United States Department of Agriculture
Forest Service

2018 Biennial Monitoring and Evaluation Report

Humboldt National Forest Land and Resource Management Plan

June 2018

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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 administrate 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?	Yes	No	N/A
(MON-SOIL-01) How are characteristics of soil health and productivity changing?	Yes	No	N/A
(MON-SOIL-02) How are management activities affecting soil health and productivity?	Yes	No	N/A
(MON-VEG-COND-01) What changes have occurred to landscape scale vegetative community types?	Uncertain (B)	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	Yes	Need to increase focused management on wild horses and elk where there are impacts to vegetation condition.
(MON-FOCAL-SPECIES-01) How are Populus tremuloides	Yes	Yes	Need to increase aspen stand management to address effects from

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]
(aspen) communities changing over time?			combined effects of all ungulates.
(MON-FOCAL-SPECIES-02) What do aquatic macroinvertebrate communities indicate about stream ecosystem integrity?	Yes	No	N/A
(MON-T&E-01) Are forest management activities affecting recovery of T and E species?	No (C)	No	N/A
(MON-REC-01) Is the Forest's developed recreation program meeting visitor needs and providing for public health and safety at Forest facilities?	Yes	Yes	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
(MON-CULT-01) Are cultural resources being evaluated for the National Register of Historic Places and protected and if required, are mitigation measures (avoidance, data recovery, etc.) appropriate and effective in the given situation?	Uncertain (A)	Yes	Need to include number of sites monitored to better understand the sample size of sites impacted.
(MON-CULT-02) Are significant cultural resources being interpreted?	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.

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-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	Yes	No	Suggest need for future management of wild horse herds.
(MON-MULTI-01) Is the supply of firewood adequate to meet the demand?	Yes	No	N/A
(MON-MULTI-02) How many road and trail rights of way are acquired annually?	Yes	No	N/A
(MON-MULTI-03) Are property boundaries sufficiently marked and identified to prevent trespass?	Yes	No	N/A
(MON-MULTI-04) Are Aspen/Hardwood stands being managed for multiple benefits?	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) Is the management of wildland fires accomplishing protection objectives for important Values at Risk (VAR)?	No	Yes	Need to remove Monitoring question from Monitoring Program.
(MON-FIRE-03) Is the response to wildland fires trending more towards using fire as a management tool to achieve land and resource management objectives?	No	Yes	Need to amend plan to allow for the management of wildland fires for land and resource objectives.

[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 Humboldt 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 2022. While the report provides some data for the Cultural Resource Monitoring questions a transition of data form 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 Humboldt 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 Humboldt 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.
- 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 seleceted 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 2022 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.

Monitoring Result

Indicator 1: Indicator 1 data show 14 sub-watersheds are in a Functional condition, 191 sub-watersheds are in a Functional at Risk condition, and 15 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 56% and 55% of watersheds being rated as Non-Functional for these indicators, respectively.

Indicator 2: Data show that one meadow restoration project was completed in FY17 in the Cold Springs Meadow and one meadow restoration project was completed in very early FY18 in Holloway meadow in the Headwaters North Fork Little Humboldt River sub-watershed, one of two Priority Watersheds currently identified in the planning area. Neither sub-watershed has yet been identified as having improved condition due to management activities.

Finding

Indicator 1: Because the watershed classification data which are available to inform Indicator 1 were primarily developed in 2011 during a very 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., 87% of watersheds rated as Functional-at-Risk and 7% 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 Humboldt 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: Indicator #1 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: Indicator #2 PacFish/InFish (PIBO) 2012-2014 report

Monitoring Result

Indicator 1: data show 160 miles of impaired streams (34 segments) and 60 acres of lakes/ reservoirs (two locations).

Indicator 2: for Jerritt Canyon associated streams, baseline condition samples in the 1970s were dominated by mayflies, but recent sampling events have found an assemblage dominated, in terms of density, by true flies, especially the family Chironomidae (midges). The intermittent nature of these streams, combined with drought conditions in some years, have likely caused the shift in composition over the monitoring period. These changes indicate deteriorating water quality conditions most likely attributable to lower stream flows.

