland management and monitoring across land ownerships, various programs that help livestock producers and/or land managers, and other professional rangeland management issues and topics.

Medicine Wheel Ranger District and Tongue Ranger District range and wildlife staff, forest resource staff officer, and the Wyoming Game and Fish Department cooperatively monitored for wandering bighorn sheep from the Devil's Canyon herd prior to trailing of domestic sheep along the 14A stock driveway in September 2015. In addition, the Forest Service, Wyoming Game and Fish Department, and two domestic sheep permittees maintained close communication throughout the trailing process to ensure no stray domestic sheep were left behind. These efforts were tied to implementation of Big 6 design criteria to minimize potential contact of the Devil's Canyon bighorn sheep herd and domestic sheep.

Tongue Ranger District

Tongue District range and wildlife personnel assisted Sheridan College with the FFA Border Wars competition attended by high school students from Wyoming and Montana. They also made presentations to various classes both in the field and in the classroom.

Tongue District staff met with WYDOT officials to coordinate effects and wetland mitigation associated with the Hwy 14 (Burgess South) reconstruction project.

The range program on the Tongue District was featured in a 13-month series (Jan 2015 to Jan 2016) in the Western Farmer Stockman magazine. District employees, permittees, and several folks from outside agencies and groups were interviewed to provide information for the articles.

Powder River Ranger District

PRRD range staff worked closely with permittees and Wyoming Game and Fish biologist to secure funding and get a riparian area management fence built on the district.

PRRD range staff worked closely with permittees on joint cooperative use monitoring to build trust between permittees and the Forest Service.

BLM counterparts from Worland attended the annual operating instruction meeting for one allotment on the west side of the Powder River Ranger District to coordinate adaptive management of livestock rotation.

Range specialist from PRRD met permittees in the field during the grazing season and worked with them over the phone post-grazing season to discuss management and allotment management plan development on Tensleep watershed sheep allotments.

PRRD range staff monitored willow browsing in the field with Wyoming Game and Fish terrestrial and aquatic habitat biologists to coordinate understanding of willow browse on the forest.

PRRD range staff met with University of Wyoming Extension specialists to discuss livestock grazing on the district.

Medicine Wheel Ranger District

Medicine Wheel Ranger District range specialists began a new Wyoming rangeland health assessment program (RHAP) in cooperation with the Wyoming Department of Agriculture, Wyoming Cooperative Extension, and with the new Granite allotment permittee. Range specialists, the Wyoming Cooperative Extension, and the permittee took a range tour of the Granite allotment to discuss key area concepts and monitoring methods.

Appendix B - Management Indicator Species Supplemental Report

Prepared by Beth Bischoff,
January 29, 2016.

This supplement describes information available pursuant to monitoring driver #10 from Chapter 4 of the Forest Plan, pertaining to Management Indicator Species (MIS). The Record of Decision for the Forest Plan (2005, p. 26) set forth the context in which MIS would be monitored on the Forest in relation to the National Forest Management Act (NFMA) and the implementing regulations known as the "planning rule" (2005, 36 CFR 219. 14(f)). This provision allows for the use of habitat data in place of population data for MIS, unless the Plan specifically calls for population monitoring. Chapter 4 of the Forest Plan, Item 10, Potential Monitoring Items 1-3, and 9 (2006 Errata, pgs. 4-14 and 4-15) states:

- Acres and condition of habitat on the Forest for each avian and the red squirrel MIS. Associate habitat trend with available population data where feasible. Participate in the interagency statewide avian population monitoring effort (Monitoring Wyoming's Birds).
- Results of beaver (MIS) colony reintroduction and aerial survey of number of occupied 6th level HUC watersheds. Tie to habitat condition and trend monitoring provided through aquatic and range resource monitoring.
- Acres of elk (MIS) security areas, and association with past amounts available, elk distribution patterns, harvest success, hunt area strategies, herd composition, and population objectives. Updates to road density and vegetation GIS layers to rerun security habitat model.

Most of the reporting frequencies for these elements were scheduled for the 5-year interval, thus this longer review in the 2015 report.

The premise of MIS, as evidenced in the 1982 planning rule (36 CFR 219.19 (a) (1) and (6)), was to identify species to estimate the effects of Forest Plan alternatives (1) and then to monitor those species' population trends and determine relationships to habitat changes (6). The selection process and implementation guidance for MIS were described in Appendix C of the Forest Plan (2005, p. C12-17). MIS analysis for each alternative occurred in the FEIS associated with the Forest Plan (2005, pgs. 3-208 thru 3-238), and included the current population and habitat information known for each species. As stated on p. 3-208 of the FEIS, "monitoring [for MIS] is a challenge with significant costs, and many factors other than regular management activities can affect populations of MIS, with climate and prey/forage levels being the most common elements driving population trends." Several literature references that review the difficulties with MIS and the suggested "keystone" species concepts also exist, which are prompting further review of this component of the planning regulations. These regulations may change how subsequent Forest Plans address this topic. The intent of Monitoring Driver #41 in Chapter 4 of the Forest Plan (2006 Errata, pg. 4-31), the review of MIS status relative to management strategies, will further inform the use of this monitoring and effects analysis approach after the 10 year implementation period, which should help inform the Forest for the next revision or amendment.

