



National Park Service Rio Grande Valley and Southern Plains Fire Ecology Annual Report Calendar Year 2025

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Figure 1. Fire Effects Monitors Eric Behrens and Jensen Bigelow hike through basket flowers (*Centaurea americana*) at Lake Meredith NRA. Photo courtesy of Joy Bauer.

The National Park Service (NPS) Division of Fire and Aviation Management relies on science and long-term monitoring to inform an adaptive management approach for assessing and improving fire management programs and activities at park units. Adaptive management, along with policies, standards, and responsibilities for monitoring are described in Chapter 8 of [Reference Manual 18](#). The NPS Fire Ecology Program is responsible for the collection, analysis, and interpretation of fire effects monitoring data for park managers to use for program evaluation and decision making. This annual report is intended to partially fulfill reporting requirements for the Fire Ecology Program and does not constitute a complete analysis of any NPS fire management program or activity. Additional interpretation and reporting can be found in previous annual reports at [NPS DataStore](#) or by contacting the author(s) of this report.

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A. Summary

Following the challenging fire season of last year, 2025 provided a respite from significant wildfire activity across both the Rio Grande Valley and the Southern Plains. The largest wildfire across the zones was the Blue Hills fire that started on private land and burned onto Lake Meredith National Recreation Area (LAMR) in January. The 387 Fire burned 118 acres at Bent's Old Fort National Historic Site (BEOL) in April. This fire burned through a portion of the burn scar from the Bent's Fort Fire in 2022. Southern Plains' parks saw, on average, 134% more precipitation this water year than the 10-year average (See Appendix D) (WRCC, 2025). Though there were few prolonged dry periods in 2025, fine fuels remained receptive to fire.

The fire effects crew completed monitoring at seven parks (See Table 2). Additionally, the crew responded to several initial attack fires around LAMR. The lead monitor provided vegetation assessments on two Burned Area Emergency Response (BAER) assignments, and the assistant lead monitor attended the January session of the Prescribed Fire Training Center.

The fire effects crew was fully staffed this summer with 3 PFT employees and one seasonal. Jensen Bigelow left the seasonal appointment early to begin graduate school at the University of Tennessee. This year saw the departure of long-time fire ecologist, Richard Gatewood, and assistant lead monitor Eric Behrens. Ric took the deferred resignation program and retired in March. Eric took a job with the Utah Forest Restoration Institute in September. Both Ric and Eric will be missed immensely.

Using data published by the Research Data Archive, wildfire data from 1992-2020 was used to summarize the cause, size, number and dates of wildfires responded to by SPFG and RGFZ staff (Short, 2022). These graphs and accompanying maps can be found in Appendix E and can be utilized by fire managers to plan treatments, staffing levels and community outreach/education efforts.

Table 1. NPS Units in the RGFZ and the SPFG. *Denotes units the fire effects crew visited in 2025.

Rio Grande Fire Zone (RGFZ) Parks	Southern Plains Fire Group (SPFG) Parks
Amistad National Recreation Area (AMIS)	Alibates Flint Quarries National Monument (ALFL)*
Big Bend National Park (BIBE)	Amache National Historic Site (AMCH)
Blackwell School National Historic Site (BLSC)	Bent's Old Fort National Historic Site (BEOL)*
Carlsbad Caverns National Park (CAVE)	Capulin Volcano National Monument (CAVO)
Chamizal National Memorial (CHAM)	Chickasaw National Recreation Area (CHIC)*

Fort Davis National Historic Site (FODA)	Lake Meredith National Recreation Area (LAMR)*
Guadalupe Mountains National Park (GUMO)*	Sand Creek Massacre National Historic Site (SAND)*
Rio Grande Wild and Scenic River (RIGR)	Washita Battlefield National Monument (WABA)*
White Sands National Park (WSHA)	

Table 2. 2025 Fire Effects Plot Workload

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point, Rapid Assessment, CBI, etc.)	Years Data Collected (start-end)	Annual Total (2025)	Total Plots
Amache	Sand sage shrubland	Qualitative monitoring	2025	0	0
Bent's Old Fort	Short grass prairie	FMH Forest plot	2002-2025	2	6
Chickasaw	Oak Woodland	FMH Forest plot	1998-2025	3	5
Chickasaw	Mixed grass prairie	FMH Grass plot	1998-2025	5	6
Guadalupe Mountains	Mixed conifer	FMH Forest plot	1997-2025	4	19
Lake Meredith	Honey mesquite shrubland	FMH Grass plot	1998-2025	19	33
Lake Meredith	Bottomland	FMH Grass plot installation	2025	8	10
Lake Meredith	LAMR	Fuel loading- biomass	2023-2025	30	30
Sand Creek	Short grass prairie	Qualitative monitoring	2025	0	0
Washita	Tall grass prairie	FMH Grass plot	2003-2025	2	3
Total	<blank>	<blank>	<blank>	73	112

B. Monitoring Results and Recommendations

No prescribed fires were completed in SPFG or RGFZ parks in 2025. Mechanical treatments were completed at BIBE, CAVE, CHIC, GUMO and LAMR. Park visits were made to AMCH and SAND although no data was collected at these parks. Summaries for parks visited in 2025 are found below.

AMCH

The fire effects crew visited Amache National Historic Site this summer. No fuels treatments will be initiated at the park until all compliance and documents have been completed. The crew was able to speak with park personnel about vegetation concerns and will be assisting the park in creating a Local Unit Resource Guide.

BEOL

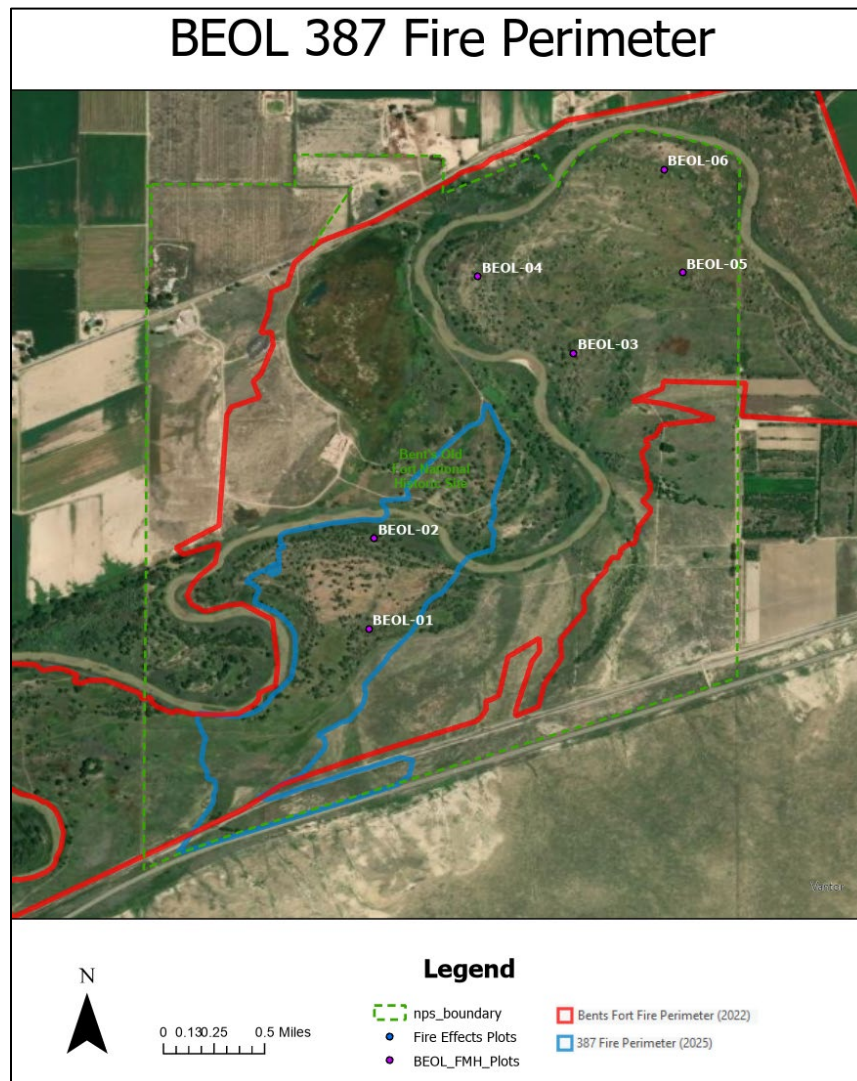


Figure 2. The 387 Fire burned within the burn scar of the Bent's Fort Fire from 2022. Two permanent FMH plots were impacted by both fires.

The 387 Fire started on April 27, 2025, off the railroad that runs parallel to Hwy 50 and South of BEOL. The fire burned 118 acres of the park including a portion that burned in the 2022 Bent's Fort Fire. Calendar year precipitation leading up to the fire was 49% lower than the 10-year average for the area. Senesced grasses from the 2024 growing season were dry and, despite green-up, enabled the fire to spread easily through vegetation. Two permanent FMH plots burned

in the wildfire. The plots had burned twice previously in wildfires in 2002 and 2022. Mature, overstory (≥ 15.1 cm DBH) cottonwoods (*Populus deltoides*) were killed by the fire with an average mortality of 61% (Figure 3). Pole-sized cottonwoods (≤ 15.0 cm DBH) saw a mortality of 50% from 2022 to 2025 (Figure 3). Cottonwood sprouting was seen from deceased overstory trees and numerous cottonwood seedlings were observed indicating cottonwood recruitment is occurring. Herbaceous vegetation responded favorably to fire and grasses and forbs were established by August. As BEOL has issues with non-native, invasive plants, the fire is likely to enable the spread of these if native grasses and forbs are unable to establish in subsequent years. BEOL resource management staff are proactive in treating non-native invasive plants and it is recommended that the park continues to survey for and treat these. Since there is an increase in dead and downed woody material following the wildfires, it is recommended that SPFG staff assist the park in conducting pile burns to reduce fuel loading and prevent further mortality to cottonwood trees should another wildfire occur on the park.

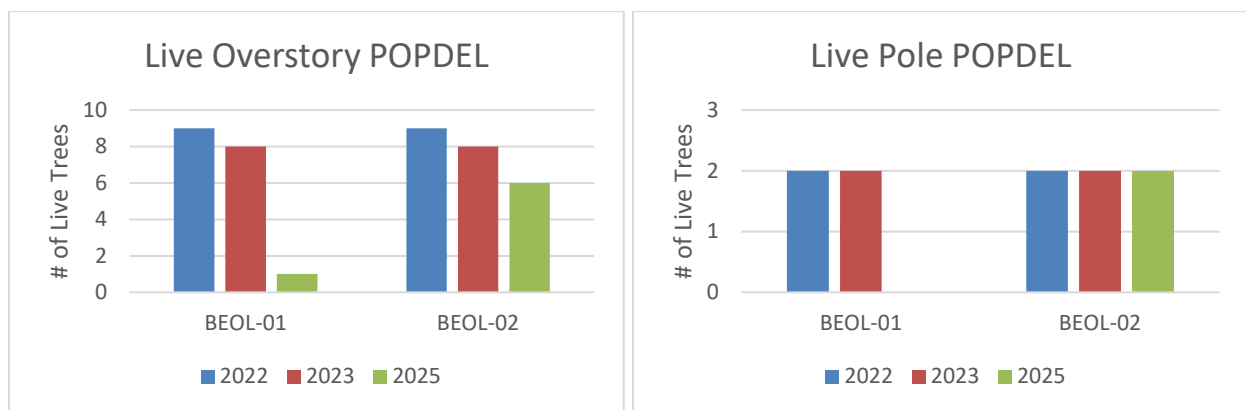


Figure 3. Live overstory cottonwood trees decreased in two FMH plots following wildfires in 2022 and 2025. Pole-sized cottonwood trees had some mortality post wildfires in 2022 and 2025.



Figure 4. Photos of plot BEOL-02 from 2023 to 2025 show mortality in overstory and pole sized cottonwood trees. With adequate rainfall, grass and forb cover should increase limiting the spread of non-native invasive plants.

CHIC

Resource management staff assisted in data collection with the fire effects crew to complete field work this year. The crew completed the Year 02 read for the Point unit which burned in a prescribed fire in February of 2024. This was the second prescribed fire in the unit that was previously burned in 2011. The unit is 1,000 acres with a post oak/blackjack oak overstory and a grass and forb understory. Pockets of prairie are prevalent throughout the unit. One FMH plot is in the Point Unit. The crew observed no additional overstory or pole tree mortality within the plot. Surface vegetation cover increased by 8% from pre-fire conditions. No non-native invasive species were detected within the plot although these species are present within the burn unit. Since data for the burn is only from one plot, further data analysis will be completed when additional burn units in post oak/blackjack oak woodlands are treated.



Figure 5. Surface vegetation has increased from pre-fire (left photo) to 2 years post-fire (right photo) within the Point burn unit at CHIC.

Table 3. Management objectives for post oak/blackjack oak woodlands at CHIC. Reduction in dead and downed fuel loading is measured pre-burn and immediately post-burn. All other objectives are measured pre-burn and two years post-burn.

Monitoring Unit	Management Objective	Monitoring Results	Progress Towards Meeting Objectives
Post oak/blackjack oak woodlands	Decrease dead and downed fuel loading by 30-50%	Total reduction= 34% (n=1, 2 fires)	Objective achieved but sample size is too small.
	Reduce density of live woody understory saplings by 30-60%	Total reduction= 37% (n=1, 2 fires)	Objective achieved but sample size is too small.
	Reduce density of live eastern red cedars by 60-80% across all age classes.	Total reduction= 45% (n=1, 2 fires)	Objective not achieved and sample size is too small.
	Increase native grass and forb cover by at least 25%	Total increase= 8% (n=1, 2 fires)	Objective not achieved and sample size is too small.
	Limit the reduction in density of live native overstory trees to less than 10%	Total reduction= 2% (n=1, 2 fires)	Objective achieved but sample size is too small.
	Limit the increase in exotic species cover to less than 5%.	Total increase= 0% (n=1, 2 fires)	Objective achieved but sample size is too small.

Additionally, the crew re-located and rehabilitated seven additional forest and grass plots at CHIC. As many of these plots had not been visited in 5+ years, plot and tree tags needed to be updated, and vegetation data was collected. Woody encroachment is increasing at CHIC in the absence of fire, and it is recommended that SPFG utilize prescribed fire to restore prairie openings and encourage oak recruitment in woodlands. Prescribed fire will also help reduce the density of woody saplings and pole-sized trees in the midstory. The increased light to the forest floor will enable grass and forb growth.

Of focus to the park this year were the bison pastures. They are unable to support the herd that was at the park in 2025. Both pastures are overgrazed with very little to no grass cover left and full of forbs. The park donated several individuals to reduce the herd in 2025. SPFG staff met with CHIC resource management staff and Southern Plains Inventory and Monitoring (SOPN) staff to form a plan for revegetating both pastures and rotating the bison. SPFG will assist with cedar removal and prescribed fire efforts in both pastures to ensure vegetation is adequate to support the remaining animals at the park.

The park hired a fuels crew this year in conjunction with the Chickasaw Tribe. The crew will be able to assist the park in wildfire response and fuels projects. SPFG staff will work with the park and new fuels crew to prioritize projects.

GUMO

The fire effects crew was able to complete backcountry field work at GUMO this year thanks to the BIBE packer Gavin Monson. Gavin traveled to the park with BIBE animals and packed the fire effects crew in and out of Pine Top Cabin. He was also able to re-supply the cabin with water for park staff and volunteers. The crew completed ten plots in the Bowl area of the park over two years to assess fuel loading and vegetative recovery following the Coyote Fire in 2016 and the Dog Fire in 2021. Both fires were ignited by lightning in May. The Coyote Fire burned a total of 14,442 acres and the Dog Fire burned a total of 1,959 acres, overlapping the Coyote Fire burn scar. Historical fires in mixed conifer forests at GUMO were frequent resulting in low to moderate fire severity and reduced mortality to overstory trees (Gatewood, et. al., 2006). The introduction of livestock grazing in the early 1900s lengthened the fire return interval in these forests. Sakulich et al. (2017) noted that the Coyote Fire yielded positive results in reducing density of seedlings and small-diameter trees without significantly altering canopy stand structure despite almost 100 years since the last major wildfire in the Bowl.

The crew collected data on six plots in 2023 and completed plotwork on four additional plots in 2025 for a total of ten plots that were affected by one or both fires. The plots are primarily Alligator bark juniper (*Juniperus deppeana*), Douglas fir (*Pseudotsuga menziesii*) and Ponderosa pine (*Pinus ponderosa*) in the overstory. Gamble (*Quercus gambelii*) and grey (*Quercus grisea*) oaks and grasses dominate the understory. The crew observed moderate fuel loading throughout the Bowl area of the park. Comparing data collected in 2016 to what was collected in 2023 and 2025, fuel loading increased in litter/duff, fine and coarse woody debris (Figure 7). The smallest increases in woody fuel loading were seen in two JUDE plots that burned in both the Coyote and the Dog Fires.

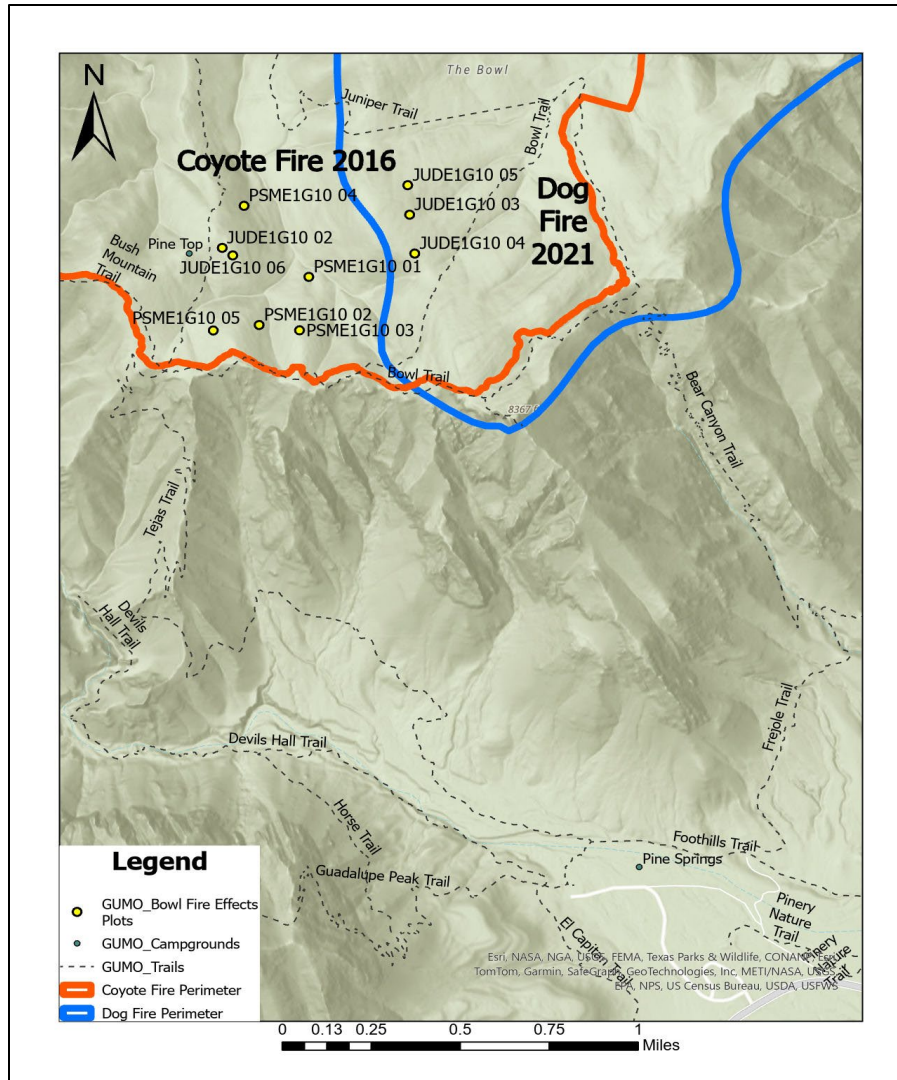


Figure 6. The Dog Fire burned through a small area previously burned by the Coyote Fire in the Bowl area of GUMO. The fire effects crew visited ten permanent plots to collect data on vegetation's response to the fires.

