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Land Management Plan Monitoring Report for the Cleveland National Forest (2020)

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USDA is an equal opportunity provider, employer, and lender.I am pleased to present the Cleveland National Forest's Monitoring and Evaluation Report for your review. The purpose of the Monitoring and Evaluation Report is to share our determination of the effectiveness of the Land Management Plan and whether changes are necessary to the Plan, or in program or project implementation.

The 2006 Record of Decision for the Cleveland National Forest Land Management Plan identified the monitoring requirements as the cornerstone of our program emphasis for the future. In 2014, the Forest Plan was amended to incorporate changes to land use zones and Forest Plan Monitoring. This report is completed under the newly revised monitoring strategy; however, in 2015, the Forest completed the transition to the new

monitoring program as required under the 2012 Planning Rule, and this transition includes new processes for monitoring that will continue to be used in this biennial FY 20 monitoring report as well as future reports. The lessons we learn from monitoring help improve our programs and projects. We continue to find ways to increase efficiency and effectiveness of our monitoring and evaluation efforts. It is my commitment to keep you informed of the monitoring results by providing this report. If you would like to participate in future monitoring, please contact the Forest.

We have evaluated the monitoring results presented in this report and we do not recommend changes to the monitoring program or the plan components contained within the 2006 Land Management Plan and management activities.

Your continued interest in the Cleveland National Forest Land Management Plan is just one way for you to stay current with activities on your public lands. Additional information can be found on our website at **http://www.fs.usda.gov/cleveland/.**

Sincerely,

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June 7, 2023

SCOTT TANGENBERG — Date

Forest Supervisor

Cleveland National Forest

About our Plan Monitoring Program

Purpose

The purpose of this monitoring report is to describe the evaluation of information gathered through Part 1 (effectiveness monitoring) of the Southern California land management plan monitoring program. The first half of this report (monitoring questions 1 to 9 or "Part 1a"), were answered collectively for fiscal years 2019 & 2020 for the Angeles and San Bernardino National Forests and fiscal year 2020 (only) for the Cleveland National Forest. The Cleveland 2019 biennial monitoring evaluation report was posted online in 2020.

The remaining monitoring questions (monitoring questions 10-21) were answered specific to the Cleveland National Forest in Part 1b.

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 Forest Supervisor 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 Angeles, Cleveland, and San Bernardino National Forests share the same plan monitoring program, which is divided into three parts, under the Southern California land management plan (2006). This report includes the results for Part 1 monitoring which evaluates plan effectiveness and occurs every two years (biennial).

Part 1a effectiveness monitoring for the three Forests includes 9 monitoring questions. One of the 9 questions is specific to the Cleveland National Forest. Combined, the Part 1a and 1b monitoring questions cover the eight required topics under the 2012 planning rule, in addition to social, economic, and cultural sustainability (see box below). Some questions cover more than one topic. The monitoring questions are grouped by the seven goals in the land management plans: (1) community protection and restoration of forest health; (2) invasive species; (3) managed recreation in a natural setting and Wilderness; (4) energy

and minerals production; (5) watershed function and riparian condition; (6) rangeland and biological resource condition; and (7) natural areas in an urban context. The monitoring questions, indicators, and results you'll read about in this report address these goals.

The Southern California Land Management 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, visitor 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).

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 coordinators on the relevant Forests to share your ideas and feedback. This monitoring report describes the key results from our monitoring; in depth results, including additional graphics and tables, are described in a supplemental report and is available upon request.

What Comes Next

The global pandemic not only influenced our ability to produce this report promptly, but also influenced data availability 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. Future biennial monitoring reports will evaluate results in the context of possible pandemic effects.

Monitoring 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 broader-scale monitoring in a future biennial monitoring evaluation report.

The next reporting cycle for Part 1 of the Angeles, Cleveland, and San Bernardino National Forests plan monitoring program will cover monitoring activities conducted during fiscal years 2021 and 2022.

Part 1 - Results

Monitoring results for Part 1 indicate that, in general, all three forests are making progress at achieving the goals set forth in the 2006 Land Management Plan (Table 1). Based on the monitoring trends, we believe the plan components and management activities continue to be effective in trending the landscape towards achieving the goals and desired conditions described in our land management plan. We do not see the need for changes or for a new assessment. However, all three Forests are facing extended drought conditions, climate change, threats from newly introduced invasive pests such as the Goldspotted oak borer. These challenges coupled with landscapes that continue to remain departed from historic fire frequency in many cases make the urgency of forest management and fuels reduction even more pressing.

Table 1. Summary of key findings for the Southern California land management plan monitoring and recommendations for action, adaptive management, or change. Monitoring results for the Angeles and San Bernardino cover fiscal years (FY) 2019-2020 and results for the Cleveland cover FY 2020.

Monitoring Questions	Summary of Key Findings	Recommended action, adaptive management, or change
Goal 1: Community protection and restoration of forest health		
MQ1. Has the forest made progress in reducing the number of acres that are adjacent to development within Wildland Urban Interface (WUI) defense zones that are classified as high-risk?	The Angeles, Cleveland, and San Bernardino conducted 136, 1131, and 2750 acres of treatments in the WUI defense zone, respectively.	All three forests have made progress in reducing the baseline number of acres in the WUI defense zone classified as high risk. However, treatment must continue in order to prevent recurrence of high-risk classification within previously treated WUI defense zone. Recommendation is to continue to treat high risk zones within the WUI defense while monitoring previously treated areas to ensure they are being treated prior to re-entering a high-risk classification.
MQ2. Are wildfires becoming larger, more frequent, or more severe, and is there a seasonal shift in fire activity?	Wildfire size has fluctuated over the last century/half century. The proportion of wildfires burning at high severity has been increasing. Fires have burned in every month.	Continue fuels treatment within montane forest ecosystems to return the fire frequency to the natural range of variation which will in turn reduce the likelihood of severe

Monitoring Questions	Summary of Key Findings	Recommended action, adaptive management, or change
		fire behavior. In chaparral ecosystems, continue to focus on the management and maintenance of fuel breaks, particularly in the WUI defense zone to protect vulnerable communities and reduce fire frequency.
MQ3. Are fire frequencies becoming more departed from the natural range of variation?	Although each Forest's landscape is trending towards the natural range of variation for fire frequencies (condition class 1 has *increased* since 2006), a large proportion of each Forest is moderately and highly departed from historic fire frequencies.	Continue fuels treatment to move more of the landscape into condition class 1, particularly within montane forest landscapes (Fire Regime I) where frequent low severity burns thin stands, keep fuel loading low and encourage the regeneration of shade-intolerant plant species.
MQ4. Is the forest making progress toward increasing the percentage of montane conifer forests in Condition Class 1?	Although each Forest's montane conifer zone (Fire Regime I) is trending towards the natural range of variation for fire frequencies (condition class 1 has *increased* since 2006), the largest proportion of this zone on each Forest is highly departed from historic fire regimes, burning far less frequently than historically. The Forests continue to emphasize treatments in areas moderately and highly departed to improve resilience.	Continue fuels treatment to move more of the montane conifer forest into condition class 1. Complete NEPA documentation for additional montane forest ecosystems to allow additional fuels treatment beyond what has been analyzed currently in existing NEPA documents.
MQ5. Is the forest making progress toward maintaining or increasing the percentage of vegetation types that naturally occur in Fire Regime IV in Condition Class 1?	Although the proportion of Fire Regime IV (shrubland and chaparral) in condition class 1 *increased* since 2006, a large proportion of these landscapes on each of these Forests are still burning more frequently when compared to historic conditions.	Explore opportunities to reduce anthropogenic fire starts in high-risk areas such as roadsides and fuel breaks to ecosystems in Fire Regime IV to reduce burn frequency and return to Condition Class I.
MQ6. Has the forest been successful at maintaining long fire-free intervals in habitats where fire is naturally	The Angeles and San Bernardino experienced a decrease in the acres (and proportion of the landscape) that are within (or slightly departed) from the historic fire regime. The majority of	Continue and expand fuels treatments in and adjacent to habitat where fire is naturally uncommon, in order to reverse current trends and decrease

Monitoring Questions	Summary of Key Findings	Recommended action, adaptive management, or change
uncommon?	the Fire Regime V landscape on these Forests is highly departed from the historic fire regime, burning with far more frequency than historically.	likelihood of fires starting in or spreading through these areas.
MQ7. Is tree mortality increasing across the landscape, and is it distributed evenly across elevations?	All Forests experienced a peak in mortality between 2015 and 2017, coinciding with a drought period. The dominant conifer species affected include white fir and yellow pine (Jeffrey and ponderosa pines). The lower and higher elevations (rather than middle) experienced greater change in mortality from 2006.	Continue and expand fuels treatments within montane conifer forests (Fire Regime I). By treating montane forest to decrease stand density and increase forest health, forests will be more resilient and less susceptible to mortality from drought and disease.
MQ8 (CNF only). Is coast live oak mortality increasing across the landscape?	The number of dead oak trees increased substantially during the most severe drought years (2015-2017). The number of dead oak trees remained elevated in 2018 but was much lower in 2019. The greatest concentration of annual dead oak trees tends to be on the leading edge of an area infested with goldspotted oak borer.	Continue to actively manage infestations on the Trabuco Ranger District, utilizing an early-detection rapid-response (EDRR) approach. Strategy may include proactive surveys, removal of infested trees and treatment of trees with targeted insecticides. Additionally, educating the public of the role firewood can play in facilitating infestations is crucial.
MQ9. Are chaparral and coastal sage scrub vegetation communities type converting to non-native annual grasslands?	There has been an increase in the acres and percent of the shrubland landscape that has type converted to non-native annual grasslands between 2009 and 2018. However, the proportion of non-native annual grasslands measured is low (1%) and San Bernardino saw a decrease between 2017 and 2018.	Combat type conversion by focusing on returning chaparral and coastal sage scrub communities (Fire Regime IV) to Condition Class I by reducing the risk of anthropogenic fire starts and containing fires to prevent type conversion within communities that are currently burning at higher frequencies than the natural range of variation.

Monitoring Questions	Summary of Key Findings	Recommended action, adaptive management, or change
Goal 2: Invasive Species		
MQ10. Are the national forests' reported occurrences of invasive plants/animals showing a stable or decreasing trend?	Acres of treatment of invasive plants / and animals is increasing year to year and target species are successfully managed. However, non-target invasive species are likely stable or increasing.	Continue treating priority invasive species while simultaneously monitoring for the introduction of any novel invasives, where a rapid response could be effective in eradicating the species locally prior to any ecological degradation.
Goal 3: Managed recreation in a natural setting and Wilderness		
MQ11. Are trends in indicators and visitor satisfaction surveys indicating that the forest has provided quality, sustainable recreation opportunities that result in increased visitor satisfaction?	Visitor satisfaction has increased in developed recreation areas as well as wilderness areas. There was a slight drop in visitor satisfaction in undeveloped areas of the Forest from 2014 to 2019. Overall satisfaction remains very high.	Recommend increasing recreation staff levels to provide a better visitor experience and manage the increasing recreation demand on the Cleveland National Forest.
MQ12. Are trends in indicators and visitor satisfaction surveys depicting the forest has provided solitude and challenge in an environment where human influences do not impede the free play of natural forces?	All four Wilderness areas on the Forest scored higher in visitor satisfaction from 2014 to 2019. Only one of four earned a score of “meets standards” while the other three were all “approaching standards”	Continue to manage wilderness areas to provide an improved visitor experience with the goal of earning a “meets standards” score for all four Wilderness areas within the next reporting period.
Goal 4: Energy and minerals production		
MQ13. Has the forest been successful at protecting ecosystem health while providing mineral and energy resources for development?	The CNF continues to provide mineral resources for development through the administration of existing mining claims.	Identify course of action to bring the unauthorized Cryo-Genie mine into compliance with environmental standards.

Monitoring Questions	Summary of Key Findings	Recommended action, adaptive management, or change
MQ14. Has the forest been successful at protecting ecosystem health while providing renewable resources for development?	No renewable energy development projects were proposed or approved during FY20, therefore monitoring question 14 has not been answered for this report.	Remain receptive to prospective renewable resource development projects while considering ecosystem health when evaluating prospective projects.
Goal 5: Watershed function and riparian condition		
MQ15. Is the forest making progress toward sustaining Class 1 watershed conditions while reducing the number of Condition Class 2 and 3 watersheds?	The CNF continues to sustain Class 1 watersheds and improve watershed condition within Class 2 watersheds through the implementation of WRAPs (invasives eradication, dam removal, etc.) within key watersheds.	Continue developing and implementing WRAPs in key watersheds.
MQ16. How do stream flows compare with historical records?	Overall, stream flow at the six measured streams (two on each Forest) appears consistent with historic flows.	No management action recommended.
MQ17. Is the forest increasing the proper functioning condition of riparian areas?	Graffiti removal within a riparian corridor and the reduction of unauthorized recreational use in Boulder Creek streamside zone has increased the proper functioning of riparian areas by preventing future impacts to the stream and its habitat caused by trampling and increased sedimentation.	Continue to plan and implement projects to mitigate recreation and invasive species impacts to riparian areas. Continue to consider appropriate Resource Protection Measures within Riparian Conservation Areas on a project-by-project basis.
Goal 6: Rangeland and biological resource condition		
MQ18. Is forest rangeland management maintaining or improving progress towards sustainable rangelands and ecosystem health?	Forest rangeland management is maintaining sustainable rangeland and ecosystem health. The Majority of issues related to rangeland condition are tied to OHV use as opposed to grazing management.	Continue to work to prevent OHV access to sensitive rangelands in areas such as Corte Madera and Mt Laguna.

Monitoring Questions	Summary of Key Findings	Recommended action, adaptive management, or change
MQ19. Are trends in resource conditions indicating that habitat conditions for fish, wildlife, and rare plants are in a stable or upward trend?	Dam removal projects, coastal sage scrub restoration, invasives control projects and management of key food sources have improved or helped to maintain habitat conditions for a variety of threatened, endangered and Regional Forester Sensitive Species such as arroyo toad, coastal California gnatcatcher. Extended drought conditions however have continued to negatively impact Hermes Copper butterfly, Southwestern Willow Flycatcher, and California Spotted Owl.	Recommended changes for future habitat and species management include the consideration of restoration work to promote Hermes copper butterfly habitat. Also, reinitiating a brown-headed cowbird control program could greatly improve southwestern willow flycatcher nesting success. Continue fuels work to protect remaining California spotted owl habitat from being impacted by catastrophic stand-replacing wildfire.
Goal 7: Natural areas in an urban context		
MQ20. Is the forest balancing the need for new infrastructure with restoration opportunities or land ownership adjustment to meet the desired conditions?	The CNF has implemented a large-scale road decommissioning project over the past eight years and although no land acquisitions were made in FY2019, several land acquisitions are being pursued to reduce ownership complexity throughout the Forest.	Continue to pursue unauthorized routes decommissioning projects via the NEPA planning process and continue to pursue land acquisitions that will reduce ownership complexity on the CNF.
MQ21. How many of each type of special use authorization, mining permit, and forest product permit are active on the forest?	There are numerous special use permits issued across the forest for a wide variety of special uses. There was a significant decrease in permits administered between 2019 and 2020 which is largely attributable to the pandemic (recreation events, FLPMA permits etc).	Return to pre-pandemic levels of permits administered in future years.

Part 1a Monitoring: Questions 1-9

Community Protection and Restoration of Forest Health

The first goal of the Southern California National Forests Land Management Plan emphasizes the need to improve resilience of our communities and ecosystems to wildfire. Goal 1.1 highlights community protection and the ability of southern California communities to recover from wildfire and limit the loss of life and property from wildfire. Goal 1.2 focuses on the need to restore forest health where alteration of the natural fire regime has put human and natural resource values at risk.