The sections that follow provide an update of the most current data available, and a comparison to the data reported in 2005, for each species selected as MIS in the Forest Plan, in order that they were described in the FEIS.

ELK

Elk were analyzed for the Forest Plan according to their populations (using data available from the Wyoming Game and Fish Department's (WGFD) aerial surveys and population modeling), and their habitat (using data derived from an elk security habitat model). The security habitat modeling was conducted by the Forest Service, based on vegetation and road data available at the time. Both data sets are reviewed below and include information from the first 5-year reporting cycle (2010) and the second 5-year reporting cycle (2015) for the Forest Monitoring Plan.

Elk population information continues to be reported by the WGFD in their Job Completion Report publications. Population objectives for each elk herd were determined by the WGFD, to represent a sustainable population meeting the demands of hunting and also meet the resource capability or carrying capacity of the land. Population objectives are set at the herd unit scale, while individual hunt areas comprise subunits for which individual hunt statistics are tracked. Hunter success (% successful harvest as compared to licenses offered) was also a component of the data reviewed, since this has potential to tie to habitat conditions. Neither the herd units nor hunt areas are comprised entirely of National Forest lands, further making interpretation of data challenging for MIS purposes.

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Herd Unit	Trend Count Objective	3 year average trend count (2001-2003)	3 year average trend count (2008-2010)	3 year average trend count (2012-2014)	Hunt Strategy	Hunter Success - 2003**	Hunter Success - 2010**	Hunter Success 2014**
North Bighorn	4,350	4,245	3,994	5,588	Limited/General	28%	29%	34%
Herd Unit	**Population Objective**	**2003 Population**	**2010 Population**	**2014 Population**	**Hunt Strategy**	**Hunter Success 2003****	**Hunter Success 2010****	**Hunter Success -2014****
South Bighorn - Hunt Area 34	1,000 (sub-objective for Hunt Area 34)	762 (actual count)	1,001 (actual count)	1,222 (actual count)	Limited	32%	42%	36%
Medicine Lodge	3,000	3,000	4,200 (population model)	3,219 (population model)	Limited	28%	41%	41%

**Hunter success is the average of the most recent 3 years for that time period (i.e. year 3003 is average of 2001-2003), except Medicine Lodge unit is average of most recent 5 years. Entire South Bighorn herd unit estimated at 150% in 2010 and 84% of objective in 2014 (1,000 is Hunt Area *sub-objective*, while 7,200 was the 2010 estimate for entire South Bighorn Herd Unit, and 5,350 is 2014 estimate).

The data used in the 2010 forest plan monitoring report table for elk, was based on a population model that the game and fish used at the time. This model used counts from aerial observations and corrected for animals not observed. Assumptions had to be met and the population for the herd unit had to be "closed" (<10% of animals leaving Herd Unit Area). In 2012, the North Bighorn Herd Unit went to a 3-year average trend count and no longer uses the population model, primarily because a number of these elk move north into Montana and are not accounted for. As a result, it would not be a fair comparison to use both population modeling data and 3-year average trend count data. So for the 2015 monitoring report for NBHU, the data for all years is based on 3-year trend counts and not population estimates. This information originated from JCRs and also discussions with Dan Thiele, WGFD. The Medicine Lodge Herd Unit continues to use population modeling so the old information was relevant to compare.

The South Bighorn Herd Unit (SBHU) is challenging because only Hunt Area 34 falls on the forest. The data used in previous years was broken out at the Hunt Area scale (hunt areas 33 and 34) which is not the proper scale for evaluating population estimates. Area 33 is not even close to the forest. While the population model is showing that the population is declining, WGFD biologist, Dan Thiele, states that this is not the case. The model does not appear to be working so they will be going to a 3-year average trend count. "It is more likely this population is stable to slightly decreasing" (WGFD, 2014 Sheridan JCR). It is difficult to make population comparisons using only one hunt unit (34) which has sub-objective of 1000. For the SBHU, the data included a three year average trend count that Dan Thiele provided rather than using population estimates which tend to be unreliable at this herd unit scale.

Factors other than habitat also contribute to elk population levels and hunter success. These can include the severity of the winter that can drive down the population through stress and disease, for which a severe one has not occurred within the reporting period. Precipitation levels or other factors affecting access for hunters during the hunting season can also affect harvest success. The main factors as reported in the JCRs influencing elk harvest and populations continue to be private land hunting access issues. Elk have learned to seek refuge on private land parcels where there is typically much less hunter access. Several hunt areas have had changes with additional late or early season opportunities to try to bring the elk down to the population objective. As elk populations increase, it would also be presumed that hunter success should increase correspondingly due to more availability of elk, although success is measured against the number of licenses sold, which may also go up in response to population increase.

