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Monitoring Report for the Inyo National Forest Land Management Plan 2020 – 2021

Forest Service

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https://www.fs.usda.gov/main/inyo/landmanagement/planning

About our Plan Monitoring Program

Purpose

The purpose of this first biennial monitoring evaluation report is to describe the evaluation of information gathered through the Inyo National Forest plan monitoring program during 2020 and 2021. This is the first monitoring report for the Inyo National Forest under the revised 2019 forest plan. Data were gathered for fiscal years 2020 and 2021.

This report is not a decision document. Rather, this report has been developed in compliance with the National Forest Management Act policy 36 CFR 219.12. This report is a vehicle for disseminating to the public timely, accurate monitoring information as well as recommended changes and adaptive management responses.

How Our Plan Monitoring Program Works

Forest plans are required to have plan monitoring programs that inform the management of resources in the plan area by testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress towards achieving plan components like desired conditions and objectives (36 CFR 219.12). The monitoring results 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, management activities, the monitoring program, or whether a new assessment is warranted.

The Inyo National Forest plan monitoring program includes 25 questions that relate to specific plan desired conditions and one goal. Collectively, the monitoring questions cover the eight required topics, as well as social, economic, and cultural sustainability (see box below). Some questions cover more than one topic. Our monitoring results were grouped into seven themes including:

(1) watershed condition;

(2) status of select ecological conditions;

(3) ecological conditions for at-risk-species;

(4) visitor use, satisfaction, and progress toward meeting recreation objectives;

(5) climate change and other stressors;

(6) fire conditions; and

(7) social and economic sustainability.

The monitoring questions, indicators, and results you'll read about in this report address these themes.

The Inyo National Forest plan monitoring program covers these eight required topics, in addition to social, economic, and cultural sustainability.

1. The status of select watershed conditions.
2. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
3. The status of focal species to assess the ecological conditions required under § 219.9.
4. The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
5. The status of visitor use, satisfaction, and progress toward meeting recreation objectives.
6. Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
8. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)). (36 CFR 219.12(a).

Results Summary

This monitoring report describes the results of monitoring activities in fiscal years 2020 and 2021 for the Inyo National Forest. The Forests collected data to answer 21 of the monitoring questions in the plan monitoring program. The remaining four questions are monitored on a longer reporting cycle, or we did not have the capacity to complete the analysis, so we will report on them in future biennial monitoring reports.

Monitoring results indicate that, in general, we do not yet have enough information to determine whether we are moving toward desired conditions in our land management plan (Table 1). Of the 21 monitoring questions addressed in this monitoring report, 9 have uncertain results, eight are consistent with Plan desired conditions, one is not consistent with Plan desired conditions, and three show partial consistency.

We do not see the need for changes to the land management plan, or for a new assessment. Only one monitoring result suggests a need for a change in management activities (increase forest management in whitebark pine), consistent with Forest Plan components.

We propose to make changes to our plan monitoring program which is part of our land management plan. These changes would improve the clarity of the questions and take advantage of the best available scientific information and data sources (see Table 1).

This report is a brief summary of findings. A supplemental report, with more detailed data and findings, can be found on the Forest monitoring website at: https://www.fs.usda.gov/main/inyo/landmanagement/planning

Table 1. Monitoring results consistency with the Inyo National Forest land management plan (2019) and recommendations for action, adaptive management, or change. Monitoring results cover fiscal years (FY) 2020 and 2021.

Monitoring Questions	Results consistent with plan direction?	Recommended action, adaptive management, or change
Theme 1: Watershed Conditions		
WS01. To what extent are watersheds in proper functioning condition being maintained, and watersheds in altered or impaired condition being improved?	**NA**. did not complete watershed condition assessment since 2019.	None
AE03. What is the status of water quality in national forest waterbodies?	**Uncertain.** available data for 303(d) listing and bacteria levels pre-date the 2019 Plan. As of 2018, 16 waterbodies on the Inyo NF have a 303(d) listing status. Data for bacteria levels have too few data points and lack repeat measurements to make conclusions at the watershed scale.	Change indicator 2 (water quality) in monitoring program from Forest-wide bacteria measurements to site or activity-specific study.
WS02. To what extent has erosion from temporary and permanent roads and trails affected water quality and soil sustainability in the national forest?	**Yes.** An average of 80% of monitored roads have had little to no soil erosion or water quality impacts (2011-2021). Fewer than 10% had major impacts, and many of those were repaired. BMPs are being implemented and have mostly been effective in preventing erosion. Nearly 2500 ft^2 of streambank adjacent to roads and trails stabilized.	None
PR01. How does soil disturbance differ from pre- and post-activity for timber management?	**Yes.** Pre- and post-disturbance monitoring showed no evidence of detrimental soil disturbance. While disturbance increased post-activity, it was never found to be severe enough to cause detrimental soil effects.	Increase the number of pre- and post-implementation monitoring sites and include areas used for public fuelwood collection.
FS02. How are aquatic benthic macroinvertebrate communities indicating stream ecosystem integrity is being maintained in high quality waters or improved in degraded waters?	**Uncertain.** All data pre-date the 2019 Plan. Six creeks were sampled one time between 1999 and 2014; five of the creeks exceeded expected conditions. The available data have too few data points, with a lack of repeat measurements.	Remove question. Forest-wide data with repeated measurements are unavailable , other monitoring questions better address aquatic ecosystems. Macroinvertebrates are also evaluated as part of the Region 5 broader-scale monitoring strategy.
Theme 2: Status of Select Ecological Conditions		
TE01. What is the status and trend of large trees in the	**Partial.** The overall current forest structural conditions are meeting	Include “old forests” in the monitoring question to cover

Monitoring Questions	Results consistent with plan direction?	Recommended action, adaptive management, or change
Sierra Nevada montane forest?	desired conditions for large trees and snag densities. However, there is a deficit of very large trees (>40 inches diameter) in Jeffrey pine and red and white fir. Future monitoring will determine if there is a declining trend.	important aspects of old forests like spatial extent. Remove logs from monitoring indicator 2 because desired conditions for log densities are not provided in the Plan.
TE02. What is the status of pinyon-juniper woodlands?	**Yes -** Pinyon-juniper woodlands are currently meeting desired conditions. However, current patterns in canopy cover loss, tree mortality, wildfire acreage, and treatment area suggest that pinyon-juniper may experience declining trend in the future in response to several interacting stressors. Trends are poorly understood with current data.	Add remote sensing data for pinyon-juniper expansion to this monitoring question, to measure whether stress effects have been compensated, and add earlier data for tree mortality and wildfires.
TE03. What is the condition of sagebrush communities?	**No.** In some areas, sagebrush canopy cover decreased, and in some others, it increased between 2004 and 2020. Overall, sagebrush communities are trending towards decadence with thinning crowns and mortality. We currently lack data on regeneration to understand if dying sagebrush are being replaced. Sagebrush cover decreased slightly in the Sierra Nevada and Eastern Slopes ecoregion where wildfire footprints are quickly colonized by fire-following herbs and resprouting shrubs.	Add an indicator to the monitoring question for sagebrush regeneration to see if decadence is balanced by new growth.
FS01. How is the abundance of Cheatgrass and red brome (nonnative Bromus spp.) changing?	**Uncertain.** Between 2006-2020, there was in increase in Forest wide areas with over 50% invasive grass cover. Data presented in TE03 confirm some of these patterns, of mostly localized sharp increases in invasive grass cover in disturbed areas, and either no change or modest increases elsewhere. The desired condition calls for "limited" non-native annual grasses, and it is uncertain whether the increase is limited or not.	Change the question to how the abundance of cheatgrass and red brome is changing in sagebrush ecosystems, rather than across the entire Forest. This change is to better address the land management plan desired conditions tied to this question, which relate to sage brush and sage grouse habitat.
AE01. What is the vegetative condition of selected grazed and ungrazed meadows?	**Uncertain.** Insufficient data and insufficient monitoring length to determine trends. Of nine grazed meadows monitored, eight were in	None

Monitoring Questions	Results consistent with plan direction?	Recommended action, adaptive management, or change
	excellent and one was in good vegetative condition class. Of the 14 un-grazed meadows monitored, three were fair, seven were good, and four were in excellent vegetative condition class.	
AE02. To what extent are riparian areas functioning properly across different management areas and levels of disturbance?	**Uncertain.** Only one riparian area was monitored since 2019 and was found to be in properly functional condition.	None
Theme 3: Status of Ecological Conditions for At-Risk-Species		
AR01. To what extent is the integrity of special habitats for at-risk plants and animals being maintained or improved?	**Yes**. Special habitats have some minor impacts, but these are being addressed and impacts are limited.	None
AR02. What is the quality of bighorn sheep winter range?	**NA.** Did not report this monitoring period	Change the monitoring question to include only critical habitat, not focus only on winter range, because winter range is not well defined.
AR03. How is the condition of seasonal sage-grouse habitats and connectivity changing?	**Uncertain –** Slightly increased invasive grass cover, but it is unlikely the degree of change is large enough that connectivity is affected.	None
Theme 4: Visitor Use, Satisfaction, ROS Progress		
VU01. What are the trends in visitor use and satisfaction?	**NA.** Did not report this monitoring period because contemporary National Visitor Use Monitoring (NVUM) data are not yet available.	None
VU02. To what extent are trails providing access to the activities as intended?	**Yes.** We conducted very little trail maintenance in 2020 due to the pandemic. In 2021, with the help of partners, we maintained 40% of non-motorized trail miles and 46% of motorized trail miles. While we do not have a trend yet, this is a high percentage of trails maintained and therefore we are meeting access goals on trails.	None