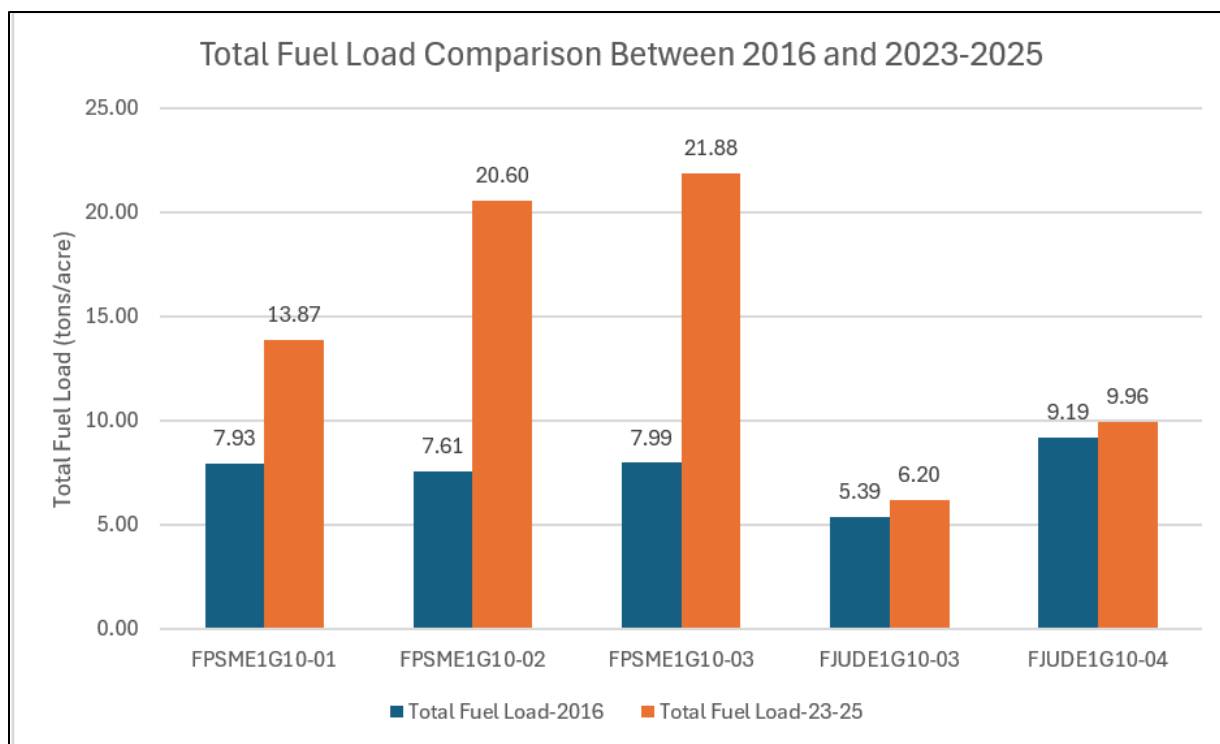


Figure 7. Total fuel loading increased in five plots from post-Coyote and Dog Fires at GUMO.

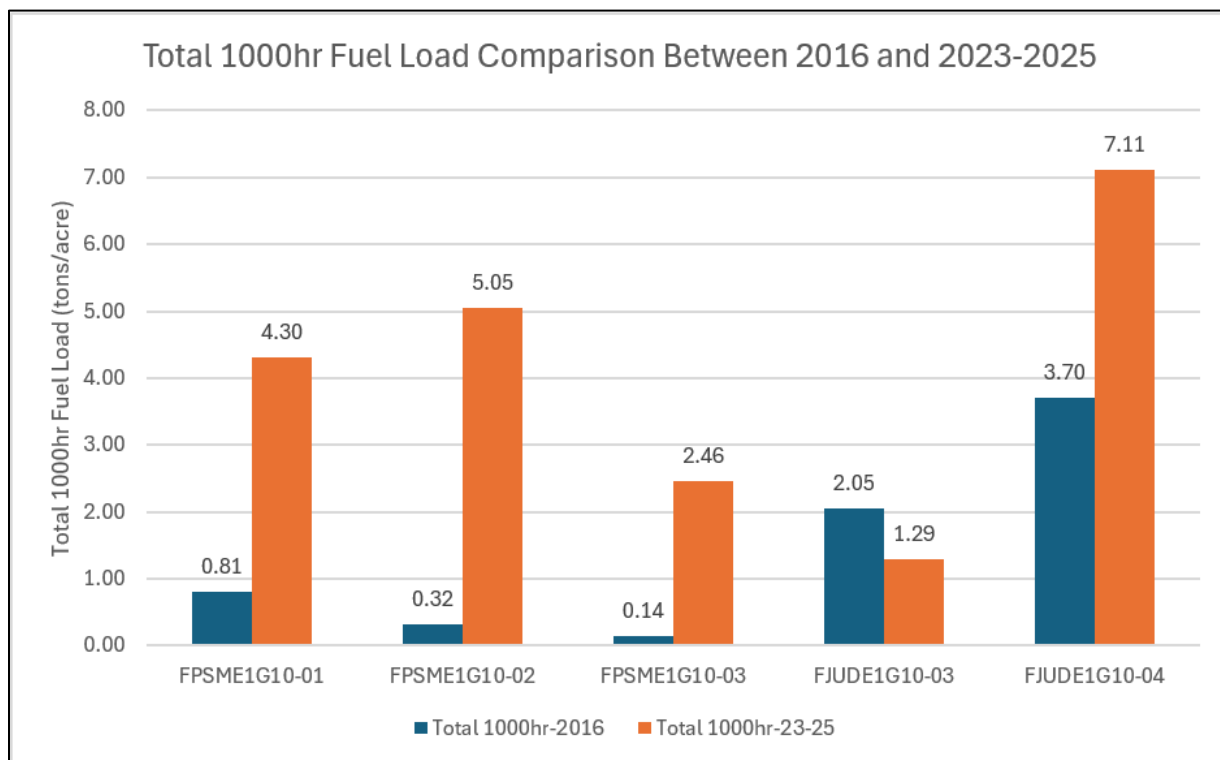


Figure 8. 1000-hr fuel loading increased in four of five plots monitored in both 2016 and 2023/2025. Plot FJUDE1G10-03 was burned in both the Coyote and Dog Fires.

The crew collected surface vegetation data using a simplified version of the point-line intercept method in 2025. This was done to capture surface cover quickly without the need to identify grasses and forbs to species. Vegetation that intercepted the pole was recorded to life form with the exception of trees which were recorded to species. Grasses had an average of 60% cover across the four plots while oaks had an average cover of 19.5% cover. Average vegetation cover and height in the four plots indicate that, should a fire ignite in the mixed conifer forests of the Bowl, fire spread will occur at the surface and that single tree torching and small crown fire runs are possible with Gambel and grey oaks serving as adequate ladder fuels (Figures 9 and 10).

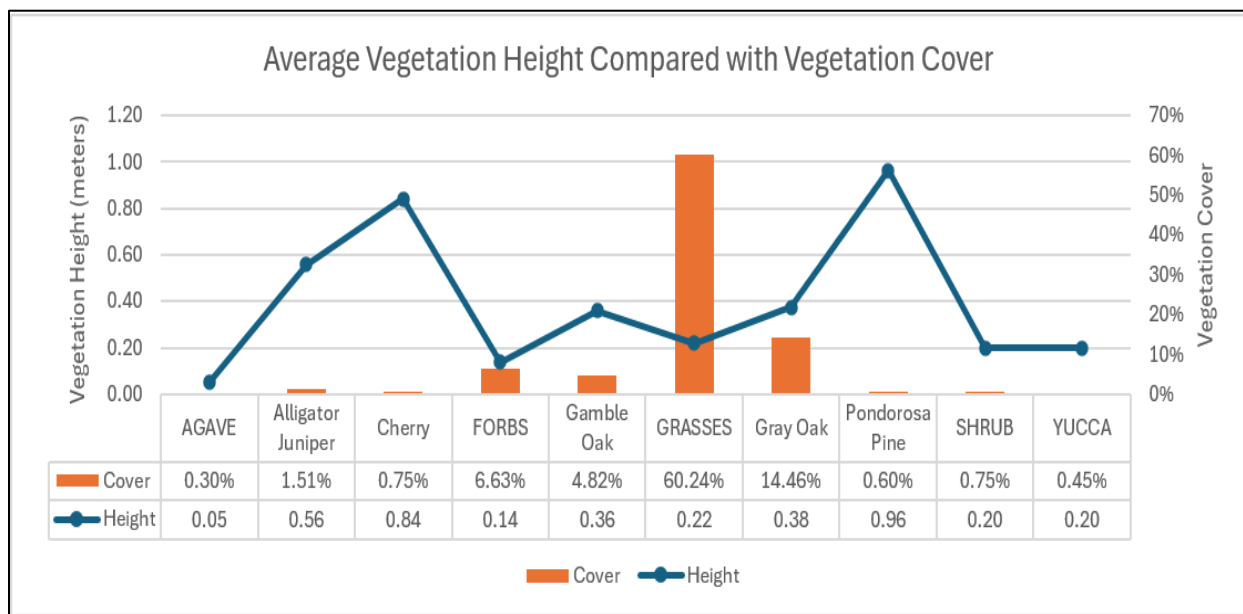


Figure 9. Average vegetation height and cover across four fire effects plots monitored in 2025.

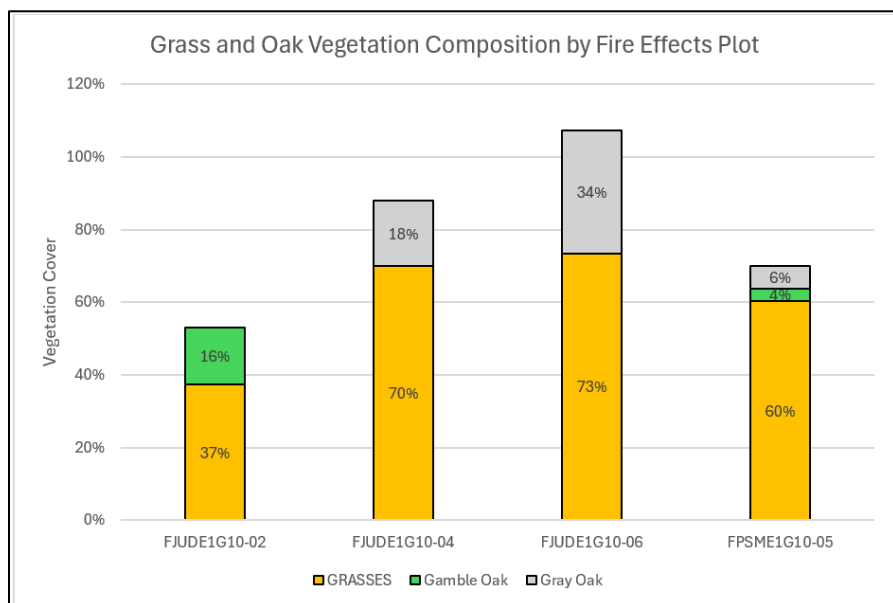


Figure 10. Vegetation composition for four fire effects plots monitored in 2025. Understory vegetation in plots was dominated by grasses and shrubby oaks.

Fuel continuity and loading within the Bowl area of GUMO is conducive to fire growth and spread should a fire ignite. While a fire will likely be a mosaic of unburned, low, moderate and high severity, pockets of moderate and high severity fire may be larger than they would have historically been given the 1000-hr fuel loading. Jackpots of coarse woody debris can lead to greater severity and fire effects in localized areas. It is recommended that the RGFZ complete mechanical work and conduct a prescribed fire within the Bowl to reduce fuel loading and limit potential patches of high severity which would consist of greater overstory tree mortality should a wildfire ignite.

LAMR

Fall moisture in 2024 and winter moisture in early 2025 brought in a superbloom of wildflowers at LAMR in the spring. The extent of flowers seen throughout the park were denser in areas that burned in 2024 but not limited to burned areas.



Figure 11. Firewheel (*Gaillardia pulchella*) blankets the prairie at LAMR.

2024 Prescribed Fire and Wildfire Results

Four burn units at LAMR saw prescribed fire in 2024. Within those units, honey mesquite (*Prosopis glandulosa*) and yucca (*Yucca glauca*) were top-killed by fire but have since re-sprouted. Honey mesquite has reduced in density post-fire (Figures 12 and 13) meeting an objective of prescribed fire at LAMR. Grasses and forbs increased in cover within the units that had prescribed fire in 2024. Native grasses had an average cover of 42% across four plots (Figures 14 and 15). The fire effects crew did note low grass cover within the Fritch Fortress burn unit. The 50-acre unit was dominated by broomweed (*Amphiachyris dracunculoides*) which, although native and beneficial to wildlife, is not desired. Additionally, K-R bluestem (*Bothriochloa ischaemum*) is moving further into the unit. This non-native grass will outcompete native grasses and contribute to higher fire behavior. It is recommended that the park treat

patches of K-R bluestem ahead of prescribed fire treatments and potentially seed in units like Fritch Fortress where native grass recovery is slow.

LAMR saw extensive wildfire in 2024, and the fire effects crew continued to monitor for vegetation recovery from those fires in 2025. Cottonwood resprouting was visually observed as high and there may be denser pockets of cottonwoods in the next 5-10 years. Honey mesquite density was reduced across the burned areas as mature individuals were top-killed. Native grass cover increased on average with the exception of one plot that saw a decrease in native grass cover. This plot had a high cover in forbs in 2025. While initially knocked back, non-native species like Johnson grass (*Sorghum halepense*) and kochia (*Kochia scoparia*) have recovered and will be at pre-fire densities or greater if they are not treated. Kochia can be chemically, manually or mechanically treated before it goes to seed to help limit further spread.

A total of ten permanent FMH plots at LAMR were impacted by fire in 2024. Six of them were impacted by the Windy Deuce Wildfire (230, 401, 402, 403, 404 and 414). The remaining four saw prescribed fire (232, 201, 206 and 208). Five of the plots were originally established as low density mesquite plots (201, 206, 208 and 232). The other five plots were established as high density mesquite plots (401, 402, 403, 404 and 414). The following graphs are broken down by plot, by low density plots, high density plots and by plots affected by wildfire and those affected by prescribed fire (Rx).

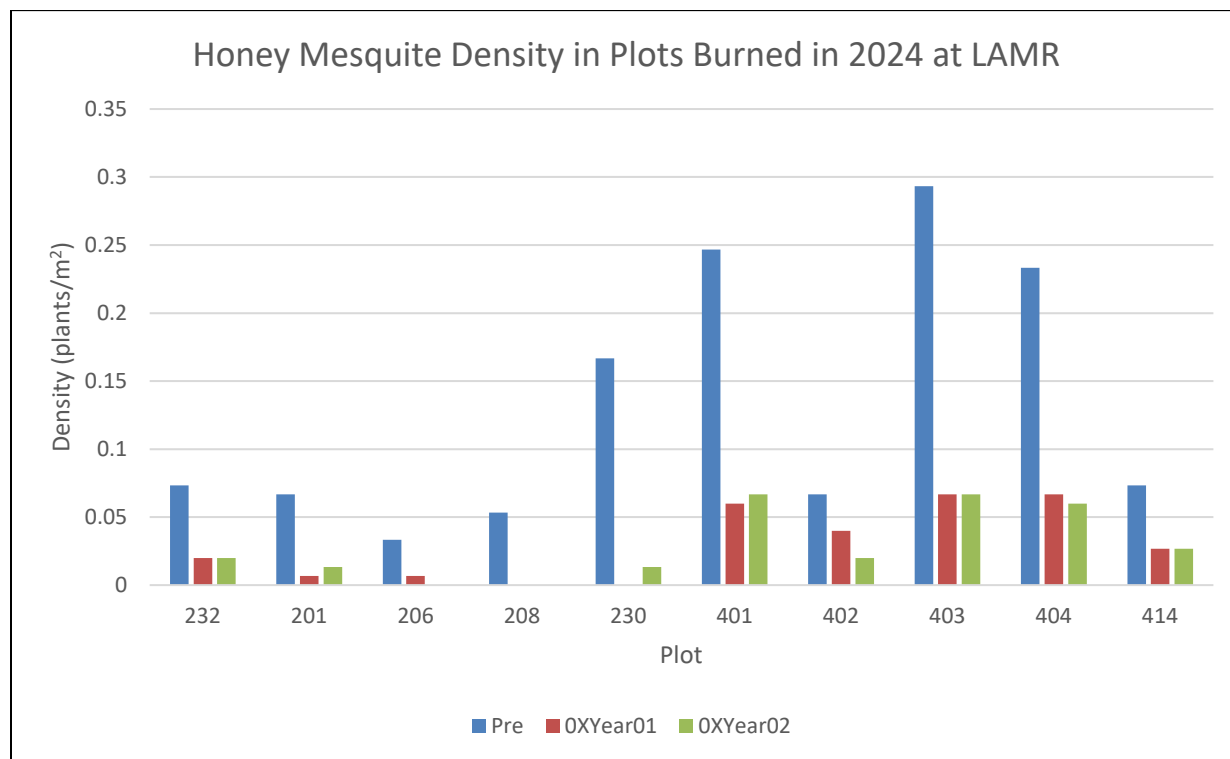


Figure 12. Honey mesquite density (plants/m²) shown for ten plots that burned in 2024 at LAMR. All ten plots saw a reduction in density of honey mesquite shrubs from pre-fire to post-fire conditions. Plots have been treated numerous times by prescribed fire, wildfire and mechanical treatments.

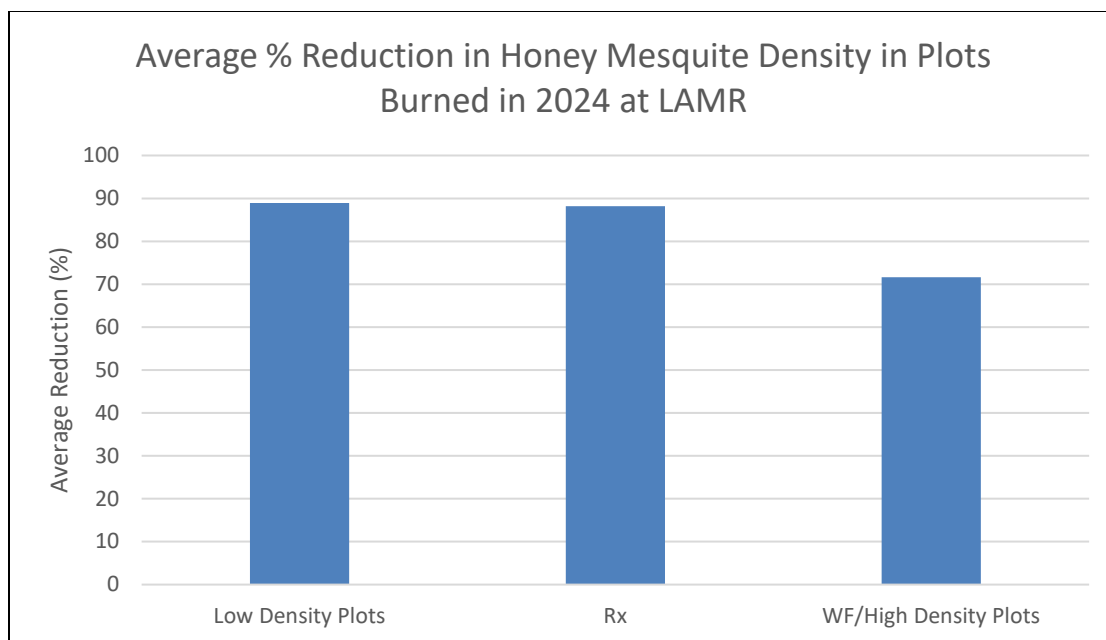


Figure 13. The average % reduction in honey mesquite density within plots that burned in 2024 at LAMR is 80% across all plots. Plots 232, 201, 206, 208 and 230 are included in the Low Density Plots category. Plots 232, 201, 206 and 208 are included in the Rx category. Plots 401, 402, 403, 404 and 414 are included in the WF/High Density Plots category.