From 2012-2014, hunter harvested elk from the North Bighorn herd unit tested seropositive for exposure to the bacterium *Brucella abortus,* that causes the disease brucellosis in livestock, elk and bison. The first incidence occurred in 2012 in Hunt Area 40 when two sampled elk tested seropositive as part of a routine statewide wildlife testing to monitor for brucellosis. As a result, an enhanced brucellosis surveillance effort was initiated in 2013. Two additional samples from Hunt Area 40 tested seropositive in 2013, and four samples tested positive in 2014, including one bull from Hunt Area 39, 1 bull and 1 cow from Hunt Area 40, and 1 bull from Hunt Area 41. More complete results area available in 2014 JCR report (WGFD, 2014 JCR pages 197-198). The enhanced brucellosis surveillance was continued during the 2015 season, but results are not available at this time. As such, antlerless elk seasons were opened earlier than traditionally in Hunt Areas 37, 38, 39 and 40 to accommodate antlerless harvest and sample collection, and seasons were extended in area 40 as well.

The 2015 elk security areas were calculated using GIS to create an elk security area using the forest's road, motorized trail, and vegetation layers. The same logic and processes were used in calculating the 2015 elk security areas, as were used in the model that was developed and used to calculate the elk security areas for the 2010 monitoring report, with two minor corrections to the process. In 2015, the order of clipping the possible elk security areas to the forest boundary was done before the removal of areas that did not meet the criteria of being 1200 feet wide. The result of this change was a small loss of both existing and potential elk security areas near the forest boundary. The second change was due to cleanup of the road data. In 2010 some non-forest system, high-clearance type roads were removed from the calculation of potential elk security areas. In 2015, all existing non-forest system roads were left in this calculation, as we do not have the authority to close them. This also resulted in a small loss of potential elk security areas within 0.5 miles of high clearance roads on private and state inholdings compared to the 2010 model.

In the period between the calculation of the elk security areas in 2010 and in 2015, there was a major effort to make corrections to the forest's road layer. Because this roads layer is an integral part of the generation of the elk security layer, the above corrections did have an impact on the resultant 2015 elk

security areas. Given this major cleanup event, it was difficult to discern corrections to the data versus actual changes to the road system that had occurred between 2010 and 2015. The vegetation layer is the other component that provides input to the establishment of the elk security areas. Since 2010, there have been several wildfires and timber harvests, which have altered characteristics of the vegetation that are used to compute the elk security areas. As of the writing of this document, the edits to the forest's vegetation layer were not quite complete. Of the remaining areas known to need updates, most are expected to not have any effects on elk security. However, the Swamp timber sale will result in some loss of potential elk security in the Goose Creek geographic area.

The spreadsheet titled "AppendixA20102015ElkSecComparisons" shows the differences between the 2010 and 2015 model results. It is important to note that this includes wildfires and not just harvest activities. For definitions of existing, potential, and percent of potential, refer to Appendix A in the Forest Plan.

The intent of the Forest Plan guideline was to maintain "no net loss" of elk security habitat (percent of potential) at the forest-wide scale as evidenced in Objective 1b, Strategy 6 in the Forest Plan (2005, pg 1-3). Additionally, Appendix A, of Forest Plan Elk Security Guideline says the intent of the guideline is no net decrease from "planned management actions (i.e. veg or travel management projects)." The Forest did apply and describe in each NEPA project decision the impacts to elk security, and how that project would mitigate the impacts if necessary. In general, elk security habitat is defined as forested areas larger than 250 acres that provide cover, and that are greater than 0.5 mile from an open motorized route. Some of the complexities of the application of this model can be summarized as follows:

- Some areas classified as "non-hiding cover" in 2005 have likely grown up to hiding cover since that time, but were not accounted for in the vegetation layer.
- The Gilead Fire, in 2012 resulted in a loss of existing elk security in the Piney Creek Watershed due to several thousand acres burned. This is included in the 2015 model run.
- A correction to the roads layer occurred for FSR 319 in 2015, which was also in the Piney Creek Watershed. This road was shown as open in 2010, but should have been in database as closed. Because of this correction in 2015, there was a gain in existing elk security of approximately 4,000 acres, which showed a resultant loss in potential security.
- Additional updates to FSVeg layer need to occur to complete 2010-2015 changes in existing or potential elk security, which could change some of the results.
- The results include actual changes to the vegetation on the ground, and do not include activities from NEPA decisions that have not been implemented yet.

Recognizing that the elk security cover was ran at this point in time, the overall comparison of the 2010 to 2015 models at the forest-wide scale shows a 2% increase in existing security as a percentage of potential. However, in places where natural disturbances occurred on the ground, there was a loss of elk security within site-specific watersheds. For example, the Gilead Fire of 2012 altered timber cover but did not alter road densities. This resulted in a subsequent loss of existing elk security cover but not through management activities.

The application of the elk security guideline continues to inform project decisions to manage wildlife habitat. This guideline for elk habitat was designed as a surrogate for the management of other species' habitat needs.

In addition to the elk security model results, the following summaries provide a review of how individual projects affected elk security habitat. This summary list includes NEPA decisions that were made between 2012 and 2015, inclusive, and only those projects that had the potential to affect elk security habitat (i.e. motorized travel routes and/or forested vegetation manipulation). Of these, Poison Creek Caribou Mesa Vegetation Management Project will create new temporary roads for the sale area which would result in a loss of acres of existing elk security cover, however this would be mitigated by closing the temporary roads once the project is completed and the acres of existing elk security cover would be retained again. Although this project is not included in the model since implementation has not occurred, it is an example of how elk security is being addressed in a project decision. Other NEPA decisions made during this time did NOT project/estimate effects to elk security.