Monitoring completed on 25 streams within the PIBO area from 2012-2014, 21 streams sampled had a RIVPACS score above 0.78 and four streams had scores above 0.78. (Scores > 0.78 indicate good quality habitat whereas scores < 0.78 indicate poorer quality habitat.)

Finding

Indicator 1: Monitoring results do not indicate a need for changing the Humboldt 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 results do not indicated a need for change of the Humboldt National Forest Plan. For monitoring (2017) macroinvertebrate in streams associated with mine activities at the Jerritt Canyon Mine, the change in the persistence of flows (perennial to ephemeral) has caused a shift of macroinvertebrate communities those more associated with degraded water quality conditions. This change is mostly attributable to drought conditions not forest management activities.

PacFish/InFish (PIBO) monitoring group monitors streams with the Columbia River Watershed on the Humboldt National Forest. The PIBO sampling scheme includes repeat sampling of streams every 5 years. The most recent (2012-2014) macroinvertebrate sampling by PIBO of several streams indicate that these water bodies may have water quality conditions below that of what is desired. It is likely that land management activities is a contributing factor to these conditions.

Soils

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. USFS R04 BMP Monitoring database.

Monitoring Results

Wild horse use is detrimentally impacting some springs and streams at lower elevations particularly on the Ely Ranger district. 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.

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.

Soil temperature is being measured by a variety of SnoTel, SCAN, and other micrometerological stations. Efforts are currently ongoing to compile this data to start developing trends to determine if any longterm changes in soil climate is occurring.

Water quality BMP monitoring has been in initiated on selected projects for different activities.

Indicator 5: Data show that mechanical fuel treatment BMPs in the Ice Plant 2 area were marginally implemented and mostly effective.

Finding

Soil health and productivity across the Humboldt 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, and accelerated erosion and sedimentation.

Projects to convert pinyon-juniper woodlands back to sagebrush ecosystems are, for the most part, improving the soil function in those area. A few of those areas have seen an increase in annual brome (cheatgrass) that are negatively affecting the health of those soils.

Indicator 5: Does not indicate a need for change of the Humboldt National Forest Plan. In FY17, the BMP implementation and effectiveness of one activity with the potential to impact soil resources was monitored and resulted in a "Fair" composite score.

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, USFS R04 BMP Monitoring database.

Monitoring Results

Wild horse use is detrimentally impacting uplands, springs and streams at lower elevations on the Ely and Santa Rosa Districts. 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.

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.

Water quality BMP monitoring has been in initiated on selected projects for different activities.

Indicator 3: Data show that mechanical fuel treatment BMPs in the Ice Plant 2 area were marginally implemented and mostly effective.

Finding

Soil health and productivity across the Humboldt 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, increased bare soil, 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 on the Santa Rosa and Ely Ranger districts are being implemented to reduce erosion on uplands, and improve riparian soil function, along streams and spring systems.

Indicator 3: Does not indicate a need for change of the Humboldt National Forest Plan. In FY17, the BMP implementation and effectiveness of one activity with the potential to impact soil resources was monitored and resulted in a “Fair” composite score.

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

In riparian meadows noxious weed occurrences have remained fairly stable, with areas being treated almost equaling areas being inhabited. Invasive weeds continue to move and expand into disturbed meadow sites, but can ebb with positive management changes. The Forest is now home to some newer invasive species, not previously encountered during field monitoring, such as littlepod false flax (*Camelina macrocarpa*), desert madwort (*Alyssum desertorum*), and several annual brome grasses (*Bromus* species). In mesic to wet sites with disturbance Musk thistle (Caardus nutans), Canada thistle (Circium arvense) and Scotch cotton thistle (Onopardum acanthium) continue to be a problem. Medusahead (*Tainiatherum caput-medusae*) was found in a dry graminoid meadow community on the Santa Rosa District.

Most sagebrush sites are in functional condition and stable. However, some Wyoming big sagebrush and low sagebrush sites have converted to a predominance of invasive

species cheatgrass (*Bromus tectorum*) and annual forbs such as tumblemustard (*Sisymbrium altissimum*) with recent fires.

2016 and 2018 monitoring data on the Santa Rosa Ranger District reported medusahead (*Tainiatherum caput-medusae*), scotch cotton thistle (*Onopordum acanthium*), Canada thistle (*Circium arvense*) and bull thistle (*Circium vulgare*). In the Mountain City District monitoring reported whitetop (*Cardaria draba*) and perennial pepperweed (*Lepidium latifolium*).