Wildland fire is a natural ecological process. However, many communities and ecosystems in southern California are experiencing uncharacteristic fire regimes. Many communities are built in remote areas leading to a relatively large amount of Wildland Urban Interface (WUI) that needs protection from wildfire. The desired condition is to have vegetation treated to enhance community protection and reduce the risk of loss of human life, structures, improvements, and natural resources from wildland fire and subsequent floods. Additionally, firefighters should have improved opportunities for tactical operations and safety near structures, improvements, and high resource values.

The present condition of the vegetation on the four southern California national forests has been influenced by a century of fire management (mostly fire suppression), as well as by other land-use practices such as logging, grazing and mining. The structure, function, and species composition of nearly all southern California plant communities is under the direct control of recurrent fire. The long-term goal of vegetation management is to perpetuate plant communities by maintaining or re-introducing fire regimes appropriate to each type while at the same time protecting human communities from destructive wildland fires.

Monitoring Questions

MQ1. Has the forest made progress in reducing the number of acres that are adjacent to development within Wildland Urban Interface (WUI) defense zones that are classified as high risk? The indicator associated with this question includes acres of high hazard and high risk in the WUI defense zone.

MQ2. Are wildfires becoming larger, more frequent, or more severe, and is there a seasonal shift in fire activity? The indicators associated with this question include total and mean fire size, ignition density, fire severity, and monthly area burned.

MQ3. Are fire frequencies becoming more departed from the natural range of variation? The indicator associated with this question includes the proportion of landscape in departed fire frequency.

MQ4. Is the forest making progress toward increasing the percentage of montane conifer forests in Condition Class 1? Indicators for this question include (1) departure from desired fire regime and (2) acres by Fire Regime I.

MQ5. Is the forest making progress toward maintaining or increasing the percentage of vegetation types that naturally occur in Fire Regime IV in Condition Class 1? Indicators for this question include (1) departure from desired fire regime and (2) acres by Fire Regime IV.

MQ6. Has the forest been successful at maintaining long fire-free intervals in habitats where fire is naturally uncommon? The indicators for this question include (1) departure from desired fire regime and (2) acres by Fire Regime V.

MQ7. Is tree mortality increasing across the landscape, and is it distributed evenly across elevations? The indicators associated with this question include mortality risk assessment and Forest Health Protection Mortality Surveys.

MQ8 (CNF only). Is coast live oak mortality increasing across the landscape? (Cleveland National Forest only) The indicator for this question includes Forest Health Protection Mortality Surveys.

MQ9. Are chaparral and coastal sage scrub vegetation communities type converting to non-native annual grasslands? The indicator for this question includes extent of non-native annual grasses.

Key Results

Progress in the Wildland Urban Interface (WUI)

The Forests continue to prioritize fuel reduction treatments within the WUI defense and threat zones, including areas that have not experienced wildfire within the natural return interval and may have high fuel densities. More work is needed to bring the landscape, including the WUI defense zone, to within the Natural Range of Variation (NRV) and improve resilience.

All three Forests conducted fuel reduction treatments within and outside of the WUI during the monitoring period despite the constraints imposed by the global pandemic, widespread regional closures during two prolonged wildfire seasons, and a regional pause on prescribed burning (Table 1a). About one third of the treatments were conducted in the WUI defense zone and two thirds (or more for the Angeles) were conducted in the WUI threat zone. The different types of treatment activities are described in the supplemental report.

The Forests continue to emphasize treatments within and adjacent to areas that are outside the natural fire return interval (red color in Figure 1a, Figure 2a, Figure 3a), especially in the montane conifer zone (Fire Regime I, brown color). These treatments help reduce unnaturally high fuel densities and improve resilience. Montane conifer ecosystems are typically characterized by frequent, low intensity wildfire. Without regular fire, stands may become overly dense with high fuel loading in forest understories.

Table 1a. Fuel reduction treatment acres in the WUI defense, threat, and Environment zones of the Angeles, Cleveland, and San Bernardino National Forests during fiscal years (FY) 2019 and 2020.

Strategic fire management zone	Treatment Acres[1]		
	Angeles (FY19-20)	Cleveland (FY 20)	San Bernardino (FY 19-20)
WUI defense	136	1131	2750
WUI threat	8416	3073	8193
WUI environment	353	22	219
Total Treatment Acres	**8905**	**4226**	**11,162**

[1] Some treatments may have overlapped the same project footprint (acreage). Therefore, acres may be greater than those unique acres (footprint acres) treated on the ground. Figures 1a – 3a show the footprints of fuel reduction treatments between 2015 and 2020 for one district on each of the three Forests. Figures for the other districts, and details of the treatment activities, are available upon request.

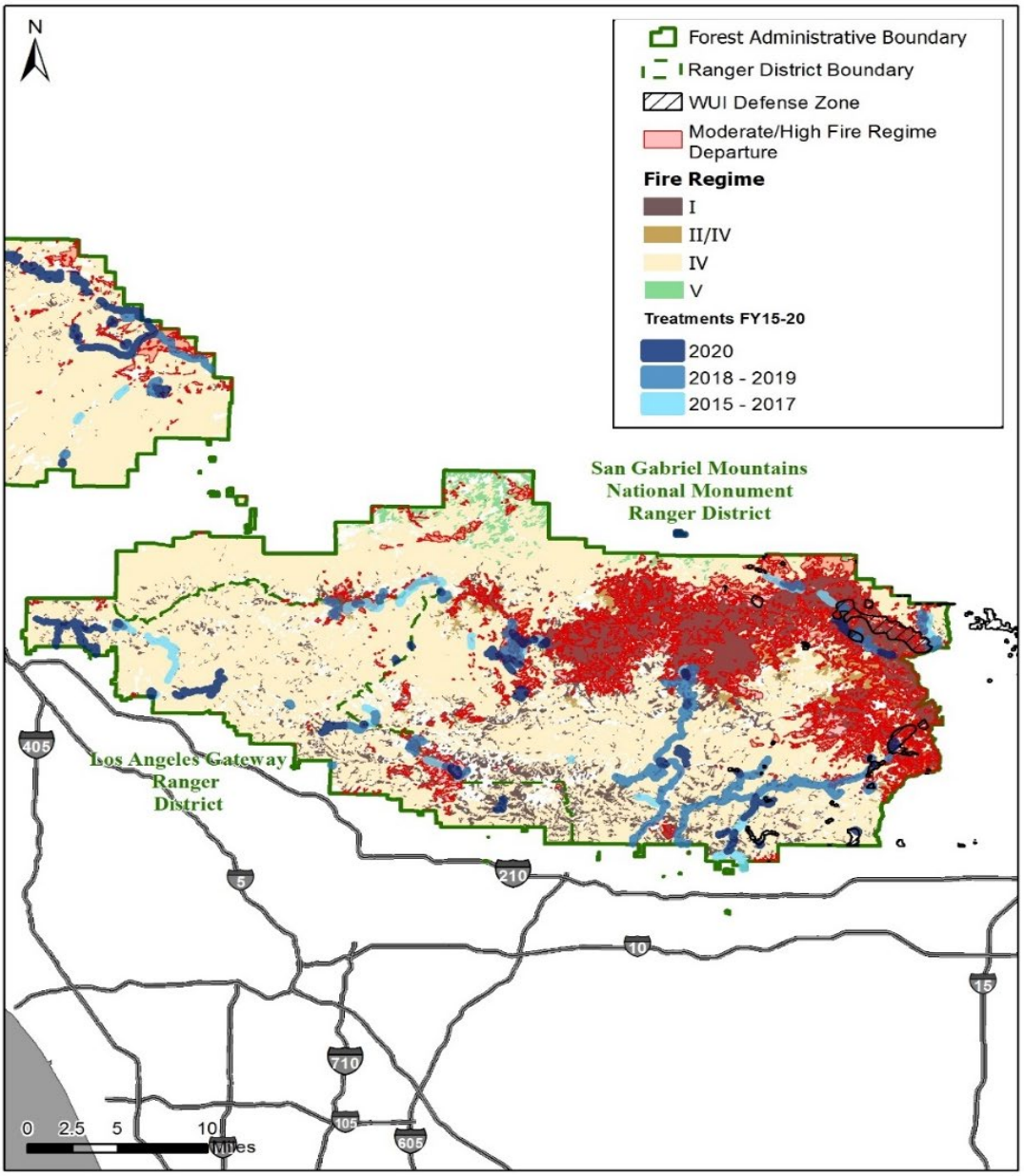

Figure 1a. Fuel reduction treatments in the San Gabriel Mountain NM Ranger District on the Angeles National Forest between 2015 and 2020. Red colored areas are moderately and highly departed from the historic fire intervals, burning far less frequently than they would historically. Fire Regime I: burn interval 0-35 years and low severity (typically montane conifer); Fire Regime II/IV and IV: burn interval 35-100+ years and high severity (typically chaparral, coastal sage scrub, serpentine, gabbro, closed cone conifer, lower montane forests); Fire Regime V: burn interval 200+ years and high severity (typically alpine/subalpine, desert woodland, forest, scrub, bigcone Douglas fir).

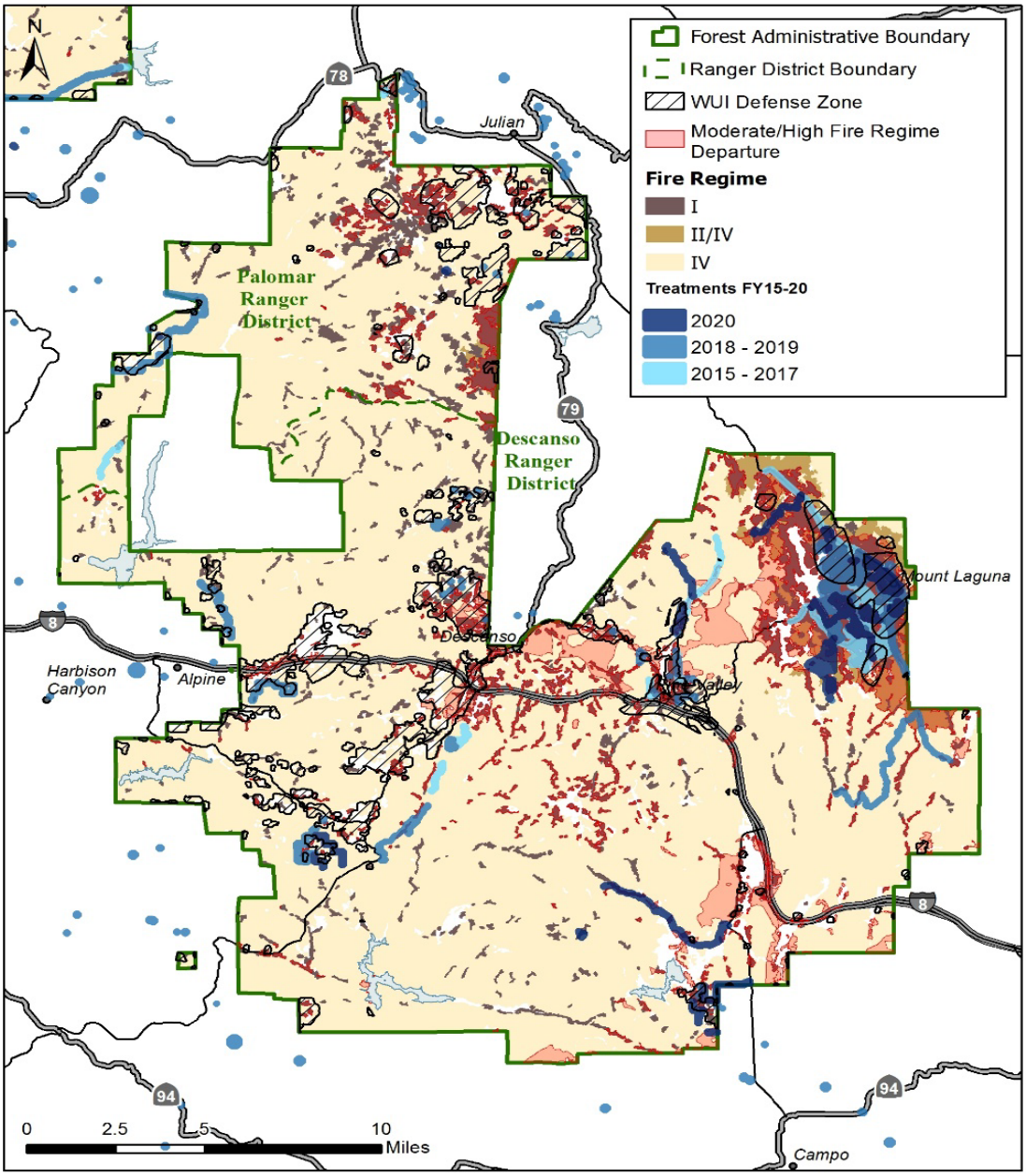

Figure 2a. Fuel reduction treatments in the Descanso and Palomar Ranger Districts on the Cleveland National Forest between 2015 and 2020. Red colored areas are moderately and highly departed from the historic fire intervals, burning far less frequently than they would historically. Fire Regime I: burn interval 0-35 years and low severity (typically montane conifer); Fire Regime II/IV and IV: burn interval 35-100+ years and high severity (typically chaparral, coastal sage scrub, serpentine, gabbro, closed cone conifer, lower montane forests).

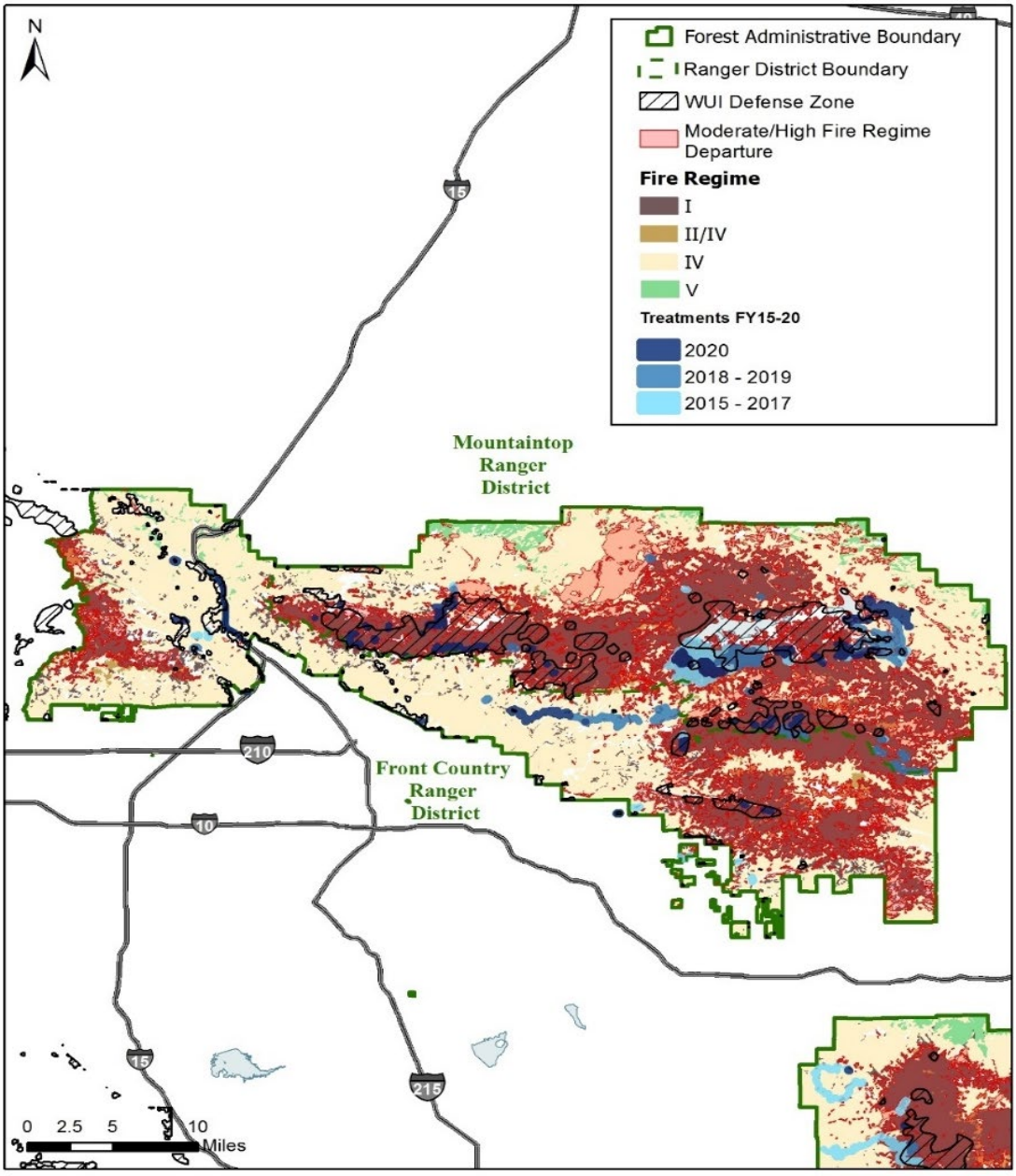

Figure 3a. Fuel reduction treatments in the Front Country and Mountaintop Ranger Districts on the San Bernardino National Forest between 2015 and 2020. Red colored areas are moderately and highly departed from the historic fire intervals, burning far less frequently than they would historically. Fire Regime I: burn interval 0-35 years and low severity (typically montane conifer); Fire Regime II/IV and IV: burn interval 35-100+ years and high severity (typically chaparral, coastal sage scrub, serpentine, gabbro, closed cone conifer, lower montane forests); Fire Regime V: burn interval 200+ years and high severity (typically alpine/subalpine, desert woodland, forest, scrub, bigcone Douglas fir).