Monitoring Questions	Results consistent with plan direction?	Recommended action, adaptive management, or change
VU03. How effective have Forest communications with the public been in considering diverse backgrounds?	**Yes.** In 2021, we continued quarterly forums with tribal governments to share information about projects and concerns, and hosted a traditional ecological knowledge workshop to promote integration of traditional practices like cultural burning into land management. We hosted the Eastern Sierra Youth Outdoor Program with partners to engage youth of diverse backgrounds. We increased Spanish language news releases and signage.	We did consider diverse backgrounds in communications, and we will continue to work to identify best available science to better capture the intent of this question; whether we reach diverse communities and allow for equal access to Forest resources.
VU04. To what extent is designated wilderness being managed to preserve wilderness character?	**NA.** Did not report this monitoring period. Expected completion year for Wilderness character condition assessments is 2023.	Change monitoring/reporting frequency to every six years to match data availability.
PC04. To what degree is the national forest using partnerships to provide additional capacity for visitor services?	**Yes.** Partnership value of contributed time almost tripled from 2019 to 2021, with an estimate of $2.4 million value of contributed time in 2021, compared to about $0.8 million in 2019.	Slightly change the indictors to be more quantifiable and able to compare from year-to-year.
Theme 5: Climate Change and other Stressors		
CC01. How are high-elevation white pines responding to the effects of climate change and other stressors?	**Partial.** Forest plan desired conditions (TERR-ALPN-DC 03) are being partially met. Whitebark pine spatial extent has remained relatively unchanged because of low levels of canopy cover loss (albeit widespread) coupled with regeneration. Limber pine, already limited on the Forest, has experienced increasing loss and we are finding limited regeneration.	Indicators should have minor alterations to use best available science. For example, remove Forest Inventory Analysis (FIA) as a data source and replace it with eDaRT data, since data collection for the latter is more frequent and robust. For more effective monitoring, proposed changes include conducting focused surveys of whitebark and limber pine and conducting effectiveness monitoring in whitebark pine stands receiving treatments. Consider the application of restoration treatments in additional targeted whitebark pine stands to increase their resilience to stressors.
CC02. What changes have occurred to the timing, amount, and duration of natural and managed runoff	**Uncertain.** Access to older datasets is needed to evaluate trends in runoff. Further, “adequate” quantity and timing of flows is not defined, and	Minor change to monitoring indicator. Indicator 1 was “annual hydrograph”, and this was refined to measure both the date

Monitoring Questions	Results consistent with plan direction?	Recommended action, adaptive management, or change
into the national forest's waterways?	therefore, success will be difficult to measure. This question will need to be used in conjunction with questions under other themes, after more time, to determine how flow changes are affecting ecosystems.	of highest peak flow and center mass of runoff. These better summarize possible shifts in runoff and timing.
Theme 6: Fire Conditions		
CC03. How are fire regimes changing compared to the desired conditions and the natural range of variation?	**Partial.** This baseline data indicates fires are burning far less frequently than the natural range of variation in the Sierra montane zone where 64% of this zone is highly departed from the historic fire regime. The majority of the subalpine and alpine and arid shrublands and woodlands zones are not departed or are only moderately departed.	Minor change to monitoring indicator – measure change by ecological zone rather than ecosystem type. Change monitoring frequency to every 6 years, rather than every 2 years. Two years is insufficient time to show any trends.
PC03. What management actions are contributing to the achievement of desired conditions relating to fire regimes?	**Yes.** The Inyo continues to implement prescribed burning and fuel reduction treatments towards achieving plan objectives. There was a dip in prescribed burning between 2020-2021 that was due primarily to a regional pause in burning.	Minor changes to monitoring indicators – include acres of pile burning as a measure of prescribed burning progress and evaluate trends in all hand and mechanical treatments rather than just mechanical thinning.
Theme 7: Social and Economic Sustainability		
PC01. What are the economic conditions in local communities that could affect the impact of national forest contributions to local economies?	**Uncertain.** Data were available through 2019 and not for the monitoring period. These data will serve as a baseline from which to compare trends moving forward.	Combine with PC02 and revise the question and indicators to reflect new best available science and reduce duplication in indicators as currently written.
PC02. What economic contributions are national forest-based recreation, forest products, mining and grazing making to local communities?	**Uncertain.** Data were available through 2019 and not for the monitoring period (2020/2021). These data will serve as a baseline from which to compare trends moving forward. There was no trend in economic indicators over the past 20 years, other than a very minor decline in the mining sector, with other sectors and overall economic condition variable over time.	Combine with PC01 and revise the question and indicators to reflect new best available science and reduce duplication in indicators as currently written.

Opportunity for Public Engagement and Partnerships

We welcome your questions, suggestions, and feedback. We also welcome opportunities for partnerships to implement this plan monitoring program. Please reach out to the Environmental Coordinator, Erin Noesser at erin.noesser@usda.gov, to share your ideas and feedback. This biennial monitoring evaluation report describes the key results from our monitoring; in depth results, including additional graphics and tables, are available in the supplemental report and raw data is available upon request.

What Comes Next

This report describes changes we are recommending to the plan monitoring program questions and indicators. These changes would not affect any forest plan components. The recommended changes are considered administrative in nature and substantive (36 CFR 219.13) and would involve issuing a public notice of the intended changes and an upcoming opportunity for public comment. This information will be made available on the Inyo National Forest Planning website at the following link:

https://www.fs.usda.gov/main/inyo/landmanagement/planning.

The global pandemic has influenced the availability of data and may have influenced data integrity. Data typically collected in the field by the Forest Service, other agencies, and partners were either not collected or collected only partially. Therefore, data used in analyses as well as data used to establish a baseline from which to compare in the future, may be skewed. Additionally, baseline data for monitoring themes like economic conditions and forest visitation may be atypical due to the very substantial impact of the pandemic. Future biennial monitoring reports will evaluate results in the context of possible pandemic effects.

Biennial monitoring evaluation reports should include relevant information from the regional broader-scale monitoring strategy. The Pacific Southwest Region broader-scale monitoring strategy (version 1) was published in June 2020. Results from this strategy will be made available to the Forest and the public at five-year intervals. We will include applicable results from the strategy in a future biennial monitoring evaluation report.

The next reporting cycle for Inyo National Forests plan monitoring program would cover monitoring activities conducted during fiscal years 2022 and 2023.

Forest Supervisor's Certification

This report describes the results of monitoring activities that occurred from fiscal years 2020 and 2021 on the Inyo National Forest.

I have found that there are no recommended changes to the plan components contained within the 2019 Land Management Plan and management activities. I am recommending modifications to improve the plan monitoring program which is part of the land management plan.

I plan to accomplish a deeper examination of the recommended changes to the plan monitoring program through engagement with resource specialists and the public. Information about recommended changes and ways to comment will be posted at: https://www.fs.usda.gov/main/inyo/landmanagement/planning

04/26/2022

Leslie Yen — Date
Forest Supervisor

Watershed Conditions

The Inyo National Forest was established in 1907 for the purposes of protecting lands needed to build the Los Angeles Aqueduct. The headwaters and tributaries into Mono Lake, the Owens River, and Owens Lake are important for the supply of water to the City of Los Angeles and local communities. At a regional level, water runoff from the national forest also flows into the Upper San Joaquin River to the west and the Upper Kern River to the south. Water on the Inyo is used for development of hydroelectricity that powers homes and businesses in the region. Water from the Inyo is also important to local communities and Tribes, providing drinking water, recreational amenities, and economic and cultural opportunities.

Protecting water and soil quality are key components of National Forest management. Water and soil quality can be affected by most management activities, and are integral in supporting healthy ecosystems. While water and soil quality are assumed to be good overall on and downstream of the Inyo National Forest, data is needed in order to understand where that may not be the case and which management activities need to be altered to better protect watershed conditions.

Monitoring Questions

- WS01. To what extent are watersheds in proper functioning condition being maintained, and watersheds in altered or impaired condition being improved? The indicator associated with this question includes the Watershed Condition Framework Classification. ***Monitoring not completed for this period.***
- AE03. What is the status of water quality in national forest waterbodies? The indicators associated with this question include bacteria levels and 303(d) status.
- WS02. To what extent has erosion from temporary and permanent roads and trails

affected water quality and soil sustainability in the national forest? The indicators associated with this question include: (1) road and motorized trail condition, (2) implementation and effectiveness monitoring results from the Best Management Practice Evaluation Program, and (3) number and type of stream crossing and bank stabilization projects.

- PR01. How does soil disturbance differ from pre- and post-activity for timber management? The indicators associated with this question include soil compaction, displacement, and erosion.
- FS02. How are aquatic benthic macroinvertebrate communities indicating stream ecosystem integrity is being maintained in high quality waters or improved in degraded waters? The indicators associated with this question include benthic macroinvertebrate diversity, species composition, and related metrics.