Aspen was monitored on the Jarbidge Ranger District, and although the tree cover has not changed significantly, the understory vegetation has seen significant improvement due to changes in grazing management. Repeat monitoring occurred on two mesic meadows in the Mountain City District, and both show some decline due to a combination of livestock grazing and recreational vehicle camping. Large RV camping in meadows, which are already impacted by livestock grazing, is having impacts across accessible sites in the Forest.

Eleven plots in spring habitats were monitored in a wild horse territory on the Ely Ranger District. Four of the plot locations could not be monitored in detail, because the water was piped away, the spring was in a narrow, slot canyon, or the remnant vegetation was limited to a tall, wild rose thicket. All of the monitored sites, except for two in slot canyons, had heavy trampling, low amounts of desirable vegetation and high amounts of bare soil. None were in functioning condition. The data indicates this wild horse population is beyond the capacity of the Forest to support those numbers.

Indicator 2: Fire risk was reduced and fire regime condition class moved towards improved conditions as a result of forest vegetation and fuels reduction treatments. There was a combined 22,300 acres treated across the forest in 2016 and 2017 (12,400 and 9,900 acres respectively). This amount is within the forest 5-year average of acres treated annually.

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

Aspen on the Jarbidge Ranger District has not seen tree cover change significantly, but the understory vegetation has seen significant improvement due to changes in grazing management. Other than the Cherry Creek allotment, permitted livestock are being effectively managed to maintain or improve ecological condition. A cottonwood monitoring plot location in the Jarbidge District was graded and the trees removed to make an unauthorized campsite.

The Ely District has experienced aspen decline related to the introduction of elk. Heavy elk and permitted livestock use in aspen is resulting in the decline of some stands. Wild horse use in the west side of the White Pine Range of the Ely District has expanded outside of the wild horse territory and now covers much of the north half of the mountain range. The ecological condition of riparian areas and surrounding sagebrush plant communities has declined as a result. The soil is compacted and productivity is low to non-existent.

The Mountain City District has many good roads and gentle rolling topography that make it suitable for dispersed recreation in areas also attractive to permitted livestock. Riparian conditions are improving for the locations sampled. Relatively flat meadows close to roads that have been resting sites for cattle are now also parking sites for large recreation vehicles. This dual use is resulting in site specific degradation of riparian meadows through soil compaction and loss a vegetation.

Monitoring data from Santa Rosa District indicates there are condition concerns with riparian sites throughout much of the District. More than half of the plots monitored have rooting depths functioning at risk or not functioning, and all of the plots sampled had cover of desirable plants in functioning at risk or non-functioning condition. Four noxious species were found in two of the 18 sampled areas. The one repeated plot showed a downward trend.

Finding

Working with ranchers/permittees appears to have resulted in improved livestock management on most of the Forest. Introduced elk and wild horse herds are in need of focused management. Recreation use is causing cumulative damage to some riparian areas.

Focal Species

MON-FOCAL-SPECIES-01: How are Populus tremuloides (aspen) communities changing over time?

Indicator 1: Spatial extent (acres) regeneration, disease, age classes, and understory.

Data source: Ecological Condition Monitoring plots

Monitoring Results

Aspen was monitored on the Jarbidge Ranger District, and although the tree cover has not changed significantly, the understory vegetation has seen significant improvement due to changes in grazing management. Repeat monitoring occurred on two mesic meadows in the Mountain City District, and both show some decline due to a combination of livestock grazing and recreational vehicle camping. Large RV camping in meadows, which are already impacted by livestock grazing, is having impacts across accessible sites in the Forest.

The Ely Ranger District has experienced aspen decline related to the introduction of elk. Heavy elk and permitted livestock use in aspen is resulting in the decline of some stands.

Finding

Aspen stands on the Jarbidge District are improving with changes in grazing management. Aspen stands on the Ely Ranger District are declining in areas with heavy elk, permitted and feral wild horse, and livestock use.