Wildfire and fire regime changes

Fire is a natural process in these landscapes. However, the conditions on the ground and the trends in fire activity together pose risks to ecological function and natural recovery. The monitoring results suggest that wildfire size is fluctuating, severity is increasing, and fires can occur in any month of the year. The Forests are making progress in moving these landscapes towards the natural range of variation (NRV), but a large proportion of each Forest continues to be in a moderately and/or a highly departed state, especially in the montane conifer zone where fires are burning much less frequently than historic fire return intervals. The Southern California LMP provides direction to protect natural resources, including by building in resilience to the landscape and decreasing the gap between current conditions and NRV, particularly for wildfire. These results suggest that decades of fire suppression and climate change continue to challenge the Forest efforts to restore resilience and work is needed, especially in the montane conifer zone, to move ecosystems toward NRV at a more rapid pace. These management actions would encourage resilience to future fire and prime these ecosystems for adapting to changes in the fire regime driven by past management and climate change.

For all the Forests, collectively, wildfire size has fluctuated since 1900 with an uptick in acres burned in the last 20 years (Figure 4a). The acres of montane forest burning at high and very high severity (stand replacing) has dramatically increased over the past 40 years (Figure 5a). Most recently the trend in high severity fires burning in forested areas was highlighted by the Apple and El Dorado fires (2020) on the San Bernardino NF. Since the 1970s, the start of our evaluation, fires have burned in nearly every month of the year (Figure 6a). There is not a major, discernable trend in the wildfire season except that the season started to become more active in May beginning in the 1990s. Before the 1990s, the wildfire season appeared to show increased activity beginning in June.

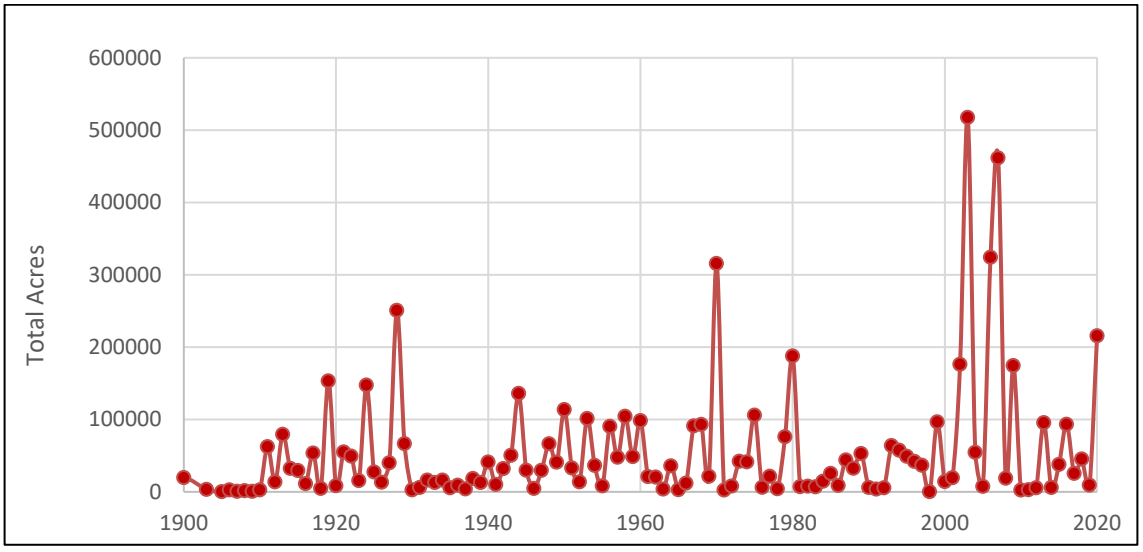

Figure 4a. Trend in total wildfire size on the Angeles, Cleveland, and San Bernardino National Forests since 1900.

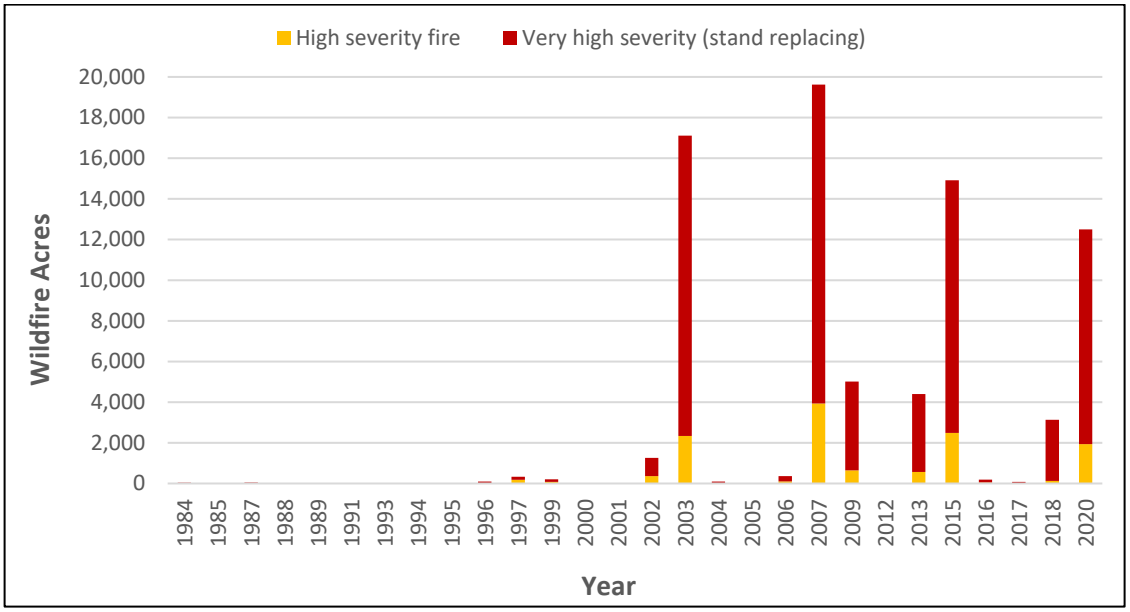

Figure 5a. Acres of wildfires burning at high severity and very high severity on the Angeles, Cleveland, and San Bernardino National Forests between 1984 and 2020. High severity is measured as a loss of more than 75% tree basal area and very high severity is measured as a loss of more than 90% tree basal area. Basal area represents the density of trees in an affected stand.

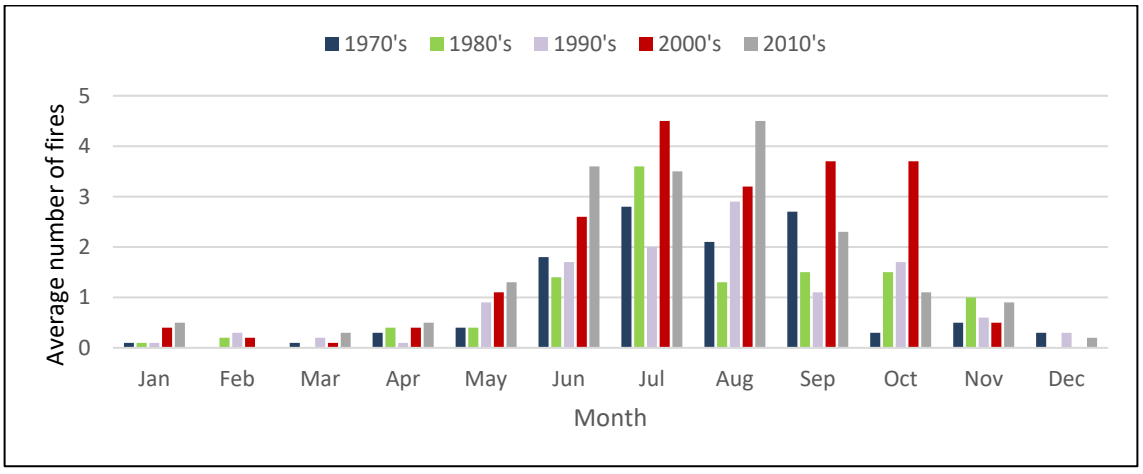

Figure 6a. Average number of wildfires each month on the Angeles, Cleveland and San Bernardino National Forests from 1970-2020.

We examined the extent of fire departure from the natural return interval to get a sense of whether the landscapes, and their representative ecosystems, are experiencing more frequent or less frequent fires than historically. Overall, there have been some positive trends on each of the Forests. Between 2006 and 2020, the Angeles National Forest has seen an increase in the proportion of the Forest experiencing fire cycles within or only slightly departed from the natural fire return interval and a decrease in the proportion of the Forest that is moderately and highly departed from the natural fire return interval (Figure 7a). Overall, the Cleveland and

San Bernardino trends are similar to the Angeles except the Cleveland has seen a very slight (1%) increase in the proportion of the Forest that is highly departed from the natural fire return interval, burning far more frequently than historically, and the San Bernardino has experienced a slight decrease (1%) in the proportion of the landscape within the natural return interval (Figure 7a).

Despite the positive trends, a large proportion of each Forest continues to be moderately and/or highly departed from the historic fire return intervals (Figure 7a). Figure 8a, Figure 9a, and Figure 10a illustrate the locations on each Forest where fire return interval is within or departed from the historic cycle. This finding is especially true for the San Bernardino National Forest where a large proportion is burning far less frequently than the natural return interval (Figure 7a). There is a need to continue (and increase the pace and scale of) management intervention, including prescribed fire and wildfire management for resource benefit, in these areas that are burning less frequently than historically. Such management can reduce fuel loadings, restore structure, and improve resilience. In areas burning far more frequently, there is an opportunity to evaluate ecosystem condition after fire to determine recovery actions and priorities. The Forest Service recently released the *Postfire Restoration Framework for National Forests in California* (Meyer et al. 2021) that is currently being applied to the Bobcat fire on the Angeles National Forest. Moving forward, the Forests may identify guidelines that trigger when a post-fire restoration evaluation is needed.

Montane Forest (Fire Regime I)

Although there was a positive trend between 2006 and 2020 in the acres of montane conifer that are experiencing fire intervals within or slightly departed from the historic fire frequency, the data overwhelmingly indicate that the montane conifer zones of these Forests are burning far less frequently than historically. Approximately 64%, 64%, and 91% of the montane conifer forests on the Angeles, Cleveland, and San Bernardino National Forests, respectively, are *burning less frequently* when compared to historic fire frequencies. Forests departed from the natural range of variation for fire typically have altered forest structure and composition (e.g., unnaturally dense conditions). All Forests prioritized treatments in those areas highly departed (burning much less frequently) from the historic fire return intervals.

Table 2a. Treatment acres in the montane conifer (Fire Regime I) zone. Treatments were focused in areas that are highly and moderately departed from the historic fire regime, burning less frequently than historically. Please note that treatment acres (e.g., mechanical thinning, broadcast burning) may be different from footprint acres (unique acres treated on the ground) because some acres may have received more than one treatment activity.

National Forest	Treatment Acres in areas burning less frequently than historically		
	High departure	Moderate departure	Within or low departure
Angeles (FY19-20)	1201	489	318
Cleveland (FY20)	2083	119	31
San Bernardino (FY19-20)	5406	188	36

Shrubland and Chaparral (Fire Regime IV)

For each Forest, we observed an increase in the proportion of the Forest shrubland and chaparral zones that are within or low departure (≤ 33%) from historic fire frequencies. Indeed, as of 2020, most of this fire regime is now within (or only minimally departed from) the historic fire regime. However, a large proportion of the shrub and chaparral-dominated landscapes on each of these Forests are still burning more frequently when compared to historic conditions.

Scrub (Fire Regime V)

For Fire Regime V, dominated by alkali desert scrub, desert scrub, desert wash, Joshua tree, and desert mixed shrub, areas that typically burn very infrequently (200+ years) and at high severities, most of this ecological zone on the Angeles and San Bernardino is highly departed from the historic fire regime, burning with far more frequency than historically. The Cleveland NF contains only four acres of Fire Regime V.