Key Results

Overall, Forest management has been successful in protecting water quality and soil quality. Roads, trails, and timber management activities all contribute to some disturbance, and a small percentage of roads and trails are causing erosion, sometimes into waterways. However, our current practices, which include regular road repair and implementation of water quality best management practices, have been effective in avoiding major or widespread water or soil quality degradation, and appear to be meeting or moving us toward desired conditions in the Forest Plan.

Although Forest wide watershed condition was not assessed during this monitoring period, the 2016 assessment found that 95 watersheds were in good, 30 watersheds in fair, and 0 in poor condition. These results will be used as a baseline for comparison when the next assessment is completed.

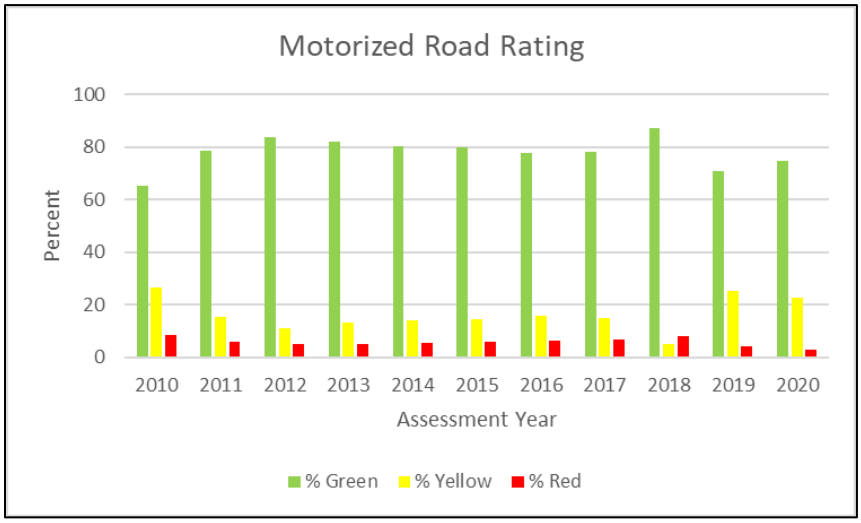
Fewer than 25% of samples on Inyo waterbodies exceeded bacteria levels from 2004 to 2018, before implementing the 2019 Plan. Of the 99 individual measurements collected on the Inyo National Forest during this time period, 23 were over 20 cfu/100 mL (the Lahontan Basin standard for fecal coliform). Three of these samples were over 100 cfu/100 mL(the standard for fecal coliform elsewhere in California and Nevada). These measures that exceed standards were often from a one-time measurement on a stream or fluctuated greatly over the years. The lack of repeated measurements and a robust set of sampling sites on the Inyo National Forest mean these data should be interpreted cautiously.

Sixteen water bodies on the Inyo National Forest have a 303(d)-listing status which will serve as a baseline from which to compare in future monitoring periods. None have TMDLs developed. Of note, Mammoth Creek was listed for mercury, and the historic mining tailings that are the source of that mercury are under investigation to determine the best way to prevent further mercury leaching.

Motorized roads and trails are generally not contributing or contributing very little sediment to Inyo waterbodies. An average of 73% of roads assessed between 2010 and 2020 were rated in good condition, meaning they provide little to no erosion to waterways (Figure 1). National

Best Management Practice (BMP) monitoring by Inyo staff of four roads and six motorized trails between 2015 and 2020 found that two roads were eroding. Any road or motorized trail found to be eroding is prioritizes for repair.

Figure 1. Ratings of road and motorized trail condition, using the California State OHV Division Trail Condition Evaluation method. Red indicates high levels of erosion and green indicates little to no erosion.



Stream crossing and streambank stabilization work continues to protect Inyo waterbodies from degradation (Table 2). Although the repair and maintenance work is episodic and dependent on funding, since 2014 the Forest has stabilized 3,410ft^2 of streambank for motorized trails and 370ft^2 of streambank for non-motorized trails. More streambank was stabilized in 2020, after the Plan was signed, than any other year.

Table 3. Area of road and trail stream crossing repair on the Inyo National Forest from 2014 through 2021 (none occurred in 2021). This includes both motorized roads/trails and non-motorized (hiking) trails.

Stream Crossing Repair		
Motorized	**Year Completed**	**Amount of Stream Stabilized (sqft)**
32E303 (Onion Creek)	2020	2000
04S54 (Birch Creek)	2019	300
04S54 (Witcher Creek)	2015	300
32E302 (Sand Canyon Trail)	2018	160
20S08 (Soda Creek, Monache)	2015	500
20S03 (Soda Creek, Monache)	2015	100
20S07A (Monache Creek)	2015	50
Total		3410
Non-Motorized		
Middle Fork Bishop Creek	2019	120
Hilton Creek Trail Stream Crossing	2014, 2015	200
Lower Lamarck Trail Crossing	2018	50
Total		370

Soil condition monitoring of units with mechanical thinning operations found that while all fuels treatments disturbed soils, none of that disturbance was causing soil impacts severe enough to effect vegetation growth or runoff. About 25% of monitored points had minor to moderate soil disturbance pre-treatment, and 75% had minor to moderate soil disturbance a year or two post-treatment.

Of six creeks measured for benthic macroinvertebrates, all but one (Walker Creek) matched or exceeded expected conditions. Walker Creek was at nearly 70% reference condition. Although these data indicate success, they should be interpreted with extreme caution and are meant to indicate a snapshot in time. Macroinvertebrate data collection is very inconsistent with some years completely missing data and with wide variation in sample locations. For example, all six creeks were sampled only once making it difficult to identify trends in the health of an individual stream over time.

Recommended Changes

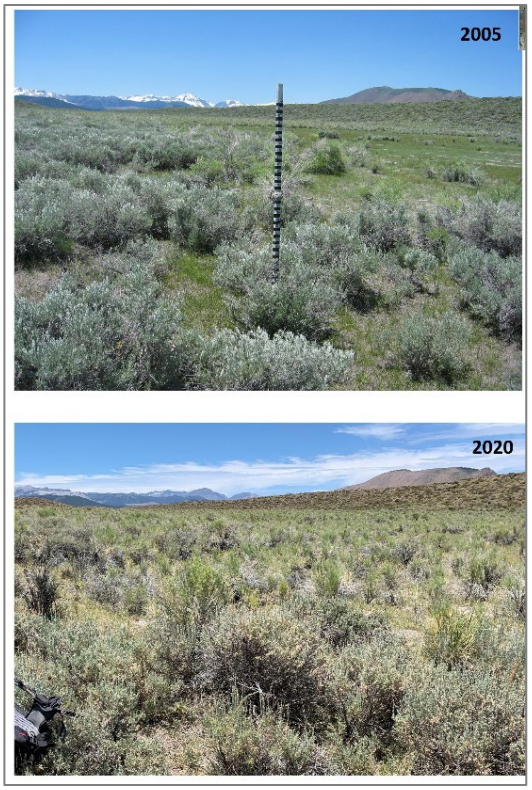
- AE03 (water quality measurements). Forest wide bacterial water quality data is collected inconsistently and not designed to answer Forest-specific questions about Forest management effects on beneficial water uses. Therefore, we recommend developing a site-specific water quality monitoring indicator to replace the measurement of bacteria levels.
- FS02 (benthic macroinvertebrates): Remove this monitoring question. The purpose of this

question was to use an aquatic focal species (here, a grouping of benthic macroinvertebrate species) to assess ecological conditions in aquatic habitat. However, we cannot use the available macroinvertebrate data to understand the trend in aquatic habitat condition. We have multiple other questions that better get at the health of aquatic ecosystems, including AE03, WS01, WS02, AE02, and AE03. Further, macroinvertebrate monitoring is being conducted as part of the Region 5 broader scale monitoring strategy.

- PR01 (soil disturbance from management). No changes recommended for the question or indicators, but we recommend prioritizing monitoring units more carefully. There is a need to monitor before and after treatment in the same unit, to better understand legacy versus modern impacts. Furthermore, some units should also be monitored after public fuelwood gathering.

Status of Select Ecological Conditions

The 2019 land management plan focuses on desired conditions for various ecosystems, and on improving their resilience to various stressors, such as climate change, grazing, fire suppression and uncharacteristic fire. These ecosystems provide a variety of ecosystem services including wildlife habitat, carbon sequestration, and biodiversity, and are closely related to the monitoring questions related to at-risk species. There are unknowns and remaining questions about the condition and status of old forests/large trees, pinyon-juniper woodlands, sagebrush communities, non-native grasses, and meadows across the Forest, and how stressors and management may be affecting the trends in those ecosystem conditions.



Monitoring Questions

- TE01. What is the status and trend of large trees in the Sierra Nevada montane forest? The indicators associated with this question include proportion of area with large trees and number of large trees, snags, large downed logs per acre by forest type.
- TE02. What is the status of pinyon-juniper woodlands? The indicators associated with this question include Pinyon-juniper spatial extent and number, type, and extent of disturbance events in pinyon-juniper woodlands (such as wildfire, disease, drought).
- TE03. What is the condition of sagebrush communities? The indicators associated with this question include: (1) proportions of seral classes, sagebrush cover, (2) acres of treatment to improve age class distribution, (3) acres of wildland fire, and (4) percent native understory vegetation.
- FS01. How is the abundance of Cheatgrass and red brome (nonnative Bromus spp.) changing? The indicators associated with this question include the spatial extent and percent cover of Cheatgrass and red brome.

