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Forest Service

2018 Biennial Monitoring and Evaluation Report

Toiyabe National Forest Land and Resource Management Plan

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Summary of Findings and Results

The following table summarizes the results and recommendations of the 2018 Biennial Monitoring information provided in this report. Recommended changes to the management of NFS lands, and implementation of best management practices associated with forest projects will be implemented during the next monitoring cycle. Recommended changes to the Monitoring program, either changes to the monitoring questions or the indicators, will require an administrative change to the Forest Plan monitoring program. The proposed changes are included in the findings for the Monitoring Questions in the main body of the report. Table 1 identifies which monitoring items require a change. For more detail see the Monitoring item in the body of this report.

Table 1. Summary of findings

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?²
MON-WTRSHD-01) How is watershed condition changing?	No	Yes	There is a need to conduct an assessment to determine the causes and potential response to the high number of watersheds across the Forest that fall into the Function at Risk or non-function class.
(MON-AQH-01) What water bodies are not meeting desired water quality conditions?	No	No	N/A
(MON-SOIL-01) How are characteristics of soil health and productivity changing?	No	Yes	BMP Monitoring indicates a need to change management practices and implementation.
(MON-SOIL-02) How are management activities affecting soil health and productivity?	No	Yes	BMP Monitoring indicates a need to change management practices and implementation.
(MON-VEG-COND-01) What changes have occurred to landscape scale vegetative community types?	No	Yes	Need to change the number and frequency of monitoring plots. Need to remove sagebrush, whitebark and bristlecone pine from monitoring.
(MON-VEG-COND-02) How are current allotment management strategies effective in meeting or moving toward desired conditions?	Yes	No	N/A

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?²
(MON-FOCAL-SPECIES-01) How is the abundance and distribution of Populus tremuloides (aspen) changing over time?	Yes	No	N/A
(MON-FOCAL-SPECIES-02) What do aquatic macroinvertebrate communities indicate about stream ecosystem integrity?	Yes	No	N/A
(MON-FOCAL-SPECIES-03) How is the abundance and distribution of invasive annual grasses (e.g. Bromus tectorum (cheatgrass)) changing over time?	Uncertain (B)	No	N/A
(MON-T&E-01) Are forest management activities affecting recovery of T and E species?	Yes	Yes	There is a need to conduct an assessment to determine the causes and potential response to the high number of watersheds across the Forest that fall into the Function at Risk or non-function class.
(MON-REC-01) Is the Forest's developed recreation program meeting visitor needs and providing for public health and safety at Forest facilities?	Uncertain (A)	No	N/A
(MON-REC-02) Is the Forest's dispersed recreation program meeting visitor needs?	Uncertain (A)	Yes	Need to modify the indicator #5 it is redundant with indicator #4.
(MON-REC-03) Do visitors have safe and sufficient access to recreational opportunities and other areas of interest around the Forest?	Uncertain (A)	No	N/A
(MON-WILD-01) How is wilderness character being preserved on wilderness areas across the Forest? Is fire being allowed to maintain its natural role as an ecosystem component within wilderness?	Uncertain (A)	No	N/A

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?²
(MON-CULT-01) Is there active enhancement and interpretation of historic properties eligible for the National Register of Historic Places that will encourage public interest?	Uncertain (A)	No	N/A
(MON-CULT-02) Are significant properties being evaluated for eligibility to the National Register and nominated to the register if eligible? Are these resources being protected?	Uncertain (A)	No	N/A
(MON-CULT-03) What is the Forest's progress in achieving a forest-wide cultural resource inventory?	Uncertain (A)	No	N/A
(MON-CLIM-01) How is climate change altering patterns of recreational activities and visitor use on the Forest?	Yes	Yes	Need to change Indicator #1 to remove components where data is unavailable.
(MON-CLIM-02) How do recent temperature and precipitation trends (1-5 years) compare to long term averages (30+ years)?	Yes	No	N/A
(MON-CLIM-03) How do recent stream discharge trends (1-5 years) compare to long term averages (30+ years)?	Yes	No	N/A
(MON-WHB-01) What are the actual or estimated numbers of wild horses and burros (compared to AML where set)?	No	Yes	Suggests need for future management of wild horse herds.
(MON-MULTI-01) What are the economic conditions in local communities that could affect the impact of forest contributions to local economies?	Yes	No	N/A
(MON-MULTI-02) What economic contributions are forest-based recreation, forest	Yes	No	N/A

Monitoring Item	Do monitoring results demonstrate intended progress or trend toward Plan targets?	Based on the evaluation of monitoring results, may changes be warranted?	If a change may be warranted, where may the change be needed?²
products, mining and grazing making to local communities?			
(MON-MULTI-03) Are forest boundary adjusted to consolidate ownership and improve public access?	Yes	No	N/A
(MON-Fire -01) How is fire and fuels management being used for resource benefit?	Yes	No	N/A
(MON-FIRE-02) Are fuels reduction projects protecting property, human health and safety, and reducing the potential for unwanted fire effects (in the wildland-urban interface (WUI) and non-WUI)?	No	Yes	Need to remove Monitoring question from Monitoring Program.
¹ Interval of data collection is beyond this reporting cycle (A); or more time/data are needed to understand status or progress of the plan component (B); or methods/results are inadequate to answer monitoring question (C). ² see body of the report for more details regarding any specific recommendations/opportunities for change.			

Based on results of the monitoring program the Toiyabe National Forest Plan is working as intended. This monitoring report indicates a need to make minor changes to the Monitoring Program. There is no intention at this time to make the changes prior to Forest Plan Revision which begins in 2021. Problems arise during project planning resulting from the age of the plan and absence of measurable plan level desired conditions and objectives. These issues will be addressed during plan revision which will begin in 2021. While the report provides some data for the Cultural Resource Monitoring questions a transition of data from one platform to another resulted in the inability to provide accurate or current data for some questions. The data transfer should be complete in time for full responses in the 2020 biennial report. Wilderness monitoring item indicators related to the use and management of wildfires in wilderness were not provided in this report. A transition in fire staff left the Fire Planning Staff position vacant during a period this report was being prepared. This position has now been filled and the 2020 biennial report should be complete.

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INTRODUCTION

Purpose

The purpose of the biennial monitoring evaluation report is to help the responsible official determine whether a change is needed in forest plan direction, such as plan components or other plan content that guide management of resources in the plan area. The biennial monitoring evaluation report represents one part of the Forest Service's overall monitoring program for this national forest unit. The biennial monitoring evaluation report is not a decision document; it evaluates monitoring questions and indicators presented in the Plan Monitoring Program chapter of the forest plan, in relation to management actions carried out in the plan area. In April of 2016 the Toiyabe National Forest Land and Resource Management Plans Monitoring Program (Chapter 5) was modified to meet the requirements of the 2012 planning rule by May 2016. This modified monitoring program is presented below in this biennial monitoring report.

Monitoring and evaluation are continuous learning tools that form the backbone of adaptive management. For this reason, we will produce an evaluation report every two years. This is our first written report of this evaluation since the Toiyabe National Forest Plan Monitoring program was finalized in 2016. This report indicates whether a change to the forest plan, management activities, monitoring program or forest assessment may be needed based on the new information. The 2018 biennial monitoring reports for the Humboldt-Toiyabe National Forest is available at <https://www.fs.usda.gov/main/htnf/landmanagement/planning>.

Objectives

There are several objectives for this report, including:

- Make information obtained from monitoring available to the public in a form that is readily understandable.
- Document implementation of the Plan Monitoring Program including changed conditions or status of key characteristics used to assess accomplishments and progress toward achievement of the selected Land and Resource Management Plan components.
- Assess the current condition (i.e., status) and trend of selected forest resources.
- Evaluate relevant assumptions, changed conditions, management effectiveness, and progress towards achieving the selected desired conditions, objectives, and goals described in the Forest Plan.
- Present recommended change opportunities to the responsible official.

How to Use this Report

This report is a tool and a resource for the Humboldt-Toiyabe National Forest to assess the condition of forest resources in relation to Forest Plan direction and management actions. It is also a tool and a resource for the public to learn more about how the Forest Service is managing forest resources.

This monitoring report, along with the biennial monitoring report prepared for the Humboldt National Forest will be used to identify where the forest needs to take or change management practices to improve the conditions of the natural, physical or social resources found on the Forest. The monitoring reports will be used as the forest begin the Forest Plan revision process in 2021 to provide information regarding the need for change and supporting information for the plan assessment process.

The biennial monitoring evaluation report is designed to help the public, as well as Federal, State, local government, and Tribal entities anticipate key steps in the overall monitoring program. The biennial monitoring evaluation report is also intended to help people better understand reported results in relation to past monitoring reports, future monitoring reports and the broader-scale monitoring strategy that is issued at the Forest Service Regional level.

MONITORING EVALUATION

Water

MON-WTRSHD-01: How is watershed condition changing?

Indicator 1: Watershed condition indicators (Class) from the Watershed Condition Framework.

Data source: Data were retrieved from the US Forest Service Watershed Condition Assessment Tracking Tool (WCATT) database.

Indicator 2: Essential projects completed.

Data source: Data were identified by personal knowledge of the Forest Hydrologist, John McCann, of projects completed on the Forest. 2016 Macroinvertebrate Report prepared by BLM/USU National Aquatic Monitoring Center, Logan, Utah.

Monitoring Result

Indicator 1: Monitoring Result: Data show 17 sub-watersheds are in a Functional condition, 246 sub-watersheds are in a Functional at Risk condition, and 16 sub-watersheds are in a Non-Functional condition. Most watersheds were rated for functionality in 2011 during a rapid assessment which was based on available spatial data and professional judgement of resource specialists with on-the-ground knowledge of certain watershed condition considerations. A few watershed condition class ratings have been updated in the intervening years as new or better data became available. The two most common indicators rated individually as Non-Functional were Aquatic Habitat and Riparian/ Wetland Vegetation with 71% and 67% of watersheds being rated as Non-Functional for these indicators, respectively.