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

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

Data source: Ecological Condition Monitoring Plots

Monitoring Results

In riparian meadows noxious weed occurrences have remained fairly stable, with areas being treated almost equaling areas being inhabited. Invasive weeds continue to move and expand into disturbed meadow sites, but can ebb with positive management changes. The Forest is now home to some newer invasive species, not previously encountered during field monitoring, such as littlepod false flax (Camelina macrocarpa), desert madwort (Alyssum desertorum), and several annual brome grasses (Bromus species). In mesic to wet sites with disturbance Musk thistle (Caardus nutans), Canada thistle (Circium arvense) and Scotch cotton thistle (Onopardum acanthium) continue to be a problem. Medusahead (Tainiatherum caput-medusae) was found in a dry graminoid meadow community on the Santa Rosa District.

Most sagebrush sites are in functional condition and stable. However, some Wyoming big sagebrush and low sagebrush sites have converted to a predominance of invasive species cheatgrass (Bromus tectorum) and annual forbs such as tumblemustard (Sisymbrium altissimum) with recent fires. 2016 and 2017 monitoring data on the Santa

Rosa Ranger District reported medusahead (Tainiatherum caput-medusae). This highly invasive species is of great concern, as it can out compete the current dominant annual invasive cheatgrass.

Finding

The Santa Rosa District has seen increases in invasive annual grasses cheatgrass (Bromus tectorum), field brome (Bromus arvensis), bald brome (Bromus racemosus) and rattlesnake brome (Bromus briziformis) with increased fire or other disturbance. The other Districts on the Humboldt National Forest have some invasive species, but higher elevations, more resistant soil types and lower levels of disturbance have protected these areas from large acres of invasives.

Threatened and Endangered

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

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

Data source: Indicator #1 data were retrieved from the US Forest Service Watershed Condition Assessment Tracking Tool (WCATT) database.

Indicator 2: Essential projects completed.

Data source: Indicator #2 data were identified by personal knowledge of the Forest Hydrologist, John McCann, of projects completed on the Forest.

Indicator 3: Invasive and noxious species, sagebrush, pinyon-juniper, whitebark pine, wet-to-dry meadows and riparian zones, aspen, and fir encroachment.

Data source: Indicator #3 Ecological Condition Monitoring Plots

Monitoring Results

Indicator 1: Indicator 1 data show 14 sub-watersheds are in a Functional condition, 191 sub-watersheds are in a Functional at Risk condition, and 15 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 56% and 55% of watersheds being rated as Non-Functional for these indicators, respectively.

Indicator 2: Data show that one meadow restoration project was completed in FY17 in the Cold Springs Meadow and one meadow restoration project was completed in very early FY18 in Holloway meadow in the Headwaters North Fork Little Humboldt River sub-watershed, one of two Priority Watersheds currently identified in the planning area.

Neither sub-watershed has yet been identified as having improved condition due to management activities.

Indicator 3: In riparian meadows noxious weed occurrences have remained fairly stable, with areas being treated almost equaling areas being inhabited. Invasive weeds continue to move and expand into disturbed meadow sites, but can ebb with positive management changes. The Forest is now home to some newer invasive species, not previously encountered during field monitoring, such as littlepod false flax (*Camelina macrocarpa*), desert madwort (*Alyssum desertorum*), and several annual brome grasses (*Bromus* species). In mesic to wet sites with disturbance Musk thistle (Caardus nutans), Canada thistle (Circium arvense) and Scotch cotton thistle (Onopardum acanthium) continue to be a problem. Medusahead (*Tainiatherum caput-medusae*) was found in a dry graminoid meadow community on the Santa Rosa District.

Most sagebrush sites are in functional condition and stable. However, some Wyoming big sagebrush and low sagebrush sites have converted to a predominance of invasive species cheatgrass (*Bromus tectorum*) and annual forbs such as tumblemustard (*Sisymbrium altissimum*) with recent fires.

Wild horse use in the west side of the White Pine Range of the Ely District has expanded outside of the wild horse territory and now covers much of the north half of the mountain range. The ecological condition of riparian meadows and stream ecosystems and surrounding sagebrush plant communities has declined as a result. The soil is compacted and productivity is low to non-existent. The soil is compacted and productivity is low to non-existent.