- AE01. What is the vegetative condition of selected grazed and ungrazed meadows? The indicators associated with this question include: (1) rangeland ecological condition; (2) species richness, species diversity, and plant functional groups; (3) range greenline monitoring; and (4) vegetation community types.
- AE02. To what extent are riparian areas functioning properly across different management areas and levels of disturbance? The indicators associated with this question include vegetation cover, structure, and composition as well as floodplain and channel physical characteristics.

Key Results

The proportion of large trees in the Sierra montane ecological zone (47%) is within desired conditions (40-94%) but at the lower end. There are a few patterns that indicate conditions outside of the natural range of variation. Notably, there was a surplus of medium diameter (20-30 inch) trees in the dry mixed conifer and lodgepole pine forest types, a surplus of snags >20 inches in the red and white fir type, and a deficit of very large trees >40 inches in the Jeffrey pine and red and white fir types. These forest-wide patterns are consistent with documented patterns of greater densities of medium diameter trees in contemporary than historical mixed conifer stands in the southern Sierra Nevada (e.g., Stephens et al. 2015) associated with long-term fire exclusion and historical logging impacts. Regional warming trends will likely contribute to a declining trend in large trees and increasing trend in large snags in the Sierra Nevada montane zone of the Inyo National Forest, especially in the absence of forest stand reduction treatments that reduce moisture stress.

Preliminary results for pinyon-juniper woodlands suggest that this ecosystem on the Inyo National Forest is currently meeting the Forest Plan desired conditions. There has been some loss of canopy cover, including widespread impacts from the 2012-2016 drought, but loss has been relatively slight (i.e., less than 10% loss) (Figure 2). However, current patterns in canopy cover loss, tree mortality, wildfire acreage, and treatment acreage in pinyon-juniper woodlands suggest that pinyon-juniper woodlands may experience a declining trend in the future in response to several interacting stressors. The loss may have been offset by pinyon-juniper expansion into sagebrush, but our indicators did not include monitoring expansion. To better understand pinyon-juniper conditions, and sagebrush conditions, monitoring of expansion would need to be completed.

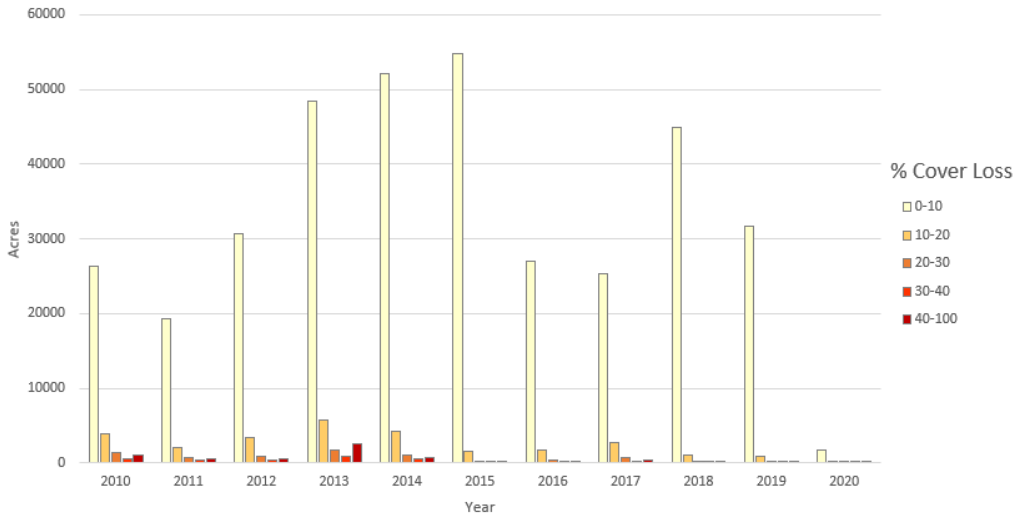


Figure 2. Ecosystem Disturbance and Recovery Tracker (eDaRT) canopy cover loss per 30 m pixel within pinyon-juniper forests in years 2010-2020

Sagebrush and non-native grasses are closely related, and it is suspected that non-native grasses may be expanding in sagebrush habitat. The results this monitoring period were not sufficient to determine whether there is a definite trend in either sagebrush or non-native grass cover. And there were some Forest locations where sagebrush cover increased (mainly encroaching in meadows) and locations where it decreased. Figure 3 below shows some of the variation in sagebrush canopy cover in one area, the Crowley Basin.

We identified some indicators that sagebrush communities are experiencing stressors that may be thwarting efforts to recover the species in the face of increasing disturbance. Sagebrush communities are aging from late-seral to decadent condition over time, but we haven't seen a comparable increase in early seral stages (a regeneration proxy). The high levels of decadence (sagebrush mortality), combined with absence of information on sagebrush recruitment makes it difficult to assess age class structure and likely future trends following disturbance.

Additionally, there were some areas on the Inyo National Forest, especially in the Sierra Nevada and Eastern slopes ecoregion, where sagebrush cover declined between 2004 and 2020 (Figure 3). This trend is consistent with the effects of fire during this time, where fire-following herbs and resprouting shrubs have replaced sagebrush. Slight increases in sagebrush cover occurred within the Long Valley, Mono Basin, Glass Mts. ecoregion and White and Inyo Mountains. This change is very slight and highly variable by location.

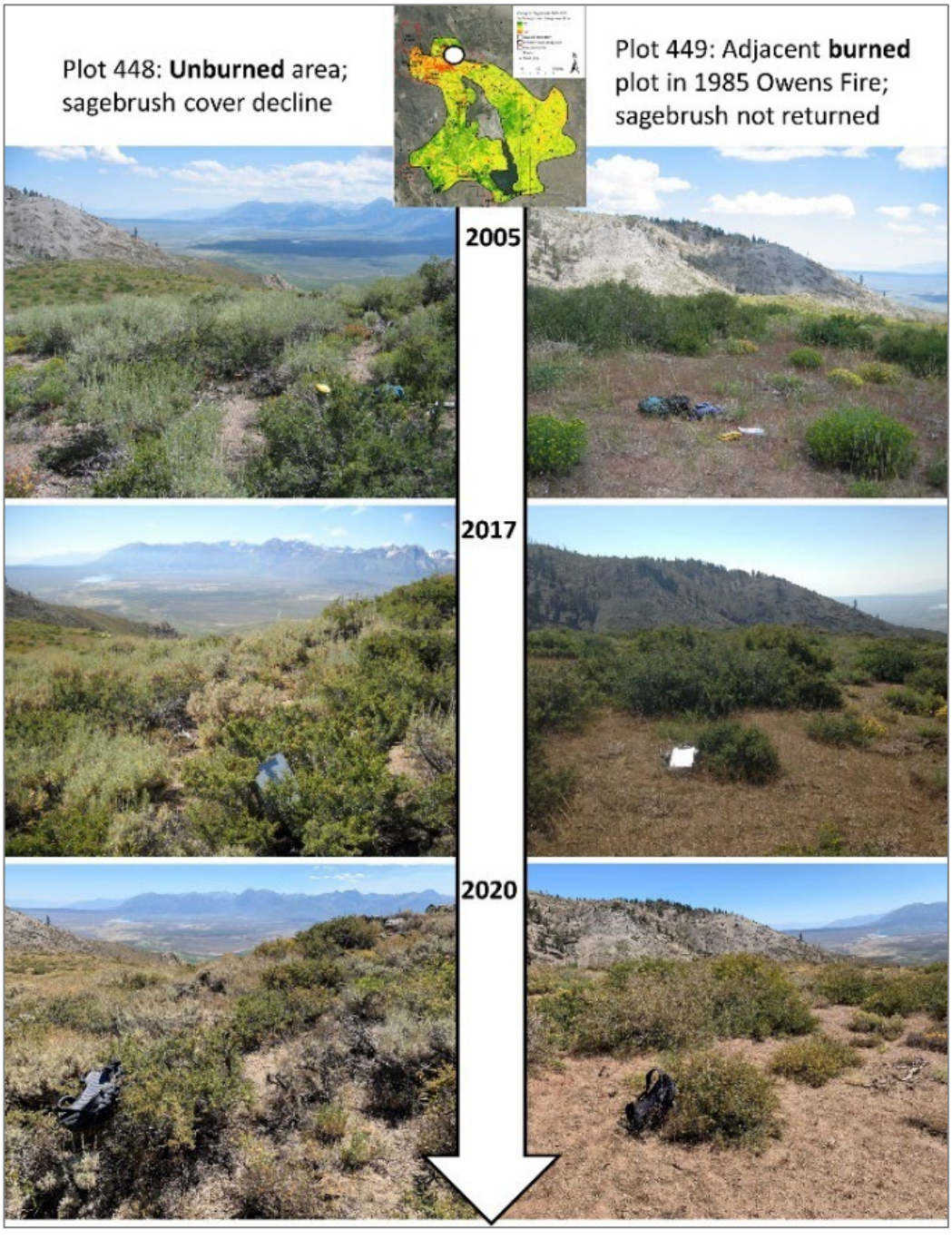


Figure 3. Photos showing change in sagebrush cover over 15 years, on two plots within the Crowley Basin, comparing change in an unburned area versus a burned area.