Project/Type	**Decision Year**	**Summary**
Poison Creek – Caribou Mesa Timber Sale Project EA	2013	The purpose of the project is to maintain or restore healthy forest vegetation conditions and to maintain and enhance scenic values along U.S. Highway 16, while managing fuels to help protect the public, firefighters, and property in the event of a wildfire. The EA discloses the following effects to elk security: While the temporary road is being used to access units PC19 and PC20, there would be a 5% decrease in the 1,200-acre elk security block that is adjacent to and within the project area. After the harvest is complete and the temporary road is closed, the elk security block will once again be 1,200 acres.
Billy Creek Timber Sale Project EA	2015	The purpose of the project is to 1) offer wood products for commercial harvest and personal use, 2) improve forest health, 3) reduce levels of, and increase resilience to, insect and disease infestations by increasing size and age class diversity, 4) improve aspen habitat, 5) improve short and long-term landscape aesthetics along the Cloud Peak Skyway Scenic Byway (U.S. Highway 16), and 5)protect the public, firefighters, and property in the event of a wildfire by managing fuels. The EA discloses the following effects to elk security: "The project would not affect the forest-wide or herd unit population trends of elk because effects to elk security and hiding cover habitats are localized and minor in context of the entire geographic area. Road closures would benefit most species and there is potential with future vegetation management projects adjacent to the project area to potentially add to the existing elk security acres through road closures."

When taking a combined view of the elk security, population, and harvest data information, it is not yet apparent if there have been any changes broad enough on the Forest to either improve habitat conditions or worsen habitat conditions that result in a corresponding change in elk populations. Harvest success could be improved by reducing the road density (more elk security) or improved access on private lands where elk seek refuge; however, hunters are also continuing to change their preference towards more motorized access and not taking advantage of more intact (non-roaded) habitat. In terms of overall Forest Plan level predictions of effects to elk security, the level of timber harvest predicted to occur in suited timber areas under the revised Forest Plan has not occurred. The plan projected far more uneven-aged management than has occurred, so while fewer acres have been cut more volume has been removed. The overall increases in elk population, at this point, are not attributable to either improved or declined habitat conditions on the Forest, and there is no apparent correlation to elk security habitat either.

Beaver

Beaver were selected as an MIS due to their tie to riparian habitats, both as engineers of that habitat and their reliance on healthy willow assemblages for dam and food supplies. Beaver were analyzed for the Forest Plan according to their populations, using data available from a jointly funded beaver survey conducted in 2003 by the Forest Service and the WGFD as well as older data available from previous WGFD surveys. The survey protocol focused on counting active food caches in the fall as an estimate of population based on literature of similar monitoring. The Forest received regional office input on the beaver habitat and population survey methodology. From 2004 through 2009, the WGFD and the Forest continued a joint effort to relocate beaver to the Forest from private lands adjacent to the Forest. A survey of beaver populations (occupied habitat) was repeated in 2014 in conjunction with the WGFD to determine if population trends were apparent. There is no population objective developed by the WGFD for beaver, but the Forest established a strategy within the Forest Plan (2005, pg 1-3) to reintroduce beaver into 3 6th level HUC watersheds and increase self-sustaining populations, as beaver populations are thought to be significantly reduced from historic levels. The WGFD released 204 beaver in many locations between 2004 and 2010. The objective of beaver reintroductions was met successfully by 2009 as evidenced in the Prospect/Owen Creeks, Muddy Creek, and Big Willow Creek drainages at that time. The 2014 observations were that the reintroduction efforts increased beaver distribution and cache counts in the short term, primarily on the Tongue River drainage. Efforts on the south end of the forest did not appear to be as successful, and perhaps these beaver re-located to other areas in the watershed (WGFD, 2014 Beaver). The following table displays the 2003, 2010 and 2014 population survey information as summarized in the WGFD report (WGFD 2015).

Beaver Survey	2003	2010	2014
Total Caches Seen	30	23	15
Estimated Missed Caches	20	15	10
Total Caches	50	38	25
Beaver Population Estimate on Forest	225	171	113

While surveys prior to 2003 used fixed wing aircraft and likely were on a different route, the long-term trend data is showing a significant decrease in beaver distribution and abundance over the years on the eastern slope of the forest (WGFD, 2014 Beaver). There have been significant reductions in livestock permitted numbers and/or season of use since implementation of the Tongue EIS Record of Decision, which was signed in 2005. Actual reductions started taking place in 2009 after 3 years of monitoring and resulted in 30-65% reductions in stocking rates primarily along the North Tongue River drainage. As a result, there has been a fairly decent response to the grazing changes in riparian areas and willow communities in this area. Monitoring shows an improvement in streambank conditions and willow height and density. Beaver cache counts have gone down here between the 2003 and 2014 counts. However, it is difficult to interpret what the cause may be as habitat quality is improving in some areas where beaver were reintroduced in the North Tongue watershed. The 2010 report noted an increase in caches, but could not tie it directly to road management or livestock grazing (Warder, 2010 monitoring report). This report stated that the increase was, likely, a result of reintroduction efforts as habitat could not have respond to the recent grazing changes at that time. Additional willow monitoring efforts have occurred on a landscape scale assessment on the southeast end of the forest and has shown a constraint on willow morphology and height (Bower, et al. 2014). Cache counts have also dropped here, and little to no change in grazing administration has occurred from 2010-2015. Bower et al. note that many factors can influence beaver populations, but perhaps colony abandonment has occurred because of a lack of forage and dam material being available. Beaver are also known to be susceptible to disease and predation, which may or may not be correlated to habitat quality. Ungulate grazing (including wildlife) is of