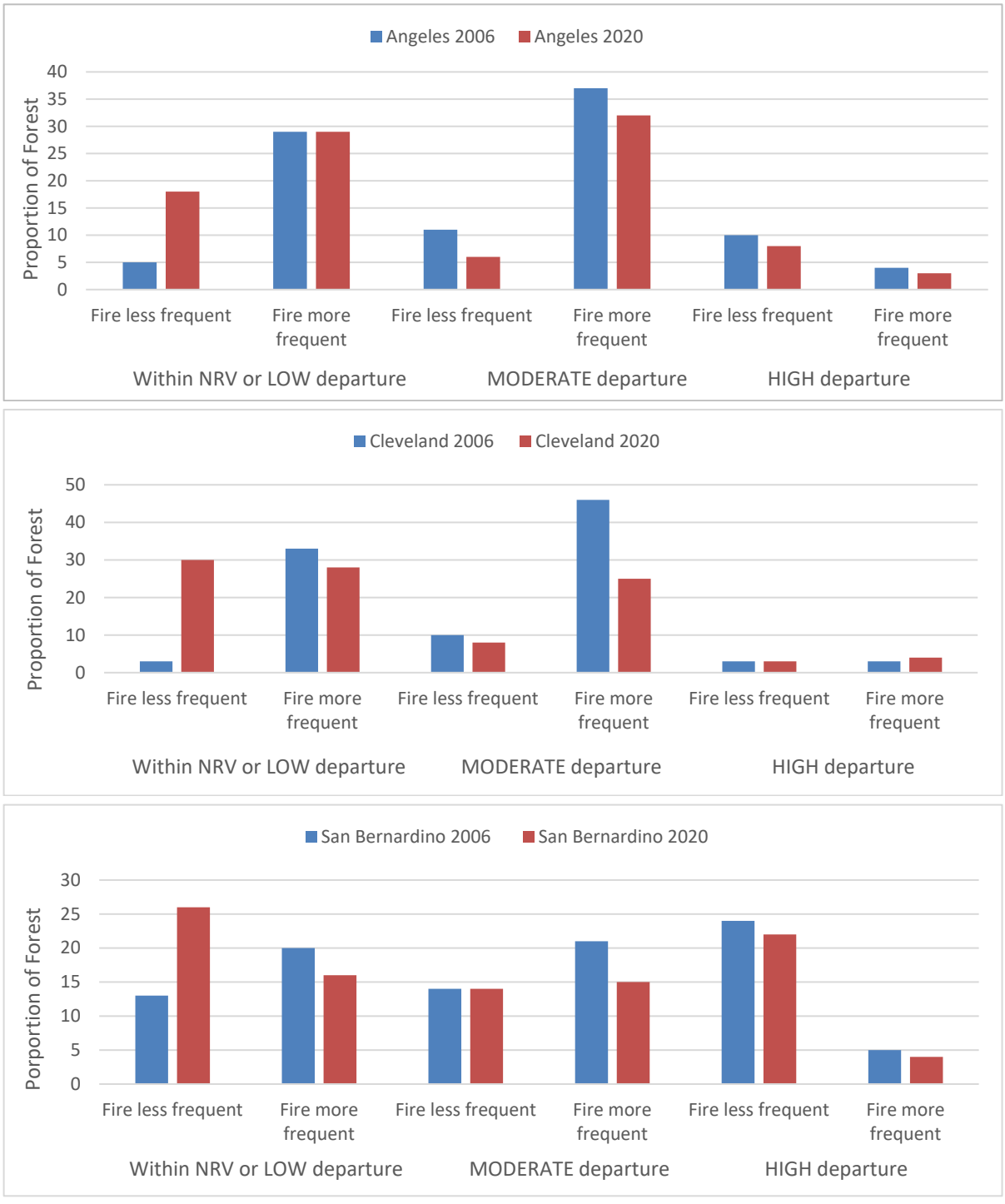

Figure 7a. Proportion of the Angeles (top), Cleveland (middle), and San Bernardino (bottom) National Forests that are within (or low departure), moderately departed from, and highly departed from historic fire return intervals in 2006 and in 2020. Within each departure category, bars indicate if the proportion of the forest is burning more or less frequently than historic fire return intervals.

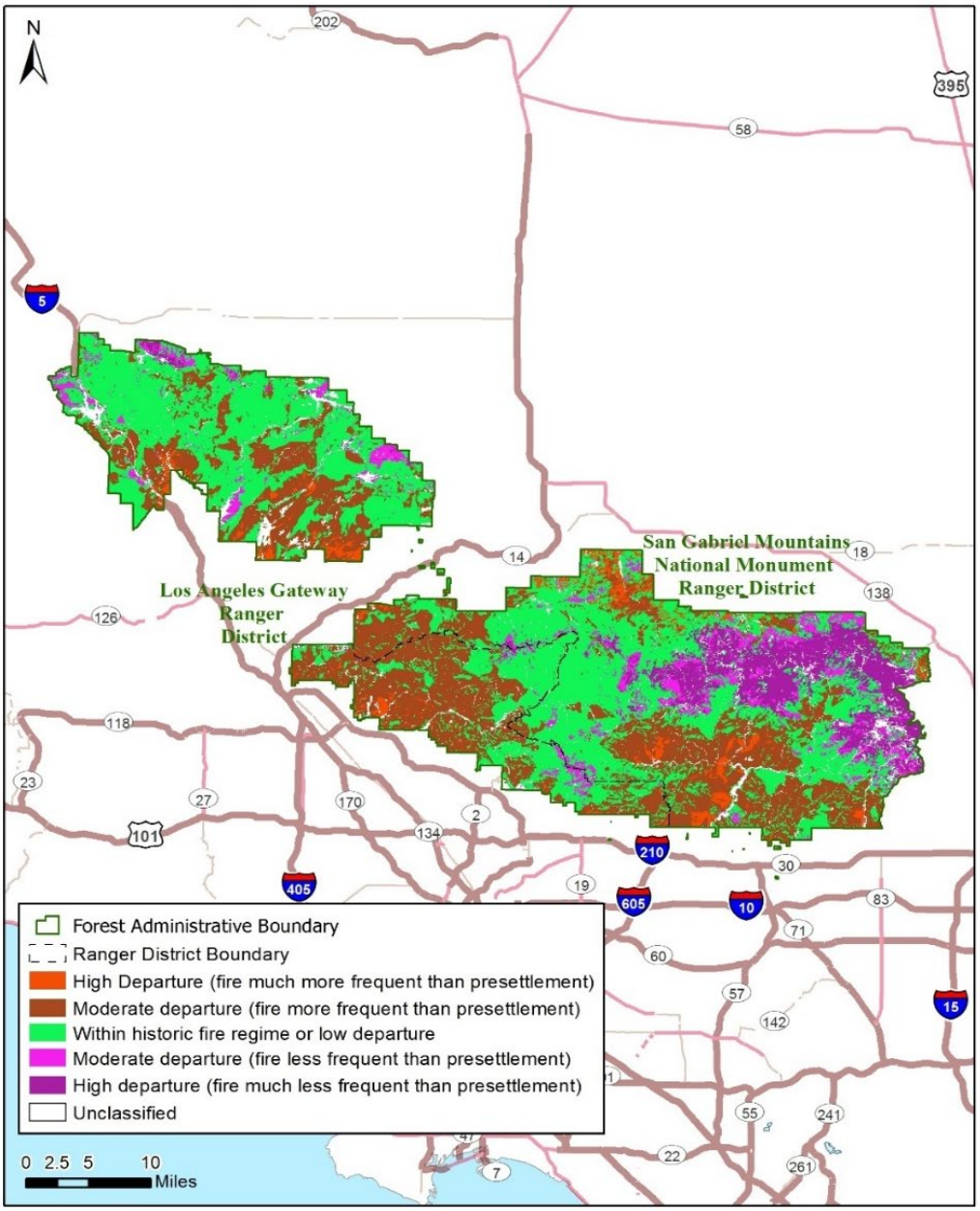

Figure 8a. Fire Return Interval Departure for the Angeles National Forest. Red and brown areas are those that are burning much more frequently than historically. Purple areas are those that are burning much less frequently than historically. Green areas are within or only slightly departed from the historic fire return interval.

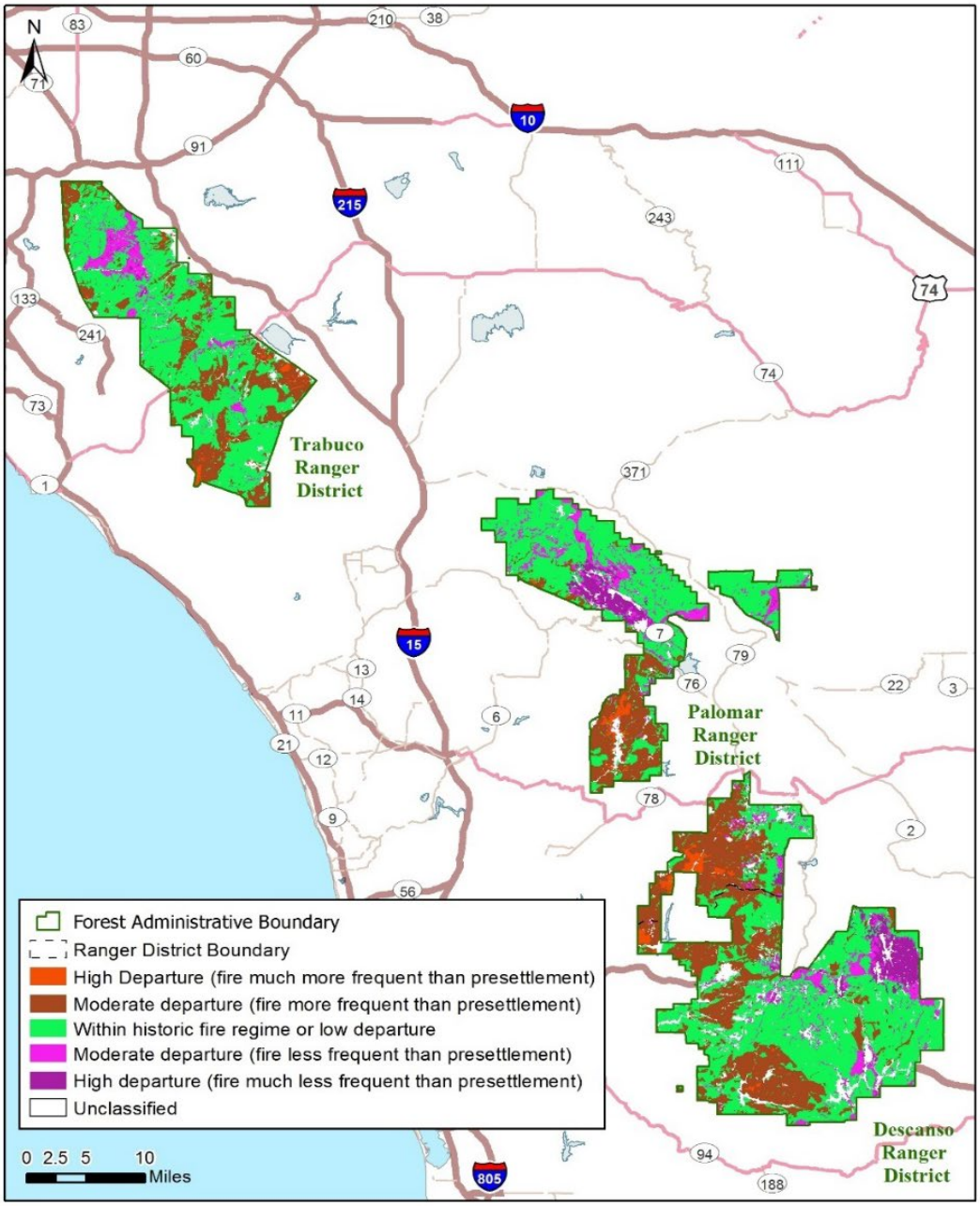

Figure 9a. Fire Return Interval Departure for the Cleveland National Forest. Red and brown areas are those that are burning much more frequently than historically. Purple areas are those that are burning much less frequently than historically. Green areas are within or only slightly departed from the historic fire return interval.

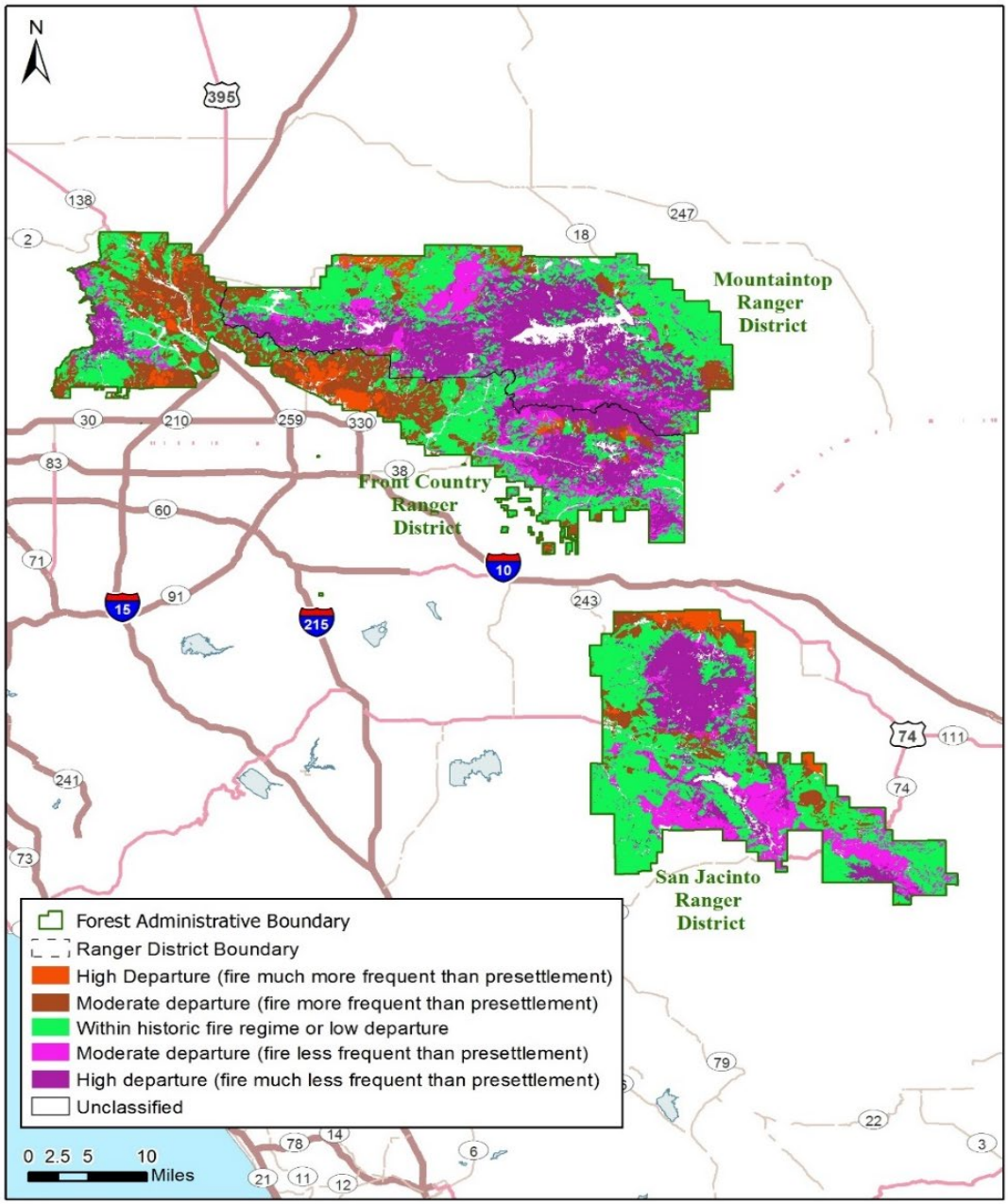

Figure 10a. Fire Return Interval Departure for the San Bernardino National Forest. Red and brown areas are those that are burning much more frequently than historically. Purple areas are those that are burning much less frequently than historically. Green areas are within or only slightly departed from the historic fire return interval.

Drought and insect – related tree mortality

Based on data for the USFS Forest Health Protection Aerial Detection Surveys, all Forests experienced a sharp increase in the acres of conifer mortality and estimated number of dead trees between 2015 and 2017. The dominant conifer species affected include white fir and yellow pine (Jeffrey and ponderosa pines). Conifer mortality since 2017 has been comparatively low. Lower and higher elevations, rather than middle elevations experienced a higher percent change in acres of mortality compared to baseline conditions but it is unclear if that is a result of higher relative mortality rates or the effects of tree densities (low and high elevations may have fewer trees). On the Cleveland National Forest, where the goldspotted oak borer is killing live oak trees, oak mortality also peaked between 2015 and 2017, and continued into 2018. The greatest concentration of dead oak trees radiates from existing goldspotted oak borer infestations. The peak in conifer and oak mortality coincided with a major drought event in the region. As drought is expected to increase over time due to climatic changes, there will be an increasing trend in either gradual or drought-induced punctuated mortality.