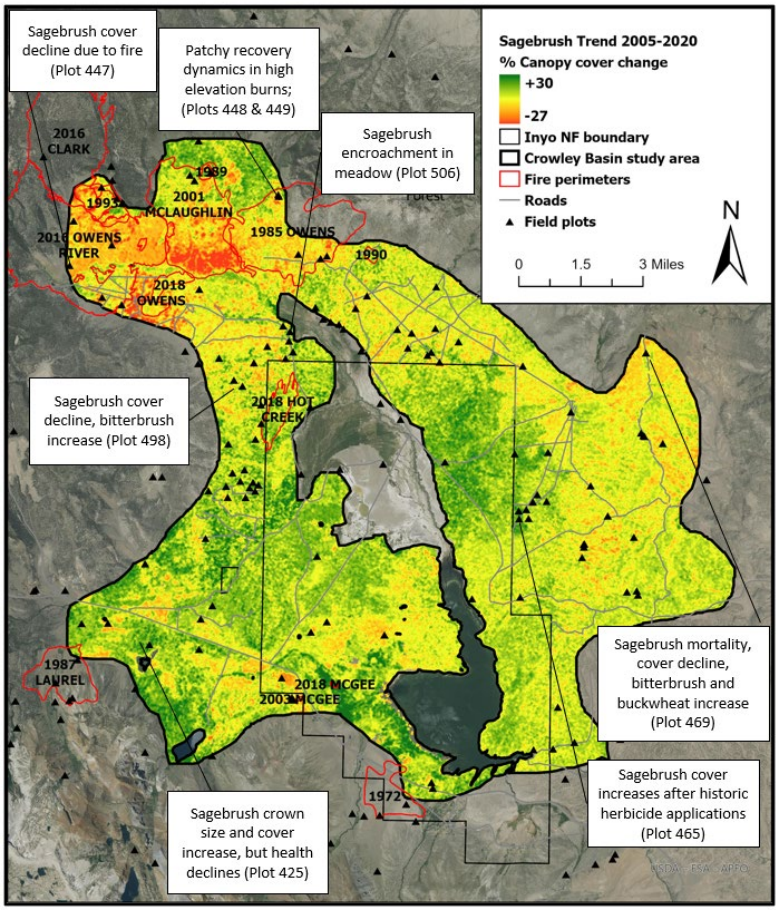


Figure 4. Spatial models of sagebrush cover change from 2005-2020, with field based-plot confirmation and site-specific findings shown in call-outs.

Non-native grass expansion trends are less well understood but preliminary data for 2006-2020 indicate an increase in areas with over 50% invasive grass cover. The recent drought appears to have suppressed growth in most recent years. We generally found that invasive grass cover estimates were higher on south-facing slopes and in some fire footprints of varying ages; we see localized sharp increases in invasive grass cover in disturbed areas.

For riparian and meadow conditions, we were unable to collect sufficient data to determine trends related to the 2019 Plan. However, the few meadows (9) monitored in 2019 and 2020 showed eight in excellent condition and one in good vegetative condition class. Of the 14 un-grazed meadows monitored, three were fair, seven were good, and four were in excellent vegetative condition; five of these ungrazed meadows decreased in condition since monitoring before Plan implementation.

Recommended Changes

- TE01 (large trees): Change the question to include the status and trend of old forests, to get at important information like landscape extent of old forests. Remove logs as an

indicator; desired conditions for log densities are not provided in the land management plan.

- TE02 (pinyon juniper): Add remote sensing data for pinyon pine expansion as a data source and evaluate longer-term data for tree mortality and wildfires.
- TE03 (sagebrush): Add an indicator for sagebrush regeneration
- FS01: Recommend changing the question to how the abundance of cheatgrass and red brome is changing in sagebrush ecosystems only, not across all shrublands. This change is to better address the land management plan desired conditions tied to this question, which relate to sage brush and sage grouse habitat.

Status of Ecological Conditions for At-Risk Species

Special habitats and the at-risk species like Sierra Nevada bighorn sheep and bi-state sage grouse are locally unique and specifically called out in the land management plan as important to manage. While bighorn sheep and sage-grouse are extensively studied by other agencies, special habitats are the focus only of the Inyo National Forest. Quantitative data on special habitat extent and condition is generally lacking or has not been compiled, and systematic tracking and monitoring is limited for most habitat types. This monitoring program attempts to improve our understanding of threats to special habitats and any management changes that could improve their condition.

There may be a need for expanding habitat connectivity in the winter range of Sierra Nevada bighorn sheep by decreasing pinyon pine and other conifer canopy. The uncertainty is whether vegetation management, specifically managed fire, will be adequate for improving bighorn sheep winter range to minimize or mitigate threats to bighorn sheep. This importance is supported by the USFWS Recovery Plan for the Sierra Nevada (2007).

Sagebrush ecosystems dominate the lower elevation landscapes of the plan area and provide habitat for several at-risk species, including the bi-state sage grouse. However, there are large areas that have decreased fire resilience due to invasion by non-native annual grasses (such as cheatgrass and red brome) that increase susceptibility to more frequent fires and disrupt native vegetation composition and structure. Monitoring of sage-grouse habitat will help the Inyo National Forest understand where management changes may be possible to improve resilience of sage-grouse habitats.

Monitoring Questions

- AR01. To what extent is the integrity of special habitats for at-risk plants and animals being maintained or improved? The indicators associated with this question include special habitat extent (acres) and health (e.g., species composition), and number, type, and extent of disturbance events (e.g., adverse effects from authorized or unauthorized use).
- AR02. What is the quality of bighorn sheep winter range? The indicators associated with this question include acres of vegetation management in the winter range for bighorn sheep and tree cover in winter bighorn sheep range. ***Monitoring not completed for this period.***
- AR03. How is the condition of seasonal sage-grouse habitats and connectivity changing? The indicators associated with this question include sagebrush stand condition from monitoring plots (e.g., cover, species composition) and acres of treatment (e.g., conifer removal, meadow restoration, invasive removal).

Key Results

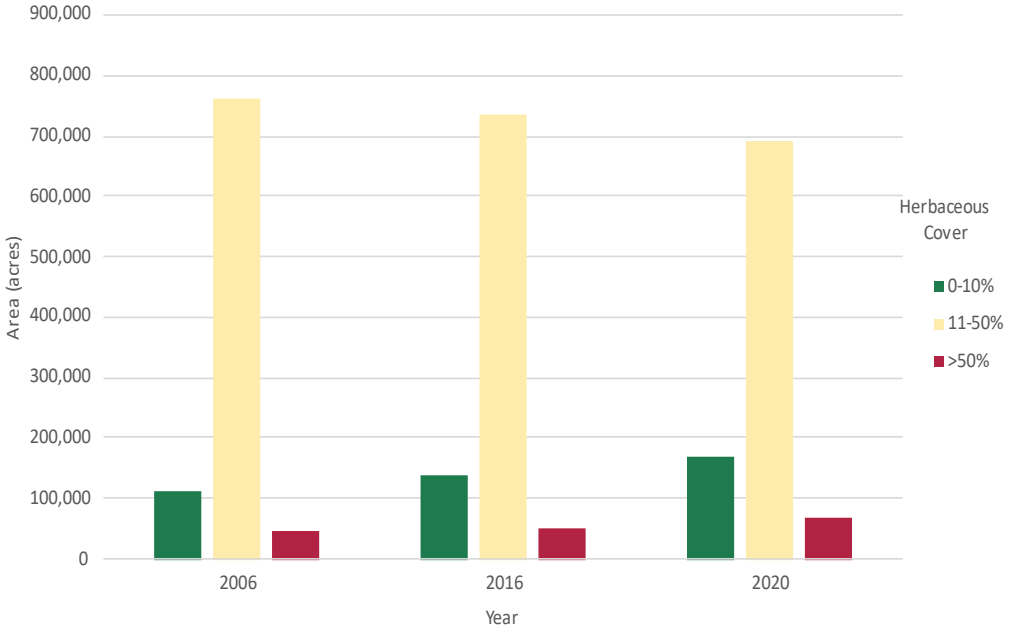
Current mapping of special habitat types total just over 100,000 acres, with approximately half of that acreage located in wilderness. While some amount of natural and anthropogenic disturbance is ongoing in a variety of special habitats, desired conditions appear to be met. Some of the impacts include invasive species, unauthorized routes, off Highway Vehicle trespass and wildfire. The forest plan components (eg TERR-SH-DC-01, 02, 03, and TERR-SH-STD-01) allow for management and restoration that would address these impacts and is being implemented. This inventory will serve as a baseline for comparison in future years.

Our review of surveys, invasive plant infestations, fire history, and OHV related impacts highlight certain areas that should be prioritized for further field assessments and management/restoration efforts. Some examples are OHV impacts in dry forb habitat, invasive species in alkali flat and black oak habitats, and fire effects in black oak and eolian/sand dune habitats. In addition, this initial review of the data will be used to prioritize efforts in special habitat types which have had little previous survey and monitoring effort.

For question AR03, regarding sage-grouse habitat connectivity, we looked at percent of sage grouse suitable habitat that had herbaceous cover, within the Crowley Basin. Here, we are using herbaceous cover as a proxy for invasive grasses. While some herbaceous vegetation is important for sage-grouse forage, a large increase in invasive grasses can lead to much higher than natural fire frequencies and convert sage brush habitat into grasslands, which reduces habitat suitability and connectivity for sage-grouse. Figure 4 shows that areas with very little grass cover have increased, as well as those with over 50% grass cover. Areas with over 50% cheatgrass are of greatest concern, because that is where the risk of frequent fires and ecosystem change drastically increases. Invasive grass cover has not increased dramatically in these areas over the past 14 years, and where it has, it has been small areas, mostly after fires. However, the steady increase in areas with greater than 50% invasive grass cover is a cause for continued monitoring and may indicate a concern is on the horizon.