Indicator 2: There are two priority watersheds on the Toiyabe NF Indian Creek and Harris Springs Creek. Data show that one meadow restoration project was repaired and one meadow restoration project was completed in FY17 in the Indian Creek sub-watershed. This sub-watershed has not yet been identified as having improved condition due to management activities.

Macroinvertebrate collections were collected in 2016 from Silver King Creek and tributaries within the East Fork Carson River Watershed. Number of EPT taxa as well as number of intolerant taxa present indicate that water quality for macroinvertebrates is meeting desired conditions in that watershed. The Hilsenhoff Biotic Index averaged 2.9 which is indicative of good water quality conditions. The average number of Ephemeroptera, Plecoptera Trichoptera (EPT) taxa was 16 which also indicated good water quality. No other water bodies were sampled.

Finding:

Indicator 1: Because the watershed classification data which are available to inform Indicator #1 were primarily developed in 2011 during a rapid assessment, it would benefit the Forest if a more current and comprehensive assessment were completed of watershed condition. While current watershed condition data (i.e., 88% of watersheds rated as Functional-at-Risk and 6% rated as Non-Functional) seem to indicate a need for changing either the Humboldt National Forest Plan or management within the planning area, such Plan or management changes should not be made unless improved assessment data show the same need.

Indicator 2 Monitoring does not indicate a need for change of the Toiyabe National Forest Plan.

MON-AQH-01: What water bodies are not meeting desired water quality conditions?

Indicator 1: Miles of impaired 303(d) streams.

Data source: Data were retrieved from spatial Integrated Water Quality Report data from both California (data collected in 2012) and Nevada (data collected in 2014).

Indicator 2: Aquatic macroinvertebrate metrics (where sampled).

Data source: 2016 Macroinvertebrate Report prepared by BLM/USU National Aquatic Monitoring Center, Logan, Utah.

Monitoring Result

Indicator 1: Data show 90 miles of impaired streams (21 segments) and 0.01 acres of lakes/ reservoirs (one location) in Nevada and 100 miles of impaired streams (eight segments) and 80 acres of impaired lakes/ reservoirs (two locations) in California.

Indicator 2: Macroinvertebrate collections were collected in 2016 from Silver King Creek and tributaries within the East Fork Carson River Watershed. Number of EPT taxa as well as number of intolerant taxa present indicate that water quality for macroinvertebrates is meeting desired conditions in that watershed. The Hilsenhoff Biotic Index averaged 2.9 which is indicative of good water quality conditions. The average number of EPT taxa was 16 which also indicated good water quality. No other water bodies were sampled.

Finding

Indicator 1: Does not indicate a need for changing the Toiyabe National Forest Plan. However, several streams, lakes, and reservoirs are listed as not attaining water quality

standards for identified beneficial uses. Generally, management under the Forest Plan is intended to preserve, conserve, or improve water quality. In some cases, altered management may lead to an improvement in or in some cases more rapid improvement of water quality.

Indicator 2: Monitoring has not indicated a need for change of the Toiyabe National Forest Plan.

Soil

MON-SOIL-01: How are characteristics of soil health and productivity changing?

Indicator 1: Change in surface organic matter (litter).

Indicator 2: Soil temperature trends at select locations.

Indicator 3: Depth to water at select locations.

Indicator 4: Soil stability: Erosion and sedimentation.

Indicator 5: BMP implementation and effectiveness monitoring.

Indicator 6: Burn severity (any management activity that uses fire as a tool).

Data source: Ecological condition monitoring plots, climate station data, BMP monitoring reports. Indicator #5 data were retrieved from the USFS R04 BMP Monitoring database.

Monitoring Results

Indicator 1: Long term monitoring plots on uplands are showing slight increases in litter, basal area, overstory cover, and corresponding decreases in bare soil. Some of the more heavily used rangelands are seeing increases in cheatgrass, lowering soil productivity.

Indicator 2: Soil temperature is being measured by a variety of SnoTel, SCAN, and other micrometeorological stations. Efforts are currently ongoing to compile this data to start developing trends to determine if any long-term changes in soil climate is occurring.

Indicator 3: Water quality BMP monitoring has been initiated on selected projects for different activities.

Indicator 4: Physical impacts such as soil compaction, and changes in vegetative composition from wetland to upland species is indicative of a loss of upward capillary movement of water in the soil thereby lowering of the water table. On the uplands, over population of wild horses have resulted in low amounts of vegetative ground cover, compacted soils, and high amounts of bare soil resulting in reduced soil productivity.

Wild horse use is detrimentally impacting some springs and streams at lower elevations particularly on the West side of the Austin-Tonopah RD and the North end of the Spring Mountains.

Indicator 5: Data show that grazing BMPs in the North Murphy area were mostly implemented, but not effective and that construction or maintenance BMPs at the Cathedral Rock Picnic Area parking lot were not implemented and not effective.

Indicator #6 – No prescribed fires occurred in the planning areas during this monitoring cycle to monitor burn severity. Some project level pile burning occurred on the SMNRA during the cool/moist season. Areas are too small to measure for burn severity.

Finding

Indicators 1/3/4: Soil health and productivity across the Toiyabe portion of the forest is for the most part stable. Localized impacts from wildfire, cattle, sheep, and wild horses has reduced soil health and productivity due to loss of surface organic matter, increased soil compaction, high amounts of bare soil, and accelerated erosion and sedimentation. This is particularly the case on the West side of Austin-Tonopah district, and portions of the SMNRA that have been affected by wildfire and wild horse grazing.

Riparian plots surveyed on the Bridgeport RD have predominately shown stable to improved soil health. Vegetative ground cover and composition is high, soil compaction is localized around water developments, and bare soil is low. Water tables support riparian vegetation.

No changes appear to be needed in forest plan

Indicator #2

While the SNOTEL stations have been collecting atmospheric climate data for up to 40 years, soil temperature and soil moisture sensors were only installed in the past 15 years. Ideally we would need 30 continuous years of data to start developing quality trend data. At some of the longer functioning SNOTEL stations, we may be able to start seeing changes in air temperature and precipitation data.

Indicator #5: Seems to indicate a need for changing management within the planning area. In FY17, the BMP implementation and effectiveness of two activities with the potential to impact soil resources were monitored. Both resulted in a “Poor” composite score.

Indicator #6: Does not indicate a need for change in the Toiyabe National Forest Plan.

MON-SOIL-02: How are management activities affecting soil health and productivity?

Indicator 1: Change in surface organic matter (litter).

Indicator 2: Soil stability: Erosion and sedimentation.

Indicator 3: BMP implementation and effectiveness monitoring.

Indicator 4: Burn severity (any management activity that uses fire as a tool).

Data source: Ecological condition monitoring plots, BMP monitoring reports.
Indicator #5 data were retrieved from the USFS R04 BMP Monitoring database.

Monitoring Results

Indicator 1: Ecological monitoring plots on uplands are showing increases in litter, basal area, overstory cover, and corresponding decreases in bare soil. Some of the more heavily used rangelands are seeing increases in cheatgrass and bare soil, lowering soil productivity.

Indicator 2: Wild horse use is detrimentally impacting uplands, springs and streams at lower elevations on the Austin Tonopah Ranger District and Spring Mountains National Recreation Area. Physical impacts such as increased soil compaction, bare soil, and accelerated erosion is resulting in changes in vegetative composition from wetland to upland species. This is indicative of a loss of upward capillary movement of water in the soil thereby lowering of the water table.

Indicator 3: Water quality BMP monitoring has been initiated on selected projects for different activities.

Indicator #4 – No burn severity was monitored from prescribed fires during this monitoring cycle. Some project level pile burning occurred on the SMNRA during the cool/moist season. Areas are too small to measure for burn severity.

Finding

Indicator 1/2: Soil health and productivity across the Toiyabe portion of the forest is for the most part stable. Localized impacts from prescribed burning, cattle, sheep, and wild horse grazing, recreation management has reduced soil health and productivity due to loss of surface organic matter, compaction and accelerated erosion.

Projects to convert pinyon-juniper woodlands back to sagebrush ecosystems are, for the most part, improving the soil function in those area. These projects will result in higher vegetative ground cover to effectively reduce erosion and sedimentation. A few of those areas have seen an increase in annual brome (cheatgrass) that are negatively affecting the health of those soils by outcompeting the establishment of native vegetation.

Watershed, and site specific restoration projects are being implemented to reduce erosion on uplands, and improve riparian soil function, along streams and spring systems.

Does not indicate a need for change in the Toiyabe National Forest Plan

Indicator #3: Does not indicate a need for change of the Toiyabe National Forest Plan.

Indicator #3: Data show that grazing BMPs in the North Murphy area of the Bridgeport Ranger District were mostly implemented, but not effective and that construction or maintenance BMPs at the Cathedral Rock Picnic Area (SMNRA) parking lot were not implemented and not effective.

Indicator #4: Does not indicate and need for change of the Toiyabe National Forest Plan.

Indicator 3: Data show that grazing BMPs in the North Murphy area were mostly implemented, but not effective and that construction or maintenance BMPs at the Cathedral Rock Picnic Area parking lot were not implemented and not effective.

Indicator 4: No data available for this monitoring cycle.

Vegetation

MON-VEG-COND-01: What changes have occurred to landscape scale vegetative community types?

Indicator 1 Invasive and noxious species, sagebrush, pinyon-juniper, white bark pine, bristlecone, wet-to-dry meadows and riparian zones, aspen, and fir encroachment.

Data source: Ecological Condition Monitoring Plots

Indicator 2 Fire risk assessment, fire regime condition class, and wildfire

Data source: Corporate Data Warehouse – FACTS, Interagency Fire Dispatch Center/GIS

Monitoring results:

Indicator 1: Twenty eight plots were located in riparian meadows on the Toiyabe National Forest. Ten of the riparian meadow plots were on the Bridgeport Ranger District, and eighteen on the Austin-Tonopah District.