concern for willow habitat in many drainages on the Forest, and monitoring efforts on the combined plant use continues in conjunction with the WGFD in three representative locations (North Tongue drainage, South Tongue River, and most recently Grommund Creek and Caribou Creek). Since 2010, the Forest also installed one new beaver deceiver near Tyrell RS and re-installed one that had become unserviceable due to high runoff flows on Owen Creek. "Beaver deceivers" are designed to mitigate road and stream crossing concerns by preventing beaver from plugging culverts, which typically results in the removal or death of the beaver(s). A pond leveler was also installed in a beaver pond located below a culvert, to prevent the culvert from freezing solid and potentially washing out a Forest Road during spring runoff. A population survey would be recommended to occur again in 2020, if the Forest Plan monitoring protocol is followed.

Beaver are perhaps one of the best suited MIS species as their habitat quality and quantity affects many other wildlife species and watershed functioning, populations and habitat can be affected by management, and yet populations are also affected by factors other than habitat and management related impacts including predation, trapping, disease, and climate. The largest potential management effects to beaver, as described in the FEIS, are livestock grazing and road networks within riparian areas. The Forest continues to actively improve both management situations to improve habitat potential for beaver.

Red-Breasted Nuthatch

Red-breasted nuthatches were chosen as MIS with regard to their relationship to mature forested habitat, and tied to potential timber harvesting related management effects, although it was also noted in the 2005 Bighorn National Forest Final Environmental Impact State (FEIS) that fires play a larger role than timber harvest in shaping vegetative structural stages. Both nuthatch populations and habitat were described in the FEIS with regard to anticipated effects by alternatives. There was no specific population objective or habitat strategies developed in the Forest Plan specific to the nuthatch. Only the broader direction for emphasis species described in Objectives 1b and 1c in the forest plan (pgs. 1-2 and 1-4) would apply for this MIS.

The nuthatch population information described in the 2005 FEIS (pg. 3-227) was obtained from avian monitoring conducted on the Forest by the Rocky Mountain Bird Observatory (RMBO) starting in 2002, in response to a Forest Plan amendment on MIS in 2001. A total of 40 point count transects were conducted annually on the Forest in four different habitat types (montane riparian, sagebrush, mid-elevation conifer, high elevation conifer) from the period 2002-2007. These Bighorn Forest specific surveys were conducted in conjunction with the statewide (RMBO: Monitoring Wyoming's Birds) monitoring effort sponsored by an interagency partnership (WGFD, BLM, USFS). Furthermore, a regional office biologist did a review of the avian monitoring protocol and established the ten transects per habitat type as a minimum for statistical validity. In 2008, due to limited funding and inconclusive data related to management effects on the Forest, the transects on the Forest were scaled back to only those that had been originally selected to occur on the Bighorn Forest as part of the statewide avian monitoring program, for a total of 10 transects. Starting in 2009, a new sampling methodology was implemented based on Integrated Monitoring in Bird Conservation Regions (IMBCR), which sampled across the entire landscape (forest) rather than four specific habitat types, to adhere to other national monitoring efforts. The Forest is mostly located within Bird Conservation Region 10, and has 10 samples across the forest. These different compiling of data make for challenges when trying to interpret any changes that may be apparent on the Forest scale, let alone the statewide scale. Density (#/km2) cannot be directly compared across the two methods; however, you can interpret trend from density. The following tables summarize the population information available from *Monitoring Wyoming's Birds Results* and the new IMBCR sampling method.

Monitoring Wyoming's Birds Results for 2002-2006 Seasons (Hutton et al, 2007, pgs. 32, 34, 199) with 10 transects per habitat type:

Bighorn NF **High** Elevation Conifer Habitat and Red-breasted Nuthatch:

Year	Density (#/km2)
2002	8.8
2003	8.3
2004	2.8
2005	6.0
2006	4.8

Bighorn NF **Mid** Elevation Conifer Habitat and Red-breasted Nuthatch:

Year	Density (#/km2)
2002	9.7
2003	9.6
2004	3.6
2005	4.3
2006	6.5

IMBCR WY-BCR10-BI-Bighorn National Forest
Red Breasted Nuthatch (RBNU)

Year	Density (#/km2)	%CV
2009	3.04	53
2010	1.25	55
2011	4.41	40
2012	2.1	46
2013	3.13	39
2014	4.06	11

IMBCR WY-BCR10
Red Breasted Nuthatch (RBNU)

Year	Density (#/km2)	%CV
2009	8.93	37
2010	2	51
2011	0.68	37
2012	2.15	35
2013	0.93	27
2014	1.77	27

In comparing the WY-BCR10-BI to WY-BCR 10, the trend is fairly stable from 2009-2014, (although there was an initial drop in 2010 and a slight increase in 2014) and the density estimates are within or fairly close to the 90% confidence interval so there is no significant difference. While the CV% (coefficient of variation) is a little above 50% (desired is <50%) for IMBCR WY-BCR10-BI, it is not far off and is a pretty decent estimate. Region 2 and State of Wyoming show a similar trend. The data from the old method (Monitoring Wyoming's Birds) from 2002-2006 shows a high density number in 2002 and a subsequent drop and slight increase for a U shaped curve.