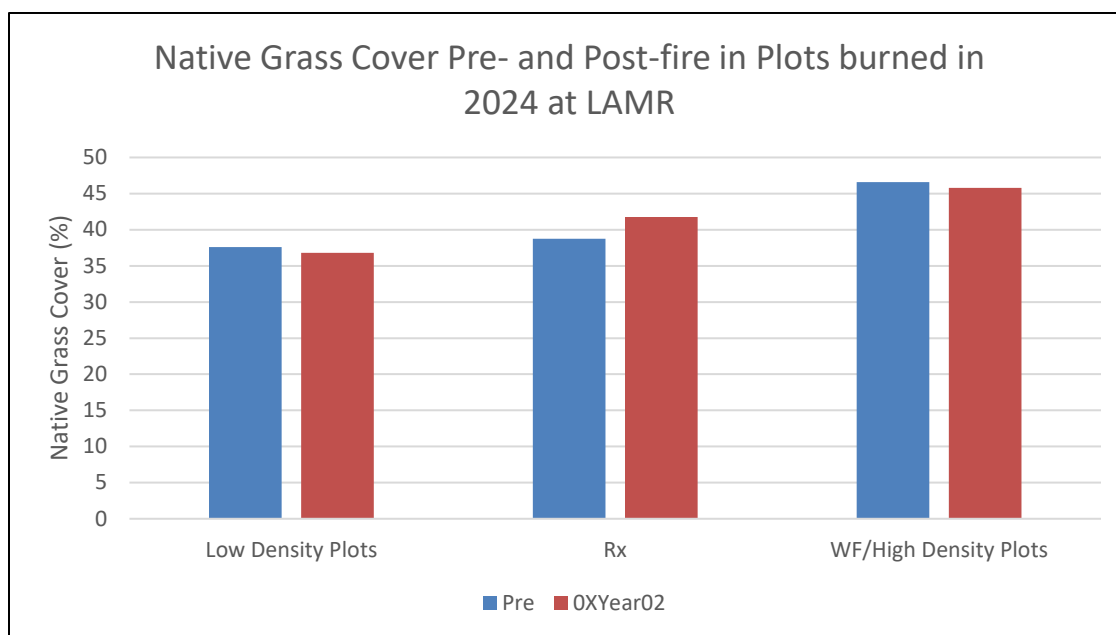


Figure 14. Native grass cover in plots burned in 2024 at LAMR did not see drastic change pre- and post-fire. Only plots burned in prescribed fire (Rx) in 2024 (230, 201, 206 and 208) saw an average increase in cover post-fire. Plots 232, 201, 206, 208 and 230 are included in the Low Density Plots category. Plots 401, 402, 403, 404 and 414 are included in the WF/High Density Plots category.

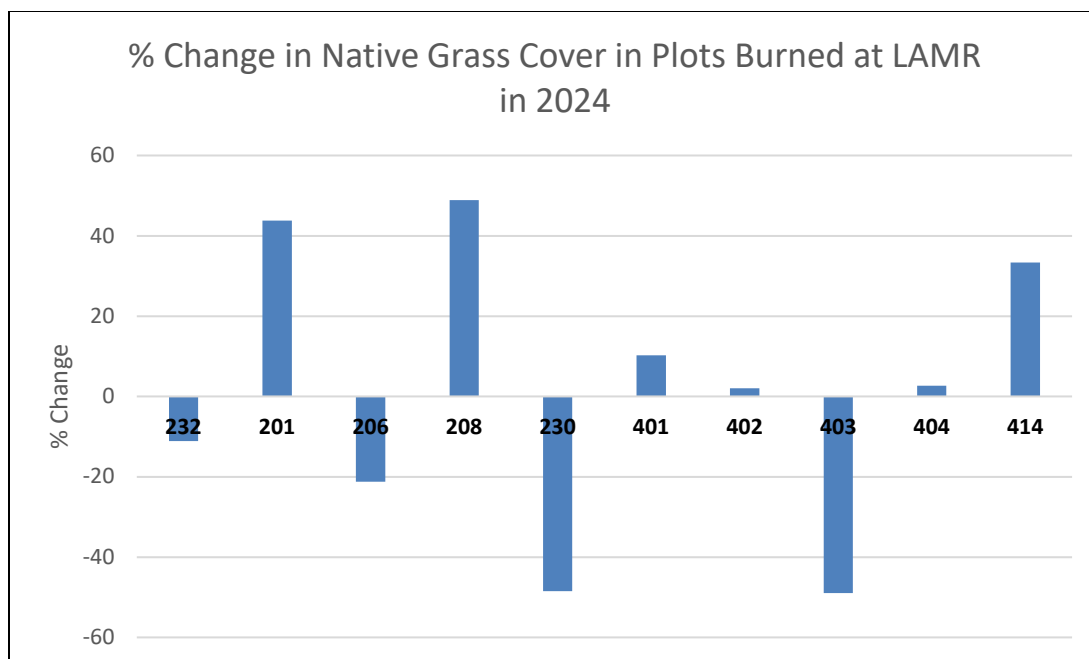


Figure 15. Percent change in native grass cover by plot for ten plots burned in 2024 at LAMR. Negative values indicate a decrease in native grass cover. Positive values indicate an increase in native grass cover.

Table 4. Management objectives for honey mesquite shrublands at LAMR. Brush density reduction is mean percent reduction from pre-burn to two years post-burn. Grass consumption is measured pre-burn to immediately post-burn.

Monitoring Unit	Management Objective	Monitoring Results	Progress Towards Meeting Objectives
<i>Honey Mesquite Shrubland</i>	Reduce cover density of mature honey mesquite brush by 25-50%.	Total % Reduction= 88% (n=4 plots, 2-4 fires + mastication)	Objective achieved
	Consume 70-90% of grasses.	Total consumption= 75-100%	Objective achieved

While the average reduction in honey mesquite density in plots that burned in prescribed fire in 2024 meets objectives, it is worth noting that the plots with higher density of honey mesquite saw less of a reduction post-fire. This is likely due to less grass cover and surface fuel loading to carry fire in plots with larger mesquite shrubs in the canopy. Reduced light to the ground limits grass growth. Sufficient grass cover and fuel loading is needed to produce the flame lengths and residual heat necessary to top-kill mesquite. Honey mesquite is a prolific re-sprouter and will return to its pre-fire density unless mechanical or prescribed fire treatments are frequent. In burn units with low grass cover and high density mesquite, cutting out the mesquite with chainsaws can enable the spread of native grasses. Native grasses only saw an increase in post-fire cover within the plots that burned in prescribed fire (Figure 14). The Windy Deuce Wildfire burned at a very high intensity during a drought and fanned by high winds. This resulted in greater fire intensity leading to greater mortality in vegetation. Additionally, the prescribed burns in 2024

were conducted in late April when green-up had begun resulting in lower fire behavior and severity. It is recommended that prescribed fire at LAMR continue to occur in March and April to enable native grass regeneration. Across eight of the ten plots burned in 2024, non-native plants have either established and/or increased in cover from pre-fire conditions. Species include Russian thistle (*Salsola tragus*), Johnson grass and kochia. It is recommended that the park obtain grass seed of species native to LAMR to use in prescribed burn units, wildfire perimeters, dozer lines and other areas impacted by fire activity. Establishment of native grasses can help limit the spread of non-native species into disturbed areas. Treating existing populations is also necessary as these species are drought and fire tolerant.

Blue Hills

The park had one large wildfire in February, Blue Hills. The fire was ignited by a downed powerline on a ranch near the Blue West area of the park. The fire burned 3,900 acres of which 1,908 acres were on LAMR. The week leading up to the fire was warm and sunny. The high temperature the day the fire started was 70°F with a low relative humidity of 11%. Sustained winds were in the low 20s with gusts in the high 30s contributing to rapid fire spread. Forward progression of the fire was stopped on February 1st with February 2nd and 3rd spent burning out pockets of fuel that had yet to ignite. Aircraft were used on the fire and retardant was dropped on the park. No drops impacted water. Approximately 0.25 miles of dozer line was constructed on the park boundary. This was rehabilitated by SPFG staff and recovery will be monitored through the 2026 growing season. No permanent plots were located in the wildfire perimeter so qualitative monitoring will be conducted. A fence interior to the park was downed when wooden posts were consumed by the fire. This fence will not need to be replaced. However, 9.8 miles of boundary fence and 1.1 miles of fence within the Blue West off-road vehicle (ORV) area will need to be replaced to prevent resource damage to the park. A Burned Area Rehabilitation (BAR) plan was written and may be submitted in 2026 to complete the fence replacement.



Figure 16. Dozer line from the Blue Hills Fire pre- and post-rehabilitation.

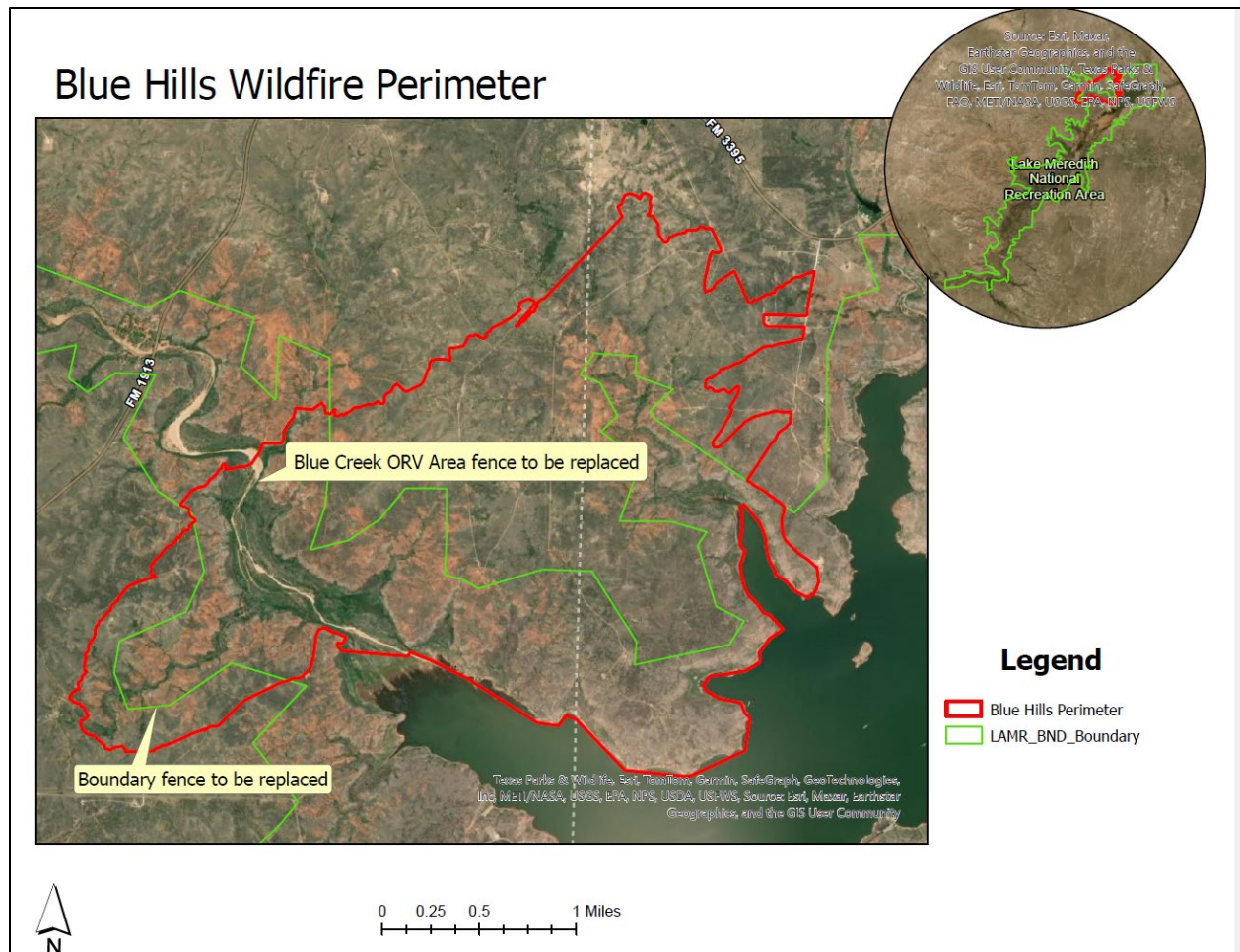


Figure 17. The Blue Hills Wildfire burned 3,900 acres total at LAMR and caused damage to two sections of fence. Replacing these fences is crucial to minimizing resource damage on the park.

The fire burned upland honey mesquite shrublands, bottomland cottonwood galleries and salt cedar galleries along the shoreline. The most severely impacted cottonwoods are in Blue Creek. The salt cedar along the shorelines will be monitored for mortality and resprouting. Fire effects show moderate severity through the upland communities. Honey mesquite, sand sage and other woody shrubs were top-killed by the fire but resprouted. Grasses and forbs were consumed almost entirely leaving only root crowns of grass. Bottomland areas of the park saw higher fire behavior due to thicker, taller fuels that produced larger flame lengths and heights.



Figure 18. Cottonwood mortality was high in the Blue West area of the park following the Blue Hills Fire.

2025 Fuel Loading

The fire effects crew completed fuel loading (biomass) sampling at LAMR again this year. Thirty plots were collected: twenty plots in upland honey mesquite communities and ten plots in bottomland tall grass communities. Average fuel loading in upland honey mesquite communities is 1.71 tons/acre. Removing the plot that contained K-R bluestem yielded a fuel loading of 1.61 tons/acre. Average fuel loading in bottomland tall grass communities is 3.40 tons/acre. Removing the two plots that had Johnson grass yielded a fuel loading of 2.61 tons/acre. This significant difference in fuel loading is apparent in fire behavior in bottomland communities invaded by Johnson grass. It is recommended that the park prioritize treating Johnson grass and K-R bluestem in areas where the two species are most prevalent as they will increase fire's resistance to control. Fuel loading in upland and bottomland communities at LAMR has not changed significantly in the three years the crew has been collecting data, despite significant changes in precipitation in the three years. Fuel loading values indicate that there is adequate fuel to carry fire across much of the park (Figure 19). The crew will create a KML file that contains fuel loading values, photos and species information for the 30 plots that were collected. This file will be shared with local fire personnel for planning purposes.

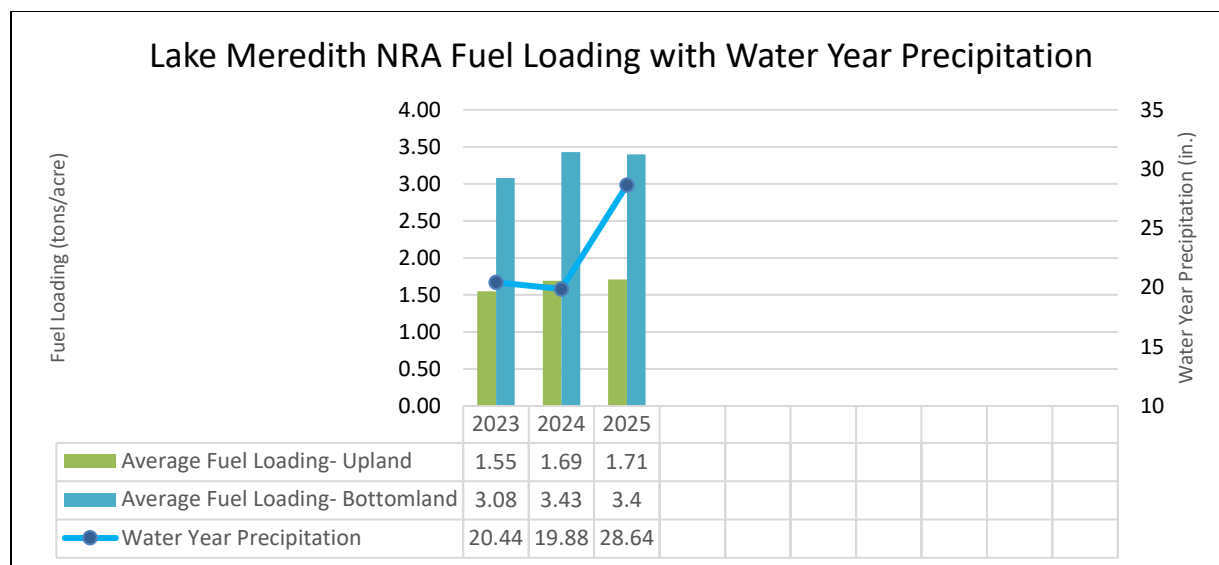


Figure 19. Average fuel loading at LAMR with water year precipitation shows no significant differences in fuel loading despite differences in precipitation. Note that fuel loading is collected in the early winter when the growing season has concluded. The 2023 fuel loading values are what was available to burn in the 2024 wildfire season at LAMR in which 18,132 acres burned on the park. 2024 values were measured post-fire season.

SAND

The fire effects crew visited SAND to verify the existence of FMH plots at the park. The crew found old GIS data indicating that three plots were established at the park. However, the plots were not located and SPFG has no known plots located at SAND and no plans to establish any. Fuels management at the park will be a collaborative effort between the Bureau of Indian Affairs, the Cheyenne and Arapaho tribal liaisons and SPFG.

WABA

The crew visited WABA to complete Year 02 reads on the South and Central burn units which saw prescribed fire in 2024. There is one FMH plot in the South unit and two in the Central unit. The crew was unable to locate one of the two plots in the Central unit. It is likely that the rebar monumenting the plot was visible and was removed accidentally. The crew will return in 2026 to re-install the plot and complete the missed read. The South unit had a high cover of sweet yellow clover (*Melilotus officinalis*). The clover was present pre-fire and spread following the prescribed burn. The plot in the South unit had 50% cover of clover. The plot also had K-R bluestem and Japanese brome (*Bromus japonicus*). The clover is a biennial and will hopefully reduce in cover next year. Woody encroachment decreased in the plot as native vegetation may have outcompeted resprouts. The Central unit responded well to the burn with increased cover in native grasses. The Central unit also has patches of K-R bluestem and Japanese brome but in much smaller quantities. Woody encroachment increased in the plot in the Central unit but still has excellent grass cover. Additional burns at WABA can help increase grass cover in the South unit. Growing season burns can reduce the cover of both sweet yellow clover and Japanese brome and it is recommended that SPFG staff implement prescribed burns on the park during the

summer. A second recommendation is that the park does not mow the burn units. Mowing can enable the further spread of non-native plants into the unit.





Figure 20. Photos from plot WABA-03 in 2011 (top), in 2024 (middle) and in 2025 (bottom) show how the grass cover has decreased in the plot over time. Additionally sweet yellow clover was prevalent throughout the South unit in 2025.

Table 5. Management objectives for tallgrass/mixed grass prairie at WABA. Grasses consumed is measured pre-burn and immediately post-burn.

Monitoring Unit	Management Objective	Monitoring Results (w/level of certainty)	Progress Towards Meeting Objectives
<i>Tallgrass/Mixed grass prairie</i>	Consume 70-90% of grasses	Total grasses consumed=70-90%	Objective achieved

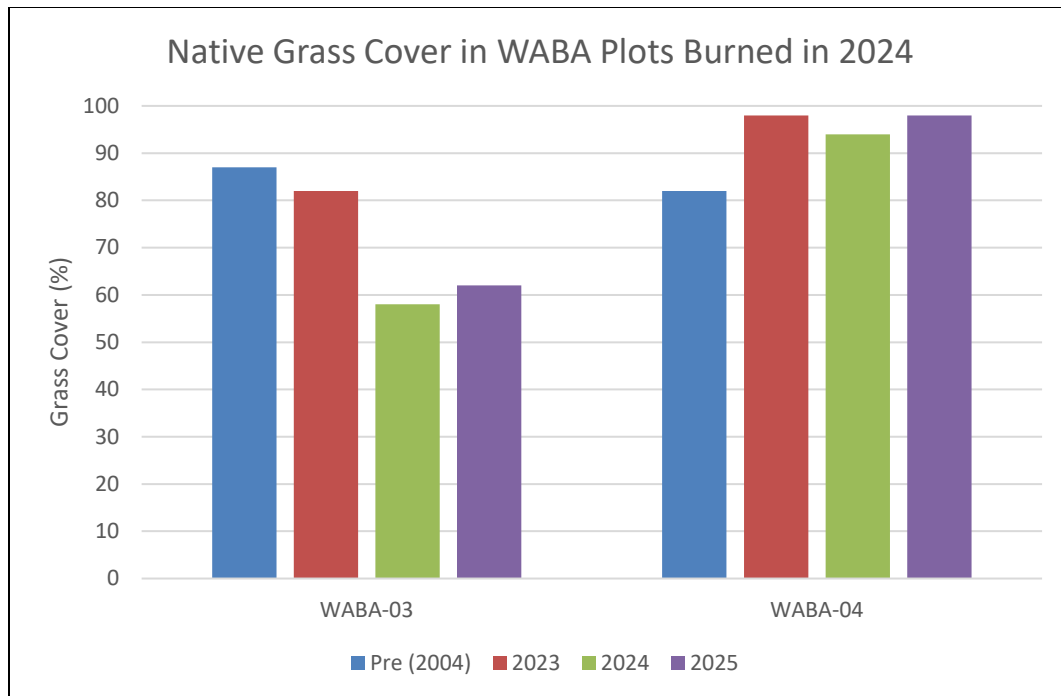


Figure 21. Native grass cover in FMH plot WABA-03 has increased since 2024 but is still not at pre-fire cover. Native grass cover in FMH plot WABA-04 has increased beyond pre-fire cover.