Aspen was monitored on the Jarbidge Ranger District, and although the tree cover has not changed significantly, the understory vegetation has seen significant improvement due to changes in grazing management. Repeat monitoring occurred on two mesic meadows in the Mountain City District, and both show some decline due to a combination of livestock grazing and recreational vehicle camping. Large RV camping in meadows, which are already impacted by livestock grazing, is having impacts across accessible sites in the Forest.

Finding

Indicator 1: Because the watershed classification data which are available to inform Indicator 1 were primarily developed in 2011 during a very 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., 87% of watersheds rated as Functional-at-Risk and 7% 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 results do not indicate a need for change of the Humboldt National Forest Plan, forest management, or the monitoring program.

Indicator 3: Monitoring results show some improvement in habitat conditions on the Mountain City and Jarbidge Ranger Districts. In other portions of the Forest T and E species that are dependent on riparian streams and meadows, aspen and drier sagebrush ecosystems have seen a drop in available habitat due to wild horse use, feral livestock use

and inadequate livestock management practices. This drop in available habitat suggests a need to change management practices related to these activities.

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

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

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

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

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

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

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

Frequency: 1 year, Data Source: Infra/NRM

Indicator 5: Number of annual skier days

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

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

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

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 HNF in CY 2016, pass/fail data was available for all 9 water systems. There were 94 (97.9%) passing tests and 2 (2.1%) failing tests (total coliform present). 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 HNF in CY 2017, pass/fail data was available for all 9 water systems. There were 85 (94.4%) passing tests and 5 (5.6%) failing tests (total coliform present).

Indicator 4: In 2000, there were 13 active water systems on the HNF. In 2016 there were nine water systems managed on the HNF. 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: There are no permitted ski areas on the HNF. There is one permitted Heliski operations. The number of skier days for that operation during this time period were not available for this report.

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

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

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

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

Indicator 3: Trail miles maintained to standard

Frequency: 1 year, Data Source: Infra/NRM

Indicator 4: Trail miles improved to standard

Frequency: 1 year, Data Source: Infra/NRM

Indicator 5: Miles of new trail constructed

Frequency: 1 year, Data Source: Infra/NRM

This indicator 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

Frequency: 1 year, Data Source: Infra/NRM

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%

Activity	SMNRA	HTNF outside SMNRA
Relaxing	31.4%	12.4%
Driving for Pleasure	25.3%	10.8%

Indicator 3: In FY 2016, one district on the HTF reported having completed trail maintenance on 143 miles of trail. In FY 2017, one district on the HNF reported having completed trail maintenance on the HNF 36 miles of trail.

Indicator 4: In FY 2016, one district on the HTF reported having completed trail improvements on 5.8 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. 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: In FY 2017, one district on the HTNF reported having trail miles meeting standard for a total of 75 miles.

Finding

Monitoring has not indicated a need to change the forest plan, to change management activities, or identified the need 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 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

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

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

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

Indicator 3: Miles of high clearance road maintained

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

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

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

Indicator 5: Miles of passenger car road maintained

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

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

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

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 HNF. In FY 2017, 28.7 miles of road were reported as having been decommissioned on the HNF.

Indicator 3: In FY 2016, 14.4 miles of high clearance road were reported as having been maintained on the HNF. In FY 2017, 52.8 miles of high clearance road were reported as having been maintained on the HNF.

Indicator 4: In FY 2016, no miles of high clearance road were reported as having been improved, constructed or reconstructed on the HNF, In FY 2017, 0.5 miles of high clearance road were reported as having been improved, constructed or reconstructed on the HNF.

Indicator 5: In FY 2016, 101.9 miles of passenger car road were reported as having been maintained on the HNF. In FY 2017, 101.5 miles of passenger car road were reported as having been maintained on the HNF.

Indicator 6: In FY 2016, 0.9 miles of passenger car road were reported as having been improved, constructed or reconstructed on the HNF. In FY 2017, 1.8 miles of passenger car road were reported as having been improved, constructed or reconstructed on on the HNF.

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

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

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

Frequency: 1 year, Data Source: Infra/NRM

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

Frequency: 1 year, Data Source: Infra/NRM

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)

Frequency: 1 year, Data Source: Data not available at time of publication.