Sage-grouse habitat connectivity and movement patterns within the bistate populations are not fully understood. Ongoing research may contribute to our understanding and connection between the species and landscape uses. Based on what data we have on sage-grouse habitat selection and movement patterns, the condition of seasonal habitat connectivity is presumed to be decreasing, though as of now, the decrease seems to be minor and it is uncertain whether it is meaningful for sage-grouse population dynamics.

Figure 5. Invasive grass cover model for suitable sage-grouse habitat within the Long Valley Population Management Unit (PMU)



Recommended Changes

AR02 (bighorn sheep winter range)**:** We recommend focusing the question and indicators on bighorn sheep critical habitat because winter habitat is not defined and poorly understood.

Visitor Use, Satisfaction, and Progress on Recreation Objectives

The Inyo National Forest is a highly used recreational are, and recreation is what draws the majority of visitors and their associated economic benefits to this area. The Inyo is within a 4-hour drive of nearly half of the 37 million people who live in California. This large pool of potential visitors is one of the most ethnically diverse in the world, challenging the staff of the Inyo to look at nontraditional methods of providing service. Over 2 million users visit the Inyo National Forest yearly, with the majority of visitors coming from southern California. The Inyo also receives many international visitors.

Effective communication is necessary to ensure that visitors can access the information they need to enjoy the forest responsibly. Long term changes in visitor use patterns and satisfaction metrics can indicate the need for greater access to specific recreational activities or the need to improve the quality of services and opportunities available to the visiting public.

Monitoring Questions

- VU01. What are the trends in visitor use and satisfaction? The indicators associated with this question include visitor use and satisfaction and visitor recreational activity type. ***Monitoring not completed for this period.***
- VU02. To what extent are trails providing access to the activities as intended? The indicators associated with this question include total miles of motorized and nonmotorized roads and trails and percentage of miles maintained.
- VU03. How effective have Forest communications with the public been in considering diverse backgrounds? The indicators associated with this question include Number and types of public outreach activities and visitor demographics.
- VU04. To what extent is designated wilderness being managed to preserve wilderness character? The indicators associated with this question include wilderness performance measures and elements classification. ***Monitoring not completed for this period.***
- PC04. To what degree is the national forest using partnerships to provide additional capacity for visitor services? The indicators associated with this question include the number of agreements with partners by activity type that are supporting visitor services and the number and type of projects completed with partners.

Key Results

In 2021, the Inyo NF and partners completed annual maintenance on 470 miles (39%) of non-motorized trails and 161 miles (46%) of motorized trails. The Forest also conducted 6.8 miles of heavy maintenance on the John Muir Trail, Shadow Creek, and Lower Rock Creek trails working with partners. The miles of trail maintained in 2021 was larger than in past years, mainly due to an increase in partnerships and a focus on hiring Forest staff like Wilderness Rangers.

The Forest has been able to move toward the desired condition of more partnerships, despite the ongoing effects of the pandemic on travel and hiring. Partnership value of contributed partner time nearly tripled from 2019 to 2021, with an estimate of $2.4 million value of contributed time in 2021, compared to about $0.8 million in 2019 (Table 2).

Table 4. Volunteer and partner contributions 2019-2021

Measure	2019	2020	2021
# of volunteers & partner personnel	852	228	863
Volunteer & partner hours	32,778	18,949	85,630
Value of contributed time	$833,545	$514,413	$2,443,880
# of individual & group volunteer agreements	33	25	37
# of partner agreements	6	6	17

In 2021 the Inyo National Forest continued quarterly forums with tribal governments to share information about projects and concerns. The Forest staff worked with local tribes and other partners to host a traditional ecological knowledge (TEK) workshop in the Mono Basin to promote integration of traditional practices like cultural burning into land management.

The Inyo increased Spanish language news releases and social media posts in 2021. Leave no trace and recreate responsibly messages have been translated into Spanish. Partners such at the Town of Mammoth Lakes also provide Spanish language signage at some trailheads.

Recommended Change

- VU03 (communicating with diverse groups): We recognize that indicator 2 is difficult to measure and interpret. We will continue to collect information on consideration of diverse backgrounds in Forest communications. We will also work to identify best available science to better capture the intent of this question; whether we reach diverse communities and allow for equal access to Forest resources.
- VU04 (wilderness): we recommend changing the monitoring frequency for this question to every six years since these data are only available every five years.
- PC04 (partnerships): we recommend updating the indicators to aligned with categories in available data. New indicators would include: (1) number of agreements with partners that are supporting visitor services and (2) number of volunteers, partner personnel, hours contributed, and value of contributions by partners that are supporting visitor services.

Climate Change and Other Stressors

Climate change has the potential to drastically alter all ecosystems on the Inyo National Forest, and some measurable changes are already occurring. The Inyo National Forest, along with all National Forests, needs to adapt its management strategies

Changes in spatial extent, health, and regeneration of high-elevation white pine woodlands are essential indicators of subalpine ecosystem function and integrity. There is uncertainty regarding the degree and extent of negative impacts of climate change and associated stressors (e.g., insect outbreaks) on subalpine ecosystems dominated by white pines. Landscapes with elevated levels mortality could be targeted for ecological restoration treatments (e.g., prescribed fire or managed wildfire) to improve ecosystem resilience, or focused field-based monitoring of the impact of interactive stressors.

While the impacts of climate change on runoff are generally known at a Regional scale, the local effects on the Inyo National Forest are not fully understood. Understanding how runoff will change, both in volume and in timing, may help the Forest adapt its management to changes in water supply, infrastructure impacts, or ecosystem impacts from changing runoff regimes.

Monitoring Questions

- CC01. How are high-elevation white pines responding to the effects of climate change and other stressors? The indicators associated with this question include: (1) spatial extent, by forest type, (2) tree mortality, incidence of insects, disease, and pathogens, and (3) spatial extent of tree regeneration.
- CC02. What changes have occurred to the timing, amount, and duration of natural and managed runoff into the national forest's waterways? The indicators associated with this question include annual in-stream flow regime for selected waterways (not those regulated by the Federal Energy Regulatory Commission).

Key Results

Between 2010 and 2020, whitebark, foxtail, and bristlecone pine experienced minor changes in spatial extent but limber pine losses in spatial extent were dramatic. About 4% of the whitebark pine acres on the Inyo NF experienced >20% loss in canopy cover and about 23%

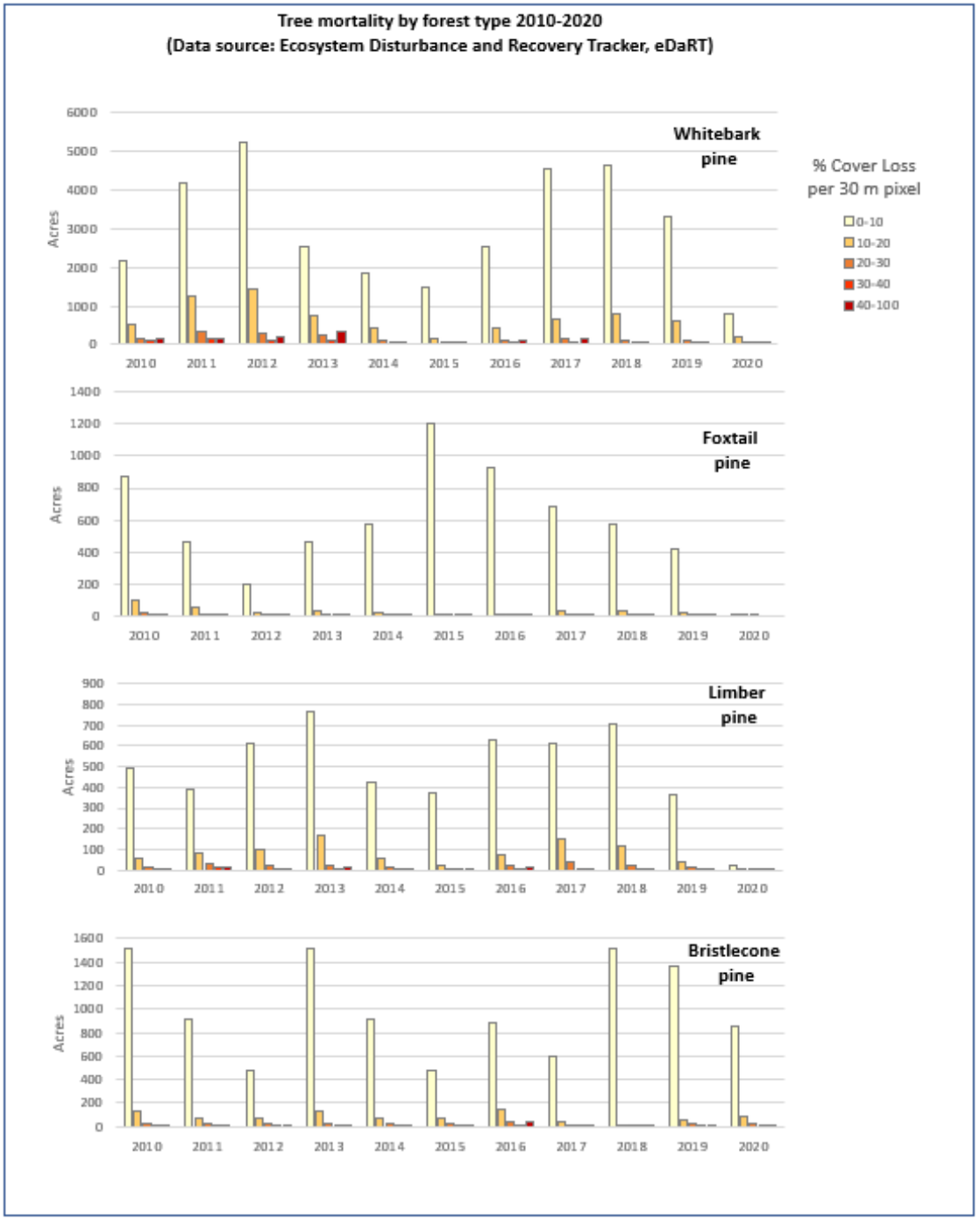
experienced ≤10% canopy cover loss. The primary disease agent was mountain pine beetle. Whitepine blister rust was not identified. There was no overall loss in the spatial extent of whitebark pine on the Forest because regeneration was found to occur in these areas of forest mortality. Only two areas, Mammoth Mt and Saddlebag Lake, experienced whitebark pine mortality without identified regeneration. Foxtail and bristlecone pine experienced minor, mostly sparse loss in cover during this same time. For limber pine, about 10% of the known extent loss >20% canopy cover and about 38% lost ≤10% canopy cover.