Nuthatch populations are known to fluctuate widely in response to climate, insect populations, and cone crops. As evidenced above, even at different configurations and years of data, there is wide variability in populations, without known ties to changes in any potential management related effects or such large changes in habitat availability or quality. The likelihood of populations ever being reliably tied to management related effects in habitat are low at a forestwide scale, at least at the level of habitat changes predicted to occur on the Forest in the FEIS with regard to wildfire or timber harvest. Population monitoring at the statewide scale may also be influenced by pine beetle outbreaks that will change habitat in forested areas affected by this outbreak, currently focused in the southern portion of the state, though outbreaks have also occurred on the Shoshone NF and the Black Hills NF.

With regard to nuthatch **habitat**, the Region 2 habitat capability or HABCAP model was used to describe the habitat available in 2005 on the Forest, and make predictions associated with Forest Plan alternatives in the future based on timber harvest and growth modeling predicted changes. The Forest's current vegetation database (FSVeg) is a GIS compatible system that is updated to reflect fires and timber harvest effects on forested vegetation. As of the writing of this document, the edits to the forest's vegetation layer were not quite complete, so we anticipate changes to this model during subsequent runs. Of the remaining areas known to need updates, most are small wildfires that are not expected to make significant changes to the numbers. The biggest area still to input is the West Tensleep Stewardship and scattered polygons that were thinned under forestwide WUI. Polygons are delineated and interpreted from aerial photography with regard to the size and density of timber stands with a corresponding habitat structural stage assigned. For nuthatches, a habitat structural stage 3 (pole sized timber) is weighted for 20% habitat value, and structural stage 4 (mature timber) is weighted for 100% habitat value. The HABCAP values in the FEIS were based on 2003 vegetation data at that time. It should be noted that it is not sustainable to manage forested habitat in a 100% value for nuthatches, as it is neither logical nor historically valid that timber occurred in a continuously mature state. The figures used in the table below are the Cover Value Index figures generated from HABCAP. The following table describes the HABCAP values by the larger geographic areas, which also had Desired Future Conditions for timber structural diversity described in the Forest Plan (Chapter 3).

Cover Value Index for Red-breasted Nuthatch

Geographic Area	HABCAP Model 2003	HABCAP Model 2010	HABCAP Model 2015
Clear/Crazy	37%	38%	38%
Devils Canyon	65%	63%	74%
Goose Cr	39%	37%	37%
Little Bighorn	57%	52%	52%
Paintrock	52%	51%	51%
Piney/Rock	41%	40%	41%
Shell	57%	47%	48%
Tensleep	52%	49%	50%
Tongue	43%	42%	42%
Forestwide Average	47%	45%	45%

The most significant change noted in the HABCAP model reanalysis between 2010 and 2015 is in the Devils Canyon geographic area, which shows an increase of 11% CVI. It is not known what activities would have accounted for this increase. The data used in the 2010 model is not available to crosscheck that information. It could have been an update to the vegetation layer, such as an area that has grown back, or some error in the database that was corrected. The Gilead Wildfire occurred in the Piney/Rock Creek geographic area, which was about 8,100 acres and altered vegetation; however, it does not show

a significant change in the overall cover value for the geographic area and one would expect it would have. Overall, other changes in HABCAP numbers between 2010 and 2015 were largely due to succession or small timber sale projects or small wildfires. Annual vegetation treatment acres (e.g. timber sale) are also reported in the Forest Plan monitoring report, and indicate that at the Forestwide or geographic area scale, that very few acres are treated with mechanical methods. In summary, the Forest appears to be maintaining adequate conditions for this MIS habitat.

With regard to anticipated habitat changes, it was estimated in the Forest Plan that approximately 10,000 acres of forested habitat would be burned in the first decade by wildfire, and possibly 20,000 acres. This was already been met in the first 5 years of the forest plan revision, with the 1,000 acres of the Little Goose Fire (on the Forest in timber) and the 9,000 acres of the Bone Creek Fire that affected timber, both in 2007. Bone Creek Fire was in the Shell geographic area, whereas the Little Goose Fire was in the Goose Creek Geographic Area. In addition, the Gilead Fire in 2012 accounted for 8,100 acres and the Reservoir fire in 2011 was 1,500 acres. The 2010 monitoring report noted that the larger change component anticipated in the FEIS was one of *growth*, as HABCAP numbers were anticipated to grow by approximately 15% over a 50-year period, but be near current levels at the 10-year interval. With re-application of the HABCAP model in 2015, the 10-year prediction in the FEIS at the forest wide scale does show we are near the same level as shown in the 2010 report. At the geographic scale, most areas show a similar result, except where large-scale wildfires altered the vegetation (as discussed above) the result showed a loss between 2003 and 2015.