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)

Frequency: 1 year, Data Source: Data not available at time of publication

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: Data Source: Data not available at time of publication

Indicator 5: Data Source: Data not available at time of publication

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: Are cultural resources being evaluated for the National Register of Historic Places and protected and if required, are mitigation measures (avoidance, data recovery, etc.) appropriate and effective in the given situation?

Indicator 1: Number of acres inventoried and number of cultural resources recorded.

Data source: The baseline data presented here is from both the Humboldt-Toiyabe National Forest and the Humboldt-National Forest and uses Forest Service Heritage INRA and data and Forest Service Heritage files.

Indicator 2: Number of significant properties evaluated to the National Register?

Data source: The baseline data presented here is from both the Toiyabe National Forest and the Humboldt National Forest and uses Forest Service Heritage INFRA and data and Forest Service Heritage files.

Indicator 3: Number of eligible significant properties being adversely impacted by federal undertakings, looting, environmental disturbance, and other actions.

Data source: The baseline data presented here is from both the Toiyabe National Forest and the Humboldt National Forest and uses Forest Service Heritage INFRA and data and Forest Service Heritage files.

Monitoring Results

Indicator 1: The baseline data for the Humboldt-Toiyabe National Forest is 659,629 acres inventoried and 11,118 sites discovered.

Indicator 2: There are 321 properties that have been evaluated on the Humboldt National Forest as significant.

Indicator 3: Cultural resources are being evaluated for the National Register and are being protected. The baseline data only indicates three significant sites being adversely impacted by federal undertakings, looting, environmental disturbance, and other actions.

Finding

Monitoring has not indicated a need to change of the management direction for Cultural Resources in the Humboldt National Forest Plan. There may be a need to change the monitoring program to include reporting on the number of sites monitored as well as the number of significant properties being adversely impacted.

MON-CULT-02: Are significant cultural resources being interpreted?

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

Data source: The baseline data presented here is from both the Toiyabe National Forest and the Humboldt National Forest and uses Forest Service Heritage INFRA and data and Forest Service Heritage files.

Indicator 2: Number of significant cultural resources being interpreted (e.g. graphics, tours, etc.) and interpretative Heritage products created.

Data source: The baseline data presented here is from both the Toiyabe National Forest and the Humboldt National Forest and uses Forest Service Heritage INFRA and data and Forest Service Heritage files.

Monitoring Results

Indicator 1: The baseline data for the Humboldt National Forest indicates that 321 significant properties have been evaluated to the National Register.

Indicator 2: The baseline data for the Humboldt National Forest indicates that six cultural resources have interpreted and five interpretative Heritage products produced.

Monitoring has not indicated a need for change of the Humboldt National Forest Plan.

Finding

The available data lacks the accuracy to produce valid monitoring at this time. The 2020 Monitoring report will provide additional information related to this monitoring question.

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: Indicator #1 District records, internet search.

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

Data source: Indicator 2 data were retrieved from the NRCS Snow Survey Program's online database.

Monitoring Results

Indicator 1: On the HNF, operational days for the Ruby Mountain Helicopter Skiing 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.

Indicator 2: Data show that water year 2017 (October 1, 2016 – September 30, 2017) was above average in terms of the amount of snow that fell throughout the planning area. Snow measured in April was between 130% and 180% of 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

Indicator 1: Monitoring has indicated a need to change the monitoring program. Components of Indicator #1 (MON-CLIM-01-01: Number of open/operational days at winter recreation sites and services) should be removed from the monitoring program. On the HNF, permittee reporting at the end of their season for the Ruby Mountain Helicopter Skiing 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 Humboldt 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, melt out date, monthly/ annual temperature statistics.

Data source: Indicator 1 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 MON-CLIM-01 Indicator 1 with water year 2017 showing high totals of precipitation and early water year 2018 being lower than average. Data are not available to demonstrate a trend in temperatures. 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 was higher than long term averages.

Finding

Indicator 1: does not indicate a need for change of the Humboldt 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: Indicator #1 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 varied across the planning area relative to average. Discharge in Lamoille Creek (Ruby Mountains) and Martin Creek (Santa Rosa Mountains) was more than double long term averages. Jarbidge River discharge was about 150% of long term averages. Steptoe Creek in the Ely Ranger District was only about 80% of average.

Finding

Indicator #1 does not indicate a need for change of the Humboldt National Forest Plan.