In terms of tree morality, canopy cover in denser whitebark pine forests was lost primarily during events in 2010-2013 and was mostly localized to June Mt. and surrounding areas. Background levels of mortality (< 10% canopy cover loss) were also high then and spiked again in the years following the extreme drought that peaked in 2014 to 2016.

Tree mortality in limber pine has been fairly consistent between 2010-2019. Most loss occurred in the Sierra Nevada, and both ADS and field surveys indicate mountain pine beetle and drought as the major drivers. Of all the white pines, limber pine is the most limited in spatial extent (10,517 acres), and therefore had the greatest proportional loss of cover during the analysis period.

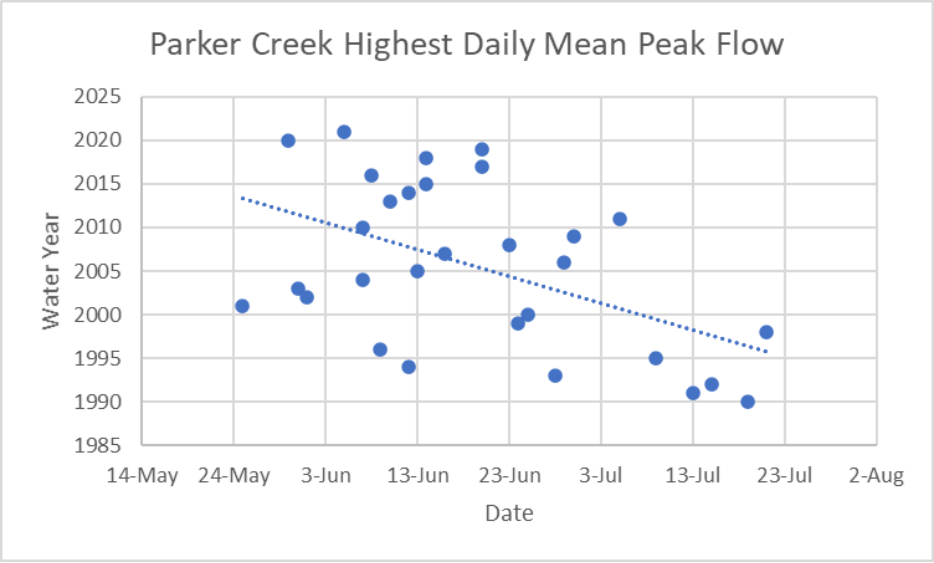
There has been limited regeneration of most white pine species with the exception of whitebark pine, which contained relatively higher regeneration densities in most sampled locations.

Figure 6. Ecosystem Disturbance and Recovery Tracker (eDaRT) tree mortality detections for white pines, binned by % canopy cover loss per 30 m pixel, by forest type, in years 2010-2020.



For runoff, the two streams that were used as proxies for the Forest showed a slight trend in timing peak flows, to earlier in the season, between 1990 and 2020. Parker Creek's date of highest peak flow is graphed in Figure 6 below. This is expected as snowfall melts sooner with warmer temperatures, and also less snowpack over winter months. However, the trend is weak, and a longer time span of data is needed to understand the trend and degree of change in past decades, and to predict changes over the coming decades.

Figure 7. Highest daily mean for the Parker Creek with trendline. Graph represents 30yrs of flow data going back to 1990.



Recommended Changes

- CC01 (high elevation white pines): Indicators should have minor alterations, to keep up with the best available science. For example, remove Forest Inventory Analysis (FIA) as a data source and replace it with eDaRT data, since data collection for the latter is more frequent and robust. For more effective monitoring to inform Forest management, proposed changes include conducting more focused surveys of whitebark and limber pine and conducting effectiveness monitoring in whitebark pine stands receiving management treatments (e.g., mechanical thinning on June Mountain. Consider the application of restoration treatments in additional targeted whitebark pine stands to increase their resilience to stressors.
- CC02 (changes in runoff): Increase the time period of data analysis to at least 50 years and add more streams to better understand climate effects across the entire Forest.

Fire Conditions

Wildland fire is a necessary ecological process, integral to the sustainability of fire-adapted ecosystems. The wildland fire regime has been altered in many terrestrial and riparian ecosystems by decades of fire suppression. For example, some forest ecosystems (e.g., eastside Jeffrey pine) are burning too infrequently and severely compared to the natural range of variation (NRV), resulting in the loss of forest ecosystem resilience and health. The Inyo Land Management Plan is interested in moving the landscape towards the NRV for fire regimes and testing whether management actions contribute to this trend.

Monitoring Questions

- CC03. How are fire regimes changing compared to the desired conditions and the natural range of variation? Indicators associated with this monitoring question include: (1) fire return interval departure, (2) number and acres of fire by ecosystem type, and (3) fire severity by ecosystem type.
- PC03. What management actions are contributing to the achievement of desired conditions relating to fire regimes? Indicators associated with this monitoring question include: (1) acres of fires managed for resource objectives by ecosystem type, (2) acres of fire by objective within each fire management zone, (3) acres of prescribed fire, and (4) acres of mechanical treatment.

Key Results

Overall, contemporary fire regimes on the Inyo National Forest are burning too infrequently compared to historical (i.e., NRV) conditions (Figure 7). This finding is inconsistent with the Inyo Plan desired condition (FIRE-FW-DC-01) that wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner. The divergence from historical fire frequency is particularly evident in the Sierra Nevada montane zone where 64% of the landscape is highly departed, burning far less frequently than under historical conditions. In contrast, the majority of the subalpine and alpine and arid shrublands and woodlands zones are not departed or are only moderately departed from their historical fire frequencies, aligning more closely with the Inyo Plan desired condition.

Between 2015 and 2021, wildfires burned about 60.445 acres of the Inyo National Forest, with 84% of the acres occurring under a full suppression strategy and 16% occurring under a strategy other than full suppression (multiple objections). About a third of the acres burned in each of the General Wildfire, Wildfire Restoration, and Wildfire Maintenance zones; a small proportion of wildfires (2%) burned in the Community Wildfire Protection zone.

Between 2017 and 2020, virtually all the area burned in wildfires managed under multiple objectives (not just suppressed) were in the Sierra Nevada montane zone, which is consistent with ecosystem types (e.g., Jeffrey pine, dry mixed conifer) that are the most departed from their historical fire frequencies. This pattern is supportive of Inyo Plan objectives for reestablishing natural fire regimes (e.g., TERR-FW-GOAL-02) and restoring ecosystem structure and composition (e.g., TERR-FW-GOAL-01). Managing wildfires to meet resource objectives is also consistent with the Inyo Plan goal to create and maintain fire resilient landscapes (MA-WRZ-GOAL 01).

Fire severity patterns for full suppression wildfires in the Sierra Nevada montane zone are consistent with recent regional patterns, showing severe fire effects outside NRV, particularly in the yellow pine and mixed conifer forest types (Safford and Stevens 2017). In contrast, fire severity patterns in wildfires managed for multiple objectives are mostly consistent with Inyo Plan desired conditions and NRV, as recently observed in the Southern Sierra ecoregion (Meyer 2015).