The Angeles National Forest conifer mortality pattern peaked in 2015 and again in 2017, 2016 mortality was relatively low (Figure 11a). In 2015, yellow pine, white fir and Bigcone Douglas fir were affected by the drought but yellow pines died in the greatest numbers and largest acreage. White fir mortality lagged behind, with a small peak in 2015 and greater peak in 2017. The greatest percent change in acreage and estimated dead trees occurred at the high elevation band (8,000 feet) on the Angeles National Forest in 2015.

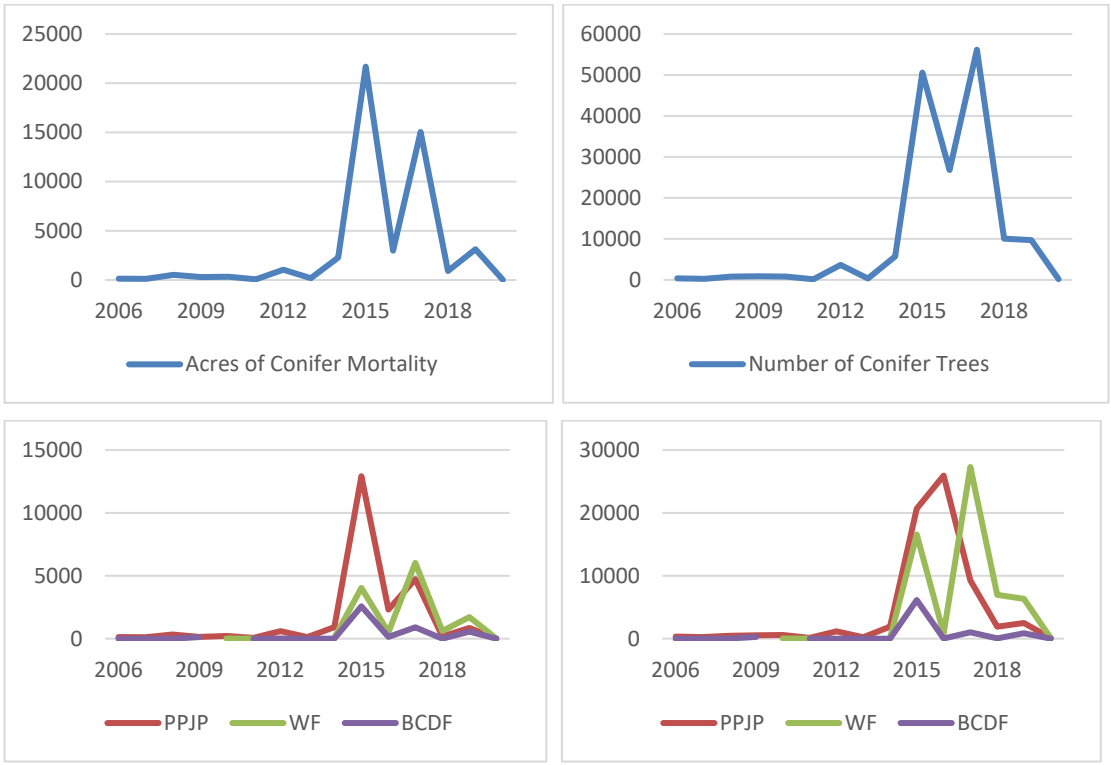

Figure 11a. Acres of conifer mortality (top left) and estimated number of dead conifers (top right) on the Angeles National Forest (USFS Forest Health Protection Aerial Detection Surveys). Acres (bottom left) and estimated number of dead (bottom right) white fir (WF), yellow pine (PPJP = pinyon pine, Jeffrey pine), and Bigcone douglas fir (BCDF) trees on the Angeles National Forest.

The Cleveland National Forest conifer mortality spiked in 2015 and ended earlier than the other two Forests (Figure 12a). The mortality event also affected far fewer acres and trees compared to the other two Forests. However, of the three Forests, the Cleveland National Forest had the highest percent change in tree mortality from 2006 numbers. Yellow pine trees were more affected by the mortality event than any other species group. In fact, Bigcone Douglas fir mortality affected fewer than 120 acres and 60 trees. Unlike the Angeles National Forest, the peak mortality on the Cleveland occurred at the lower elevation band (2,000 feet).

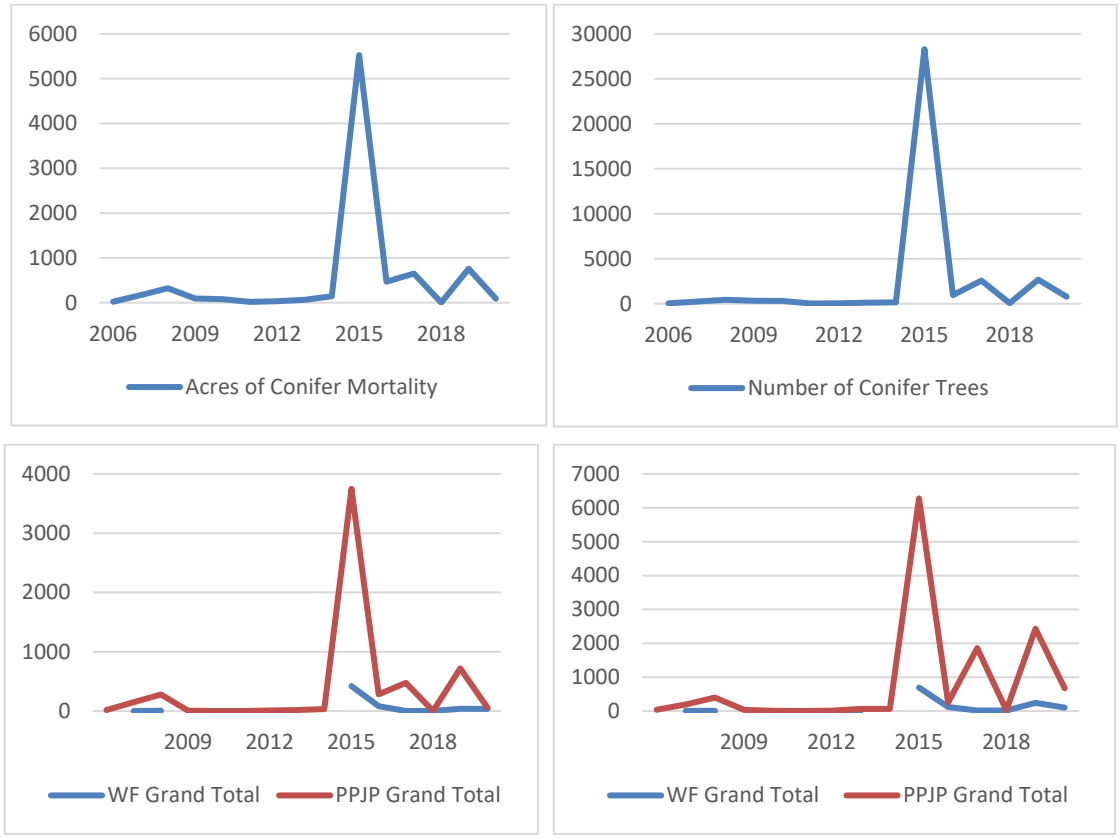

Figure 12a. Acres of conifer mortality (top left) and estimated number of dead conifers (top right) on the Cleveland National Forest (USFS Forest Health Protection Aerial Detection Surveys). Acres (bottom left) and estimated number of dead (bottom right) white fir (WF) and yellow pine (PPJP = pinyon pine, Jeffrey pine) trees on the Cleveland National Forest.

The Cleveland National Forest experienced a peak in live oak mortality also during the drought period (2015-2017). The estimated number of dead oak trees also remained elevated in 2018 (Figure 13a). The greatest concentration of annual dead oak trees tends to be on the leading edge of the goldspotted oak borer (GSOB) infestation as the beetles kill the most susceptible trees first adjacent to those already affected. On the Descanso Ranger District, GSOB-caused tree mortality was greatest from 2006-2017. By 2015, oak mortality began to increase on the Palomar Ranger District. GSOB was introduced to the Trabuco Ranger District through infested firewood and was first detected on National Forest lands in 2017 within Blue Jay and Falcon campgrounds. Active management within those campgrounds included removing GSOB-infested trees to reduce local population levels and preventative insecticide sprays to limit further infestation of trees. As a result, GSOB-related oak mortality has been limited on the Trabuco Ranger District. In 2019, oak mortality was concentrated on the Palomar Ranger District near Palomar Mountain.

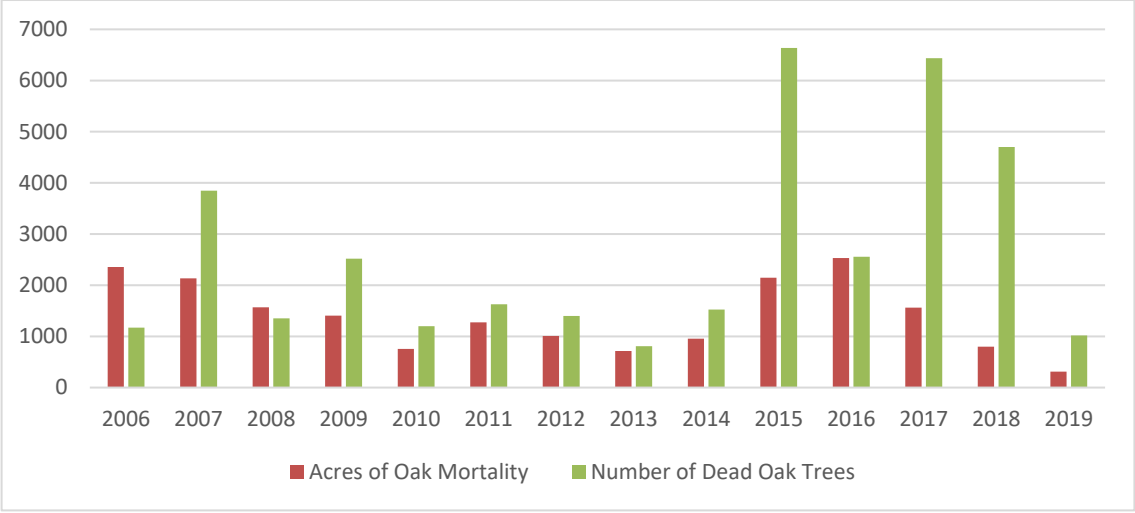

Figure 13a. Annual estimates of acres of new oak mortality and number of dead oak trees on the Cleveland National Forest from 2006 to 2019 (USFS Forest Health Protection Aerial Detection Surveys).

Conifer mortality on the San Bernardino National Forest spiked the most in 2017 compared both to previous years and the other two Forests (14a). This Forest had the most mortality (acres and numbers of trees) of the three Forests, but this result may reflect the fact that the San Bernardino has more conifer trees. Acres of Jeffrey pine and Ponderosa pine peaked in 2015 and then again in 2017 and a smaller peak in 2019. White fir experienced greater mortality than the pines showing one strong peak in 2017. Bigcone Douglas fir mortality also peaked in 2017 but in numbers far below the other species (< 2500 acres, < 4000 trees). Like the Cleveland National Forest, the elevation band that has experienced the most change in tree mortality is the lower elevation (3,000 feet).

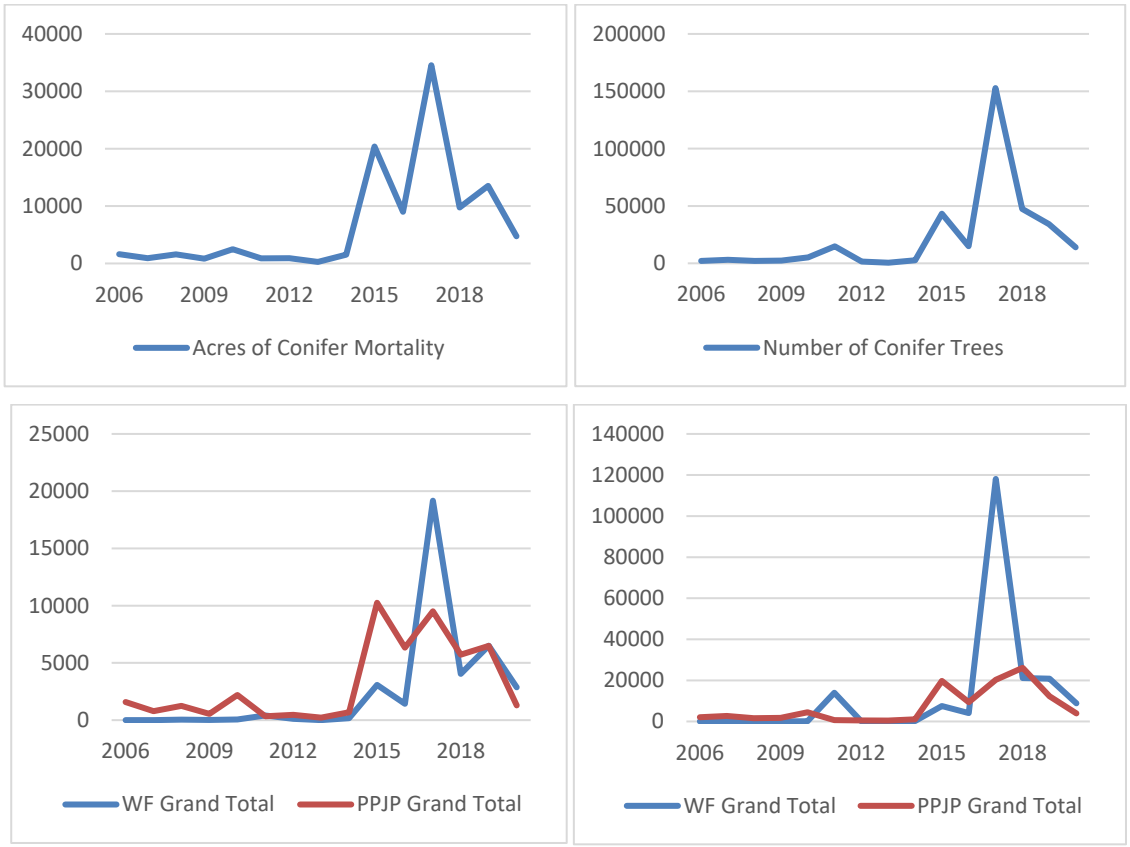

Figure 14a. Acres of conifer mortality (top left) and estimated number of dead conifers (top right) on the San Bernardino National Forest (USFS Forest Health Protection Aerial Detection Surveys). Acres (bottom left) and estimated number of dead (bottom right) white fir (WF) and yellow pine (PPJP = pinyon pine, Jeffrey pine) trees on the San Bernardino National Forest.

The three Forests are part of a multi-jurisdictional, collaborative partnership with the Climate Science Alliance, Institute for Ecological Monitoring and Management at San Diego State University, and the Southwest Climate Adaptation Science Center to develop a scientific assessment and create a conservation strategy for southern California's montane forests. The Southern California Montane Forest Project is guided by stakeholder input and is intended to help identify vulnerabilities and challenges facing montane forests (conifers and oaks) and identify the opportunities and strategies for increasing forest resilience.

Shrubland conversion to non-native grasses and herbs

There has been an increase in the acres and percent of the shrubland landscape that has type converted to non-native annual grasslands between 2009 and 2018 (the most recent years data were available). However, the proportion of non-native annual grasslands measured is low (1%) and the San Bernardino saw a decrease between 2017 and 2018. All three Forests have experienced an increase in the acres and percent of the shrubland landscape that has converted to non-native annual grasslands. This pattern has not been continuous – the Forests

experienced an initial decrease in converted acres generally between 2009 and 2013 before increasing again (Figure 15a). The Angeles and Cleveland National Forests mirror this trend, but the San Bernardino experienced a decrease in the acres of non-native annual grassland between 2017 and 2018, the most recent years of available data (Figure 16a). The percentage of non-native annual grassland measured remains relatively low (1%).