One sagebrush plot and two aspen plots were re-sampled on the Bridgeport Ranger District in 2017. The sagebrush plot indicated the ecosystem was in functioning condition with a slight upward trend. One of the aspen stands had a slight upward trend, and the other stand had a downward trend. The aspen stand with the downward trend appeared to be suffering from a loss of regeneration. There were very few aspen suckers or saplings on the 2017 reading of this transect, when compared to the 2011 monitoring results.

All eighteen of the plots on the Austin-Tonopah District are located in wild horse territories. Four of the plots could not be fully monitored, as the water has been developed and piped away, or the riparian zone is too small to sample. Six of the remaining wild horse monitoring plots were not-functioning and eight are functioning at risk. High bare soil, undesirable species composition, poor rooting depth due to soil compaction and heavy grazing/trampling use are the key factors affecting the plant communities in the wild horse use areas.

Of the ten riparian meadow plots on the Bridgeport District, five are in functioning condition, four are functioning at risk, and one is non-functioning. Most of these areas have been rested from grazing for five years or more, and have an upward trend in vegetative condition.

The following table contains acreages for community types listed in indicator #1 on a forest-wide scale.

Species	Acres
Cheatgrass	2,525
Medusa Head	3,299
Aspen	195,260
Fir	703,848
Pinyon Juniper	2,345,959

Species	Acres
Meadow Ecosystems (Wet & Dry)	116,640

Indicator 2: Invasive weeds continue to move and expand into disturbed meadow sites, but have declined in meadows on the Bridgeport District that have been rested from grazing for several years. Invasives present in meadows on the Bridgeport, Austin-Tonopah District include cheatgrass (*Bromus tectorum*), wild iris (*Iris missouriensis*), dandelion (*Taraxacum officinale*), owl clover (*Orthocarpus* spp.), goosefoot (*Chenopodium* spp.), plantain (*Plantago* spp.), curly dock (*Rumex crispus*), tumbled mustard (*Sisymbrium altissimum*), false dandelion (*Tragopogon dubius*), shepardspurse (*Capsella bursa-pastoris*), wild rose (*Rosa woodsii*) and grey rabbitbrush (*Ericameria nauseosa*).

One noxious plant species was found among locations monitored on the Toiyabe National Forest in 2016 and 2017. Bull thistle (*Cirsium vulgare*) is located in a mesic meadow community in the Tonopah District.

Finding

Indicator 1: Changes in wetland vegetative communities where wild horses and burros (WHB) are present in active grazing allotments indicate a need to change monitoring protocols. Increasing the number of monitoring plots and how often data is collected in a) areas where WHB and livestock grazing occur, b) where WHB exists without livestock grazing, and c) where WHB do not exist in active grazing allotments and analyzing for differences in changes to riparian and other wetland vegetative community types will provide a better understanding for need for change in management activities.

Indicator 2: Noxious weeds are being treated and there are positive signs of success in treatments, but infestations of new species are occurring and few restoration projects have resulted in a reduction of invasive species. Some community types have proven to be less than reliable as indicators of management action and planning. For example, a loss of 5,000 acres of sagebrush community may not register a significant change if monitoring accounts for millions of acres. Secondly, evaluating the expansion or loss of bristlecone acres are particularly challenging and less useful for managers as those communities change at extremely slow rates. Additionally, as whitebark and limber pine share ecological parameters, geographic range, and a similar reflective index, there exists a low confidence level in being able to discern between the two communities from a landscape scale. Therefore, there is a need to remove sagebrush, whitebark and bristlecone pine from monitoring as they are poor indicators of management action or the need for change in strategies. The analysis for changes in the remaining habitat types are based upon differences in acreages as GIS information is updated in databases described in the project record.

MON-VEG-COND-02: How are current allotment management strategies effective in meeting or moving toward desired conditions?

Indicator 1: Ground cover, invasive species, Aspen, species composition, water quality, soil productivity to determine satisfactory condition.

Data source: Ecological Condition Monitoring Plots

Monitoring Results

Indicator 1: Invasive weeds continue to move and expand into disturbed meadow sites, but have declined in meadows on the Bridgeport District that have been rested from grazing for several years. Invasives present in meadows on the Bridgeport, Austin and Tonopah Districts include cheatgrass (*Bromus tectorum*), wild iris (*Iris missouriensis*), dandelion (*Taraxacum officinale*), owl clover (*Orthocarpus* spp.), goosefoot (*Chenopodium* spp.), plantain (*Plantago* spp.), curly dock (*Rumex crispus*), tumbled mustard (*Sisymbrium altissimum*), false dandelion (*Tragopogon dubius*), shepardspurse (*Capsella bursa-pastoris*), wild rose (*Rosa woodsii*) and grey rabbitbrush (*Ericameria nauseosa*).

One sagebrush plot and two aspen plots were re-sampled on the Bridgeport Ranger District in 2018. The sagebrush plot indicated the ecosystem was in functioning condition with a slight upward trend. Ground cover is in functioning condition and stable. One of the aspen stands had a slight upward trend, and the other stand had a downward trend. The aspen stand with the downward trend appeared to be suffering from a loss of regeneration, but still has good aspen overstory cover. Ground Cover is in functioning condition in both aspen stands. There were very few aspen suckers or saplings on the 2017 reading of this transect, when compared to the 2011 monitoring results.

Twenty eight plots were located in riparian meadows on the Toiyabe National Forest. Ten of the riparian meadow plots were on the Bridgeport Ranger District, and eighteen on the Austin and Tonopah Districts.

All eighteen of the plots on the Austin and Tonopah Districts are located in wild horse territories. Four of the plots could not be fully monitored, as the water has been developed and piped away, or the meadow area was too small to sample. Six of the remaining wild horse monitoring plots were not-functioning and eight are functioning at risk. High bare soil, undesirable species composition, poor rooting depth due to soil compaction and heavy grazing/trampling use are the key factors affecting the plant communities in the wild horse use areas. Expanding elk population and wild horse herds are impacting some grazing allotments and focused management is needed. In areas where both elk and wild horses winter, sagebrush and riparian sites are being depleted.

Of the ten riparian meadow plots on the Bridgeport District, five are in functioning condition, four are functioning at risk, and one is non-functioning. Most of these areas have been rested from grazing for five years or more, and have an upward trend in vegetative condition. Ground cover is high on seven of the sample sites and moderate on three of the sites. In some areas increased recreation use is contributing to damage in some riparian areas.

Finding

Indicator 1: Although many grazing allotments are functioning at risk, the monitoring data indicated that work by Forest staff with ranchers/permittees has resulted in grazing management changes that are leading the Forest toward better vegetation and soil condition scores across much of the area sampled. Continued grazing management in line with the Forest Plan directives, should benefit ecological condition on grazing areas across the Forest. There is a need to incorporate monitoring the effects of elk on aspen stands and in elk wintering areas.

Focal Species

MON-FOCAL-SPECIES-01: How is the abundance and distribution of *Populus tremuloides* (aspen) changing over time?

Indicator 1: Spatial extent (acres), regeneration, disease, age classes, and understory, (soil temperatures - climate change).

Data source: Ecological Condition Monitoring Plots, NRCS SNOTEL climate station data.

Monitoring Results

Indicator 1: Two aspen plots were re-sampled on the Bridgeport Ranger District in 2017. One of the aspen stands had a slight upward trend, and the other stand had a downward trend. The aspen stand with the downward trend appeared to be suffering from a loss of regeneration and understory structure. There were very few aspen suckers or saplings on the 2017 reading of this transect, when compared to the 2011 monitoring results. In areas of the Tonopah District where wild horse and elk use overlaps, some aspen stands are impacted by elk rubbing and chewing the bark.

One sagebrush plot was sampled on the Bridgeport Ranger District in 2018. This sagebrush plot was at high elevation in a rested area of the District and indicated the ecosystem was in functioning condition with a slight upward trend.

Some of the SNOTEL stations collecting soil temperature data are located in aspen communities. Efforts are currently ongoing to compile this data to start developing trends to determine if any long-term changes in soil climate is occurring.

Finding

Indicator 1: Some aspen decline is occurring in the Bridgeport District, however, these are small isolated incidents, and the general trend is upward. In the Austin-Tonopah District, there is aspen decline at higher elevations, where elk are feeding and rubbing on trees. There is not clear indication that plan or management direction needs to change.

While the SNOTEL stations have been collecting atmospheric climate data for up to 40 years, soil temperature and soil moisture sensors were only installed in the past 15 years. You would need 30 years of data to start developing quality trend data. At some of the longer functioning SNOTEL stations, we may be able to start seeing changes in air temperature and precipitation data. Warmer temperatures and lower precipitation add stress to the aspen at the lower elevational boundaries opening them up to disease.

MON-FOCAL-SPECIES-02: What do aquatic macroinvertebrate communities indicate about stream ecosystem integrity?

Indicator 1: Diversity; species composition; and other indices of macroinvertebrate response to current conditions (e.g., index of biotic integrity [IBI], Ephemeroptera, Plecoptera Trichoptera index [EPT]).

Data source: 2016 Macroinvertebrate Report prepared by BLM/USU National Aquatic Monitoring Center, Logan, Utah.

Monitoring Results

Indicator 1: Macroinvertebrate collections were collected in 2016 from Silver King Creek and tributaries within the East Fork Carson River Watershed. Number of EPT taxa as well as number of intolerant taxa present indicate that stream ecosystem integrity is meeting desired conditions in that watershed. The Hilsenhoff Biotic Index averaged 2.9 which is indicative of a healthy stream ecosystem. The average number of EPT taxa was 16 which also indicated that the stream ecosystem integrity was excellent. No other water bodies were sampled.

Finding

Indicator 1: Monitoring has not indicated a need for change of the Toiyabe National Forest Plan.

MON-FOCAL-SPECIES-03: How is the abundance and distribution of invasive annual grasses (e.g. Bromus tectorum (cheatgrass)) changing over time?