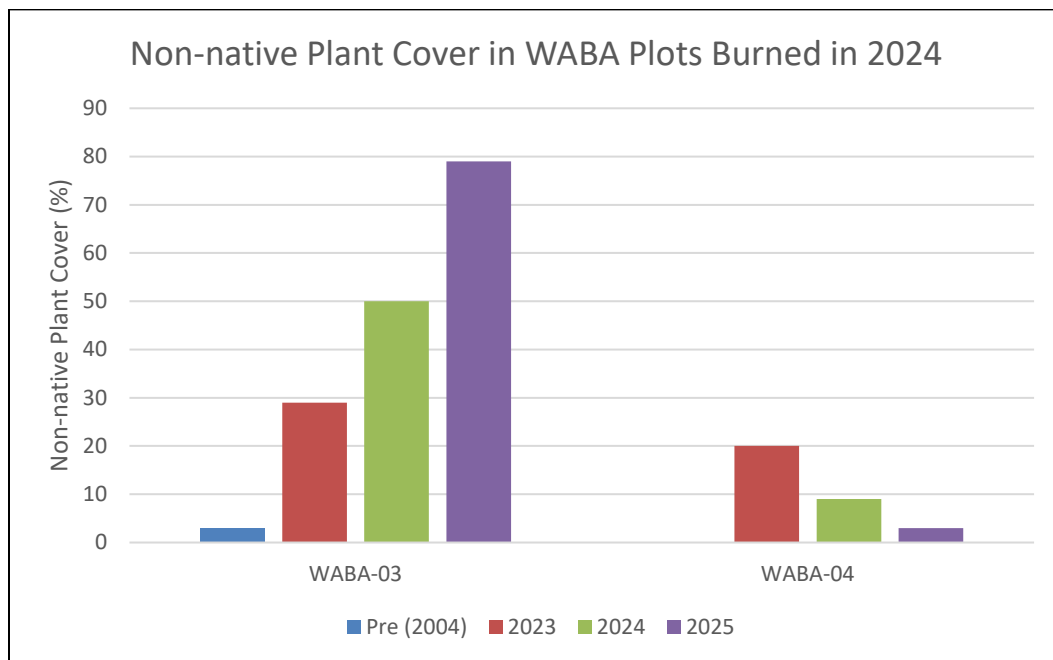


Figure 22. Non-native plant cover was prevalent in FMH plot WABA-03. Sweet yellow clover, K-R bluestem and Japanese brome were widespread in the South unit. FMH plot WABA-04 has seen a decrease in non-native plant cover since 2023, and the Central unit did not have widespread patches of non-native plants.

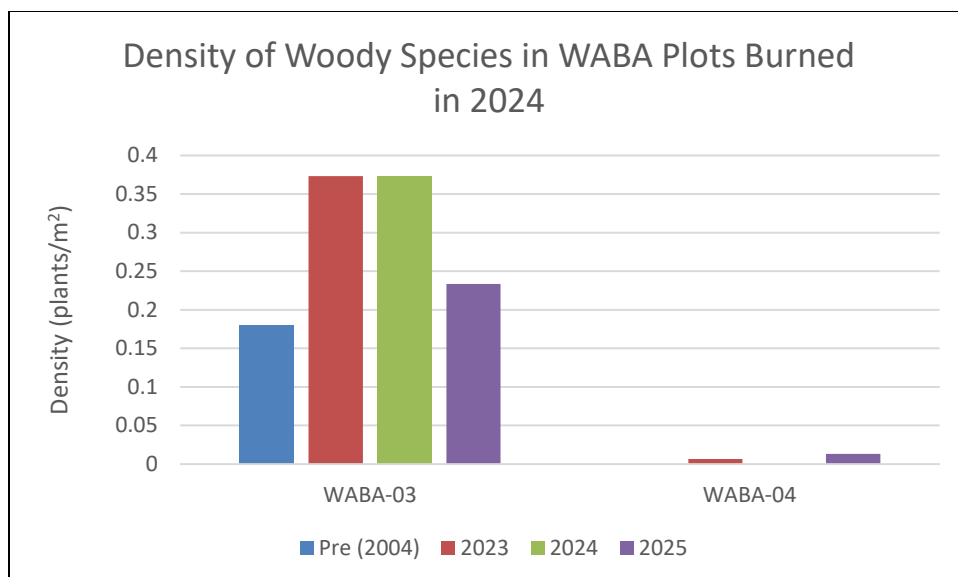


Figure 23. Woody species density in WABA-03 decreased in 2025 but increased in WABA-04. Frequent fire will help prevent woody encroachment into the prairie.

C. Research, Planning, and Communication

There are no known NPS Reserve Fund Research projects being completed in RGFZ or SPFG parks at this time. The fire effects crew did assist a researcher from Texas Tech University in choosing plot locations for a study on how the severity of the Windy Deuce fire was influenced by previous prescribed burning and how the fire impacted forage quality, quantity and composition. The researcher collected data from April to October of 2025.

Monitoring plans for the RGFZ and SPFG parks are in progress at this time. Fire management plans have been completed for all SPFG parks except for AMCH. Fire management plans have been completed for all RGFZ parks with the exception of WHSA which is awaiting signatures. Environmental compliance work is being completed by contractors for AMIS, BIBE, CAVE, FODA and GUMO. A BAR plan was written to replace fence damaged by the Blue Hills Fire in 2025 and will be submitted in 2026.

D. Future Direction

With the approval of the 0456 Wildland Firefighter (Fire Effects and Fuels Monitoring) position descriptions, all fire effects positions will need to be advertised and hired. Hopefully hiring occurs for all positions in FY26. Short-term program goals include improving communications with resource management staff in all parks with long-term program goals of solidifying objectives, treatment schedules and monitoring schedules.

E. References, Links, and Additional Reading

IRMA Data Store Records for FFI Databases

BEOL: <https://irma.nps.gov/DataStore/Reference/Profile/2314049>

BIBE: <https://irma.nps.gov/DataStore/Reference/Profile/2314052>

CAVE: <https://irma.nps.gov/DataStore/Reference/Profile/2314056>

CAVO: <https://irma.nps.gov/DataStore/Reference/Profile/2314050>

CHIC: <https://irma.nps.gov/DataStore/Reference/Profile/2314051>

GUMO: <https://irma.nps.gov/DataStore/Reference/Profile/2314055>

LAMR: <https://irma.nps.gov/DataStore/Reference/Profile/2314053>

WABA: <https://irma.nps.gov/DataStore/Reference/Profile/2314054>

Monitoring Plan Locations

RGFZ and SPFG Monitoring Plans are currently located on the LAMR Shared drive at the following file path: Z:\Shared\Fire\Fire Effects\Monitoring Plans

Monitoring Methods

Monitoring protocols used by the fire effects crew are derived from the Fire Monitoring Handbook (see Literature Cited section).

Literature Cited

U.S. D.O.I. National Park Service. 2003. Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center.

<https://home.nps.gov/orgs/1965/upload/fire-effects-monitoring-handbook.pdf>

Sakulich, J., H. M. Poulos, R. G. Gatewood, K. A. Wogan, C. Marks, & A. H. Taylor. 2022. Low-Severity Wildfire Shifts Mixed Conifer Forests toward Historical Stand Structure in Guadalupe Mountains National Park, Texas USA. *Fire*: 5, 119.

Short, Karen C. 2022. Spatial wildfire occurrence data for the United States, 1992-2020 [FPA_FOD_20221014]. 6th Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2013-0009.6>.

Western Regional Climate Center. RAWS USA Climate Archive. 2025. <https://raws.dri.edu/>.

Appendix A. Staffing and Accomplishments

Table A-1. Fire Ecology Staffing 2025

Ecologist and Monitors	Position	Appointment Length	Training and Development
Richard Gatewood	Fire Ecologist	PFT- Took DRP in March (5 payperiods)	
Allyson Arulanantham	Lead Monitor	PFT	BAES assignments to New Mexico and Montana, Taught at 3 WFAP Academies, IMR Fuels Workshop, Completed Master's degree in Fire Ecology and Management
Eric Behrens	Assistant Lead Monitor	PFT- Took new position in September (18 payperiods)	PFTC
Joy Bauer	Monitor	PFT	S-290, RAWS tutorials
Jensen Bigelow	Monitor	1039- Left early for graduate school (7 payperiods)	S-130/190, L-180, IS 100, 200, 700

Table A-2. Fire Ecologist 2025 Accomplishments/Focus Areas

*Fire Ecologist, Richard Gatewood, took the deferred resignation program and retired in March of this year.

Table A-3. Fire Effects Crew 2025 Accomplishments/Focus Areas

Category	Percent Time	Notes
Data collection	45%	Data collection consists of photopoints, plot installations, and full plot reads at AMCH, BEOL, CHIC, GUMO, LAMR, SAND and WABA. Includes travel time.
Wildfire assignments	10%	FFT2, FFT1 initial attack and severity at LAMR, BAES assignments to Buck Fire and Windy Rock Fire
Prescribed fire/fuels treatment projects	2%	Time spent monitoring fuel breaks, scouting lines for burn units and prepping burn units.
Travel out-of-park for plot or project work	0%	
Data entry/management	10%	Entering and quality control checking plot data, fuel moisture data, fuel loading data
Data analysis	2%	Data analysis for annual report
Administrative activities	5%	QuickTime, Concur, field season planning, park meetings, orientation, EPAPs,
Training	20%	IMR Fuels Workshop, NWCG courses, FLN webinars, Online tutorials for Landfire, ArcPro, AGOL,
Miscellaneous	6%	Taught at 3 WFAP Advanced Academies, Assisted LAMR with administrative and interpretive support.

Appendix B. History of Fire Effects Monitoring Plots

Table B-1. All Fire Effects Plots Established

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point, Rapid Assessment, CBI, etc.)	Years Data Collected (start-end)	Total Plots
Amistad	Giant Reed	FMH Grass	2024-2025	10
Bent's Old Fort	Cottonwood Prairie	FMH Forest	2003-2025	5
Big Bend	Chisos	FMH Forest	1998 - 2025	10
	Pinion Juniper- Oak Woodland Research Plots	Circular Density	2003-2025	144
	Lechuguilla Grassland	FMH Brush	1997 - 2025	11
	Sotol Grassland	FMH Brush	1998-2025	9
	White Brush	FMH Brush	1998-2025	5
	Exotic- Lehman's- Rx	FMH Grass	2004-2025	15
	Exotic- Lehman's- Herbicide	Circular Density	2007-2024	20
	Gambusia T&E	Photo Point	2003-2025	9
	Gambusia T&E	Census of Overstory Trees	2006-2025	1
	Rio Grande River Restoration	BIBE Restoration	2008-2025	4
	Flood Plains Shrub-Mechanical	Circular Density	2006-2024	4
	Long-term Fire Ecology	Circular	1976-2025	15
Capulin Volcano	Pinion Juniper	FMH Forest	2004-2024	7
Carlsbad Caverns	Exotic	FMH Brush	2000-2025	6
	Juniper Grassland	FMH Brush	2000-2025	4
	Curlyleaf Muhly Grassland	FMH Brush	1992-2025	28
	Tobosagrass Shrubland	Circular Density	2004-2010	15
	Shrub Desert	Circular Density	2004-2010	15
	Honey Mesquite Shrubland	Circular Density	2004-2010	1
Chickasaw	Post Oak Woodland	FMH Forest	2006-2025	6
	Mixed Grass Prairie	FMH Brush	1994-2025	6
Fort Davis	Shortgrass Prairie	FMH Brush	2008-2025	5
Guadalupe Mountains	Douglas Fir Mixed Conifer	FMH Forest	1998-2025	5
	Alligator Bark Juniper Mixed	FMH Forest	1998-2025	6

	Conifer			
	Muhly Grassland	FMH Brush	1996-2025	14
	Redberry Juniper Shrubland	Circular Density	2008-2025	1
	Grassland	Circular Density	2008-2025	1
Lake Meredith	Honey Mesquite Shrubland	FMH Brush	1998-2025	33
	Cottonwood Prairie	Circular Forest	-2025	3
	Western Wheatgrass Bottomland	FMH Brush	2006-2025	4
	Switchgrass Bottomland	FMH Brush	2006-2025	3
Washita Battlefield	Mixed Grass Prairie	FMH Brush	2003-2025	3
Total	<blank>	<blank>	<blank>	428

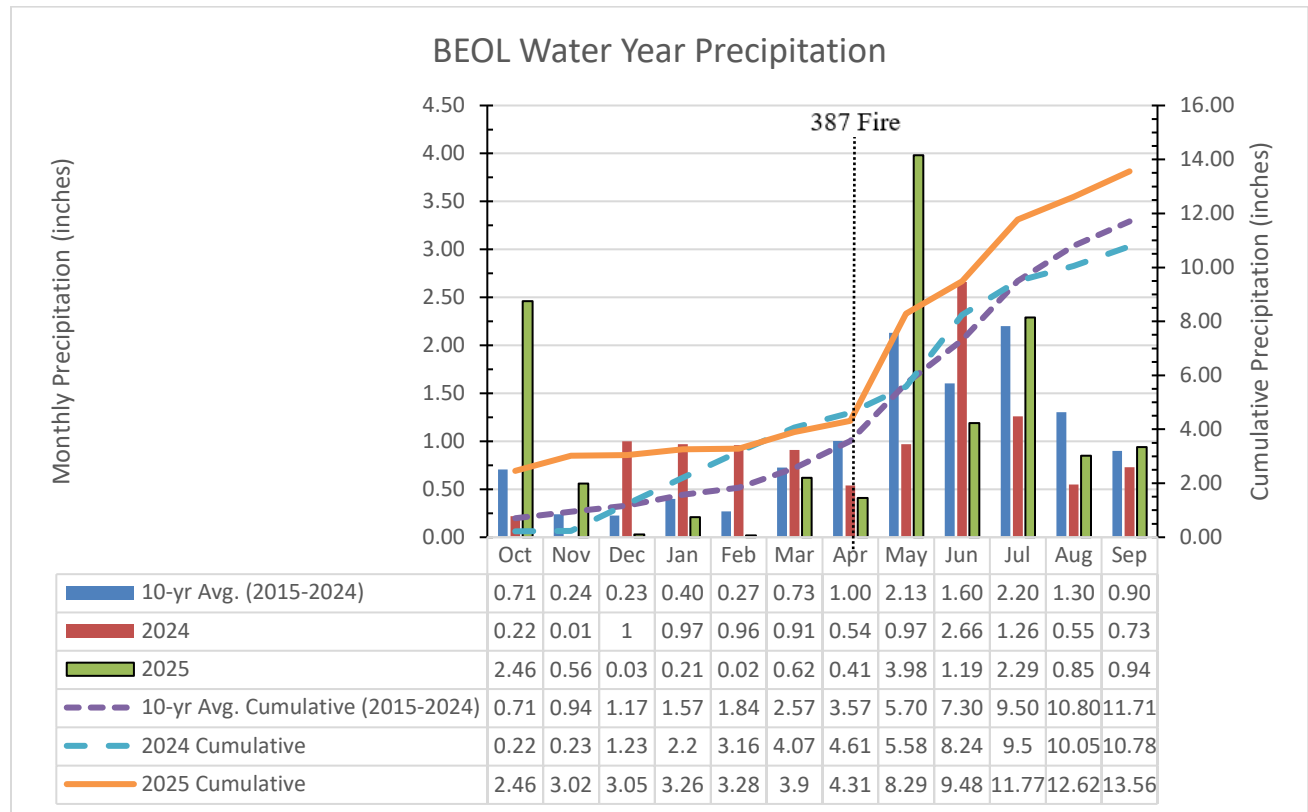
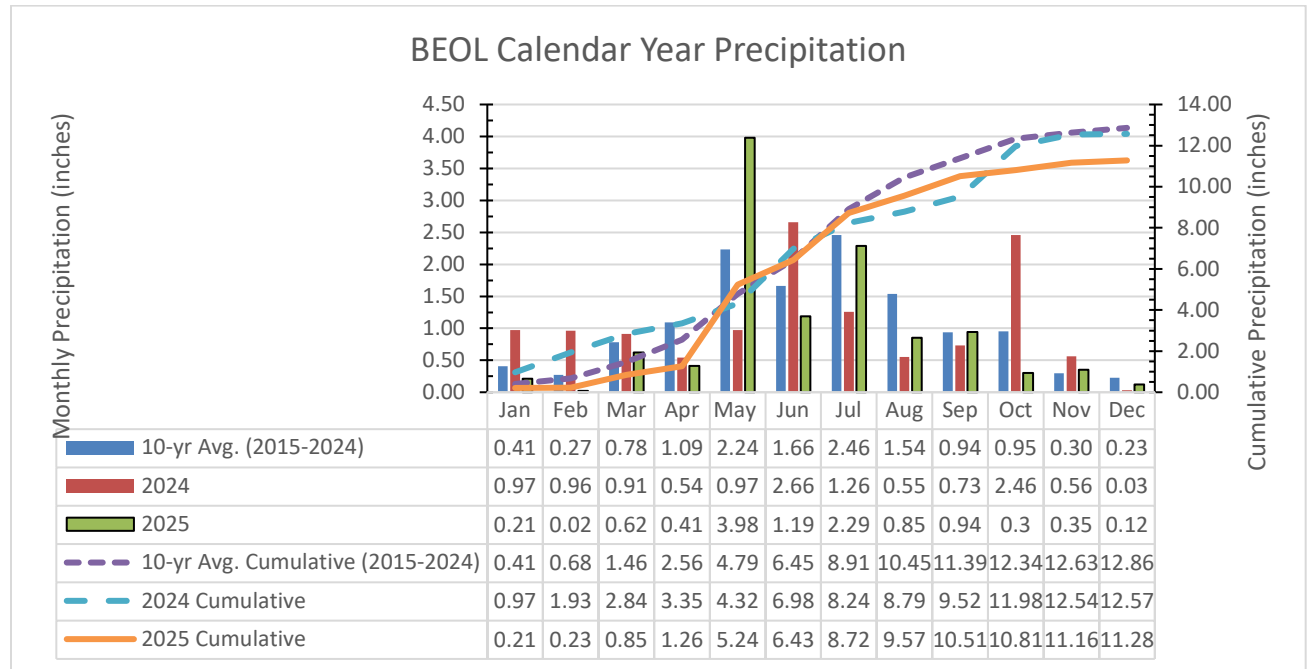
Appendix C. Fire/Fuels Treatments and Associated Monitoring