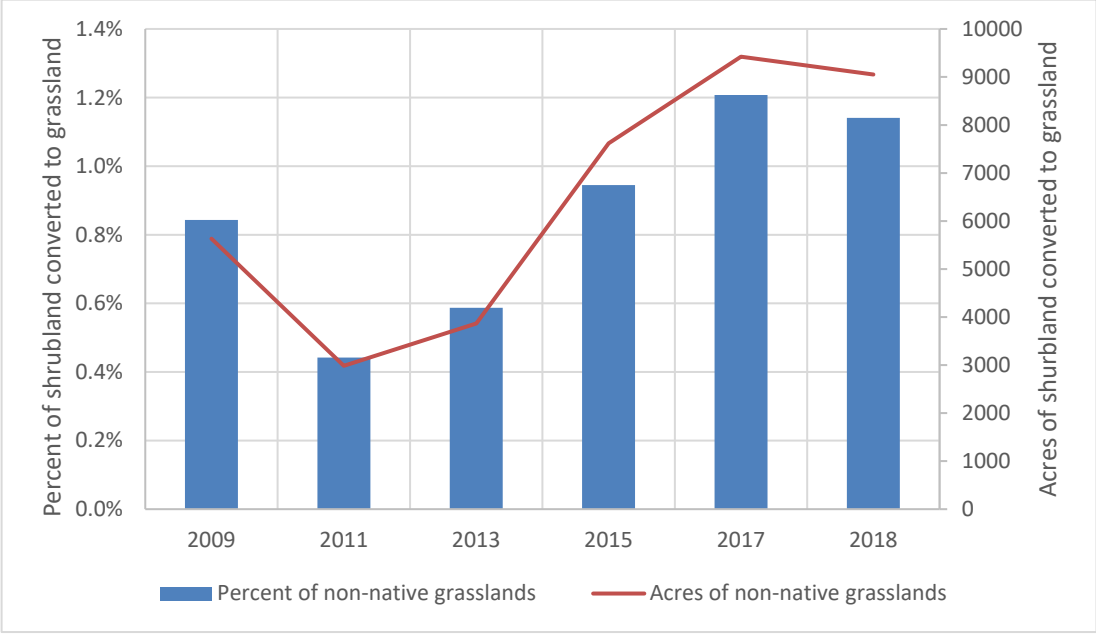

Figure 15a. Trend in acres and percent of shrubland converting to non-native annual grasslands on the Angeles, Cleveland, and San Bernardino National Forests between 2009 and 2018. Any areas burned in the last 10 years were not included in the analysis because of the potential to inflate conversion trends due to native fire-following grasses and herbs. The threshold for conversion was 50% meaning that any area that previously was considered shrubland (per Wieslander historic map) and is now >50% herb cover would be considered converted.

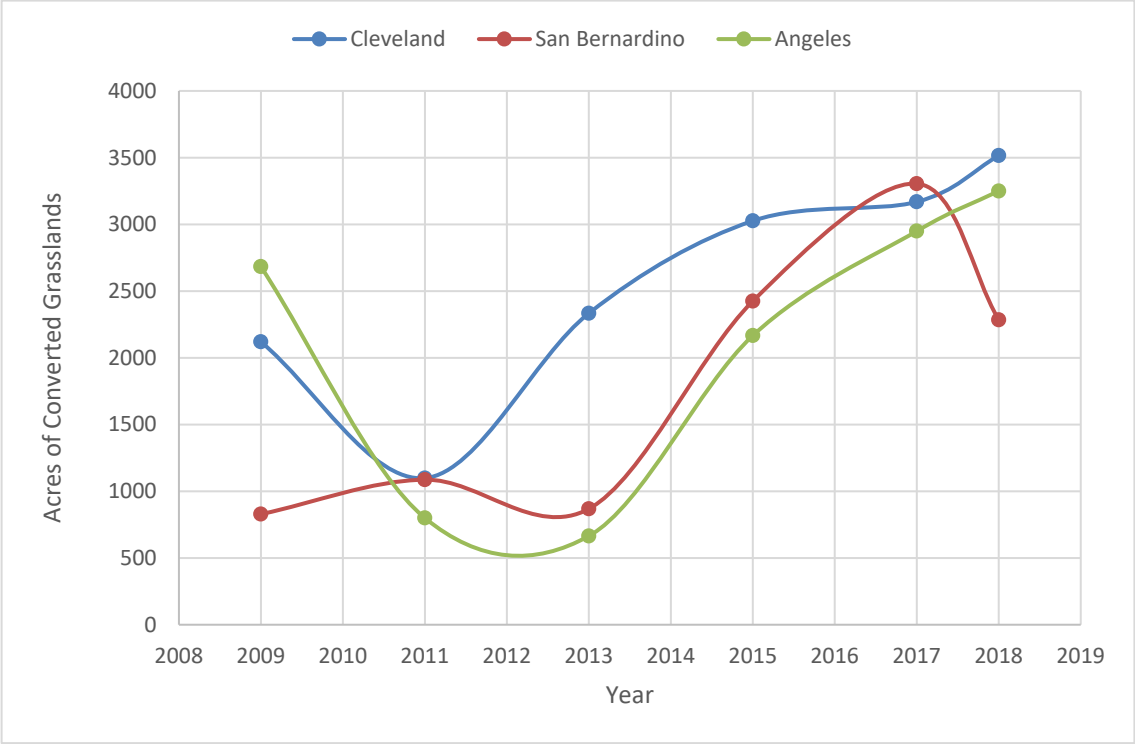

Figure 16a. Trend in acres of non-native annual grasslands on the Angeles, Cleveland, and San Bernardino National Forests between 2009 and 2018. Any areas burned in the last 10 years were not included in the analysis because of the potential to inflate conversion trends due to native fire-following grasses and herbs. The threshold for conversion was 50% meaning that any area that previously was considered shrubland (per Wieslander historic map) and is now >50% herb cover would be considered converted.

Part 1b Monitoring: Questions 10-21

Invasive Species

The second goal of the Southern California National Forests Land Management Plan emphasizes the desire to manage and/or eradicate invasive species on the southern California National Forests. Specifically, Goal 2.1 focuses on reversing the trend of a loss of natural resource values due to invasive species. Invasive plant and animal species, when unchecked, often demonstrate a capacity for spread at the expensive of endemic species. These species can cause extraordinary damage to ecosystem composition, structure, and function. Some invasives are already so prevalent that they are unlikely to be eradicated, therefore the objective is to control their spread into novel sites. There is also a continuous threat of the introduction of new invasive species. In these cases, the emphasis may be to eradicate them before they become ubiquitous as well as to prevent future introduction of invasives. Due to heavy use the recreating public, as well as a diverse suite of special uses on all southern California National Forests, the introduction and spread of invasive species will likely always be a primary management concern.

Monitoring Question

MQ10. Are the national forests' reported occurrences of invasive plants/animals showing a stable or decreasing trend? The indicator for this question is acres of treatments in reported occurrences.

Key Results

Progress in Managing the Spread and/ or Eradication of Invasive Species

The Forest continues to aggressively target the treatment of invasives species and target species are successfully managed. However, non-target invasive species are likely stable or increasing. The Invasive Weed Management Environmental Assessment and subsequent Decision Notice have allowed the CNF to rapidly respond to novel invasives as well.

On the Cleveland National Forest, approximately 807 acres of invasive plant species were treated on the CNF during FY20. There were invasive plants/weed treatments on Palomar and Trabuco Ranger Districts, with most of the acreage treated focusing on tamarisk in the Upper San Diego River Basin funded by a State of California Proposition 84 grant. In riparian habitats, 586 acres were treated the first year of this grant on the Palomar Ranger District, with an additional 167 acres retreated the following season but within the same fiscal year.

Trends in annual indicators for Goal 2.1: Survey data was entered into the Natural Resource Information System (NRIS) corporate database and acres treated are recorded in the FACTS database. Based on reported activities that have occurred from FY08 through FY20, approximately 3,728[1] acres have been treated or retreated for invasive plant species on the CNF. Invasive species that were removed include giant reed (*Arundo donax*), edible fig, (*Ficus carica*), tree tobacco (*Nicotiana glauca*), tamarisk (*Tamarix* sp.), yellow star-thistle (*Centaurea solisticialis)*, Italian thistle (*Carduus pycnocephalus*), Spanish broom (*Spartium junceum*), mustard (*Hirschfeldia incana* and *Sisymbrium* sp.), and purple pampas grass *(Cortadaria jubata*). Eradication of new infestations and treatment of riparian areas were emphasized.

New treatment areas in the San Diego River Watershed for aquatic invasive fish were identified, primarily targeting green sunfish, bass, and bullfrogs. Because the Forest does not receive a level of funding sufficient to conduct a comprehensive inventory, we are unable to identify a trend based on change from total inventoried acres. Based on internal knowledge of the infested areas, it is likely that there is a decreasing trend for our priority weed species; however, for all invasive plants it is stable or even New treatment areas in the San Diego River Watershed for aquatic invasive fish were identified, primarily targeting green sunfish, bass, and bullfrogs. Because the Forest does not receive a level of funding sufficient to conduct a comprehensive inventory, we are unable to identify a trend based on change from total inventoried acres. Based on internal knowledge of the infested areas, it is likely that there is a decreasing trend for our priority weed species; however, for all invasive plants it is stable or even increasing.

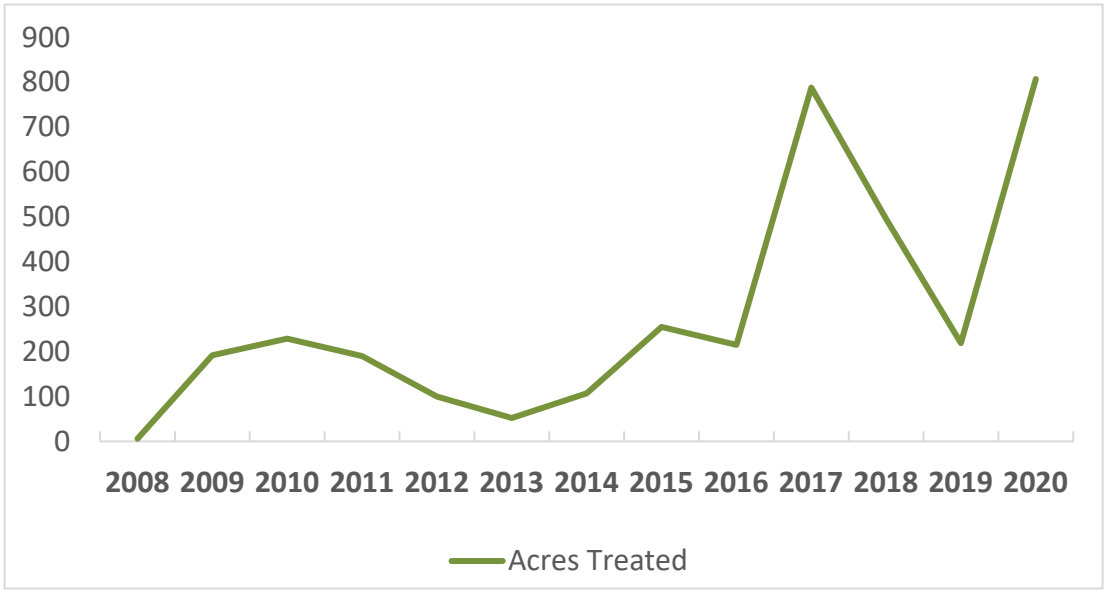

Figure 1b: Acres of invasive plant species treated on the Cleveland National Forest from 2008 to 2020

[1] In 2018 496 acres of invasive plant species were treated, however, the 2018 Monitoring Report did not add the 496 acres to the cumulative total. As a result, the cumulative total was incorrectly reported in 2018 and 2019 but has been corrected for the 2020 Biennial Evaluation and Monitoring Report.

Managed Recreation and Wilderness

The third goal of the Southern California National Forests Land Management Plan emphasizes managed recreation and wilderness values. Goal 3.1 seeks to provide public use while simultaneously managing natural resource protection in the face of soaring demand for outdoor recreation from heavily populated southern California. This includes sustainably managed recreation facilities, conservation education, Tribal use, safe and well-designed roads and trails. Further, these recreational needs must be balanced with habitat protection, heritage site protection and other resource protection goals. Goal 3.2 is to retain a natural evolving character within wilderness. The desire condition for wilderness includes the maintenance of untrammeled ecological processes, vegetation and fire management, high air quality and opportunities for solitude for the recreating public.

Monitoring Questions

MQ11. Are trends in indicators and visitor satisfaction surveys indicating that the forest has provided quality, sustainable recreation opportunities that result in increased visitor satisfaction? The indicator for this question is visitor satisfaction.

MQ12. Are trends in indicators and visitor satisfaction surveys depicting the forest has provided solitude and challenge in an environment where human influences do not impede the free play of natural forces? The indicator for this question is Wilderness condition.

Key Results

Progress in Maintaining and Improving the Recreation Experience on the Forest

Visitation to the Forest increased from about 641,000 visits in 2014 to 717,000 visits in 2019. Visitor satisfaction increased except in three key areas: developed facilities in undeveloped sites, services in undeveloped areas, and access in designated wilderness. Wilderness stewardship performance scores for our four designated Wilderness increased in 2020. However, the Agua Tibia Wilderness is our only Wilderness currently managed to standard and Hauser, Pine Creek, and San Mateo Canyon Wilderness are approaching standards.

Annual indicators are “recreation facilities managed to standard”, including natural resource protection as described in Goal 3.1. Implementation and effectiveness monitoring of resource protection actions required by LMP standards S34 and S50 (including Part 3 Appendix D) help to measure the resource protection element of this goal.

Long-term indicators are visitor use trends by activity and overall satisfaction from the National Visitor Use Monitoring (NVUM) survey. The NVUM is produced every five years. The 2019 LMP monitoring reported on the 2014 NVUM. This 2020 report reflects on the data

collected for the 2019 NVUM[2]. The current report summarized data which were collected in both 2014 and 2019 to demonstrate trends (see Table 1b)

Table 1b: Percent satisfied by site type. 2019 NVUM

Satisfaction Element	Satisfied Survey Respondents (%) 2019		
	Developed Sites	Undeveloped Areas (general forest areas)	Designated Wilderness
Developed Facilities	90.4%	68.7%	96.4%
Access	97.6%	88.1%	95.4%
Services	94.4%	71.3%	91.5%
Feeling of Safety	100%	94.8%	94.5%
Change from 2014 to 2019	**+ 4.8%**	**- 3.7%**	**+ 6%**

These 2019 values are generally higher across the board than those determined in 2014. The three exceptions are developed facilities in undeveloped sites, services in undeveloped areas and access in designated wilderness. The results also indicate that CNF visitation has continued to increase substantially since 2014, with approximately 717,000 estimated visits in 2019 relative to 641,000 in 2014. The 2019 report is available online at: http://www.fs.fed.us/recreation/programs/nvum/.

Preliminary reporting was initiated in 2015. Table 2b shows the WSP scores of all four CNF Wilderness areas for FY 2015 to 2020. These scores reflect the 10 core elements of wilderness condition. Each element has a 10-point score maximum with a combined maximum score of 100. Scores over 60 are considered "managed to standard". Currently, only Agua Tibia Wilderness Area is considered managed to standard, although Hauser, Pine Creek and San Mateo Canyon Wilderness Areas are all "approaching standards." For FY20 there was a 22-point improvement in the overall wilderness area score. The 2020 Wilderness Stewardship Performance Report can be found here:

[2] The 2019 Monitoring Report was published before the 2019 NVUM was published. This is the first Monitoring Report that includes the 2019 NVUM data.