Indicator 1: Spatial extent (acres) and cover (%).

Data source: Ecological Condition Monitoring Plots

Monitoring Results

Indicator 1: Invasive weeds have declined in meadows on the Bridgeport District that have been rested from grazing for several years. Annual invasive plants present in meadows on the Bridgeport, Austin and Tonopah Districts include cheatgrass (*Bromus tectorum*), owl clover (*Orthocarpus* spp.), goosefoot (*Chenopodium* spp.), tumbled mustard (*Sisymbrium altissimum*), false dandelion (*Tragopogon dubius*), and shepardspurse (*Capsella bursa-pastoris*). Cheatgrass (*Bromus tectorum*) averages less than 1% cover in all plots surveyed.

One noxious plant species was found among locations monitored on the Toiyabe National Forest in 2016 and 2017. Bull thistle (*Cirsium vulgare*) is located in a mesic meadow community in the Tonopah District.

Invasive weeds continue to move and expand into disturbed meadow sites, but have declined in meadows on the Bridgeport District that have been rested from grazing for several years. Invasives present in meadows on the Bridgeport, Austin and Tonopah Districts include cheatgrass (*Bromus tectorum*), wild iris (*Iris missouriensis*), dandelion (*Taraxacum officinale*), owl clover (*Orthocarpus* spp.), goosefoot (*Chenopodium* spp.),

plantain (*Plantago* spp.), curly dock (*Rumex crispus*), tumbled mustard (*Sisymbrium altissimum*), false dandelion (*Tragopogon dubius*), shepardspurse (*Capsella bursa-pastoris*), wild rose (*Rosa woodsii*) and grey rabbitbrush (*Ericameria nauseosa*).

Finding

Indicator 1: No changes are needed. Although weed infestations are increasing on parts of the Toiyabe Planning Area, the Forest has been making efforts to control invasive plants.

There is not enough information to determine changes in abundance or distribution of invasive annual grass cover.

Threatened and Endangered

MON-T&E-01: Are forest management activities affecting recovery of T and E species?

Indicator 1: Host plant (Spatial extent - acres)

Data source: Forest GIS layers of surveyed habitat, designated Critical Habitat layers. Ecological Condition Monitoring Plots

Indicator 2: Proximity to disease vector.

Data source: GPS locations of collared Sierra Nevada bighorn sheep (SNBS) provided by California Department of Fish and Wildlife in combination with Forest GIS layers of permitted sheep and goat allotments. Term grazing permits for allotments at a higher risk of contact are also reviewed.

Indicator 3: Watershed Restoration Action Plan and associated projects completed.

Data source: Data were identified by personal knowledge of the Forest Hydrologist, John McCann, of projects completed on the Forest.

Indicator 4: Watershed condition indicators (Class) from the Watershed Condition Framework.

Data source: Data were retrieved from the US Forest Service Watershed Condition Assessment Tracking Tool (WCATT) database.

Indicator 5: Essential projects completed

Data source: Internal reports; Biological Assessment for the Enhancement of Operations and Training at MCMWTC Bridgeport, California; Concurrence and Biological Opinion for Continued Rangeland Management on the Carson and Bridgeport Ranger Districts, Alpine and Mono Counties, California; Concurrence and Biological Opinion for the CA/NV Integrated Weed Management Plan.

Monitoring Results

Indicator 1: The Mount Charleston blue butterfly (MCBB) is listed as an endangered species under the Endangered Species Act. Surveys and monitoring of suitable habitat for

the species enables a relative assessment of the potential for presence of MCBB. Suitable habitat is composed of plants that serve as host plants for larvae development and as nectar plants for adult feeding. Two species of milkvetch and mountain oxytrope are known to serve as host plants. Currently approximately 5,200 acres are identified as Critical Habitat. Each year surveys are conducted in areas where habitat may be affected. In 2016, 97 acres were surveyed, and in 2017, 70 acres were surveyed. No substantial decreases in the spatial extent of host plants were noted and the extent appears stable.

Indicator 2: There is a need to assess and monitor the likelihood of contact between domestic sheep (and goats) and Sierra Nevada bighorn sheep (SNBS), a federally endangered species. The likelihood of contact plays a role in the risk of transmitting diseases to SNBS from domestic sheep in the Sierra Nevada. Contact may result in the possible introduction of new pathogens to SNBS that may cause pneumonia. There is concern that this could lead to the loss of entire bighorn sheep herds in the Sierra Nevada. By monitoring the implementation of the terms and conditions of sheep grazing permits in conjunction with tracking where SNBS occur, we can monitor relative risk of contact. No SNBS have been sighted in the Green Creek or Twin Lakes SNBS herd units, or north of a “trigger line”. The trigger line is a topographic boundary north of which, in consultation with US Fish and Wildlife Service, it has been determined that risk of contact between domestic sheep and SNBS is elevated and adjusted management actions may need to occur. Currently the Green Creek and Twin Lake herd units are unoccupied by SNBS and the closest SNBS sighting to the trigger line is approximately two miles south.

Indicator 3/5: Data show that one meadow restoration project was repaired and one meadow restoration project was completed in FY17 in the Indian Creek sub-watershed, the only Priority Watershed currently identified in the planning area. This sub-watershed has not yet been identified as having improved condition due to management activities.

Indicator 4: Data show 17 sub-watersheds are in a Functional condition, 246 sub-watersheds are in a Functional at Risk condition, and 16 sub-watersheds are in a Non-Functional condition. Most watersheds were rated for functionality in 2011 during a rapid assessment which was based on available spatial data and professional judgement of resource specialists with on-the-ground knowledge of certain watershed condition considerations. A few watershed condition class ratings have been updated in the intervening years as new or better data became available. The two most common indicators rated individually as Non-Functional were Aquatic Habitat and Riparian/Wetland Vegetation with 71% and 67% of watersheds being rated as Non-Functional for these indicators, respectively.

Indicator 5: The Forest completed Endangered Species Act consultation for multiple allotments on the Carson and Bridgeport Ranger Districts with Yosemite toad (YT) and Sierra Nevada yellow-legged frog (SNYLF). The determination was that these actions would adversely affect YT and SNYLF. The Forest has been monitoring these allotments in accordance with the consultation to improve habitat conditions for YT, SNYLF, and where present Lahontan cutthroat trout.

Over the reporting period the Forest has been working with the Marine Corps’ Mountain Warfare Training Center to ensure that permitted activities within habitat for Lahontan cutthroat trout, Yosemite toad, and Sierra Nevada yellow-legged frog include design features that minimize impacts from permitted activities.

On the Carson and Bridgeport Ranger Districts, the Forest completed the Integrated Weed Management Plan. As part of the Purposed Action, design features were included that minimized impacts to all listed species.

Specific recovery efforts are ongoing to recover T and E species. These include: eDNA collection within Paiute cutthroat trout (PCT) habitat, and reintroduction of PCT from Cottonwood Creek; non-native trout removal from Silver Creek; mark and recapture studies of Yosemite toad; and non-native trout removal from the Sister Lakes for recovery of Sierra Nevada yellow-legged frog.

Finding

Indicator 1 and 2: No changes are needed. Mount Charleston blue butterfly host plant extent does not appear to be decreasing and areas of higher relative risk of contact are not occupied by Sierra Nevada bighorn sheep.

Indicator 3/5: Does not indicate a need for change of the Toiyabe National Forest Plan.

Indicator 4: Because the watershed classification data which are available to inform MON-WTRSHD-01 Indicator #1 were primarily developed in 2011 during a rapid assessment, it would benefit the Forest if a more current and comprehensive assessment were completed of watershed condition. While current watershed condition data (i.e., 88% of watersheds rated as Functional-at-Risk and 6% rated as Non-Functional) seem to indicate a need for changing either the Humboldt National Forest Plan or management within the planning area, such Plan or management changes should not be made unless improved assessment data show the same need.

Indicator 5: Monitoring has not indicated a need for change of the Toiyabe National Forest Plan.

Recreation

MON-REC-01: Is the Forest's developed recreation program meeting visitor needs and providing for public health and safety at Forest facilities?

Indicator 1: Percent Meets Expectations in Developed Sites for developed facilities, access, services and perception of safety

Indicator 2: Percent Participation in recreation activities in developed facilities or in developed sites/acres

Data Source: National Visitor Use Monitoring, Frequency: 5 years

Indicator 3: Number of passing and failing tests per water system

Data Source: Infra/NRM, District Files, <https://ndwis.ndep.nv.gov/DWW/>, <https://sdwis.waterboards.ca.gov/PDWW/> Frequency: 1 year

Indicator 4: Number of public water systems (ex. campground, picnic site) decommissioned/removed

Data Source: Infra/NRM, Frequency: 1 year

Indicator 5: Number of annual skier days

Indicator 6: Annual percent occupied sites in concessionaire campgrounds and picnic areas

Data Source: Special Use Permit Files, Frequency: 1 year

Monitoring Result

Indicator 1: National Visitor Use Monitoring (NVUM) data is collected and reported on a five-year cycle. Data is not broken down by the Humboldt National Forest (HNF) and the Toiyabe National Forest (TNF); rather, data is shown for the Spring Mountains National Recreation Area (SMNRA) and for the rest of the Humboldt-Toiyabe National Forest (HTNF), or all combined Forest districts other than the SMNRA.

Based on CY 2016 NVUM data, Forest visitors both on the SMNRA and the rest of the HTNF report that developed recreation sites meet their expectations to a very high degree. They have between an 87.8 and 98.3 percent satisfaction rate with developed facilities, access, services and feeling of safety at the Forest's developed sites.

Indicator 2: At developed sites on the SMNRA in CY 2016, visitors participated most in Nature Center Activities (15.0%) and Picnicking (15.6%) and least in Resort Use (2.2%). On the rest of the HTNF, visitors participated most in Downhill Skiing (21.1%) in developed sites and least in Visiting Historic Sites (0.5 %).