Table C-1. Summary of 2025 Fire/Fuels Treatments and Associated Monitoring

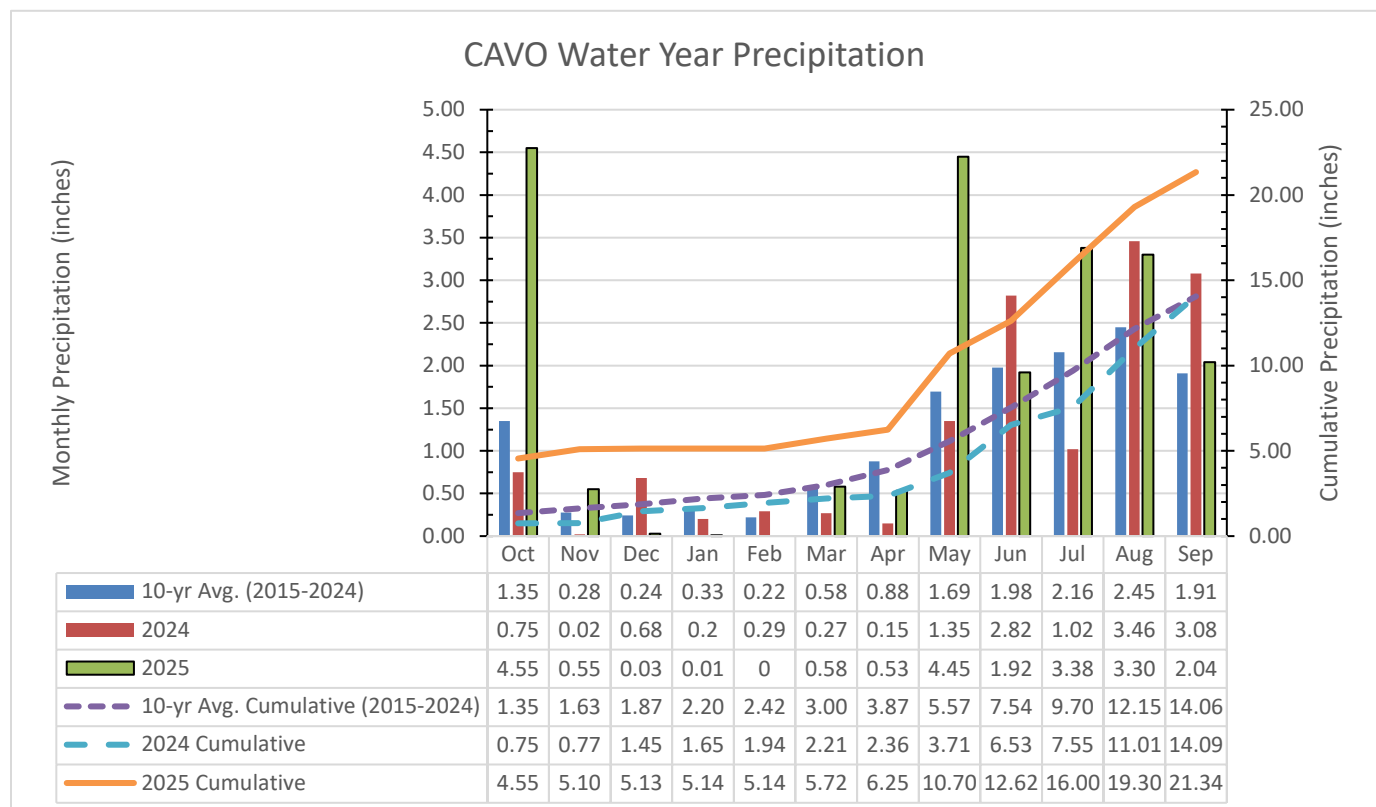
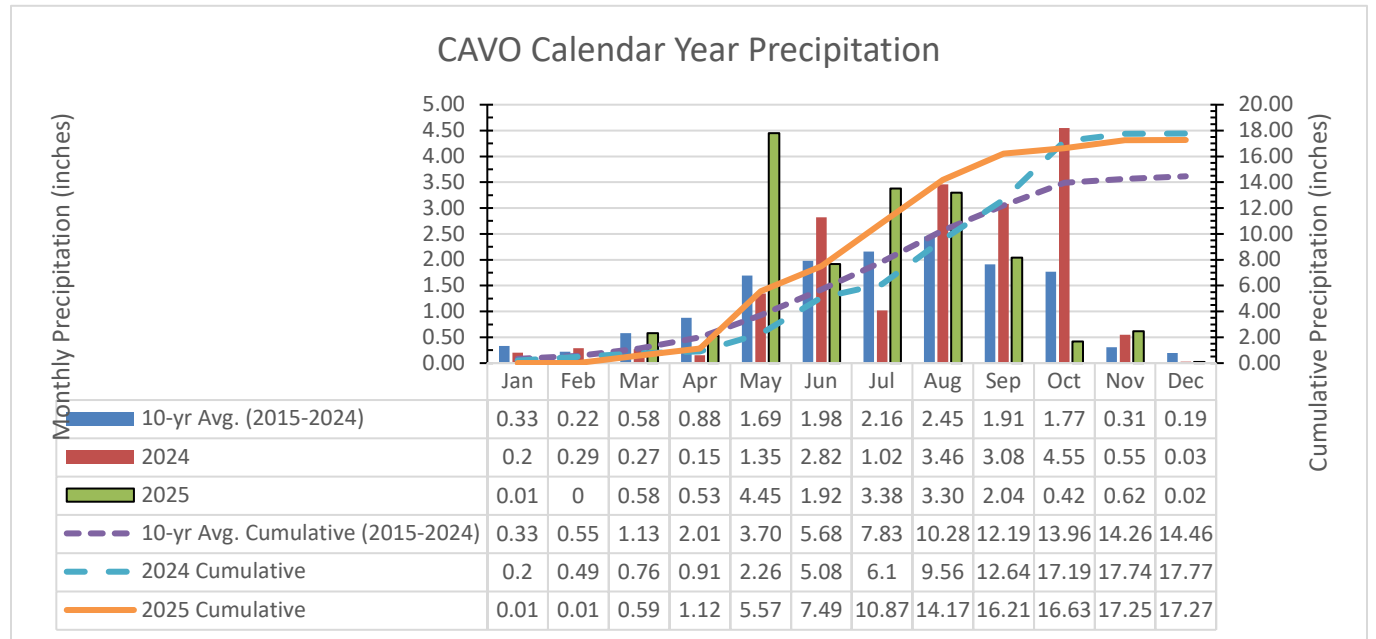
Park	Fire/Treatment Name	Monitoring Conducted	Acres
<i>Bent's Old Fort</i>	387 Fire	Yes (FMH)	118
<i>Big Bend</i>	Sublett Fire	No	103
	Buenos Aires Fire	No	50
	Buenos Aires 2 Fire	No	102
	Buenos Aires 3 Fire	No	19
	Buenos Aires 4 Fire	No	20
	Gauging Station 1 Fire	No	14
	Smokey Creek Fire	No	3
	Smokey Creek 2 Fire	No	18
	Smokey Creek 3 Fire	No	2
<i>Chickasaw</i>	Cold Springs	No	0.1
<i>Lake Meredith</i>	Blue Hills Fire	Yes (Qualitative)	3,900
	Plum Creek Windmill Fire	Yes (Qualitative)	7
	Yake	Yes (Qualitative)	0.2
	Triangle	Yes (Qualitative)	0.1
	Sanford Dam	No	0.1
	Bugbee Fuel Break	No	32
	Mullinaw Fuel Break	Yes (Qualitative)	45
Total			

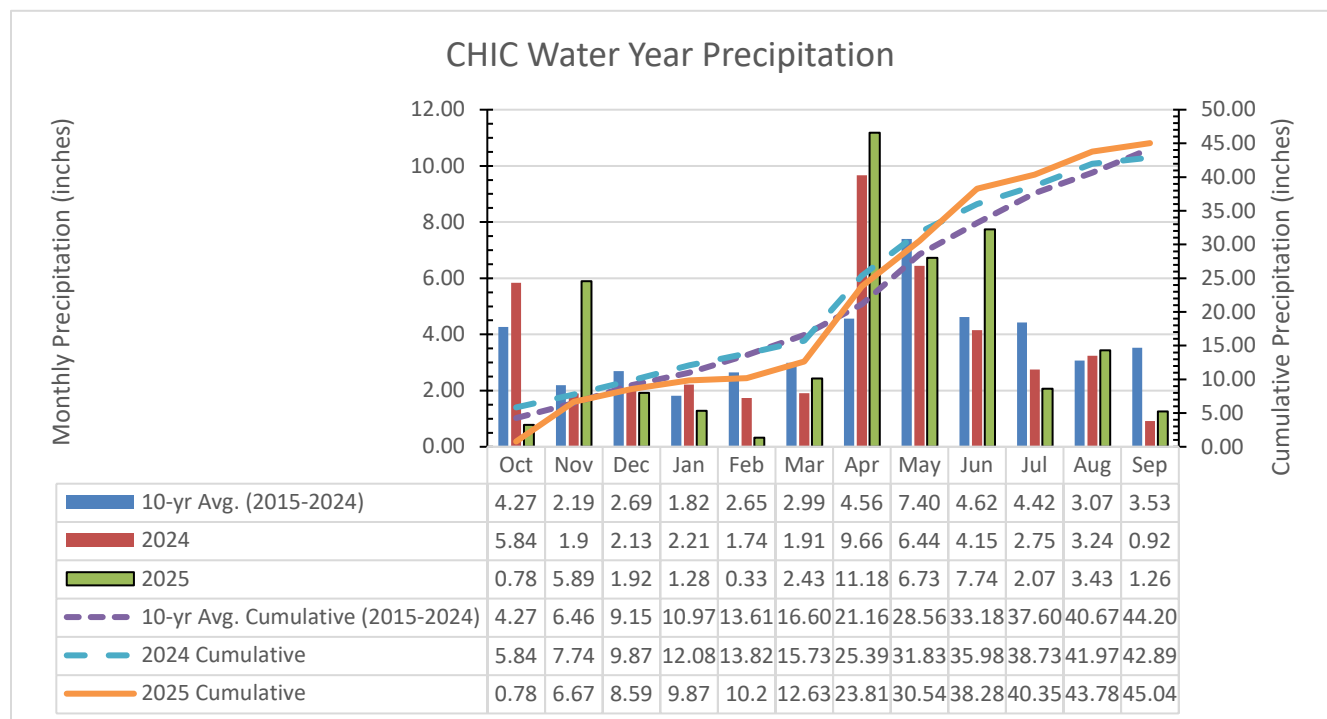
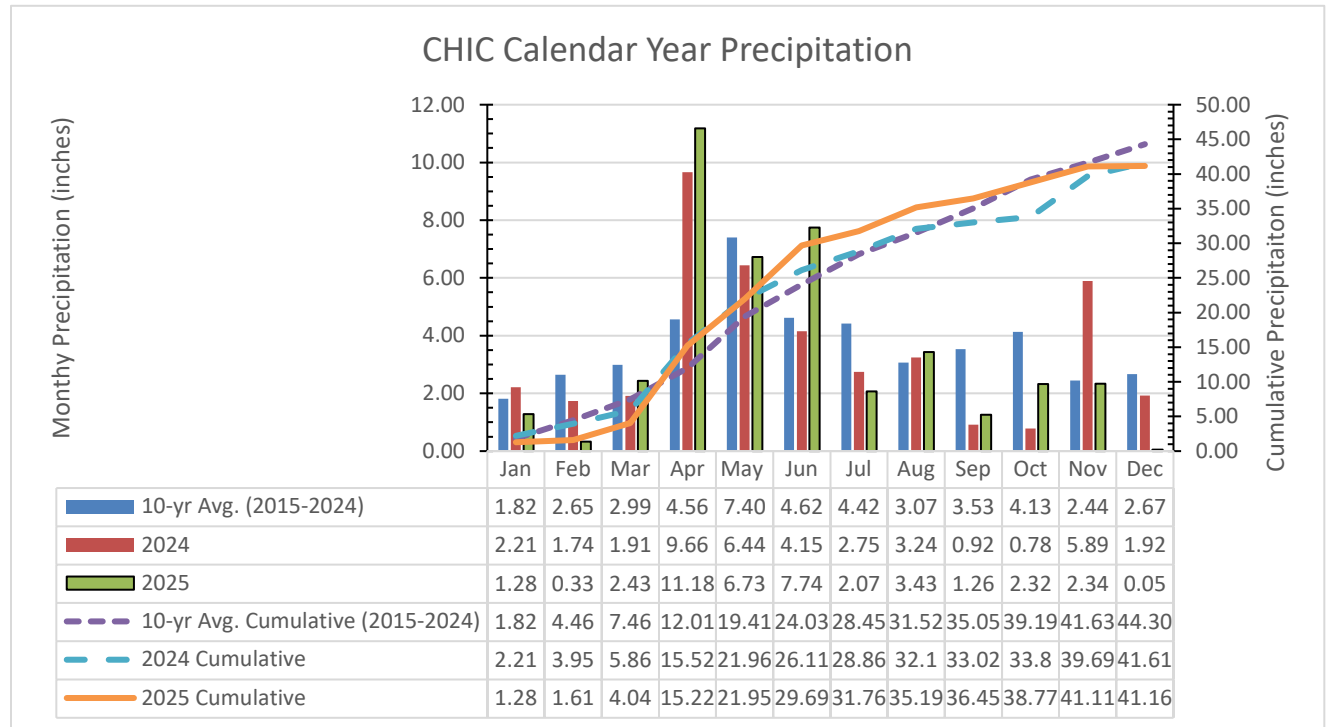
Appendix D. SPFG Precipitation Graphs

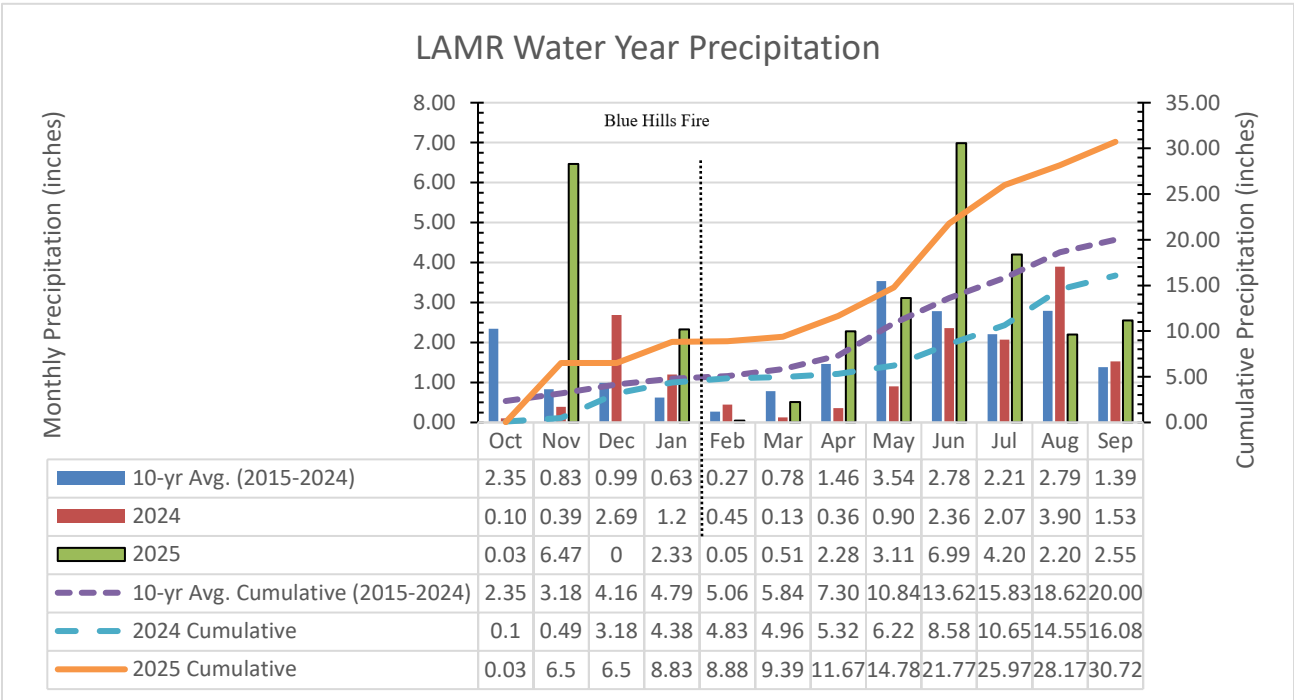
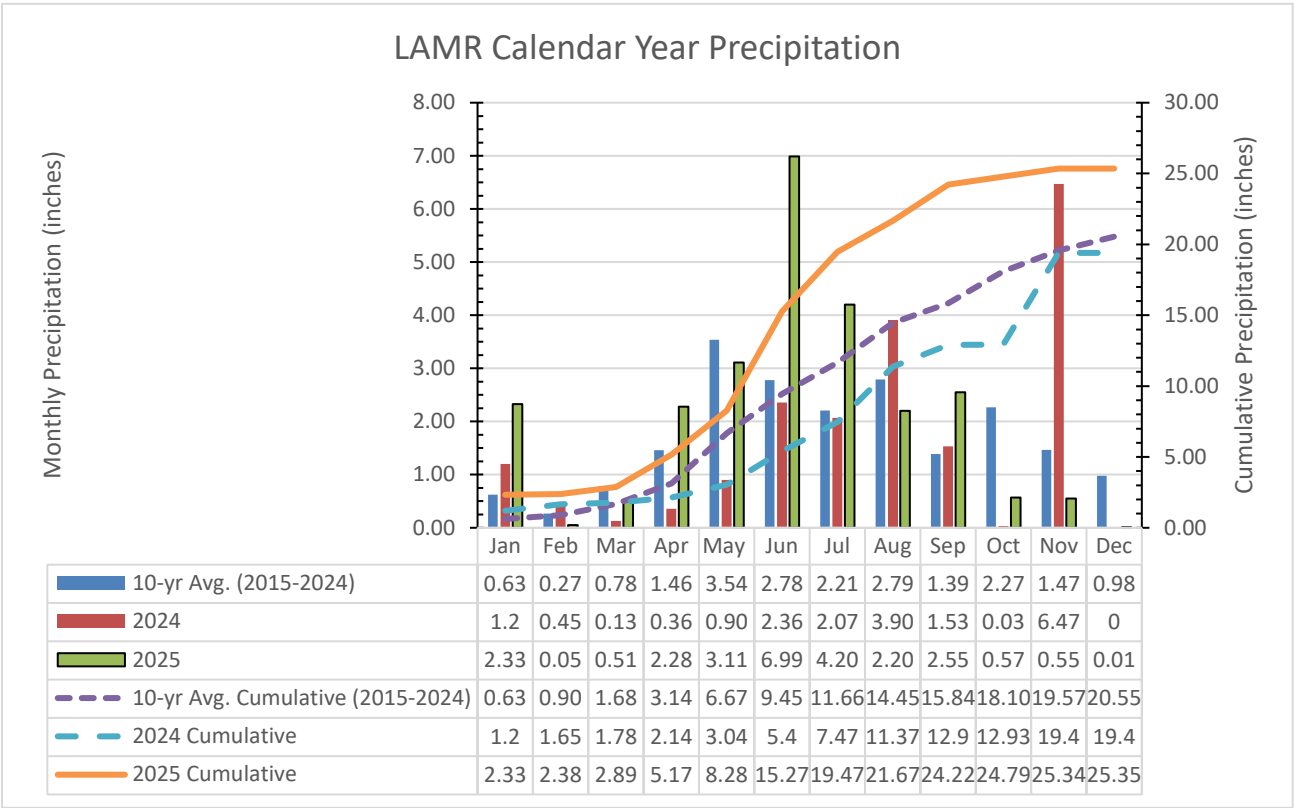
BEOL