Red Squirrel

Red squirrels were also chosen as an MIS due to their association with mature conifer habitat, similar to the red-breasted nuthatch. Both squirrel populations and habitat were described in the FEIS with regard to anticipated effects by alternatives. There was no specific population objective or habitat strategies developed in the Forest Plan specific to the squirrel. Only the broader direction for emphasis species described in Objectives 1b and 1c in the Forest Plan (pgs 1-2 and 1-4) would apply for this MIS. This species is also a key prey for many other wildlife species, although it is known to have population fluctuations in response to cone crops and climate related events.

Similar to the nuthatch, this species had **population** monitoring conducted from 2002 through 2006 on the Forest using audible/visual detections noted during the avian point count transects that were conducted. This monitoring, as was similar for the nuthatch, was dropped following this initial period as the population trends were difficult at best to associate to any potential management effects, and due to the cost of the monitoring. Since the IMBCR sampling method was started in 2009, density estimates for the red squirrel continue to be collected. The information from the 2010 monitoring report is not comparable, so only the current data from the IMBCR is shown and discussed below.

IMBCR WY-BCR10-BI-Bighorn National Forest
Red Squirrel (RESQ)

Year	Density (#/km2)	%CV
2009	80.6	34
2010	58.06	30
2011	55.88	24
2012	67.97	23
2013	76.52	20
2014	62.23	39

IMBCR WY-BCR10

Red Squirrel (RESQ)

Year	Density (#/km2)	%CV
2009	13.88	14
2010	12.1	34
2011	21.34	32
2012	26.22	19
2013	16.4	25
2014	17.63	25

The WY-BCR10-BI Bighorn results from 2009-2014 demonstrate positive estimates for the red squirrel with the 10 samples that are on the forest. The density estimates all fall within the 90% confidence interval and the %CV are <50%. The trend during this time period shows a substantial drop in density from 2009, and then an increase from 2012-13 and then a slight decrease. Comparing this to the WY-BCR 10, the trend is similar and the %CV is very good for WY-BCR10. The region 2 and State data actually showed an increase in squirrels until 2013 where they dropped again. Whether this is related to drier conditions in some of these years where cone crops were low, or some other factor it is unknown.

As evidenced above, even at different configurations and years of data, there is wide variability in populations, without known ties to changes in any potential management related effects or such large changes in habitat availability or quality. The likelihood of populations ever being reliably tied to management related effects in habitat are low at a forestwide scale, at least at the level of habitat changes predicted to occur on the Forest in the FEIS with regard to wildfire or timber harvest.

Also similar to the red-breasted nuthatch, the FEIS displayed the calculated HABCAP model results for red squirrel habitat (cover value index). The following table displays the 2005 FEIS calculated results compared to the 2010 and 2015 results by geographic area. For squirrels, the HABCAP model assumes structural stage 1 is worth 10% of optimum, ranging up to 100% for structural stage 4. It should be noted that it is not sustainable to manage forested habitat in a 100% value for squirrels, as it is neither logical nor historically valid that timber occurred in a continuously mature state. The following table describes the HABCAP values by the larger geographic areas, which also had Desired Future Conditions for timber structural diversity described in the Forest Plan (Chapter 3).

Cover Value Index for Red Squirrel

Geographic Area	HABCAP Model 2003	HABCAP Model 2010	HABCAP Model 2015
Clear/Crazy	76%	70%	71%
Devils Canyon	75%	75%	76%
Goose Cr	73%	71%	71%
Little Bighorn	72%	71%	65%
Paintrock	72%	70%	69%
Piney/Rock	70%	73%	72%
Shell	70%	60%	58%
Tensleep	70%	69%	69%
Tongue	67%	71%	68%
Forestwide	71%	71%	68%

From 2003 to 2010, the most significant change noted in the HABCAP model reanalysis is in the Shell geographic area. This change is inclusive of the Bench timber sale project (~800 ac) completed in 2007 and from the Bone Creek Fire (~13,000 ac) which burned in 2007. The Little Horn II Fire occurred in the Little Bighorn geographic area in 2003, for approximately 5,000 acres, which accounts for that larger change.

The only other large wildfire between 2003 and 2010 occurred in the Goose Creek drainage, although only approximately 1,000 acres was on the Forest.

From 2010-2015, the Gilead Fire accounted for 8,100 acres in 2012 in the Piney/Rock geographic area, and the Reservoir fire in 2011 was 1,500 acres in the Shell geographic area. Overall, other changes in HABCAP numbers were largely due to succession or small timber sale projects. Annual vegetation treatment acres (e.g. timber sale) are also reported in the Forest Plan monitoring report, and indicate that at the forestwide or geographic area scale, that very few acres are treated with mechanical methods. In summary, the Forest appears to be maintaining adequate conditions for this MIS habitat.