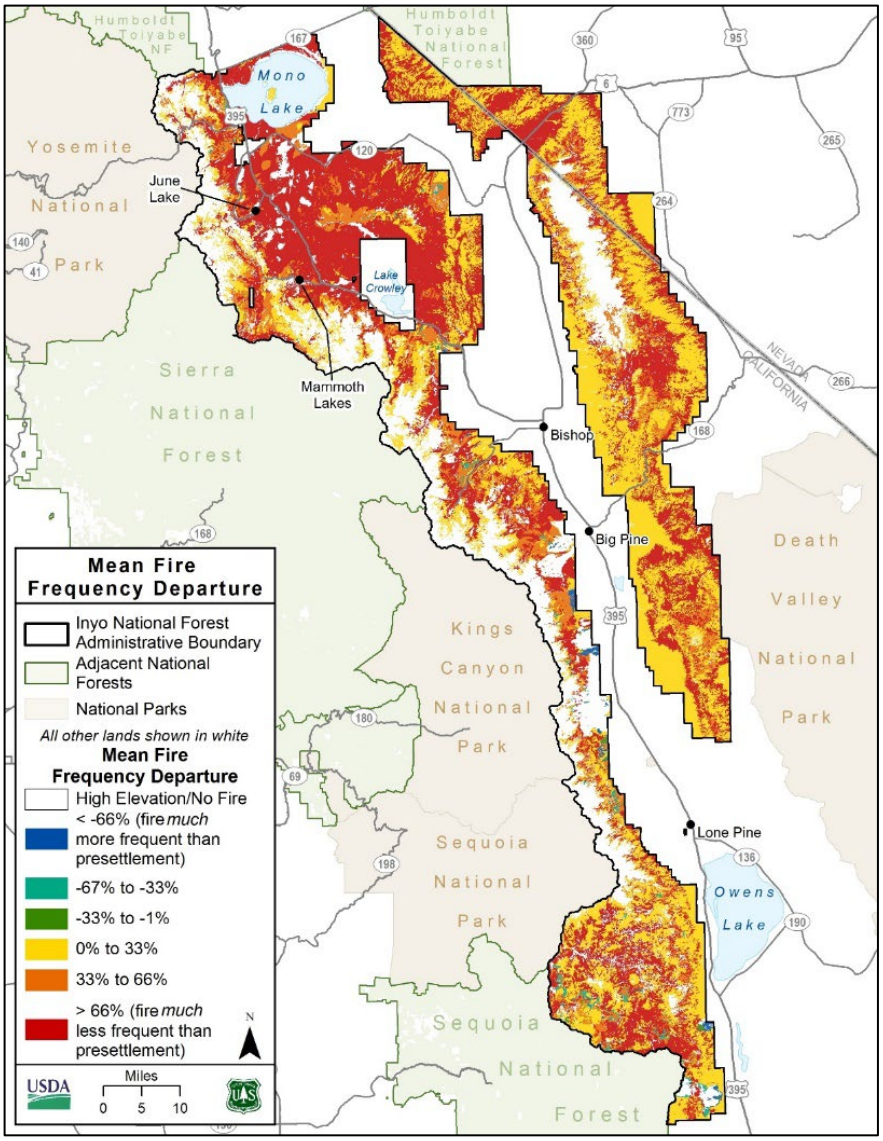


Figure 8. Fire Regime Interval Departure (FRID) condition classes for the Inyo National Forest in 2020. Warmer colors indicate vegetation types where the current fire regimes are burning much less frequently than the historical fire regimes.

The Inyo National Forest is using management action to reduce risk on the landscape and restore a mosaic of fire, consistent with multiple desired conditions and objectives associated with the Inyo Plan. From 2015 to 2021, the Inyo National Forest implemented about 3,600 acres (average 500 acres) of prescribed fire (excluding pile burns), predominately in the Wildfire Restoration Zone. During 2020 and 2021, the years following the implementation of the Inyo Plan, the Forest conducted prescribed burning on very few acres (362 and 0, respectively). More burning was desired however barriers to implementation included limited weather windows, lack of staffing and qualified personnel, and a prolonged wildfire season. Notably, the dip in prescribed burning in 2020 and 2021 was primarily due to the Regional pause on Rx fire during the fire season despite available burning windows. The Inyo National

Forest conducted fuel reduction treatments on about 11,000 acres (average 900 acres) between 2015 and 2021. During 2020 and 2021, the Forest treated about 3,500 acres, one third of all acres treated in the last seven years. Treatments have been focused in the Community Wildfire Protection zone where it is most impactful in reducing high fire severity risk.

Recommended Changes

- CC03 (fire regimes): Evaluate by ecological zone rather than ecosystem type.
- PC03 (management action): Include acres of pile burning when evaluating trends in prescribed burning. Pile burning can be a required step in the process of implementing an under burn or other prescribed fire activity. Data for pile burning will be calculated separately from under burning and other prescribed fire but all will be reported under the umbrella indicator of prescribed fire. Replace “acres of mechanical treatment” with “acres of all hand/mechanical fuel reduction activities” so all treatments are counted. A variety of treatments play a substantial role in protecting communities and restoring wildfire as a process on the landscape.

Social and Economic Sustainability

Forests provide economic contributions to communities through activities such as forest products, recreation visitation, grazing and mining as well as through the employment of forest service staff. Monitoring changes in these contributions can provide insight as to how forest management may be supporting economic and social conditions in these communities.

The Inyo National Forests spans two States (California and Nevada) and four counties that have differing economic foundations. Understanding the conditions and trends of the diverse communities affected by forest management provides insight into community resilience to changes in management activities. Specifically, communities facing challenging economic conditions and communities more dependent on forest activities for local fiscal resources, are potentially more susceptible to changes in forest management.

Monitoring Questions

- PC01. What are the economic conditions in local communities that could affect the impact of national forest contributions to local economies? Indicators associated with this monitoring question include: (1) economic health, (2) economic diversity, and (3) local fiscal conditions.
- PC02. What economic contributions are national forest-based recreation, forest products, mining and grazing making to local communities? Indicators associated with this monitoring question include local fiscal conditions (percentage of local tax revenue attributed to forest visitation) and Forest contributions to employment (annual estimate of total jobs supported by forest activities).

Key Results

The Inyo National Forest plays a large role in supporting the local travel and tourism industry (and local fiscal conditions) with a wealth of natural settings to enjoy and attractions like Mammoth Lakes ski resort. The 2016 National Visitor Use Monitoring (NVUM) Report found that 83% of visitors interviewed responded that recreation was the purpose of their visit to the Inyo National Forest. According to this 2016 report, the average total trip spending for each party visiting the National Forest is $1,361 (median $800) and nearly 80% of visits involved an overnight stay, with about 45% of stays renting a private home.

In addition to travel and tourism, the Inyo National Forest plays a role in supporting other local job sectors like mining, range, and forest products. Mining and range represent small job sectors in the four counties, which has been shrinking over the past 10 years. While many of the livestock-related jobs depend at least partially on grazing on Forest Service lands, almost all mining occurs on private land in the four Counties.

There are no jobs recorded in the forest products sector in any affected County since 2012, though we know there are at least a few small businesses in the wood products industry. The

volume of wood (forest products) sold in 2021 is generally like the volume of wood sold in 2010, with some minor fluctuations and a large peak around 2012.

The Inyo National Forest employs residents of Inyo and Mono County, thereby supporting the local economies. The annual number of jobs on the Inyo National Forest has gradually decreased between 2010 and 2021, like the number of overall federal government jobs in these counties (Figure 9). There is a larger decline in the number of temporary jobs than permanent jobs.

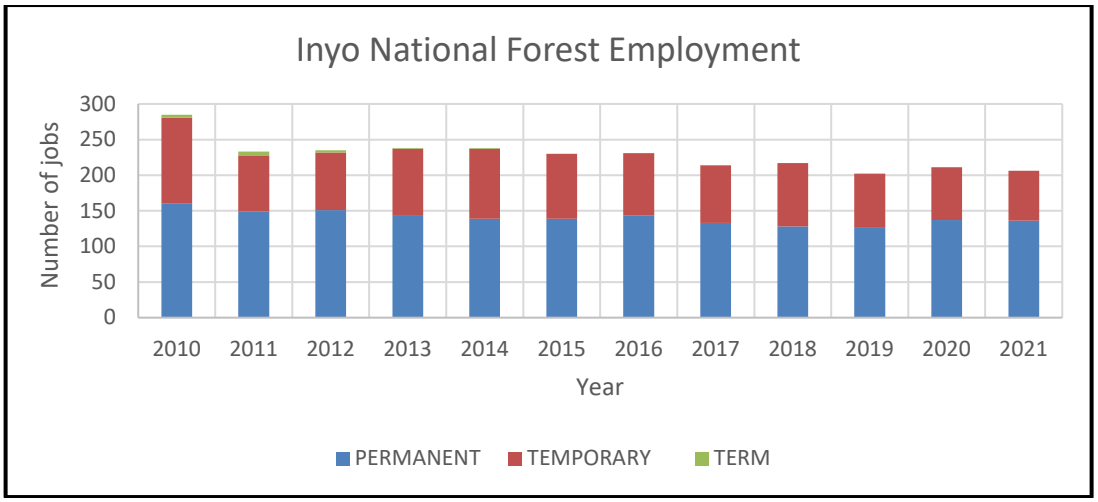


Figure 10. Number of permanent, term and temporary employees on the Inyo National Forest from 2010 through 2021. Term positions range from one- to four-year appointments.

Recommended Changes

Given the availability of new best available scientific information and the overlap of some indicators between the two questions, we are recommending combining the two monitoring questions into the following:

> What are the economic conditions in local communities and what are the economic contributions of forest-based uses like recreation, forest products, mining and grazing, and ecological services to the local communities?
>
> The indicators associated with this question would include: (1) local economic conditions and (2) Forest contributions.