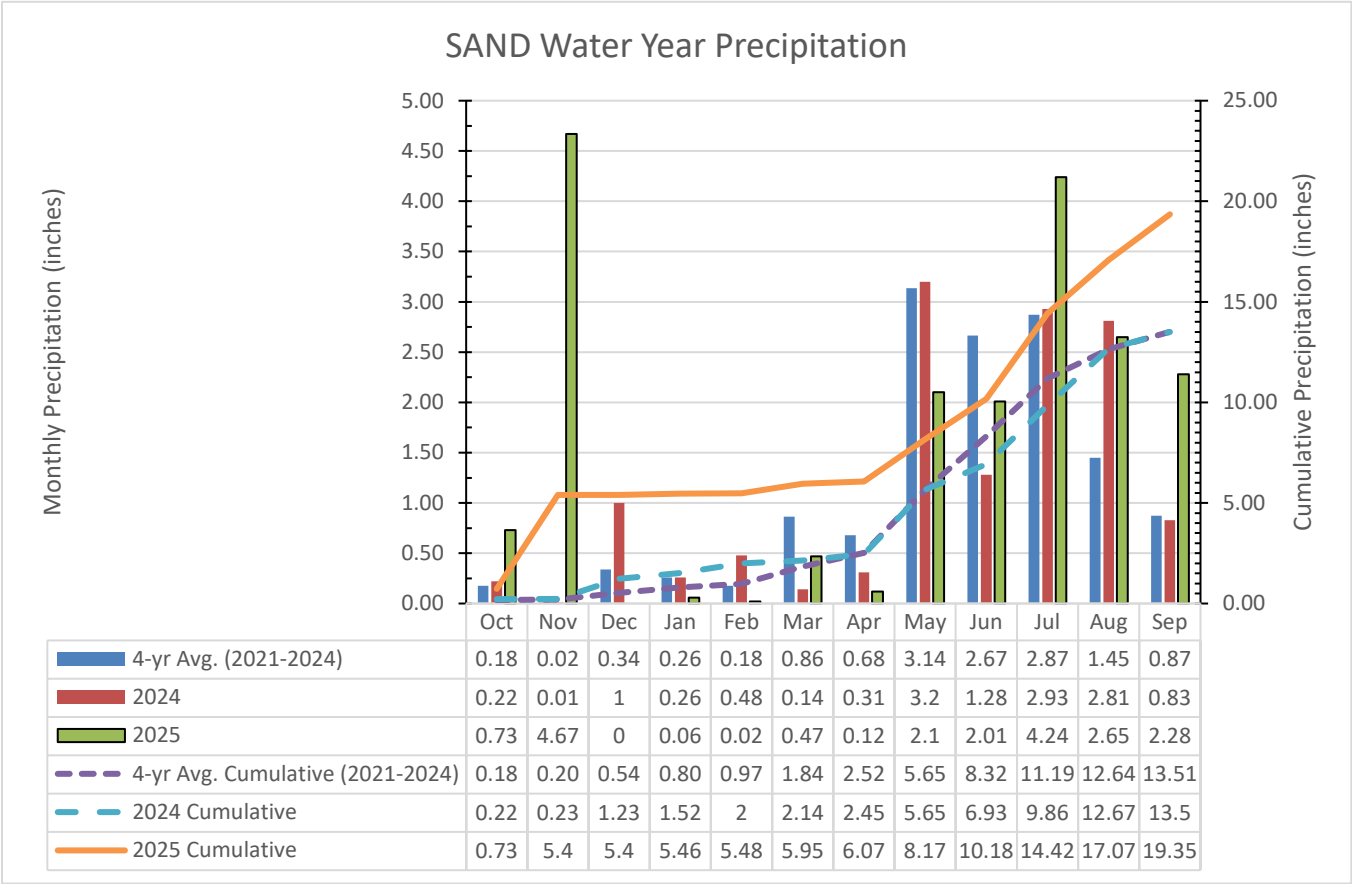


CAVO

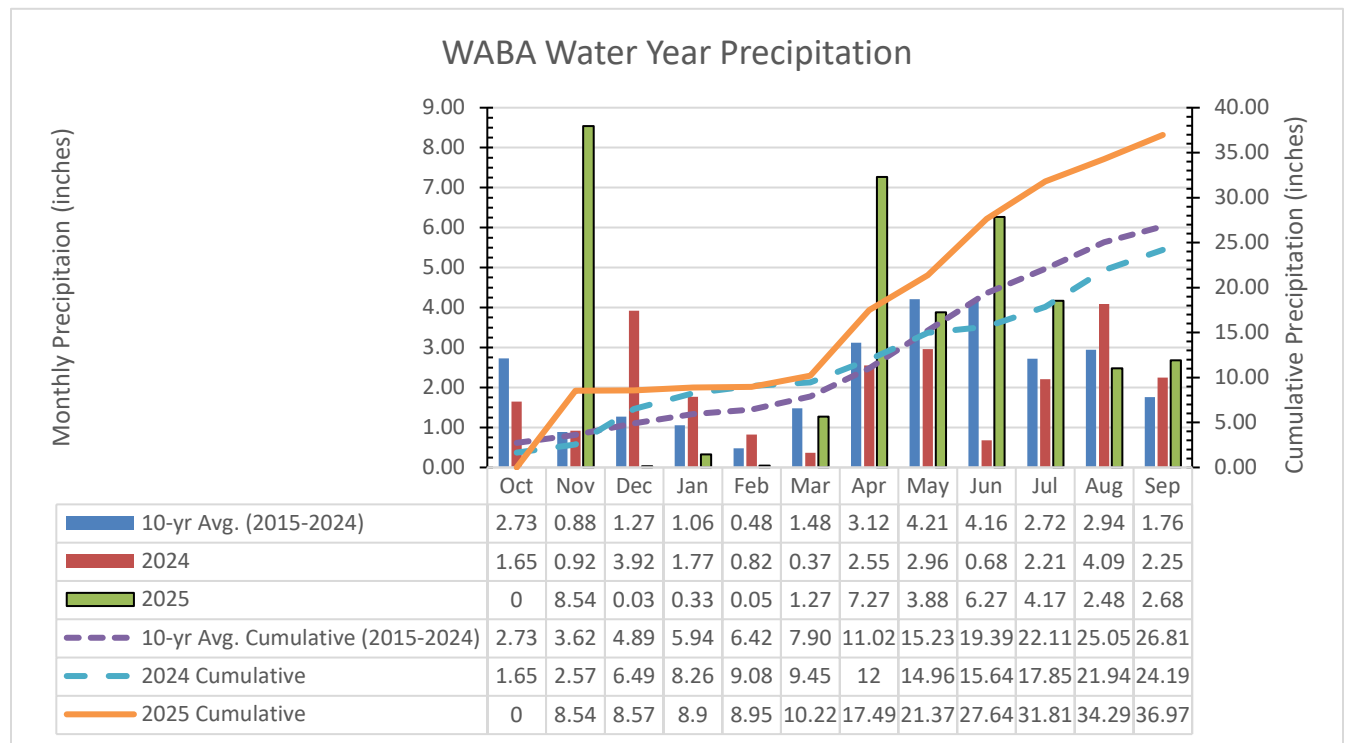
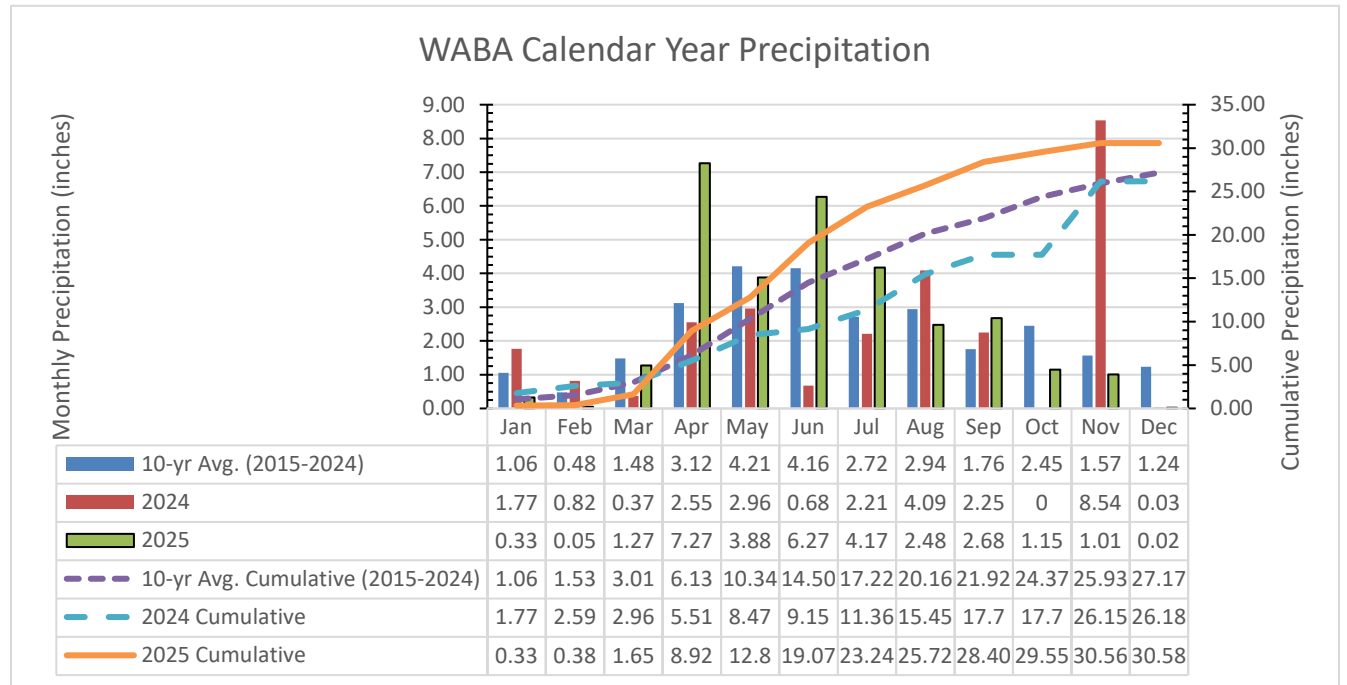








WABA



Appendix E. RGFZ and SPFG Wildfire Statistics Summaries

Data for wildfire locations, cause, size and date are from the Research Data Archive (Short, 2022). For the graphs titled “Cause of Fires”, the categories in order from left to right are Arson/incendiarism, Debris and open burning, Equipment and vehicle use, Fireworks, Missing data/not specified/undetermined, Misuse of fire by a minor, Natural, Power generation/transmission/distribution, Recreation and ceremony and Smoking.

Table E-1. Fire size classes in acres.

A	B	C	D	E	F	G
0-0.25	0.25-10	10-100	100-300	300-1,000	1,000-5,000	5,000+

BIBE

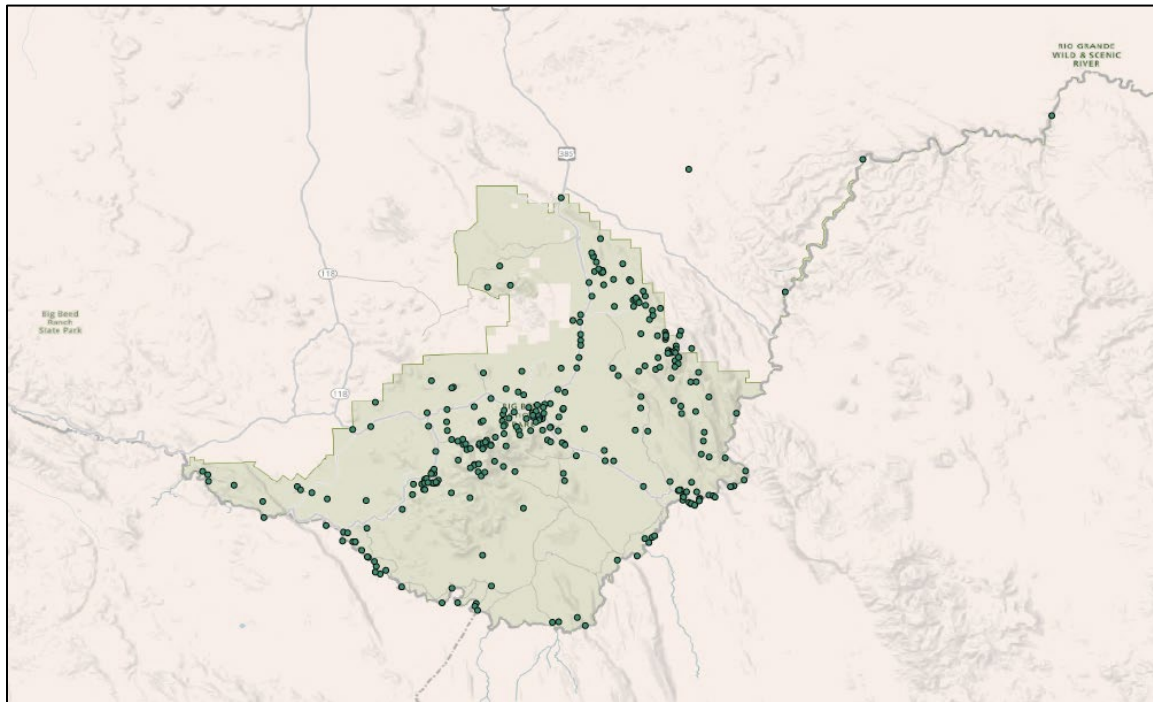


Figure E-1. Wildfire locations at BIBE from 1992-2020.

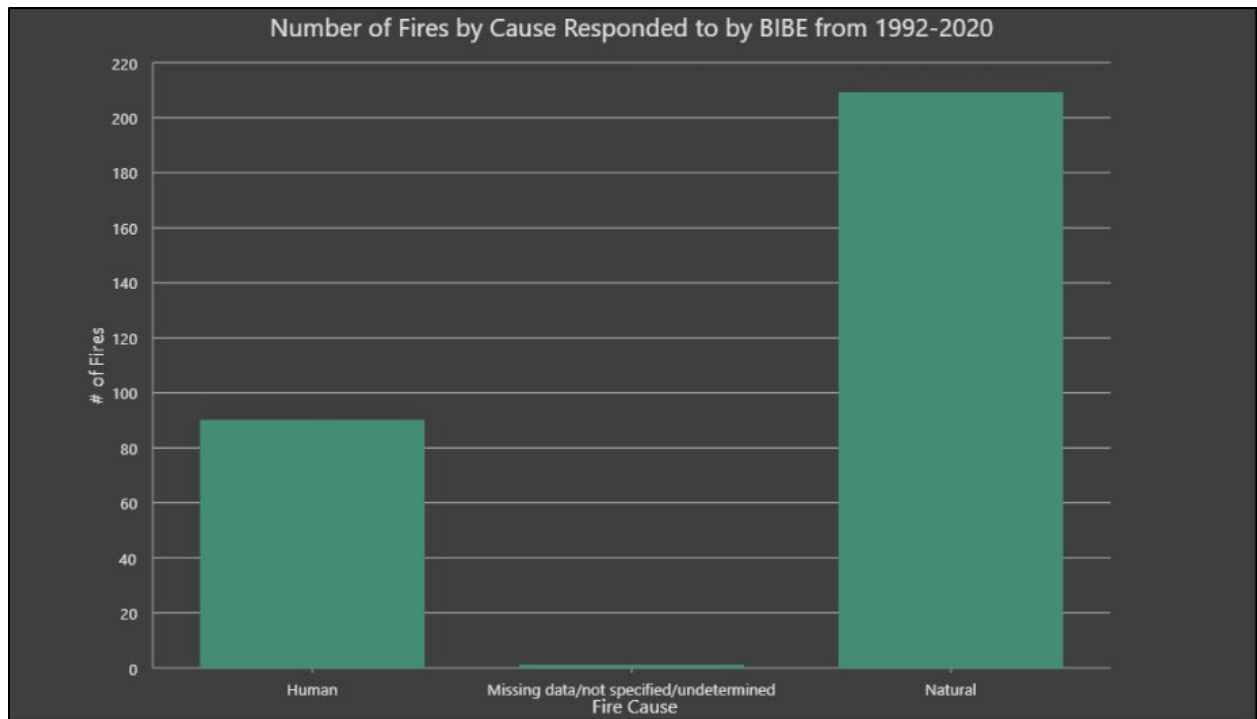


Figure E-2. The majority of wildfires responded to by fire personnel at BIBE were caused by lightning.

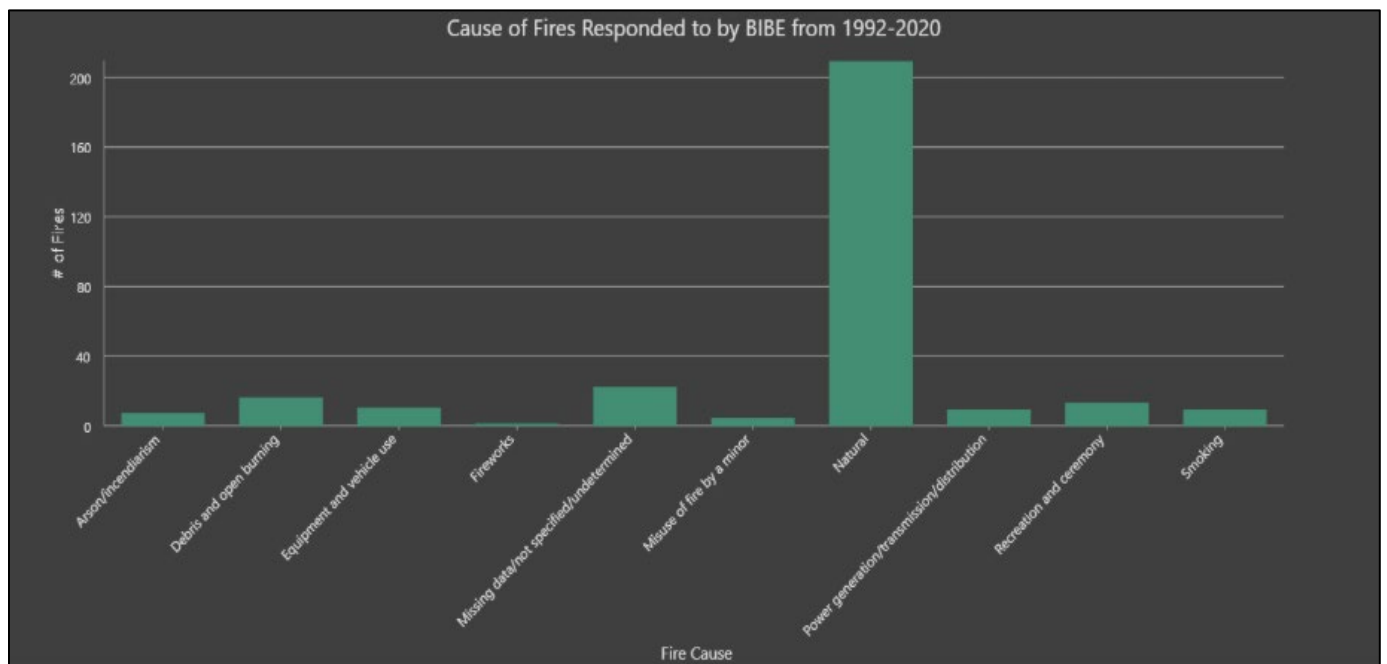


Figure E-3. The majority of fires responded to by fire personnel at BIBE are caused by lightning. Of the fires caused by humans, missing data/unspecified/undetermined had the largest amount followed by debris/open burning and recreation/ceremony.