Indicator 3: In CY 2016, pass/fail water system data was available for 25 of 27 HTNF water systems (92.6%) at the time this report was produced. There were 217 (96.4%) passing tests and eight (3.6%) failing tests (total coliform present) during that year for all water systems.

On the TNF in CY 2016, pass/fail data was available for 16 of 18 water systems (88.9%). There were 123 passing tests (95.3%) and 6 (4.7%) failing tests (total coliform present).

In CY 2017, full year pass/fail water system data was available for 18 of 27 HTNF water systems (66.7%) and partial year data was available for one water system at the time this report was produced. There were 187 (95.4%) passing tests and 9 (4.6%) failing tests (total coliform present) during that year for all water systems.

On the TNF in CY 2017, full year pass/fail data was available for 9 of 18 water systems (50%) and partial year data was available for one water system. There were 102 (96.2%) passing tests and 4 (3.8%) failing tests (total coliform present).

Indicator 4: In 2000, there were 23 active water systems on the TNF. In 2016, there were 18 active water systems, on the TNF. No water systems were decommissioned in 2016, so the same number of active water systems were managed in 2017 as compared to 2016.

Indicator 5: According to Special Use Permit files on the TNF, Mt. Rose Ski Area on the Carson Ranger District reported 268,000 skier days for the 2016/17 winter season; numbers were not available for the 2017/18 season at the time of this report. Lee Canyon Ski Area on the SMNRA reported 68,122 skier days and 11,480 tubing visits in 2016/17 winter season and 44,698 skier days and 8,753 tubing visits during the 2017/18 winter season.

Indicator 6: According to Special Use Permit files on the HTNF, there is no substantive change in the occupation rates at concessionaire operated campgrounds and picnic areas from 2016 to 2017. This indicates that the Forest's developed recreation program's ability to meet visitor needs and provide for public health and safety at Forest facilities has not changed during this brief time.

Finding

Monitoring has not indicated a need to change the forest plan, to change management activities, to change the monitoring program, or to conduct an assessment to determine preliminary need to change the plan. This monitoring question and its indicators are designed to assess trends over time and compare data reported with a one-year frequency with National Visitor Use Monitoring data reported on a five-year frequency. The next monitoring cycle for this Monitoring Question will occur in 2021 with the data available for reporting in the 2022 Monitoring report.

MON-REC-02: Is the Forest's dispersed recreation program meeting visitor needs?

Indicator 1: Percent Meets Expectations in Undeveloped Areas (General Forest Areas, GFAs) for developed facilities, access, services and perception of safety

Data Source: National Visitor Use Monitoring, Frequency: 5 years

Indicator 2: Percent Participation in recreation activities outside of developed facilities

Data Source: National Visitor Use Monitoring, Frequency: 5 years

Indicator 3: Trail miles maintained to standard

Data Source: Infra/NRM, Frequency: 1 year

Indicator 4: Trail miles improved to standard

Data Source: Infra/NRM, Frequency: 1 year

Indicator 5: Miles of new trail constructed

Data Source: Infra/NRM, Frequency: 1 year

Indicator #5 is recommended for removal from the monitoring program. Miles of trail constructed is a component of Trail miles improved to standard in annual accomplishment reporting in the Trails Infra module of NRM.

Indicator 6: Trail miles meeting standard

Data Source: Infra/NRM, Frequency: 1 year

Monitoring Result

Indicator 1: National Visitor Use Monitoring (NVUM) data is collected and reported on a five-year cycle. Data is not broken down by the Humboldt National Forest (HNF) and

the Toiyabe National Forest (TNF); rather, data is shown for the Spring Mountains National Recreation Area (SMNRA) and for the rest of the Humboldt-Toiyabe National Forest (HTNF), or all combined Forest districts other than the SMNRA.

Based on CY 2016 NVUM data, visitors to undeveloped areas on the SMNRA feel that access, services and feeling of safety met their expectations relatively well (between 82.6 and 88.2%). However, visitors to undeveloped areas are disappointed with developed facilities, with only a 26.7% rate of expectations met. On the rest of the HTNF, visitors to undeveloped areas feel that developed facilities, access, services and feeling of safety meet their expectations relatively well, between 83.9% for developed facilities and 99.9% for feeling of safety.

Indicator 2: Outside of developed facilities across the Forest, the activities that people participate in the most are as follows:

Activity	SMNRA	HTNF outside SMNRA
Hiking/Walking	62.5%	58.7%
Viewing Natural Features	48.7%	28.5%
Viewing Wildlife	42.1%	21.1%
Relaxing	31.4%	12.4%
Driving for Pleasure	25.3%	10.8%

Indicator 3: In FY 2016, two districts on the TNF reported having completed trail maintenance totaling 336 miles maintained to standard. In FY 2017, one district on the TNF reported having completed trail maintenance to standard on 235 miles of trail.

Indicator 4: In FY 2016, two districts on the TNF reported having completed trail improvements to standard on 2.3 miles of trail. No districts reported having completed trail improvements in FY 2017.

Indicator 5: This indicator is recommended for removal from the monitoring program. This indicator is redundant with indicator 4 “Trail miles improved to standard” in annual accomplishment reporting in the Trails Infra module of NRM.

Indicator 6: In FY 2016, two districts on the TNF reported having trail miles meeting standard, at 263 miles. In FY 2017, one district on the TNF reported having 180 trail miles meeting standard.

Finding

Monitoring has not indicated a need to change the forest plan, to change management activities, or to conduct an assessment to determine preliminary need to change the plan. This monitoring question and its indicators are designed to assess trends over time and compare data reported with a one-year frequency with National Visitor Use Monitoring data reported on a five-year frequency. The next monitoring cycle for this Monitoring Question will occur in 2021 with the data available for reporting in the 2022 Monitoring report.

Monitoring has indicated a need to change the monitoring program. Indicator #5 (MON-REC-02-05: Miles of new trail constructed) should be removed from the monitoring program. Indicator #4 (MON-REC-02-04: Trail miles improved to standard), in its

format for annual accomplishment reporting in the Trails Infra NRM module, incorporates miles of new construction into the definition of miles improved. Indicator #5 is redundant.

MON-REC-03: Do visitors have safe and sufficient access to recreational opportunities and other areas of interest around the Forest?

Indicator 1: Percent Meets Expectations in Developed Sites, Undeveloped Areas (GFAs) and Designated Wilderness for Access

Data Source: National Visitor Use Monitoring, Frequency: 5 years

Indicator 2: Miles of system or non-system roads decommissioned

Data Source: Infra/NRM (gPAS), Frequency: 1 year

Indicator 3: Miles of high clearance road maintained

Data Source: Infra/NRM (gPAS), Frequency: 1 year

Indicator 4: Miles of high clearance road improved, constructed or reconstructed

Data Source: Infra/NRM (gPAS), Frequency: 1 year

Indicator 5: Miles of passenger car road maintained

Data Source: Infra/NRM (gPAS), Frequency: 1 year

Indicator 6: Miles of passenger car road improved, constructed or reconstructed

Data Source: Infra/NRM (gPAS), Frequency: 1 year

Monitoring Result:

Indicator 1: National Visitor Use Monitoring (NVUM) data is collected and reported on a five-year cycle. Data is not broken down by the Humboldt National Forest (HNF) and the Toiyabe National Forest (TNF); rather, data is shown for the Spring Mountains National Recreation Area (SMNRA) and for the rest of the Humboldt-Toiyabe National Forest (HTNF), or all combined Forest districts other than the SMNRA.

Based on CY 2016 NVUM data, visitors felt that access to developed sites, undeveloped areas and designated wilderness met their expectations relatively well, from 82.7 to 90.6 percent on the SMNRA and from 88.9 to 94.2 percent on the rest of the HTNF.

Indicator 2: In FY 2016, no miles of road were reported as having been decommissioned on the HTNF. In FY 2017, 0.8 miles of road were reported as having been decommissioned on the TNF.

Indicator 3: In FY 2016, 83.3 miles of high clearance road were reported as having been maintained on the TNF. In FY 2017, 17.9 miles of high clearance road were reported as having been maintained on the TNF.

Indicator 4: In FY 2016, 4.3 miles of high clearance road were reported as having been improved, constructed or reconstructed on the TNF. In FY 2017, 3.6 miles of high clearance road were reported as having been improved, constructed or reconstructed on the TNF.

Indicator 5: In FY 2016, 102.4 miles of passenger car road were reported as having been maintained on the TNF. In FY 2017, 144.4 miles of passenger car road were reported as having been maintained on the TNF.

Indicator 6: In FY 2016, 5.42 miles of passenger car road were reported as having been improved, constructed or reconstructed on the TNF. In FY 2017, 4.8 miles of passenger car road were reported as having been improved, constructed or reconstructed on the TNF.

Finding

Monitoring has not indicated a need to change the forest plan, to change management activities, to change the monitoring program, or to conduct an assessment to determine preliminary need to change the plan. This monitoring question and its indicators are designed to assess trends over time and compare data reported with a one-year frequency with National Visitor Use Monitoring data reported on a five-year frequency. The next monitoring cycle for this Monitoring Question will occur in 2021. With the data available for reporting in the 2022 Monitoring report.

Wilderness

MON-WILD-01: How is wilderness character being preserved on wilderness areas across the Forest? Is fire being allowed to maintain its natural role as an ecosystem component within wilderness?

Indicator 1: Percent Meets Expectations in Designated Wilderness for developed facilities, access, services and perception of safety

Data Source: National Visitor Use Monitoring, Frequency: 5 years

Indicator 2: Scores on Wilderness Stewardship Performance per wilderness, per element

Data Source: Infra/NRM, Frequency: 1 year

Indicator 3: Number of authorized (emergency vs. planned with MRDG) and known unauthorized motorized/mechanized incursions

Data Source: Infra/NRM, Frequency: 1 year

Indicator 4: Number and acres of wildland fires in wilderness managed at less than full suppression to achieve land and resource management objectives (demonstrating an increasing trend over time of allowing wildland fires in wilderness to be managed as opposed to being fully suppressed)

Data for this indicator is not available for the 2018 Biennial Monitoring reports because of vacancies the Fire Planning Staff Position.