Table 2b: Wilderness Stewardship Scores

Year	Wilderness Area			
	Agua Tibia	Hauser	Pine Creek	San Mateo Canyon
2015	38	20	22	26
2016	38	24	22	26
2017	54	48	44	48
2018	56	48	44	48
2019	62	52	48	52
2020	64	58	58	56
+ /- 2019 to 2020	**+2**	**+6**	**+10**	**+4**

The CNF continues to maintain a high level of visitor satisfaction despite ever increasing levels of visitation. Wilderness Condition has also improved steadily in every category and despite one of four wilderness areas on the CNF meeting standards, if trends continue the other three wilderness areas that are currently "approaching standards" could meet standards within the next several years.

Energy and Minerals Production

The fourth goal of the Southern California National Forests Land Management Plan emphasizes energy, renewable energy, and mineral production. The aim is to provide opportunities for mineral extraction and renewable and non-renewable energy resource development while continuing to sustain the land's productivity for other uses and its capability to support biodiversity goals and ecosystem health. The desired condition is approved mineral and energy developments are managed to facilitate production of mineral and energy resources while minimizing adverse impacts to surface and groundwater resources and protecting or enhancing ecosystem health and scenic values.

Monitoring Questions

MQ13. Has the forest been successful at protecting ecosystem health while providing mineral and energy resources for development? The indicators for this question include the number of mineral and energy development projects proposed and approved, and minerals and energy

success at protecting ecosystem health.

MQ14. Has the forest been successful at protecting ecosystem health while providing renewable resources for development? The indicators for this question include the number of renewable resource projects proposed and approved, and renewable resources success at protecting ecosystem health.

Key Results

Protecting Ecosystem Health while providing Mineral, Energy, and Renewable Energy Resources for Development

While the demand for energy development on the Cleveland National Forest is minimal, multiple mining claims remain active. Challenges exist in managing existing claims to minimize damage to the landscape, as well as bringing legacy mines into compliance. The Forest has begun work to identify courses of action to bring all existing mines into compliance with environmental standards.

In FY20, inspections were conducted at 5 closed mining claims and 22 active claims. Some evidence of prospecting was identified in ephemeral channels within placer claims, but within expected levels of disturbance for prospecting not expected to pose long-term resource damage. There are a few active lode claims where there are large, oversteep or vertical cuts into veins (Maple Lode, Santa Fe). These claims, although up to date with annual BLM fees, have expired plans of operation or incomplete proposals in FS records. No direct damage from mining to any sensitive resources was observed, however there are numerous locations with inappropriate waste rock disposal in steep berms at the top of inner gorges and hillslopes. In locations where legacy mining activity has left open pits or mining roads as scars on the landscape, the loss of soil organic matter has been severe.

In FY20, consultations were initiated with certified mineral administrators within Region 5 to identify course of action to bring the unauthorized Cryo-Genie mine into compliance with environmental standards. Cryo-Genie is a legacy Tourmaline mine with a multi-decade history of non-compliance and previous unsuccessful attempts by Forest Service staff to secure a reclamation bond of the appropriate amount. Progress was made towards remediation in FY20.

No renewable energy development projects were proposed or approved during FY20, therefore monitoring question 14 has not been answered for this report.

Watershed Function and Riparian Condition

The fifth goal of the Southern California National Forests Land Management Plan focuses on improving riparian and watershed condition. The watersheds throughout the southern California National forests are the headwaters and primary source areas for the majority of the rivers across southern California. They provide aquatic and riparian species habitat. Watersheds are quantitively assessed based on a variety of indicators and riparian areas are conserved through the establishment of Riparian Conservation Areas (RCAs) which offer additional protections and consideration, particularly through the project planning process. Ultimately, the desired condition regarding watersheds and riparian areas are properly functioning, healthy, dynamic and resilient, and capable of supporting healthy populations of desired native and desired nonnative riparian dependent species.

Monitoring Questions

MQ15. Is the forest making progress toward sustaining Class 1 watershed conditions while reducing the number of Condition Class 2 and 3 watersheds? The indicator for this question is the number of watersheds in each condition class.

MQ16. How do streamflows compare with historical records? The indicators for this question include monthly stream flows, timing and magnitude of peak flows, degree of variation.

MQ17. Is the forest increasing the proper functioning condition of riparian areas? The indicators for this question include the change in indicator score for aquatic habitat, aquatic biota and riparian vegetation.

Key Results

Progress toward Sustaining Watershed Function, Maintaining or Improving the Health of Riparian Areas and Assessing Streamflow

The majority of watersheds on the CNF continue to function properly and none are considered in Condition Class 3 (impaired). Restoration actions continued in 2020 such as feral pig eradication, invasive weed treatment, and culvert installation for aquatic organism passage in Cedar Creek, Kitchen Creek-Cottonwood Creek, and Arroyo Trabuco watersheds. Boulder Creek was identified as a new priority watershed although the WRAP is still in draft form. Despite periodic drought over the last several years, the two measured waterbodies (Santa Ysabel creek and Sweetwater River) experienced above-average flows.

Table 3b: Watershed Condition Framework - 2011

Outcome indicator	Desired condition	Baseline Watersheds	Trigger
Condition Class 1, Properly Functioning	Maintained condition ratings	31	Decrease in number of Class 1 watersheds
Condition Class 2, Functioning at Risk	Maintained or improved condition ratings	17	Decrease in number of Class 2 watersheds
Condition Class 3, Impaired Function	Improved condition ratings	0	Degrading conditions in Class 3 watersheds

Overall, stream flow at the two measured streams appears consistent with historic flows and many of the creeks had flows in 2020 like historic 75th percentile flows.

Table 3b displays Watershed Condition Framework (WCF) ratings finalized in 2011. The majority of watersheds on the CNF are functioning properly; none are impaired. Priority watersheds are: Arroyo Trabuco (Trabuco Ranger District), Cedar Creek (Palomar Ranger District), and Kitchen Creek-Cottonwood Creek (Descanso Ranger District).

In FY20, the CNF continued to implement Watershed Restoration Action Plans (WRAPs) in Cedar Creek, Kitchen Creek-Cottonwood Creek, Arroyo Trabuco watersheds. Both Cedar Creek and Kitchen-Cottonwood Creek WRAPs include invasive feral pig monitoring and eradication. Invasive weeds were treated in Cedar Creek and Arroyo Trabuco. Dam removal sites completed in earlier years were monitored for recovery. Two low water crossings were replaced with small bottomless arch culverts to restore aquatic organism passage (AOP) in Arroyo Trabuco watershed.

Cleanup of two burned cabins posing hazmat risks to water quality was implemented in Arroyo Trabuco.

A new priority watershed (Boulder Creek) has been identified and the WRAP is in draft form. Several actions identified in the draft WRAP were planned in FY18, many of which were implemented in FY20. Graffiti removal and trail reroutes were implemented to improve safety and reduce resource damage on Three Sisters trail and within the Boulder Creek riparian zone. Invasive weed removal was implemented in FY20 in Boulder Creek.

The CNF's biannual Best Management Practices Evaluation Program report for FY19 and FY20 is currently being prepared and will be sent to the Regional Water Quality Control Board. This report is delayed due to impacts from the 2020 Covid-19 pandemic and BAER response actions for the 2020 Region 5 fire season.

Overall, stream flow at the two measured streams appears consistent with historic flows and many of the creeks had flows in 2020 similar to historic 75th percentile flows.

Figures 2 and 3 show percentiles and median streamflows from historical years 1955-1980 for two gauged streams on the CNF: Santa Ysabel Creek on the Palomar Ranger District and

Sweetwater River on the Descanso Ranger District. Highest and lowest flows are also displayed.

In 2020, Santa Ysabel Creek experienced above average flows relative to the historical period of 1955-1980. Cumulative annual discharge was 2,260 cubic feet per second, approximately 75th percentile streamflow for this location relative to the historical period. Seasonality of flows was consistent with typical behavior at this location. The flows at this gauge in November were higher than average, becoming consistent with 75th percentile flows in March.

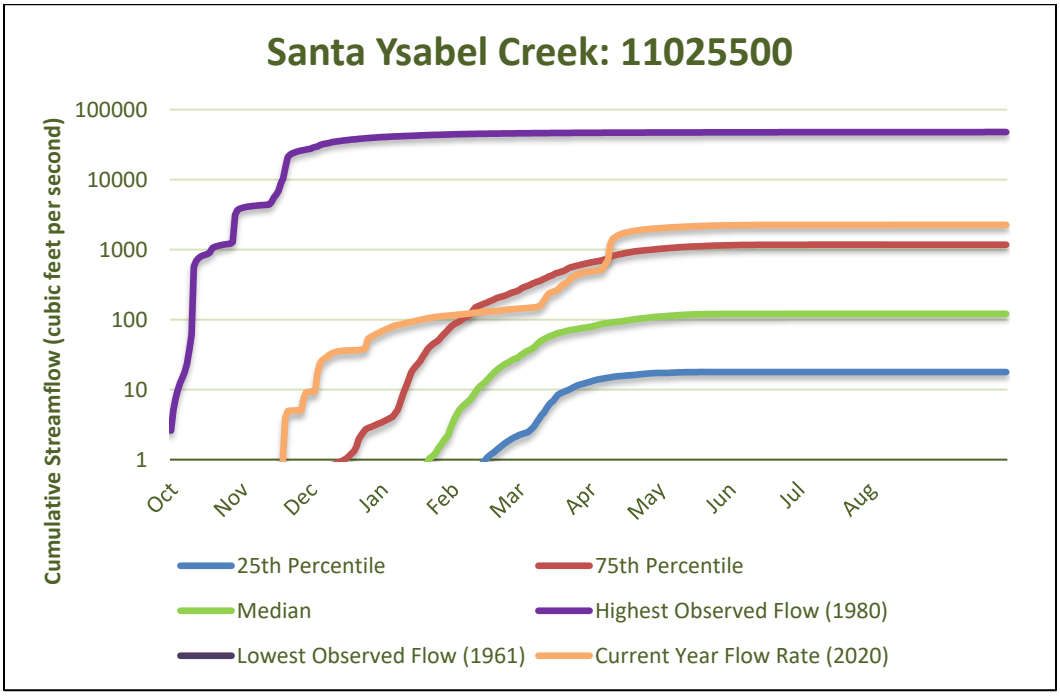

Figure 2b: Santa Ysabel Creek Streamflow (FY20). Historical Years: 1957-1980; Total Data Years: 1957-2018 (water years)

Sweetwater River also experienced above average flows relative to the historical period of 1955-1980, although strong rains in November resulted in discharges approaching that of the wettest year on record for this gage during the historical period. By March, the cumulative flows were consistent with the 75th percentile of flows at Sweetwater.

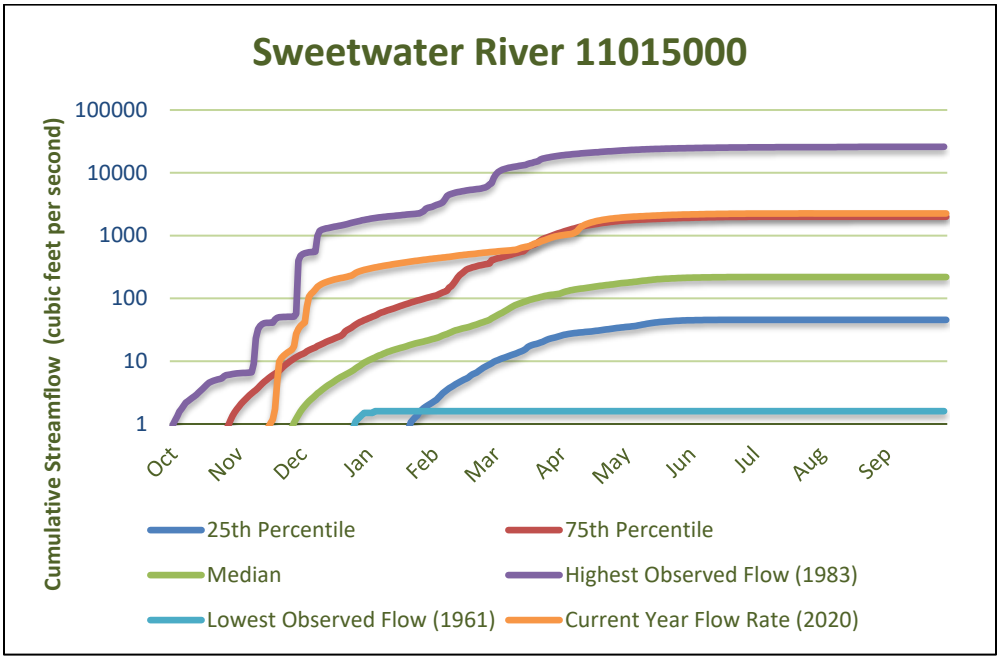

Figure 3b: Sweetwater River Streamflow (FY20). Historical Years: 1957-1980; Total Data Years: 1957-2018 (water years)

From 2017 to through 2020, Sweetwater cumulative annual flows have been at or above the median of flow from the historic period of 1955-1980 (see Figure 4). No other discernable trends appear at this time.

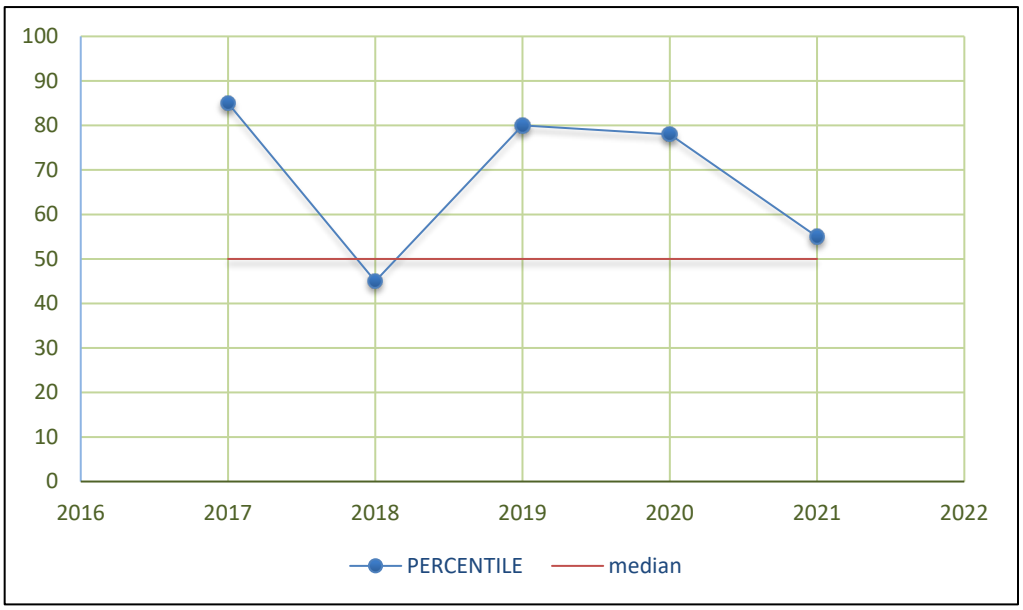

Figure 4b: Sweetwater River Cumulative Annual Flows

In FY20, graffiti removal in a riparian corridor on Boulder Creek significantly improved proper functioning along this section of stream by reducing unauthorized recreational use of the creek. This action allowed existing unauthorized trails to naturally recover and prevented future impacts to the stream and its habitat from trampling and increased sedimentation.

Rangeland and Biological Resource Condition

The sixth goal of the Southern California National Forests Land Management Plan emphasizes the management of ecological conditions to improve rangeland and habitat for native and desired non-native species.