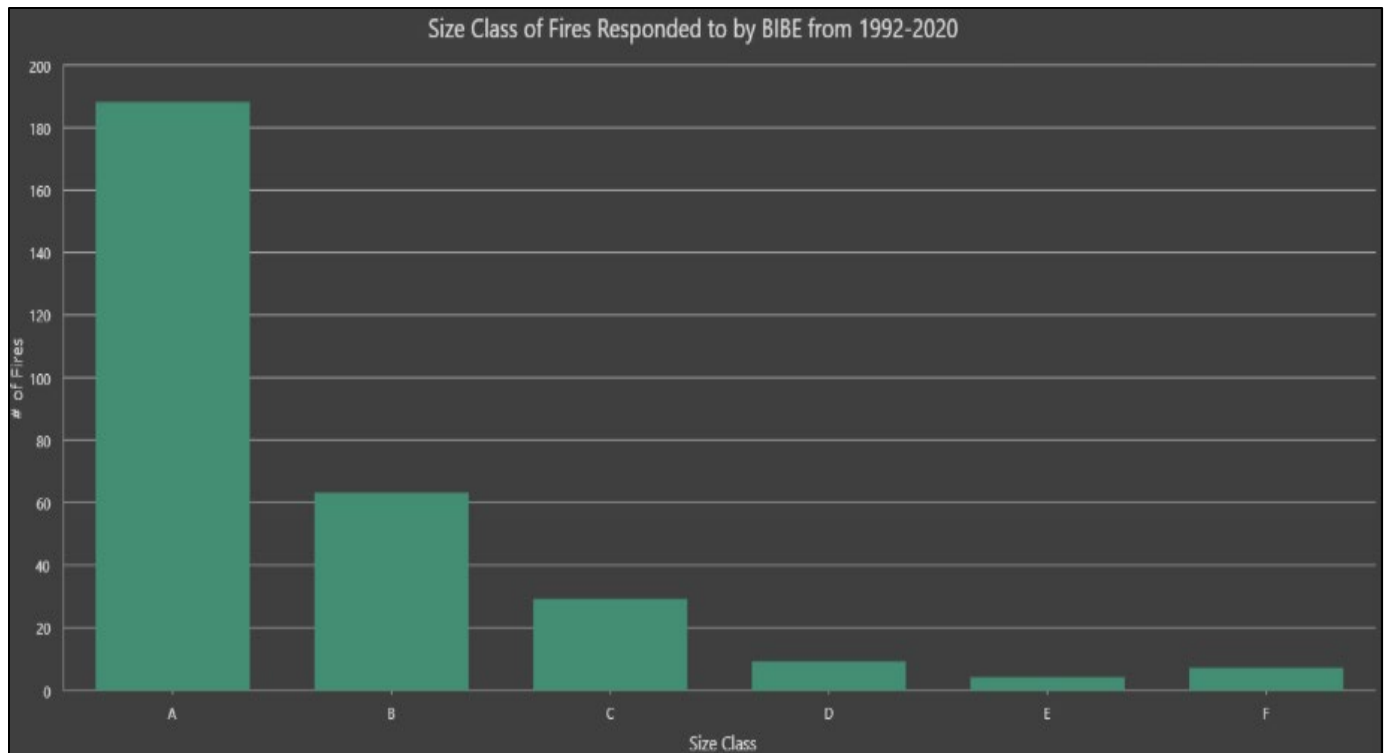


Figure E-4. The majority of fires responded to by fire personnel at BIBE are in size class A.

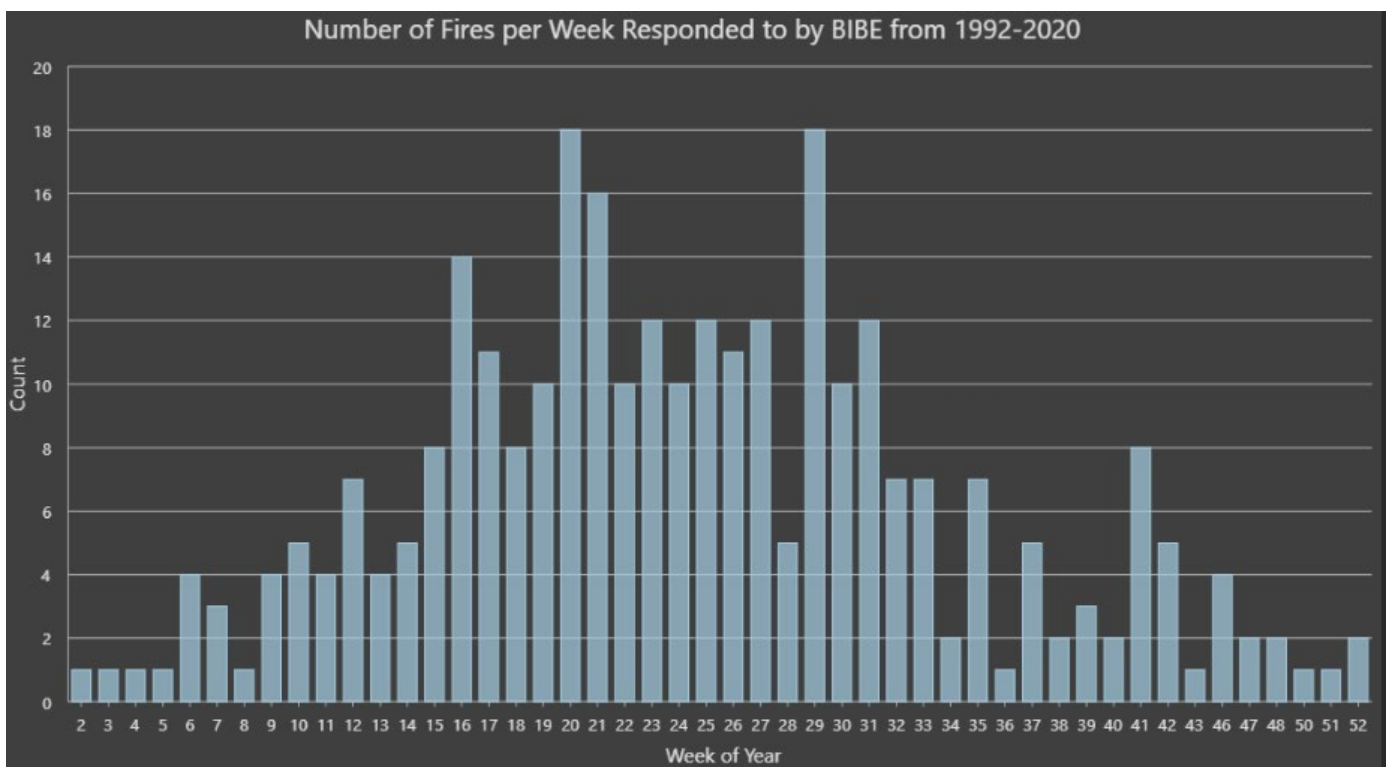


Figure E-5. Weeks of the year with the largest number of fires responded to by fire personnel at BIBE include weeks 16 (Feb. 9-15), 20-21 (May 18-31) and 29 (July 13-19).

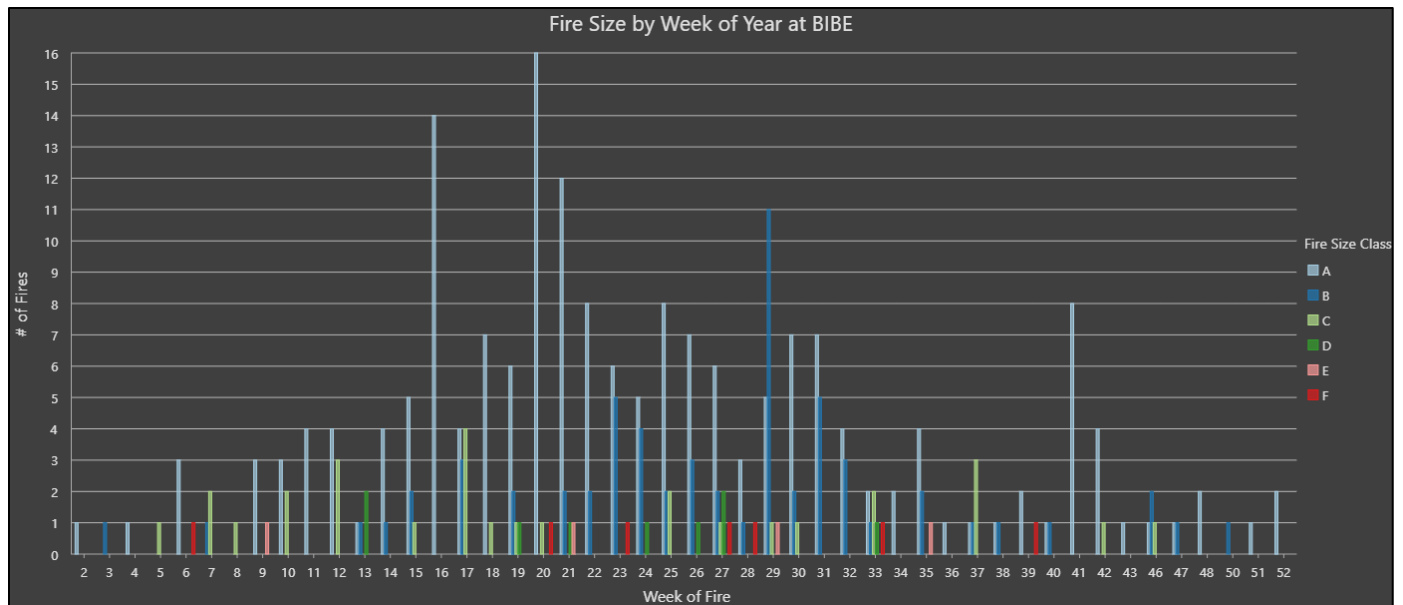


Figure E-6. Weeks of the year with the largest sized fires responded to by fire personnel at BIBE are scattered throughout the year but include weeks 6 (Feb. 5-11), 9 (Feb. 24-March 2), 20 (May 12-18), 23 (June 2-8), 27-29 (June 30-July 14), 33 (Aug. 11-17), 35 (Aug. 25-31) and 39 (Sept. 22-28).

CAVE/GUMO

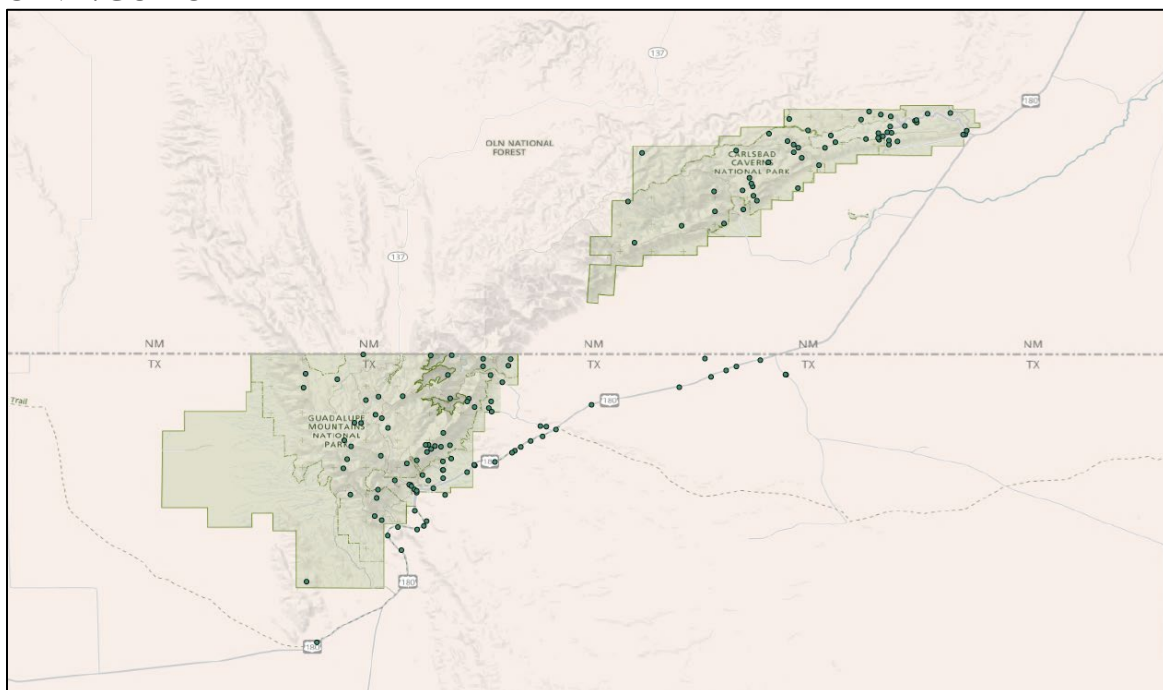


Figure E-7. Wildfire locations at CAVE and GUMO from 1992-2020.

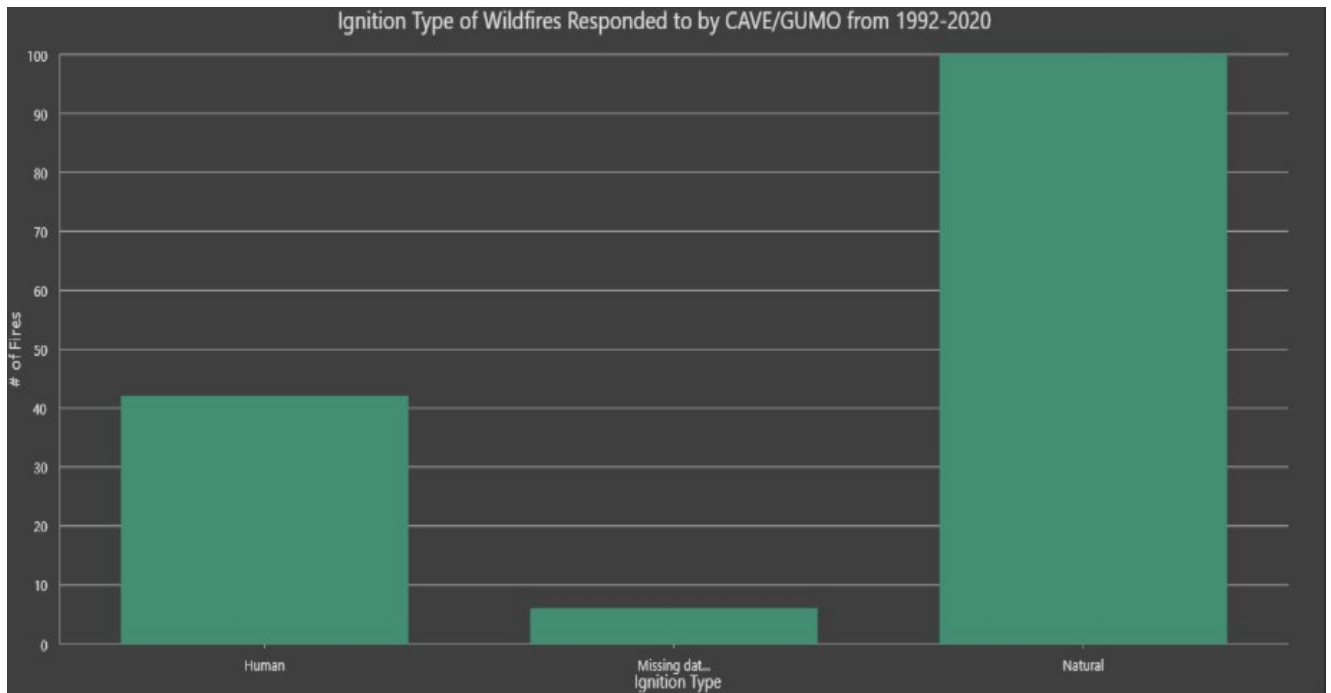


Figure E-8. The majority of wildfires responded to by fire personnel at CAVE and GUMO were caused by lightning.

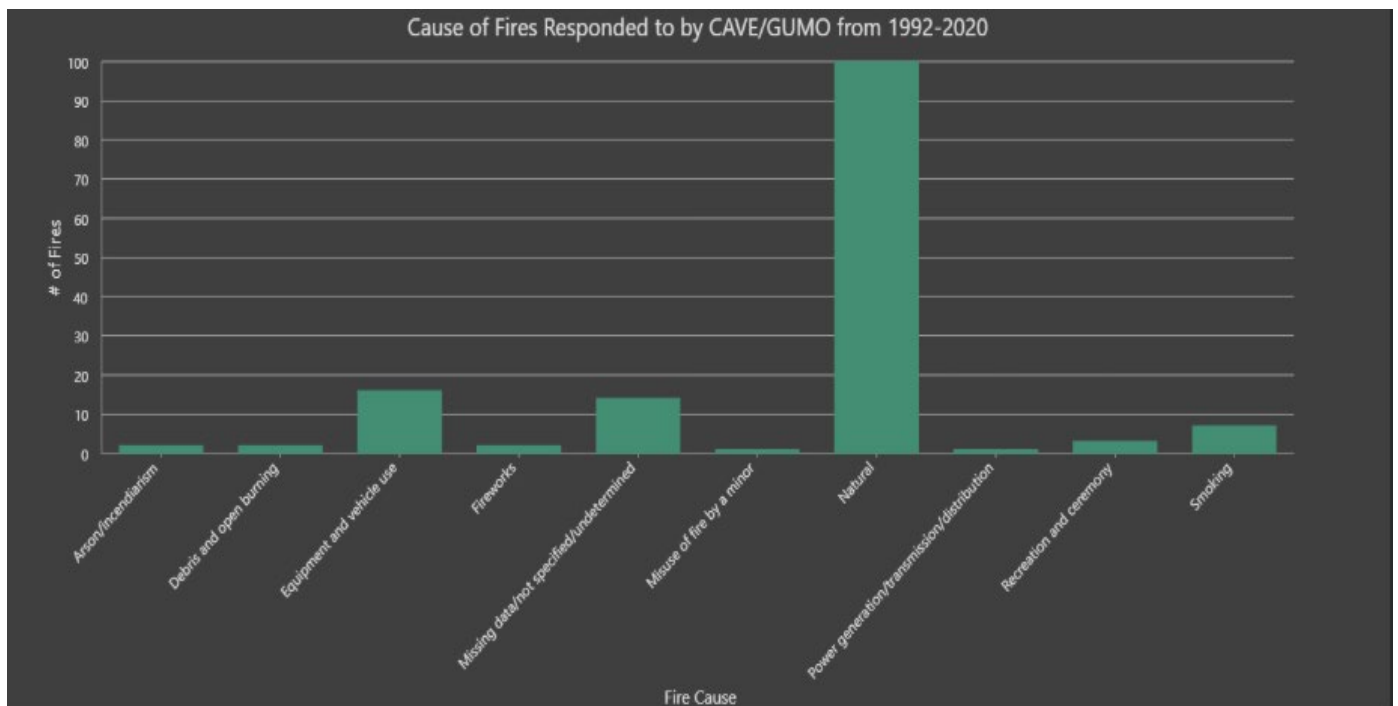


Figure E-9. Lightning caused the majority of fires at CAVE and GUMO. Of fires caused by humans, Equipment and vehicle use, missing data/not specified/undetermined, and smoking contributed the most fires.

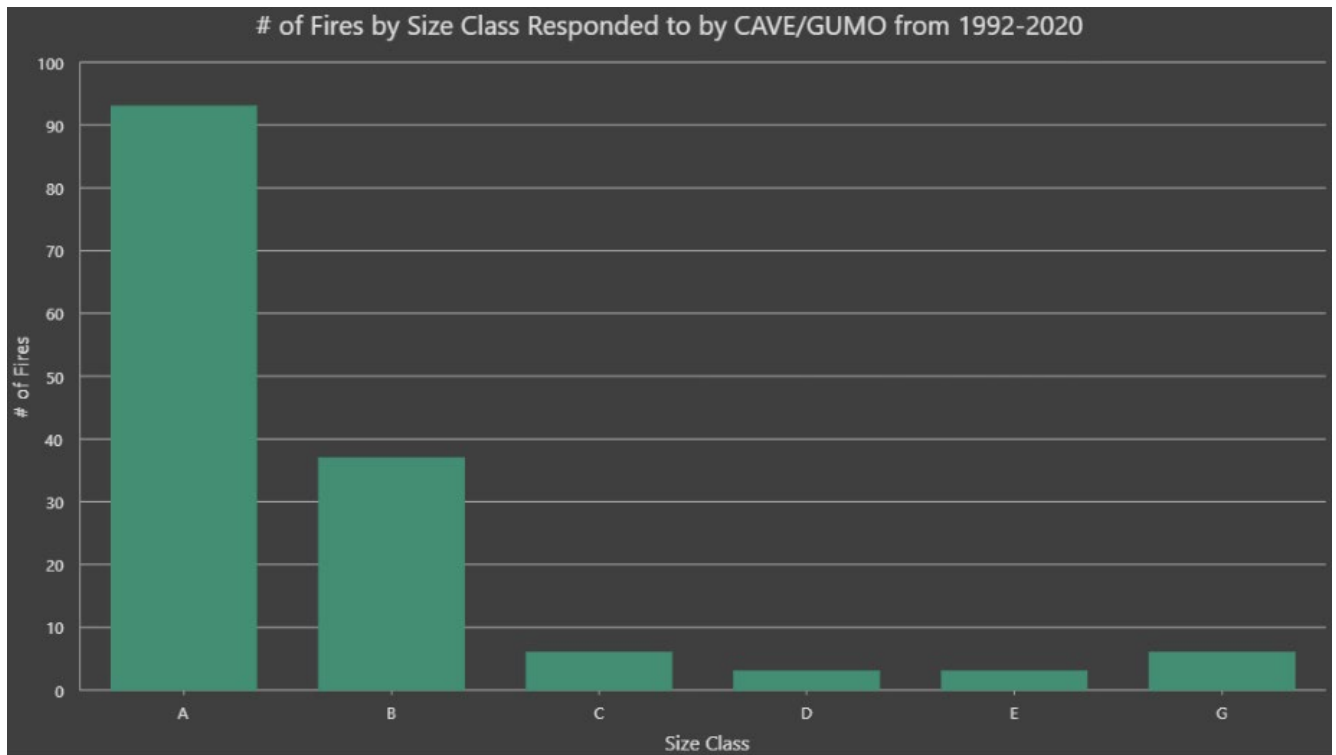


Figure E-10. Size class A was the largest size class of fires responded to by fire personnel at CAVE and GUMO.