Similar to the anticipated habitat changes in the 2010 MIS monitoring report, it was estimated in the Forest Plan that, approximately, 10,000-20,000 acres of forested habitat would be burned in the first decade by wildfire. This was already been met in the first 5 years of the forest plan revision, with the 1,000 acres of the Little Goose Fire (on the Forest in timber) and the 9,000 acres of the Bone Creek Fire that affected timber, both in 2007. Bone Creek Fire was in the Shell geographic area, whereas the Little Goose Fire was in the Goose Cr geographic area. In addition, the Gilead Fire in 2012 accounted for 8,100 acres and the Reservoir fire in 2011 was 1,500 acres. The 2010 monitoring report noted that the larger change component anticipated in the FEIS was one of *growth*, as HABCAP numbers were anticipated to grow by approximately 15% over a 50-year period, but be near current levels at the 10-year interval. With re-application of the HABCAP model in 2015, the 10-year prediction in the FEIS at the forest wide scale does show we are near the same level as shown in the 2010 report. At the geographic scale, most areas show a similar result, except where large-scale wildfires altered the vegetation (as discussed above). The result demonstrated a loss between 2003 and 2015.

Brewer's Sparrow

Brewer's sparrows were chosen as an MIS due to their association with mature sagebrush habitat. There was no specific population objective or habitat strategies developed in the Forest Plan specific to the squirrel. Only the broader direction for emphasis species described in objectives 1b and 1c in the Forest Plan (pgs. 1-2 and 1-4) would apply for this MIS.

Population information for Brewer's sparrows was collected from similar methodology and sources to those described above for the red-breasted nuthatch. Those results are summarized as follows:

Monitoring Wyoming's Birds Results for 2002-2006 Seasons (Hutton et al, 2007, pgs 39, 197) with 10 transects per habitat type:

Bighorn NF **Shrub-steppe** Habitat and Brewer's Sparrows:

Year	Density (#/km2)
2002	21
2003	23
2004	21
2005	15
2006	57

IMBCR WY-BCR10-BI-Bighorn National Forest for Brewer's Sparrow

Year	Density (#/km2)	%CV
2009	0	NA
2010	1.57	84
2011	0	NA
2012	0	NA

2013	0	NA
2014	0	NA

IMBCR WY-BCR10 for Brewer's Sparrow

Year	Density (#/km2)	%CV
2009	47.39	24
2010	34.6	14
2011	29.47	19
2012	22.43	20
2013	26.85	19
2014	33.47	23

The WY-BCR10-BI Bighorn results from 2009-2014 shows only one year that the Brewer's sparrow was detected and the %CV was very poor. It is unknown if this result was influenced by a lack of samples in the sagebrush habitat, observations occurring elsewhere, management, or other unknown factors. The majority of the WY BCR10 density estimates all fall within the 90% confidence interval and the %CV are very good, indicating that good estimates are being obtained with the sample size across WY BCR10. The trend during this period shows a substantial drop in density from 2009, and then an increase from 2012-13. The State of WY data showed a similar pattern as the WY BCR10, while the Region 2 Forests showed a stable level of very low detections (less than 0.97).

Similar to results described for other MIS species, the populations of Brewer's sparrows are subjected to many other factors besides management related habitat effects. From 2002-2006 the density numbers showed a slight decrease with a huge spike in 2006. This was collected under the Monitoring Wyoming's Birds sampling method and there is not any CV% or confidence intervals to show if there was any statistical difference in the data. The 2010 monitoring report noted, "The large fluctuation in population seen in the years monitored have no apparent tie to habitat, as there were no widespread or large changes in habitat during these years that would affect the population."

As predicted in the FEIS for sagebrush habitat, the primary disturbance agent and management effect has been livestock grazing and prescribed fire/wildfire. Since, approximately, 2,000 acres per year of sagebrush have been treated with prescribed fire, and there have been no significant wildfires that affected sagebrush habitat, there are many more acres of sagebrush maturing in any given year. Some of the prescribed burning has been larger contiguous areas of treatment, while other areas have had a more mosaic burn. Further consideration into why only one detection has occurred on the forest from 2009-2014 needs to be made. This should probably start with the IMBCR sample location on the forest to assure the sagebrush habitat type is represented.

There was no habitat capability (HABCAP) model run for this species' habitat in the 2005 FEIS, as the Forest's vegetation database (FSVeg) does not adequately or reliably classify sagebrush habitat, due to uncertainties in photo interpretation with regards to meadows and bare areas. Habitat quantification efforts have been improving at the project scale with regards to sagebrush canopy cover, due to the tie with sage grouse habitat and Forest Plan direction in Wildlife guideline #10 (p. 1-47). The intent of the mapping efforts is to determine the overall percent of sagebrush canopy cover at the allotment or geographic area scale to comply with sage grouse habitat management guidance, which would also presumably provide adequate habitat for the Brewer's sparrow, due to their tie to more mature sagebrush as preferred habitat. Prescribed fire treatments are proposed in several areas throughout the Forest over the next 10 years.

A mapping effort was started in 2006 to look at sagebrush densities in the Battle Park area as part of the range NEPA process. This effort was renewed in 2013 with additional data collection occurring in 2013 and 2014 in both the Battle Park C&H allotment and the Sunlight Mesa C&H allotment, based on the initial 2006 canopy cover classes. The initial summary of acres in each sagebrush cover class for these two allotments has been done, however the interpretation and summarization of the data is not complete at this time.

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