Goal 6.1 highlights a desire to move towards improved rangeland conditions as indicated by key range sites throughout the southern California National Forests. Sustainable rangeland management of livestock grazing areas requires moderate utilization in order to maintain forage cover, soil productivity, wildlife habitat, water quality and overall ecosystem health. Goal 6.2 focuses on providing sustainable ecological conditions for wildlife and plant species and uses Management Indicator Species (MIS) to monitor population and habitat trends. These trends help in the management of federally-listed threatened and endangered (T/E) species on the southern California National Forests. Goal 6.2 is inseparable from other Land Management Plan (LMP) goals such as Goal 1.2 which aims to manage vegetation condition towards the desired condition identified for each habitat type, as well as properly functioning watersheds (Goal 5.1) that support riparian and aquatic habitat types that are essential for certain federally listed species, and properly functioning rangeland (Goal 6.1).

The desired condition for these two goals is that livestock grazing opportunities are maintained and are managed for sustainable, healthy rangelands that contribute to improving watershed conditions towards a fully functional and productive condition and that habitats for federally listed species are conserved, and listed species are recovered or trending towards recovery.

Monitoring Questions

MQ18. Is forest rangeland management maintaining or improving progress towards sustainable rangelands and ecosystem health? The indicator for this question includes the percent of key areas in active allotments meeting or moving towards desired conditions.

MQ19. Are trends in resource conditions indicating that habitat conditions for fish, wildlife, and rare plants are in a stable or upward trend? The indicator for this question is habitat condition of at-risk species.

Key Results

Progress towards Maintaining and Improving Rangeland and Ecosystem Health

Grazing permittees have adjusted to changing climate conditions, but unauthorized Off Highway Vehicle remains the biggest source of impacts to grazing allotments. Some progress has been made in reducing OHV use in some areas, while other areas require additional measures.

On the CNF, Long Term rangeland monitoring plots were not re-read in 2020 due to difficulty travelling due to pandemic restrictions. Annual rainfall was near average, however, drought conditions over a longer temporal scale persist. In general, grazing permittees have responded to the drought by reducing numbers of the livestock in the herds or selling calves early. Based on periodic compliance monitoring, nearly half of allotments or pastures remain in good to high condition (see Table 4b).

Several issues with range condition are tied to illegal OHV use and not grazing management. These include areas on the Corte Madera Allotment and on the Laguna Allotment. Work has occurred to block off sensitive meadow areas from vehicular trespass at Bear Valley and along Kitchen Creek Road. Monitoring has shown OHV caused damage remaining relatively stable in Bear Valley in FY20, and sharply reduced along Kitchen Creek Road.

Table 4b: Baseline and trend monitoring for the range and grazing for FY20. No change was observed in trend monitoring for range allotments in FY20.

Outcome indicator	Desired condition	Previous monitoring	Current	Trend	Trigger
Good/high	Maintain condition rating	12	12	Stable	Decrease in number of key areas in good condition
Fair/moderate	Maintain/improve condition rating	14	14	Stable	Decrease in number of areas in fair condition
Poor/low	Improve condition rating	0	0	Stable	Degrading conditions in key areas poor condition

Table 5b displays the most recently available allotment conditions. Several allotments were assessed during 2020, however, no significant changes in allotment conditions were observed from 2019 to 2020 in any of the plots monitored in 2020.

Table 5b: Grazing Allotment Conditions.

Allotment, pasture	Condition	Assessment type	Year
Black Mountain	Good—stable	Annual compliance monitoring, BMP monitoring	2018
Corte Madera, Lower Bear Valley	Fair – Signs of reduced OHV trespass damage, drought impacts highly visible, grazing season shortened	Annual compliance monitoring	2019
Guatay	**Good – Stable**	**Region 5 long-term trend monitoring in 2010; annual compliance monitoring**	**2020**
Indian Creek	Un-grazed, not monitored	--	n/a
Laguna, Kitchen Valley	**Moderate**	**Annual compliance monitoring**	**2020**
Laguna, Cameron, La Posta Creek	**Moderate**	**Region 5 long-term trend monitoring in 2010; annual compliance monitoring**	**2020**
Laguna, Joy Pasture	Low—2006 , Low – 2011 Visual assessment in 2013 showed improvement and reduction on OHV impact – Fair condition in 2017	Region 5 long-term trend monitoring in 2017; annual compliance monitoring	2017
Laguna, Long Canyon Pasture	Low—2006; Moderate—2009	Region 5 long-term trend monitoring in 2009; annual compliance monitoring	2016
Laguna Meadow, mid-meadow plot	**Good—light grazing pressure well within standards**	**Annual compliance monitoring**	**2020**
Laguna Meadow, Las Rasalies plot	High 2000, moderate 2005, moderate 2009, trend stable	Region 5 long-term trend monitoring, annual compliance monitoring	2011
Love Valley	**High—stable**	**Annual compliance monitoring,**	**2020**
Mendenhall, Lower	**Good**	**Annual compliance monitoring**	**2020**
Mendenhall, Upper	High	Region 5 long-term trend monitoring in 2011; annual compliance monitoring	2019
Mesa Grande, Kelley unit	Fair – difficult to monitor	Rapid	2008

Allotment, pasture	Condition	Assessment type	Year
Miller Mountain	Good	Annual monitoring compliance	2019
Samataguma	Good	Annual monitoring compliance	2019
Tenaja	Good – un-grazed	Region 5 long-term trend monitoring	2011
Verdugo	Good	Annual compliance monitoring	2019
Warner Ranch	Good	Annual compliance monitoring	2018

Habitat Conditions for Fish, Wildlife, and Rare Plants

Monitoring of several federally endangered and threatened, and Forest Service sensitive species continued. No incidental take of any federally endangered or threatened species was observed in 2020. Habitat improvement work continued as did management action to prevent habitat degradation. Some species like Hermes Copper butterfly and southwestern willow flycatcher, are showing signs of population decline or range restriction, potentially associated with drought.

Threatened and Endangered species monitoring: In 2020, the CNF continued with monitoring specified in applicable biological opinions. The CNF annual report to the U.S. Fish and Wildlife Service included the following species and monitoring activities, where applicable:

Arroyo Toad – Sites on the CNF require some level of arroyo toad monitoring effort including five roads, two campgrounds and one trail. Monitoring efforts primarily focus on three factors including the determination of toad presence/absence, toad mortality and habitat disturbance. In 2020, no roadkill was detected. In general, protection measures were implemented and were working well. Other responsibilities include checking relevant signage, barriers, fences, and gate closures, etc. Additional barriers and fencing are needed to address unauthorized vehicle use and unauthorized trail development, especially in the Pine Valley Creek area.

Habitat improvement work (including noxious weed removal) was completed in San Juan Canyon. The Forest has completed a dam removal project that included removal of 81 check-dams that are impairing stream function. Approximately 81 dams have been removed from Silverado, San Juan, Trabuco and Holy Jim Creeks (FY15, FY17, FY18, FY19, FY20 work). The Forest developed agreements with seven partners who are funding or contributing in-kind effort to this project. The project has already improved fish passage in San Juan Creek, and the resident arroyo chub (Forest Service sensitive species) has expanded its range in this watershed. The project will have substantial benefits for arroyo toad populations in San Juan and lower Trabuco Creeks as it will restore more natural flows of water and sediment in the

stream. A companion project, the replacement of eight concrete fords with bridges, is approximately 50% complete. Four concrete fords have been replaced with bridges and one concrete ford has been removed.

California Gnatcatcher – Coastal sage scrub restoration work is underway in the San Diego River Gorge Area. This project is located within designated critical habitat for the gnatcatcher, and it is funded through San Diego Gas and Electric funds for biological mitigation for Sunrise Powerlink.

Least Bell's Vireo - A Least Bell's vireo survey was conducted in San Diego River to check the status of this small population. Four vireos were detected. The population at San Diego River appears to be stable or increasing slightly.

Southwestern Willow Flycatcher – U.S. Geological Survey (USGS) continued monitoring and research at the upper San Luis Rey River in 2020. Approximately five pairs of southwestern willow flycatcher were detected on the Forest in 2020. Monitoring will resume next year, and no incidental take has been detected. There is evidence that this population may be declining due to drought related changes in habitat and a possible increase in brood-parasitism by Brown-headed Cowbirds.

Hermes Copper Butterfly– The Forest has conducted additional surveys for this species and has implemented a number of management actions to protect its habitat including gates and barriers to prevent OHV traffic and restoration of nectar sources after fire. The Forest has also reseeded some recent burned areas such as Valley Fire with Buckwheat, in an effort to improve nectar source availability. This species appears to be in extremely rapid decline due to the extended drought. Only three populations remain, two of which are on the Cleveland National Forest.

Laguna Mountains Skipper – Laguna Mountains skipper surveys were conducted at Palomar Mountain sites by a contractor. Fence enclosures at Observatory Campground, Mendenhall Valley and Mount Laguna were maintained. Surveys now include the recently-acquired Jeff Valley area and selected areas of Laguna Mountain.

Munz's Onion – Improved habitat by controlling yellow star-thistle population at Elsinore Peak, along South Main Divide Road.

San Bernardino Bluegrass – Pre-grazing checks were completed for populations at Laguna and Mendenhall Meadows.

San Diego Thornmint – Implementation continued for grass-specific herbicide treatment to control or eradicate non-native Purple False Brome in occupied habitat along Viejas Grade Road to improve habitat for San Diego Thornmint. This work will continue for several years and is being implemented by the San Diego Gas and Electric (SDG&E) as part of the mitigation for the Sunrise Powerlink Project. In partnership with the San Diego Management & Monitoring Program, several populations were monitored as part of a coordinated landscape-scale conservation effort.

Southern Steelhead – In 2020, additional planning was done for removal of 81 check-dams. The Forest is currently working with several partners including Caltrans, Orange County Parks,

U.S. Marine Corps, and Orange County Transportation Authority; all of these partners contribute funding or in-kind labor toward the completion of the dam removal project. In 2020, spider excavators removed eight dams from Trabuco and Holy Jim creeks, and Marines removed 11 dams from Holy Jim Creek. Over the next 5- 10 years, the endangered Southern Steelhead is expected to return to spawn on the Forest. This project has already improved fish passage for a Regional Forester's sensitive list species, arroyo chub.

Incidental Take: No take was observed for any threatened or endangered species in 2020 from LMP on-going activities.

The environmental baseline identifies the extent of occupied and suitable habitat for each species and describes ongoing activities in relation to the occupied and suitable habitat. Annual reporting of activities that may change the baseline conditions—including recovery actions proposed, new conservation strategies and new information from surveys or inventory—for threatened, endangered, proposed, and candidate species is recommended by the U.S. Fish and Wildlife Service.

It is evident that some federally listed and sensitive species are declining due to the extended drought. These include Hermes Copper butterfly, Southwestern Willow Flycatcher, and California Spotted Owl.

Natural Areas in an Urban Context

The seventh goal of the Southern California National Forests Land Management Plan aims to retain the natural character of the southern California National Forests in the face of urbanization and a rapid increase in Wildland Urban Interface (WUI) areas. Specifically, goal 7.1 seeks to retain natural areas as a core for a regional network while focusing the built environment into the minimum land area needed to support growing public needs.

Goal 7 seeks to reduce ownership complexity, maintain habitat linkages and wildlife corridors with the desired condition that natural and cultural features of landscapes that provide their 'sense of place' are intact; that Back Country area retain their undeveloped character; facilities and infrastructure are high quality, well maintained and are clustered on existing sites or designated corridors.

Monitoring Questions

MQ20. Is the forest balancing the need for new infrastructure with restoration opportunities or land ownership adjustment to meet the desired conditions? The indicators for this question include land ownership complexity, authorized and administrative infrastructure, and miles of unauthorized motorized routes.

MQ21. How many of each type of special use authorization, mining permit, and forest product permit are active on the forest? The indicator for this question is the number of special use authorizations and permits by type.

Key Results

MQ20. Is the forest balancing the need for new infrastructure with restoration opportunities or land ownership adjustment to meet the desired conditions?

As of the end of FY20, the CNF manages 426,832 acres of land with 1,037 miles of boundary, yielding a perimeter to area ratio of 0.00243 miles per acre which represents no effective change in land ownership complexity. No land acquisitions were made in FY20, however, several land prospective land donations are being evaluated for future inclusion into the Cleveland National Forest by the Region 5 Land and Realty Management staff.

Roads are another element of the built environment and are part of the outcome indicators for this goal. The CNF has successfully decommissioned 186.4 miles of unauthorized travel routes between FY06 and FY20, 28.56 miles of which were decommissioned in FY20. Many of these routes impact riparian conservation areas (RCA), archaeological sites, Wilderness areas, or habitat for endangered or threatened species. The 2016 Forest-wide Unauthorized Route Decommissioning decision has largely been completed. In FY20, 5.61 miles of NFS roads were also decommissioned, a few of which were retained as motorized trails for public use.

MQ21. How many of each type of special use authorization, mining permit, and forest product permit are active on the forest?

Table 6b below shows the number and variety of special use authorizations (SUA) administered in FY20 – a total of 693 permits were active on the CNF with 30 administered in FY20. This represents a significant decrease from 150 administered the previous year. This decline can largely be attributed to the COVID-19 pandemic in 2020. Overall, the number of active authorizations/permits only declined by about 1 percent (693 permits in FY20). There most notable declines in permits were in recreational events, and FLPMA Permits. For FY20, the number of authorizations (total active) decreased by about 17.6% compared to FY19.

Table 6b: Number and type of special use authorizations and permits in FY20

Type	#	Type	#	Type	#
Club	4	Construction Camp and Residence	1	Cellular	1
Shelter	0	Warehouse and Storage Yard	0	Resource Monitoring Site	3
Recreation Residence	290	Commercial Still Photography	3	Commercial Mobile Radio	3

Type	#	Type	#	Type	#
Resort	2	Motion Picture and TV Location	3	Facility Manager	14
Concession Campground	1	Geological and Geophysical Exploration	0	Telephone and Telegraph Line	13
Recreation Event	2	Powerline	30	Fiber Optical Cable	3
Apiary	8	Other Utility Improvement	1	Other Communication	1
Convenience Enclosure	0	Airport, Heliport	2	Navigation Equipment	1
Church	1	DOT Easement	5	Irrigation Water Trans- Pipeline >= 12” Diameter	1
Marker	4	Forest Road and Trail Act Easement	6	Irrigation Water Trans- Pipeline < 12” Diameter	8
Monument	1	Federal Land Policy and Management Act Easement	9	Water Trans- Pipeline >= 12”	1
Service Building	9	Federal Land Policy and Management Act Permit	73	Water Transmission Pipeline < 12” Diameter	5
Site Survey and Testing	0	Wilderness Act Auth-, Roads and Trails	1	Dam, Reservoir	5
Resource Survey	1	Amateur Radio	2	Water Diversion, Weir	1
Experimental Station	0	Microwave-Common Carrier	5	Well, Spring, or Windmill	6
Research Study	3	Microwave-Industrial	4	Wildlife Water Supply	2
Weather Station	2	Local Exchange Network	1	Water Storage Tank	17
Observatory	1	Private Mobile Radio Service	34	Water Treatment Plant	1

Type	#	Type	#	Type	#
Military Training Area	4	Passive Reflector	0	Special Forest Product Permit	78
Non-disturbing Use (Arch Investigation)	7	Cable Television	1	Active Mineral Operations	0
Disturbing Use (Arch Investigation)	1	Outfitting and Guiding Service	5	Non-Commercial Group Use	1
Education Center	1				
				TOTAL [3]	**693**

[3] Based on number reported in Special Use database (SUDs), forest product permits (separate database), and mining claims (currently not reported in SUDs/SUDs not accurate).