Indicator 5: Number and acres treated by managing wildland fires in wilderness at less than full suppression to achieve land and resource management objectives (demonstrating an increasing trend over time of allowing wildland fires in wilderness to be managed as opposed to being fully suppressed)

Data for this indicator is not available for the 2018 Biennial Monitoring reports because of vacancies the Fire Planning Staff Position.

Monitoring Result

Indicator 1: National Visitor Use Monitoring (NVUM) data is collected and reported on a five-year cycle. Data is not broken down by the Humboldt National Forest (HNF) and the Toiyabe National Forest (TNF); rather, data is shown for the Spring Mountains National Recreation Area (SMNRA) and for the rest of the Humboldt-Toiyabe National Forest (HTNF), or all combined Forest districts other than the SMNRA.

Based on CY 2016 NVUM data, visitors to designated wilderness on the SMNRA are moderately satisfied with the developed facilities, access, services and feeling of safety they experience, ranging from developed facilities that meet their expectations at 64.9 percent to feeling of safety meeting expectations at 89.4 percent. Visitors to designated wilderness on the rest of the HTNF are more satisfied than those on the SMNRA, with a range of developed facilities meeting their expectations at 68.8 percent to feeling of safety that meets their expectations at 97.0 percent.

Indicator 2: Based on the INFRA/NRM data Wilderness Stewardship Performance Scores have remained fairly constant between FY 2016 and FY 2017. Out of the 110 points possible the average Wilderness Performance Score for the 23 Wilderness Areas on the HTNF was 20.2 in 2016 and 21.8 in 2017.

Indicator 3: According to INFRA/NRM data there were 10 emergency incursions into wilderness and one administrative incursion in 2016 and 12 emergency incursions into wilderness in 2017. The emergency incursions were primarily related to wildfire response.

Indicator 4: Monitoring results for this indicator is not available for the 2018 Biennial Monitoring reports because of vacancies the Fire Planning Staff Position.

Indicator 5: Monitoring results for this indicator is not available for the 2018 Biennial Monitoring reports because of vacancies the Fire Planning Staff Position.

Finding

Monitoring has not indicated a need to change the forest plan, to change management activities, to change the monitoring program, or to conduct an assessment to determine

preliminary need to change the plan. This monitoring question and its indicators are designed to assess trends over time and compare data reported with a one-year frequency with National Visitor Use Monitoring data reported on a five-year frequency. The next monitoring cycle for this Monitoring Question will occur in 2021. With the data available for reporting in the 2022 Monitoring report.

Cultural Resources

MON-CULT-01: Is there active enhancement and interpretation of historic properties eligible for the National Register of Historic Places that will encourage public interest?

Indicator 1: Number of Register-eligible sites interpreted (e.g. graphics, tours, etc.)

Data source: Heritage INFRA data via the Heritage Application (old and new) and GIS.

Indicator 2: Number of Register-eligible sites enhanced (adaptive reuse or sustainable use of eligible properties).

Data source: Heritage INFRA data via the Heritage Application (old and new) and GIS.

Monitoring Results

Indicator 1 and 2: The available data lacks the accuracy to produce valid monitoring at this time. The 2020 Monitoring report will be able to provide information related to this Monitoring question.

Finding

Available data not valid for monitoring purposes. The 2020 Monitoring report will include data relevant to this monitoring question.

MON-CULT-02: Are significant properties being evaluated for eligibility to the National Register and nominated to the register if eligible? Are these resources being protected?

Indicator 1: Number of significant properties evaluated to the National Register?

Data source: Heritage INFRA data via the Heritage Application (old and new) and GIS.

Indicator 2: Number of eligible significant properties being adversely impacted by federal undertakings, looting, environmental disturbance, and other actions.

Data source: Heritage INFRA data via the Heritage Application (old and new) and GIS.

Monitoring Results

Indicator 1 and 2: The available data lacks the accuracy to produce valid monitoring at this time. The 2020 Monitoring report will include data relevant to this monitoring question.

Finding

Available data not valid for monitoring purposes. The 2020 Monitoring report will include data relevant to this monitoring question.

MON-CULT-03: What is the Forest's progress in achieving a forest-wide cultural resource inventory?

Indicator 1: Number of acres previously not inventoried and number of newly discovered historic properties recorded.

Data source: Heritage INFRA data via the Heritage Application (old and new) and GIS.

Monitoring Results

Five newly discovered historic properties recorded. 12.4 percent of the Forest was subject to varying levels of cultural resource inventory.

Finding

This measure provides a baseline to compare future monitoring results to. With only one data point there is insufficient information to base a finding. 12.4 percent of the Forest was subject to varying levels of cultural resource inventory.

Climate

MON-CLIM-01: How is climate change altering patterns of recreational activities and visitor use on the Forest?

Indicator 1: Number of open/operational days at winter recreation sites and services (i.e Ruby Mountains Heli-Ski, ski resorts, SMNRA winter use/snow play permit).

Data Source: District records, internet search, Frequency: 1 year

Indicator 2: NRCS Basin Index (Percent Median) monthly snowpack for each basin in Nevada for each winter season (October through May)

Data source: data were retrieved from the NRCS Snow Survey Program's online database.

Monitoring Results

Indicator 1: On the TNF, operational days for the Foxtail Snowplay recreation special use permit is recommended for removal from the monitoring program. The holder's

permit does not include a requirement of reporting number of operational days to the Forest Service.

Ski Area	Winter Season 16-17 Operational days	Winter Season 17-18 Operational days	Notes
Mt. Rose Ski Area	192	173	Open 18/11/2016 07/11/2017
Bridgeport Winter Recreation Area	No Data	No Data	
Lee Canyon Ski Resort	114	113	Open 09/12/2016 08/12/2017

Indicator 2: Data show that water year 2017 (October 1, 2016 – September 30, 2017) was exceptional in terms of the amount of snow that fell throughout the planning area. Snow measured in April was between two and three times the median amount of snow usually remaining throughout the planning area. Water year 2018 (October 1, 2017 – September 30, 2018) was well below median snow packs throughout the planning area until a series of storms in March added to the existing snowpack. April snow pack throughout the area was still slightly below long term medians.

Finding

Monitoring has indicated a need to change the monitoring program. Components of **Indicator 1: Number of open/operational days at winter recreation sites and services**, should be removed from the monitoring program. On the TNF, permittee reporting at the end of their season for the Foxtail Snowplay recreation special use permit does not include a requirement of reporting number of operational days to the Forest Service.

Indicator 2: Does not indicate a need for change of the Toiyabe National Forest Plan.

MON-CLIM-02: How do recent temperature and precipitation trends (1-5 years) compare to long term averages (30+ years)?

Indicator 1: Monthly/ annual precipitation totals, max snow water equivalent, number of days with snow cover, meltout date, monthly/ annual temperature statistics.

Data source: data were retrieved from Desert Research Institute's online database (for precipitation and temperature) and the NRCS online SNOTEL database (for snow data).

Monitoring Results

Indicator 1: Precipitation data reflect the same trends as shown by water year 2017 showing very high totals of precipitation and early water year 2018 being lower than average. Where long term temperature averages were available, 2017 seemed to show monthly average temperatures very close to the long term average with the exception of November and December which were several degrees above average. Throughout the planning area, the 2016-2017 winter snow pack began accumulating later than long term averages, but melted out at a similar date to long term averages, meaning the overall duration of consistent snowpack was shorter. 2016-2017 max snow water equivalent in

the northern portion of the planning area was higher than long term averages, but lower than long term averages in the southern part of the planning area.

Finding

Indicator 1: Does not indicate a need for change of the Toiyabe National Forest Plan.

MON-CLIM-03: How do recent stream discharge trends (1-5 years) compare to long term averages (30+ years)?

Indicator 1: Total annual discharge data from USGS gaging stations.

Data source: data were retrieved from the National Water Inventory System online database maintained by the USGS.

Monitoring Results

Indicator 1: Data show that annual total discharge was much greater (two to three times greater) than average in the western part of the planning area while flows in the central part of the state were a little below average.

Finding

Indicator 1: Does not indicate a need for change of the Toiyabe National Forest Plan

Wild Horse and Burro

MON-WHB-01: What are the actual or estimated numbers of wild horses and burros (compared to AML where set)?

Indicator 1: Census or modeled data for population size.

Data source:

Spring Mountains Complex (Johnnie, Red Rock and Spring Mountain WHBTs): 2017 data comes from population growth estimates entered in the INFRA Range Database based on the October 2015 statistical analysis of May 2015 aerial census data for Spring Mountains Complex.

Powell Mountain WHT: 2017 population data comes from estimates of population growth entered in the INFRA Range Database based on data from June 2016 statistical analysis of November 2015 aerial census data for Bi-State sage-grouse area.

Central Nevada: 2017 population data comes from preliminary results of March-April 2017 census flights. These data have not been statistically analyzed and animal locations on FS and BLM lands have not been differentiated.

Monitoring Results

Within the Red Rock and Spring Mountain WHBTs, burro populations are within the established AML range. Horse populations within these 2 WHBTs are over AML. Horse and burro populations in all other WHBTs are over AML.

Total estimated horse population is 2,050 animals. Total estimated burro population is 286 animals. These numbers include animals on BLM lands for the Central NV territories. Analysis of 2017 survey data has not been finalized. Once statistical analysis is complete, these numbers are expected to decrease.

Total horse and burro population on NFS lands at maximum AML should be approximately 539 animals.