Wild Horses and Burros

MON-WHB-01: What are the actual or estimated numbers of wild horses and burros

Indicator 1: Census or modeled data for population size.

Data source: 2017 population data comes from estimates of population growth entered in the INFRA Range Database. These estimates are based on the June 2016 statistical analysis of February 2016 aerial census data for Triple B and Pancake Complexes.

Monitoring Results

The Cherry Springs Wild Horse Territory is within the established AML range. The Monte Cristo Wild Horse Territory is over the AML range by 20%.

Finding

The Cherry Springs Wild Horse Territory is within AML. The Monte Cristo Wild Horse Territory is over AML suggesting the need for future management action.

Multiple Uses

MON-MULTI-01: Is the supply of firewood adequate to meet the demand?

Indicator 1: Number of cords (ccf) sold.

Data source: Forest Service PTSAR database

Monitoring Results

The forest sold 760 and 690 cords in 2016 and 2017 respectively. This amount fits within previous year sales of public fuelwood. There were no commercial sales of fuelwood offered during this time.

Finding

The forest sells fuelwood permits based upon supply and demand from users. Forest management projects and tree mortality lead to a consistent supply of fuelwood for the public. Should demand increase or change, the forest is able to increase its number of permits sold for both public and commercial use.

MON-MULTI-02: How many road and trail rights of way are acquired annually?

Indicator 1: Miles of ROW or acres accessible.

Data source: Landownership Adjustment Data System (LADS) and discussing with RO Land Management Personnel.

Monitoring Results

No right of ways were acquired during the monitoring period. Since this is the first year of monitoring, do not recommend any changes to the forest plan or forest management, continue to monitor.

Finding

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

MON-MULTI-03: Are property boundaries sufficiently marked and identified to prevent trespass?

Indicator 1: Number of boundary miles posted and number of trespass cases identified.

Data source: The data source for the number of boundary miles posted is the end of the year report provided to the Regional Office from the Nevada Zone Lead Land Surveyor. The data source for the number of trespass cases identified is the Title Claims and Encroachments Program database.

Monitoring Results

In 2016 the number of miles of new boundary line that was posted was 32 miles. The number of trespass cases identified in 2016 is unknown. In 2017 the number of miles of new boundary line that was posted was 31 miles and no new trespass cases were reported. Since this is the first year of monitoring, do not recommend any changes to the forest plan or forest management, continue to monitor.

Finding

Monitoring has not indicated a need for change of the current National Forest Plan.

MON-MULTI-04: Are Aspen/Hardwood stands being managed for multiple benefits?

Indicator 1: Acres of aspen stands treated.

Data source: Corporate Data Warehouse – FACTS, contract documents.

Monitoring Results

In 2016 and 2017 there were approximately 430 acres of aspen stands treated with mechanical conifer removal, piling, and prescribed burning on the Ely and Jarbidge districts. These aspen stands are expected to regenerate by aspen suckering post treatment.

Finding

Aspen treatments within these areas have met multiple objectives for fuels reduction, forest health, wildlife habitat improvement, and aesthetics/recreation. Multiple benefits

are accomplished with these treatments. The forest will continue to treat aspen and establish a trend in acres treated.

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.

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: Is the management of wildland fires accomplishing protection objectives for important Values at Risk (VAR)?

Indicator 1: The trend in loss or damage to important VARs is remaining stable or is decreasing.

Indicator 2: The trend in allowing wildland fires to be managed as opposed to fires being fully suppressed is increasing (both the number of fires being managed and the amount of acres treated).

Data source: Corporate Data Warehouse – FACTS

Monitoring Results:

In 2016 and 2017 forest fuels treatments totaled 25,300 acres (16,100 and 9,200 acres respectively). Of this amount approximately 2/3 of the treatments were conducted outside of the WUI, while 1/3 was done in the WUI. These values were attributed to treatments within pinyon/juniper types for sage brush ecosystem management. In addition, approximately 900 acres were treated using prescribed fire, which accounts for ~4% 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. 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.

MON-FIRE-03: Is the response to wildland fires trending more towards using fire as a management tool to achieve land and resource management objectives?