Wild Horse and Burro Territory	AML	2017
BUTLER BASIN	60-100 Horses	191 Horses ¹ in combination with Northumberland, Kelly Creek, Sevenmile and Butler Basin
DOBBIN SUMMIT	1-3 Horses*	See Little Fish Lake
HICKISON	16 Burros	164 Burros ¹ 3 Horses ¹
JOHNNIE	0-3 Horses 14-34 Burros	116 Horses 108 Burros
KELLY CREEK	8-16 Horses*	See Butler Basin
LITTLE FISH LAKE	80-93 Horses*	389 Horses ¹ in combination with Dobbin Summit
MONITOR	51-90 Horses*	186 Horses ¹
NORTHUMBERLAND	12 Horses	See Butler Basin
POWELL MOUNTAIN	29 Horses	52 Horses
RED ROCK	0-3 Horses 0-3 Burros	112 Horses 1 Burro
SEVEN MILE	1-3 Horses*	See Butler Basin
SPRING MOUNTAIN	47-66 Horses 20-35 Burros	435 Horses 13 Burros
STONE CABIN	1-3 Horses*	344 Horses ¹
TOQUIMA	15-30 Horses*	59 Horses
*No AML Established. # presented here is estimate of proper number		
¹ Includes horses on adjacent BLM land		

Finding

Within the Red Rock and Spring Mountain WHBTs, burro populations are within the established AML range. Horse populations within these 2 WHBTs are over AML. Horse and burro populations in all other WHBTs are over AML.

Multiple Use

MON-MULTI-01: What are the economic conditions in local communities that could affect the impact of forest contributions to local economies?

Indicator 1: Economic health: unemployment (%); household earnings; per-capita income; and source of income (%).

Indicator 2: Number of employed personnel resulting from exploration and mining permitting, leasing and mineral material permitting.

Indicator 3: Economic diversity: employment diversity index; employment projections by occupation (% change); number of local businesses, employees, and average salaries in forest related sectors.

Data source: <https://headwaterseconomics.org/> Socioeconomic report

Monitoring Results

Economic conditions improved between 2015 and 2017 across all counties. Given that this is the first year of monitoring, recommend no changes to the forest plan, forest management and re-evaluate once several more years of data is available.

Finding

Unemployment was down by several percentage points in all counties between the baseline year 2015 and 2017. Per capita income and household earnings also saw an increase for the same time period, with Alpine County having the highest per capita income. The total number of employed personnel from exploration and mining (permitting, leasing material permitting) was up overall by 30,362 jobs between 2014 and 2015, with the highest increase in Clark County. The number of local self-employed proprietors in timber saw slight increases in most counties between 2014 and 2015.

MON-MULTI-02: What economic contributions are forest-based recreation, forest products, mining and grazing making to local communities?

Indicator 1: Conditions in forest based sectors: forest-related sector employment (jobs); forest-related sector wages (annual salary); and employment and earnings from travel and tourism (by county).

Data source: <https://headwaterseconomics.org/Tourism, Mining, Timber Report>

Monitoring Results

According to the headwaters travel and tourism report, public lands can play a key role in stimulating local employment by providing opportunities for recreation. Communities adjacent to public lands can benefit economically from visitors who spend money in

hotels, restaurants, ski resorts, gift shops, and elsewhere. While the information in this report is not an exact measure of the size of the travel and tourism sectors, and it does not measure the type and amount of recreation on public lands, it can be used to understand whether travel and tourism-related economic activity is present, how it has changed over time, and whether there are differences between geographies.

Finding

Percent of private employment timber jobs remained relatively unchanged between 2014 and 2015. Percent private employment in mining remained relatively unchanged with a slight increase in Eureka and Lander Counties. The percent of private employment in travel and tourism was mostly unchanged with the exception of Alpine County which saw an approximately 40% increase between 2014 and 2015.

MON-MULTI-03: Are forest boundary adjusted to consolidate ownership and improve public access?

Indicator 1: Acres of acquired land or miles of right of way acquired

Data source: Lands adjustments database (LADS).

Monitoring Results

Since this is the first year of monitoring, recommend no changes to the forest plan or forest management and re-evaluate once several more years of data is available.

Finding

The forest acquired one parcel during the monitoring period. (Crystal Springs), it did not result in a new right of way to NFS lands. A second acquisition was processed by the Tahoe Basin but we have not received the FTO, so it will be reported in 2019 and it is not know yet whether this will result any new ROW's.

Fire

MON-Fire -01: How is fire and fuels management being used for resource benefit?

Indicator 1: Acres of hazardous fuels reduction in WUI and non-WUI, Change in seral state, Changes in FRCC

Data source: Corporate Data Warehouse – FACTS

Monitoring Results

In 2016 and 2017 forest fuels treatments totaled 15,900 acres (13,200 and 2,700 acres respectively). Of this amount approximately 4/5 of the treatments were conducted outside of the WUI, while 1/5 was done in the WUI. These values were attributed to treatments within pinyon/juniper types for sage brush ecosystem management. In addition, approximately 400 acres were treated using prescribed fire, which accounts for ~3% of the treatment accomplished. Fuels treatments across the forest contributed towards an improvement in FRCC as reported in the FACTS database. Treatment

amounts over 2016 and 2017 are representative of the forest 5-year average of acres treated annually.

Finding

Fire and fuels management is occurring within the WUI and outside of the WUI in order to meet multiple resource objectives. Landscape treatments meet fuels reduction goals across multiple land allocations.

MON-FIRE-02: Are fuels reduction projects protecting property, human health and safety, and reducing the potential for unwanted fire effects (in the wildland-urban interface (WUI) and non-WUI)? Is the management of wildland fires accomplishing protection objectives for important Values at Risk (VAR)?

Indicator 1: Acres of hazardous fuels reduction in WUI and non-WUI.

Data source: Corporate Data Warehouse – FACTS

Monitoring Results

There were 60 wildland fires reported from 2016 to 2017 in the WFDSS database. Of this amount 37 were natural 23 were human caused. These totaled 2,232 acres burned broken down by 744 acres of natural ignitions and 1,488 acres of fire caused by humans. All wildland fires that burned past initial attack phase identified VARs according to the WFDSS process. Protection objectives, resource objectives or a combination of both would be identified according to the physical setting of the wildland fire and the corresponding forest plan direction (eg wilderness or non-wilderness). In addition, the suppression strategy would vary on all fires which is consistent with the WFDSS decision making process for managing all wildland fires.

Finding:

It is recommended that this monitoring question be dropped from the monitoring plan because all wildland fires are managed to meet identified objectives from the WFDSS. The forest plan identifies areas across the landscape where values at risk occur. Based on the uncertainty of where and when wildfires would occur in any given year it would be difficult to identify a trend in loss to VARs as well as how suppression strategies vary from year to year. Therefore, the Forest Service will continue to follow policy under the forest plan, WFDSS, and Forest Service Handbook direction for managing wildfires for multiple objectives while protecting VARs.

DETERMINATIONS FROM THE BIENNIAL EVALUATION

Based on evaluations that were conducted, the following are the determinations for adaptive management, per 36 CFR 219.12(d)(2):

Need for Changing the Forest Plan

MON-SOIL-01, Indicator 5: Seems to indicate a need for changing management within the planning area. In FY17, the BMP implementation and effectiveness of two activities with the potential to impact soil resources were monitored. Both resulted in a “Poor” composite score.

Need for Changing the Monitoring Program

Monitoring has indicated a need for to change several of the monitoring questions/indicators to provide better monitoring data.

Mon-Veg-Cond-01: What changes have occurred to landscape scale vegetative community types? Need to change the number and frequency of monitoring plots. This can be done outside the administrative process. There is a need to remove sagebrush, whitebark and bristlecone pine from the list of indicators to be monitored. These species are poor indicators of management action or the need for change in strategies.

MON-REC-02, Indicator 5: Miles of new trail constructed) should be removed from the monitoring program. **Indicator #4: Trail miles improved to standard,** in its format for annual accomplishment reporting in the Trails Infra NRM module, incorporates miles of new construction into the definition of miles improved. Indicator #5 is redundant.

MON-CLIM-01, Indicator 1: Number of open/operational days at winter recreation sites and services, should be removed from the monitoring program. On the TNF, permittee reporting at the end of their season for the Foxtail Snowplay recreation special use permit does not include a requirement of reporting number of operational days to the Forest Service.

MON-FIRE-02: Are fuels reduction projects protecting property, human health and safety, and reducing the potential for unwanted fire effects (in the wildland-urban interface (WUI) and non-WUI)? Is the management of wildland fires accomplishing protection objectives for important Values at Risk (VAR)? Should be removed from the Monitoring program because it all wildland fires are managed to meet identified objectives from the WFDSS. Based on the uncertainty of where and when wildfires would occur in any given year it would be difficult to identify a trend in loss to VARs as well as how suppression strategies vary from year to year. The Forest Service will continue to follow policy under the forest plan, WFDSS, and Forest Service Handbook direction for managing wildfires for multiple objectives while protecting VARs and report that information in FACTS.

Need for Changing Management Activities

Mon-Soil-01, Indicator 5: Seems to indicate a need for changing management within the planning area. In FY17, the BMP implementation and effectiveness of two activities with the potential to impact soil resources were monitored. Both resulted in a “Poor” composite score.

Mon-Soil-02, Indicator #3: Data show that grazing BMPs in the North Murphy area of the Bridgeport Ranger District were mostly implemented, but not effective and that construction or maintenance BMPs at the Cathedral Rock Picnic Area (SMNRA) parking lot were not implemented and not effective. This indicates that implementation to decision needs be improved so that all BMPS are implemented as planned and effective.

Need For Conducting an Assessment to Determine Preliminary Need To Change the Plan

Mon-WTRSHD-01: Indicator 1: Because the watershed classification data which are available to inform Indicator #1 were primarily developed in 2011 during a rapid assessment, it would benefit the Forest if a more current and comprehensive assessment were completed of watershed condition. While current watershed condition data (i.e., 88% of watersheds rated as Functional-at-Risk and 6% rated as Non-Functional) seem to indicate a need for changing either the Humboldt National Forest Plan or management within the planning area, such Plan or management changes should not be made unless improved assessment data show the same need. (This also applies to **Mon-TES-01, Indicator 4**)

About Our Forest Plan Monitoring Program

Roles and Responsibilities

The Forest Plan Monitoring Program requires a coordinated effort of many people, from the people who collect the data, to the people outside the Forest Service who provide feedback and assistance, to the decision maker.