Indicator 1: The trend in allowing wildland fires to be managed as opposed to fires being fully suppressed is increasing (both the number of fires being managed and the amount of acres treated).

Indicator 2: Spatial extent (acres) regeneration, disease, age classes, and understory.

Data source: Not available

Monitoring Results

While there is very little data available for this report there is general consensus among managers that allowing wildland fire to be managed to help achieve land and resource management objectives would be a useful tool.

Finding

There is a need to amend the Forest plan to make it easier for Forest Line Officers and Wildland Fire Managers and to assess wildland fires manage them to achieve land and resource objectives.

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

Monitoring has indicated a need to change Forest Plan Direction in the following ways. While the plan is 32 years old these changes will be made during the Plan Revision effort scheduled to

begin in 2022. At that time the Forest will review this and subsequent monitoring reports and use them during the assessment process to identify needs for change across the forest.

MON-FIRE-03: There is a need to amend the Forest plan to make it easier for Forest Line Officers and Wildland Fire Managers and to assess wildland fires manage them to achieve land and resource objectives.

NEED FOR CHANGING MANAGEMENT ACTIVITIES

Mon-Veg-Cond-2: Indicates a need for focused management on wild horse and elk populations to reduce impacts to aspen stands and elk and wild horse winter ranges**.**

Mon-TES-01 Indicator #3: In portions of the Forest T and E species that are dependent on riparian streams and meadows, aspen and drier sagebrush ecosystems have seen a drop in available habitat due to wild horse use, feral livestock use and inadequate livestock management practices. This drop in available habitat suggests a need to change management practices related to these activities.

Mon-WHB-01: The Monte Cristo Wild Horse Territory is over AML suggesting the need for future management action.

NEED FOR CHANGING THE MONITORING PROGRAM

Monitoring has indicated a need to change or remove monitoring indicators for several of the monitoring questions. The indicators to be removed or changed along with the recommended change are listed below:

Mon-Veg-Cond-01 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.

MON-REC-02 Indicator #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 of the MON-REC-02-05: Miles of new trail constructed) should be removed from the monitoring program. 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 HNF, permittee reporting at the end of their season for the Ruby Mountain Helicopter Skiing recreation special use permit does not include a requirement of reporting number of operational days to the Forest Service. Being able to track these numbers does not provide meaningful information regarding climate change.

Mon-Fire-01: 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.

NEED FOR CONDUCTING AN ASSESSMENT TO DETERMINE PRELIMINARY NEED TO CHANGE THE PLAN

MON-WTRSHD-01 Indicator 1 Monitoring has indicated a need to conduct an assessment to evaluate the existing watershed data used to respond to Monitoring questions (MON-WTRSHD-01 and MON-TES-01). Using the WCATT data seems to indicate that approximate 87 percent of all the watersheds on the Forest are either functioning at risk or not functioning. Knowledge of watershed conditions based on field observations suggest the WCATT data may be in error. Conducting an Assessment (36 CFR 219.5 and 6) of the Watersheds across the Forest could help better define watershed conditions across the Forest and verify the accuracy/inaccuracy of the WCATT data.

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 THE 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 Humboldt National Forest monitoring program was updated in April, 2016 for consistency with the 2012 planning regulations [36 CFR 219.12 (c)(1)]. The Humboldt 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 Humboldt 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 Humboldt 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

The monitoring questions found in chapter five of the Humboldt 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.

PIBO

The PacFish/InFish Biological Opinion Monitoring Program (PIBO) monitors stream and riparian habitats within the PIBO study area, which within the Humboldt-Toiyabe National Forest includes streams which are part of the Columbia River Basin on the Mountain City, Ruby Mountains, and Jarbidge Ranger District. The goal of PIBO is to determine if the PacFish (Pacific Anadromous Fish) and InFish (Inland Fish) aquatic conservation strategies can effectively maintain or restore the structure and function of riparian and aquatic systems. Objectives of PIBO include: 1) Determine whether a suite of biological and physical attributes, and functions of upland, riparian, and aquatic

systems are being degraded, maintained, or restored across the PIBO landscape; 2) determine the direction and rate of change in riparian and aquatic habitats over time as a function of management practices; and 3) determine if specific Designated Management Area practices related to livestock grazing are maintaining or restoring riparian vegetation structure and function.

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.