Forest Supervisor William A. Dunkelberger is the responsible official for the forest plan and this report will be provided to him for his decision on the proposed changes, and changes to management direction to address deficiencies that are identified in the plan area. The monitoring report was prepared by the following Forest Employees.

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How Our Plan Monitoring Program Works

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

The Toiyabe National Forest monitoring program was updated in April, 2016 for consistency with the 2012 planning regulations [36 CFR 219.12 (c)(1)]. The Toiyabe National Forest Plan was administratively changed to include the updated monitoring program (Chapter 5). For a copy of the current monitoring program go to https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd541251.pdf. Monitoring questions and indicators were selected to inform the management of resources on the plan area and not every plan component was determined necessary to track [36 CFR 219.12(a)(2)].

The monitoring evaluation implementation protocol (monitoring protocol) is part of the overall plan monitoring program and provides more specific direction for implementing the more strategic plan monitoring program and details monitoring methods, protocols, and roles and responsibilities. The Monitoring protocol is not part of the plan decision and is subject to change as new science and methods emerge. The Toiyabe National Forest monitoring guide is available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd541251.pdf.

Providing timely, accurate monitoring information to the responsible official and the public is a key requirement of the plan monitoring program. This summary, along with the full 2018 biennial monitoring evaluation report for the Toiyabe National Forest is the vehicle for disseminating this information.

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

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

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

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

NATIONAL DATABASES USED

The monitoring questions found in chapter five of the Toiyabe National Forest Land and Resource Management Plan have been updated in compliance with the 2012 Planning Rule. Tracking and monitoring results for most of these questions has now moved to National Databases.

Introduction - Natural Resource Manager

Natural Resource Manager (NRM) is a national Forest Service organization that is responsible for coordinating software development activities for four application groups whose data are accessible through the NRM platform or the Enterprise Data Center (EDC):

- Forest Service Activity Tracking System (FACTS)
- Infra
- Natural Resource Information System (NRIS)
- Timber Information Manager (TIM)

These applications often intersect in how they collect and share data and in how they develop software and use technology. NRM finds ways to manage and grow these applications efficiently, and has already begun to standardize the processes used to develop an integrated program of work. NRM also will be looking for effective ways to use resources to reduce duplication of effort and to maximize technology investments.

There are future plans to provide a public-facing interface for some of the national datasets housed in NRM.

FACTS

The Forest Service Activity Tracking System (FACTS) is an activity tracking system for all levels of the Forest Service. It supports timber sales in conjunction with TIM Contracts and Permits; tracks and monitors NEPA decisions; tracks KV trust fund plans at the timber sale level, reporting at the National level; and, it generates National, Regional, Forest, and/or District Reports.

INFRA

Infra is a collection of Web-based data entry forms, reporting tools, and GIS tools that enable Forests to manage and report accurate information about their inventory of constructed features and land units as well as the permits sold to the general public and to partners. This information is used by Forest supervisors for the effective management of their Forests and also by visitors, partners, and Congress. Infra is a valuable tool for:

- Forest-level management
- Forest analysis, planning, and budgeting

- Implementing core data layers such as trails, roads, cultural properties, recreation, and range allotments
- Monitoring financial accountability; capitalization, depreciation and deferred maintenance
- Collecting partnerships information such as grants, agreements, and leases
- Collecting information to be made available to the public; data warehouse, Wilderness use permits, e-government
- Administering Forest permits and billings, such as Range and Special Uses

Infra also interfaces with several external systems to meet data sharing and financial reporting goals. Infra transmits daily feeds of permit billing and grant and agreement financial information to the Foundation Financial Information System (FFIS). Infra also transmits real property information to the UDSA's Corporate Property Automated Information System (CPAIS).

NRIS

The Natural Resource Information System (NRIS) combines a series of standard corporate databases and computer applications designed to support field-level users. NRIS databases contain basic natural resource and socio-economic data in standard formats built to run within the Forest Service computing environment. Some of the products available in NRIS include:

- Air Quality Information (AIR)
- Aquatic Surveys (AqS)
- FSVeg (Common Stand Exam, includes a geospatial component)
- Inventory and Mapping (Geology, Soils, etc.)
- National Visitor Use Monitoring (NVUM)
- Rangeland Inventory and Monitoring
- Threatened, Endangered, and Sensitive Plants
- Invasive Species
- Water Rights and Uses (WRU)
- Watershed Classification and Assessment Tracking Tool
- Watershed Improvement Tracking (WIT)
- Wildlife

Air

The Air application helps air resource managers analyze the effects of air pollutants on natural, cultural, and social resources on lands managed by the Forest Service.

Aquatic Surveys (AqS)

Aquatic Surveys (AqS) supports ecological and physical stream variables for three hierarchical levels of the riverine system on National Forest System (NFS) lands: valley

segments, stream reaches and channel units. Data collected about aquatic fauna communities (fish, invertebrates, macroinvertebrates, amphibians, reptiles) in streams, lakes and spring environments are supported.

Field Sampled Vegetation Spatial (FSVeg Spatial)

FSVeg Spatial manages spatial and tabular vegetation data in one place, at one time. It contains three types of data:

- The vegetation polygon feature class (required to use FSVeg Spatial),
- The vegetation point feature class, and
- Non-stand-exam vegetation data associated with the polygon feature class.

NRM is working with units to move vegetation data from forests into the FSVeg Spatial application.

National Visitor Use Monitoring (NVUM)

National Visitor Use Monitoring (NVUM) software manages information gathered from on-site surveys of recreation visitors to lands managed by the Forest Service. For information about NVUM's statistical methodology, visit Recreation, Heritage & Wilderness Programs National Visitor Use Monitoring Program. Data collection is based on a stratified random sample methodology to develop sound estimates of visitor use, characteristics, satisfaction, and spending information for each national forest.

The NVUM Results software is now available to the public on the Internet. It delivers NVUM statistics at the national, regional and forest scales using 70 pre-defined reports and maps. Results from individual forests can be combined using the Results software to access multiple-forests, regional, and national estimates of the numbers and types of recreation visits. Reports are available for all years beginning with fiscal year 2005 (October 1, 2004 to September 31, 2005).

Rangeland Inventory and Monitoring

Rangeland Inventory and Monitoring supports national protocols for vegetation and ground cover sampling, general site characterization and detailed soil pedon descriptions. The application supports site characterization, interpretations and classifications; it also accommodates casual point observations with basic attributes.

National vegetation sampling protocols supported by the application include: Tree/Snag, Ocular Macroplot, Line Intercept, Cover Frequency, Nested Rooted Frequency, Robel Pole, Density, Paced Transect, Macroplot, Riparian Greenline–Winward, Riparian Cross Section–Winward, and Riparian Woody Regeneration–Winward. Rangeland Inventory and Monitoring is a spatial application intended for defined projects with formal protocol- or program-driven inventories.

Threatened, Endangered, and Sensitive Plants, and Invasive Species (TESP/IS)

TESP/IS support national data collection standards for combined TESP and invasive species surveys, TESP element-occurrences, and Invasive Species Inventories.

Water Rights and Uses (WRU)

Water Rights and Uses (WRU) tracks state and federally recognized water uses and related information regarding the water source, beneficial uses, quantity, and periods of water use. The application also tracks core information about water rights that may be associated to the water use and the legal and administrative actions that occur. Data collected during site visits to water use system components includes descriptions and dimensions of the water use system as well as site maps, reports and digital photographs. Integration with other Forest Service corporate applications including Automated Lands Project (ALP) and Infra are also supported to provide for a variety of integrated reports.

Watershed Classification and Assessment Tracking Tool (WCATT)

NRM developed the Watershed Classification and Assessment Tracking Tool (WCATT) application in support of the Watershed Condition Framework (WCF) to provide a nationally consistent approach for classifying watershed condition. The tool supports the entering, editing and reporting of classification and assessment data for watersheds that contain U.S. Forest Service lands. WCATT provides a Geographic Information System (GIS) approach to data input for tracking Watershed Classification by 12-digit hydrologic units by year. The Watershed, Fish, Wildlife, Air, and Rare Plants Directors area sponsor it.

WIT

Watershed Improvement Tracking (WIT) manages data, observations and planning details about sites that need to be (or have been) restored or improved with the intent of benefiting watershed and aquatic ecosystem health and function. The application is a watershed restoration activity tracker that addresses site conditions, administrative plans and actions, and outcomes. The primary users of WIT are biologists and hydrologists; however, the reporting products deliver raw or summarized information valuable for project leaders, program managers, and public relations staff.

Wildlife

Wildlife supports terrestrial animal observations and site inventories.

TIM

The Timber Information Manager (TIM) supports the business of managing Timber Sales, Salvage Sales, Stewardship Contracts, and Forest Products Permits on National Forest lands. While TIM is used to complete the resource job at the field-level, it simultaneously captures information for service-wide reporting needs. TIM is integrated with other national systems, such as FACTS and PALS for project data, National Cruise applications (for timber volume), FMMI for contacts and billing information, and ATSA for payments, interest, penalties, and contract bonding.

Reports for many of these metrics are available upon request.

Project Level Monitoring

The Forest Monitoring Team did not complete any project monitoring in FY 2015-2018. However, Forest-wide and district level project monitoring was conducted for most resources, including watershed, wildlife, and fire. Reports are available upon request.

MONITORING AND EVALUATION REPORT TIMING

The 2018 Monitoring and Evaluation report documents and discloses monitoring results from fiscal years 2016 through 2017. Each Forest Plan Monitoring and Evaluation report is intended to be a “living” document, meaning information displayed in the 2018 report will be considered part of the next report. Much of what is learned from monitoring and evaluation is based on how things evolve from year to year, rather than what is learned at a single point in time.