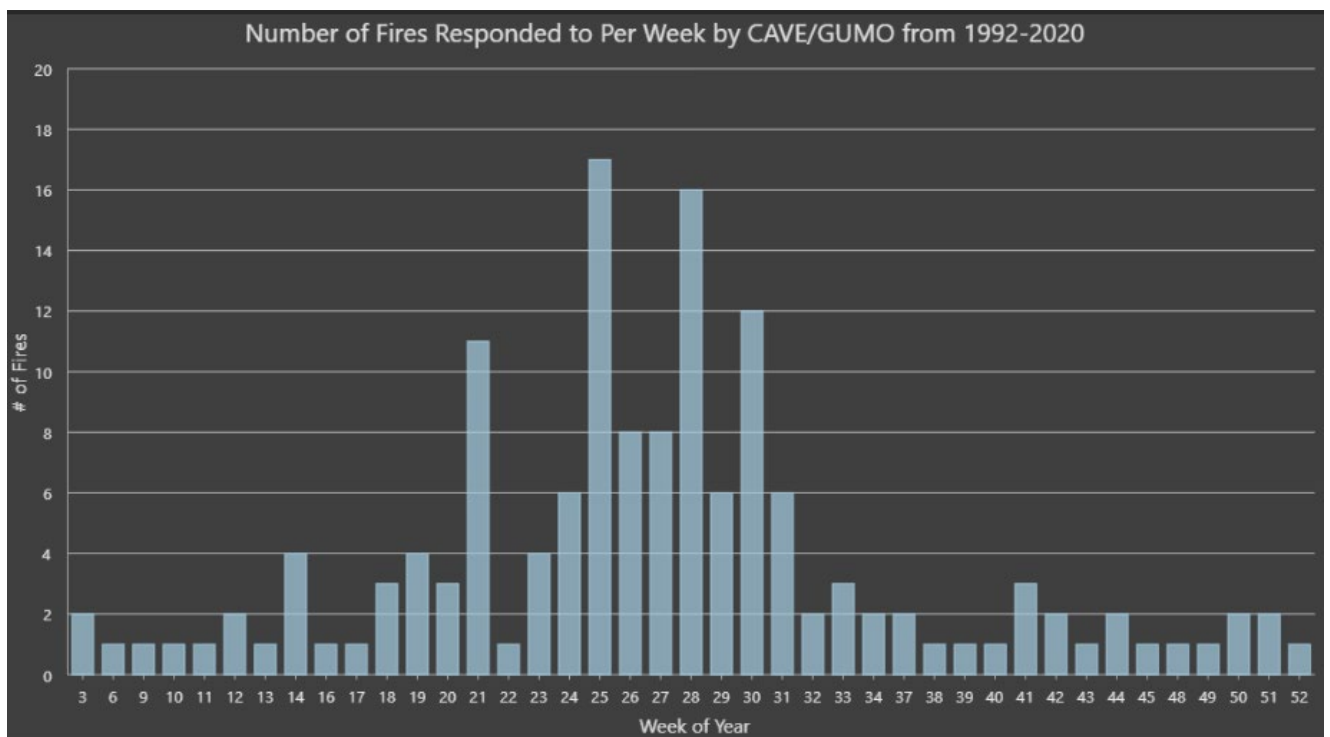


Figure E-11. Weeks of the year with the largest number of fires responded to be fire personnel at CAVE/GUMO include weeks 21 (May 18-24), 25 (June 15-21), 28 (July 6-12) and 30 (July 20-26).

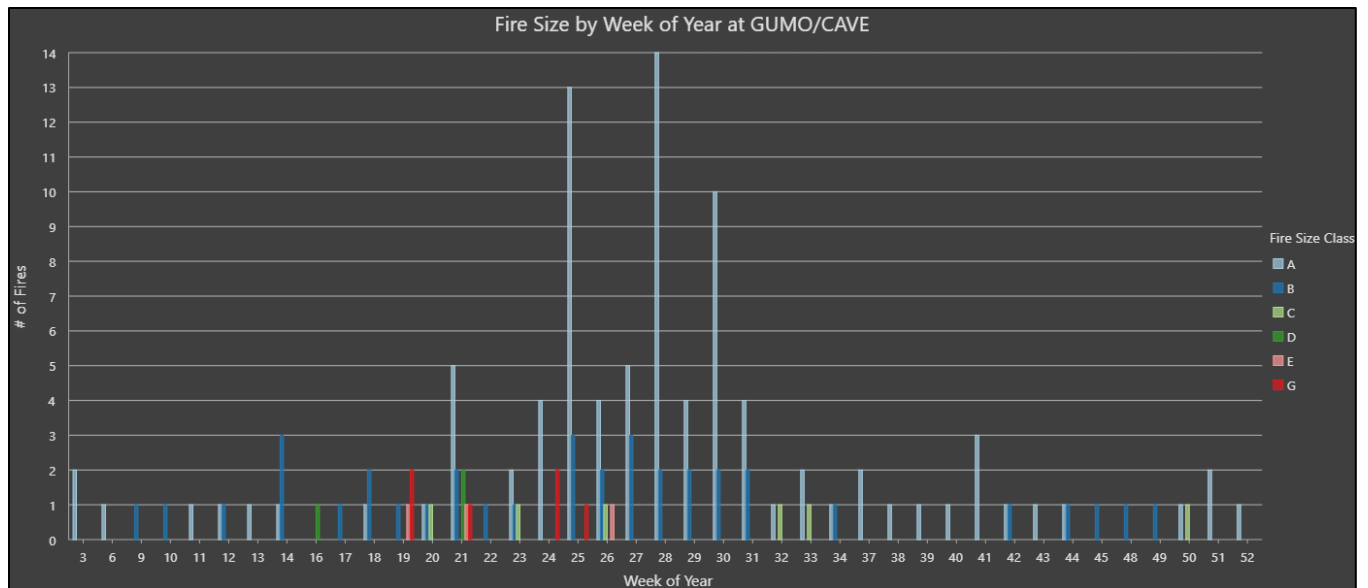


Figure E-12. Weeks of the year with the largest sized fires responded to by fire personnel at CAVE and GUMO are weeks 19-26 (May 5-June 29).

CHIC

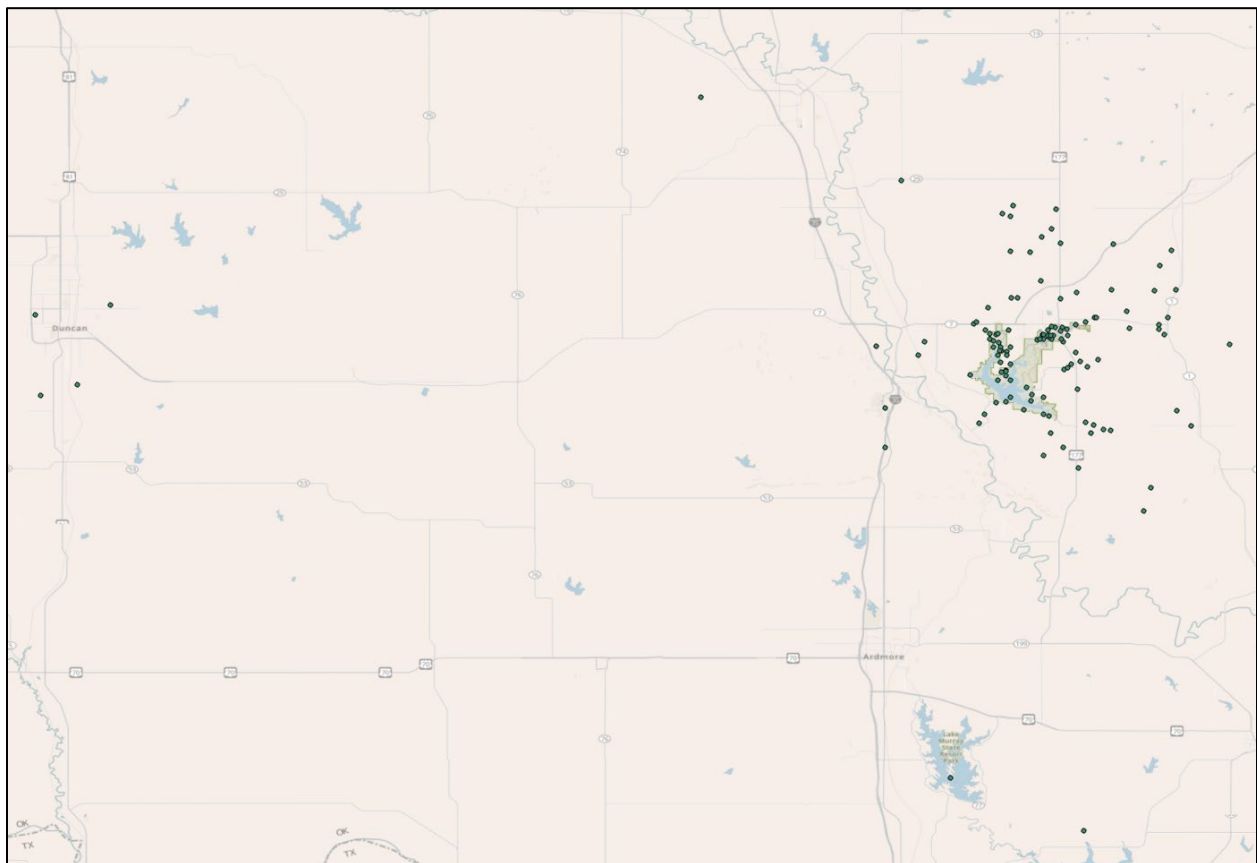


Figure E-13. Wildfire locations at CHIC from 1992-2020.

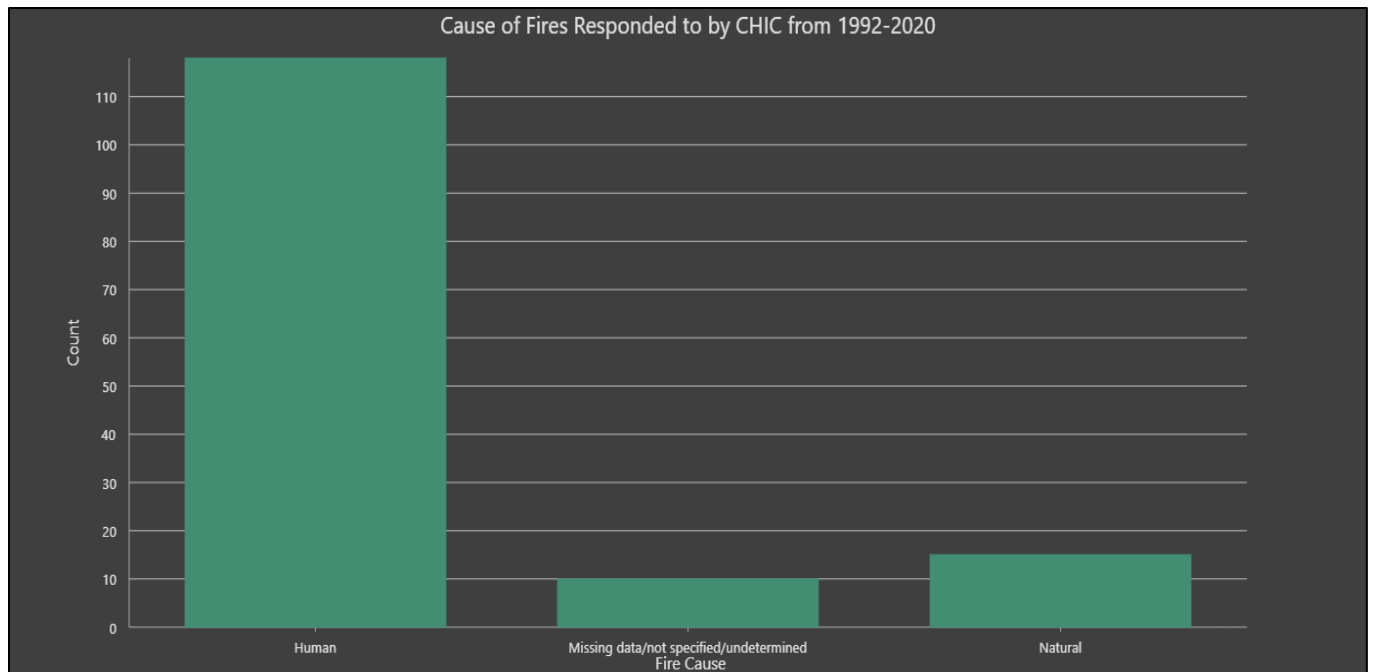


Figure E-14. The majority of wildfires responded to by fire personnel at CHIC are caused by humans.

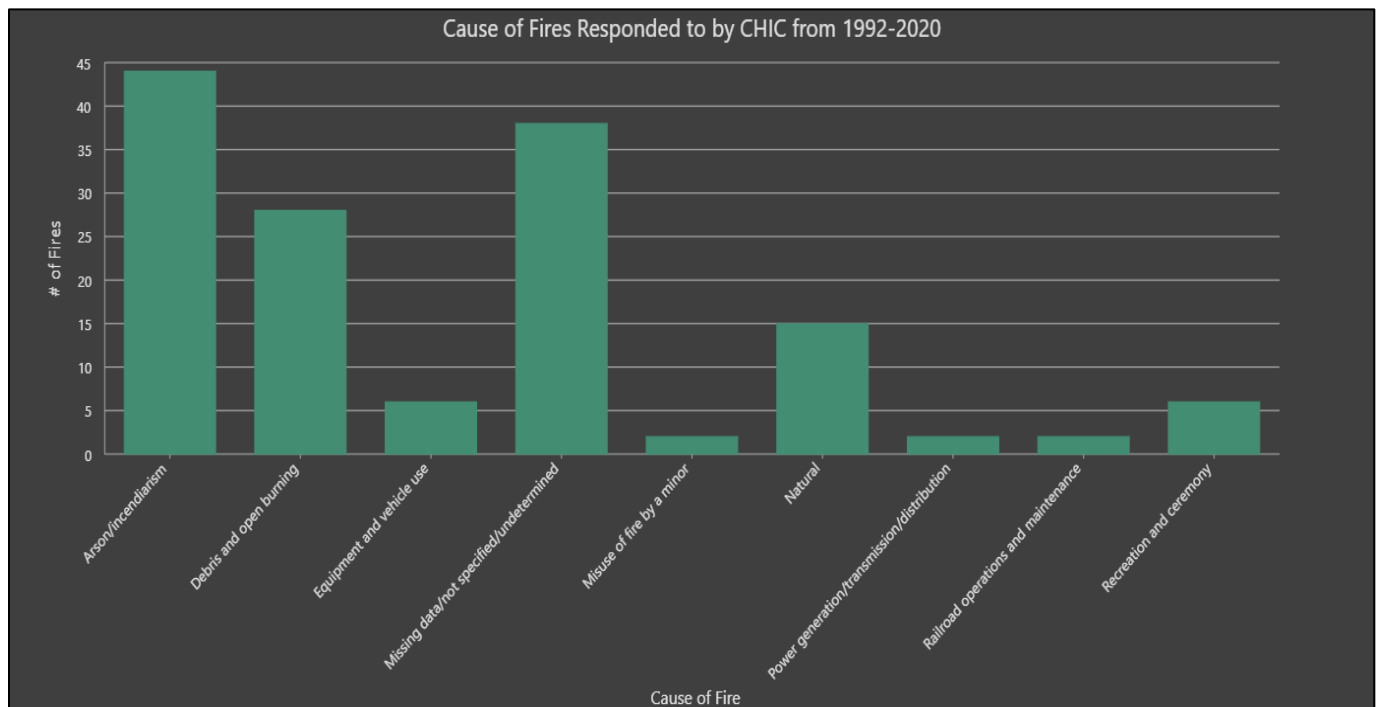


Figure E-15. Arson/incendiarism caused the most fires responded to by fire personnel at CHIC followed by Missing data/not specified/undetermined, Debris and open burning and lightning.

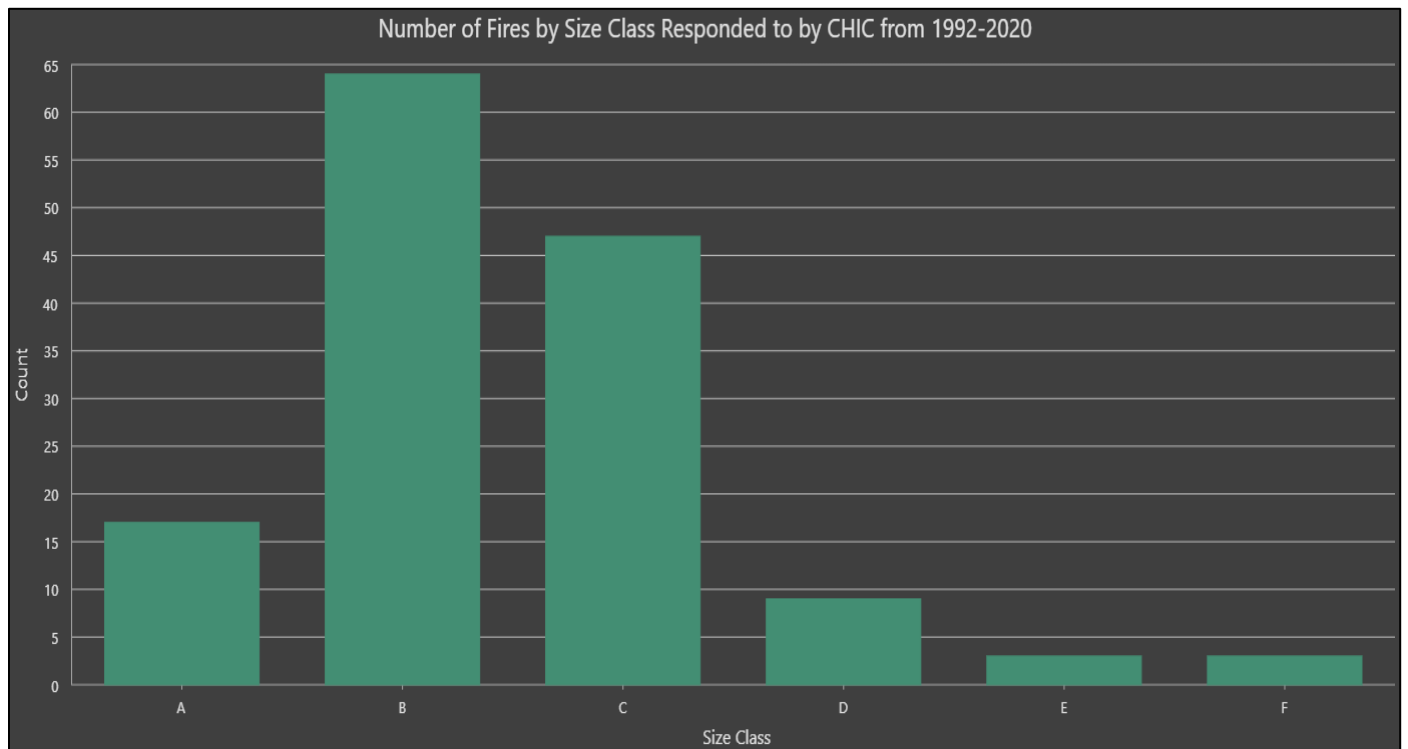


Figure E-16. Fire size class B was the largest class of fires responded to by fire personnel at CHIC followed by size class C, A, D, F and E.

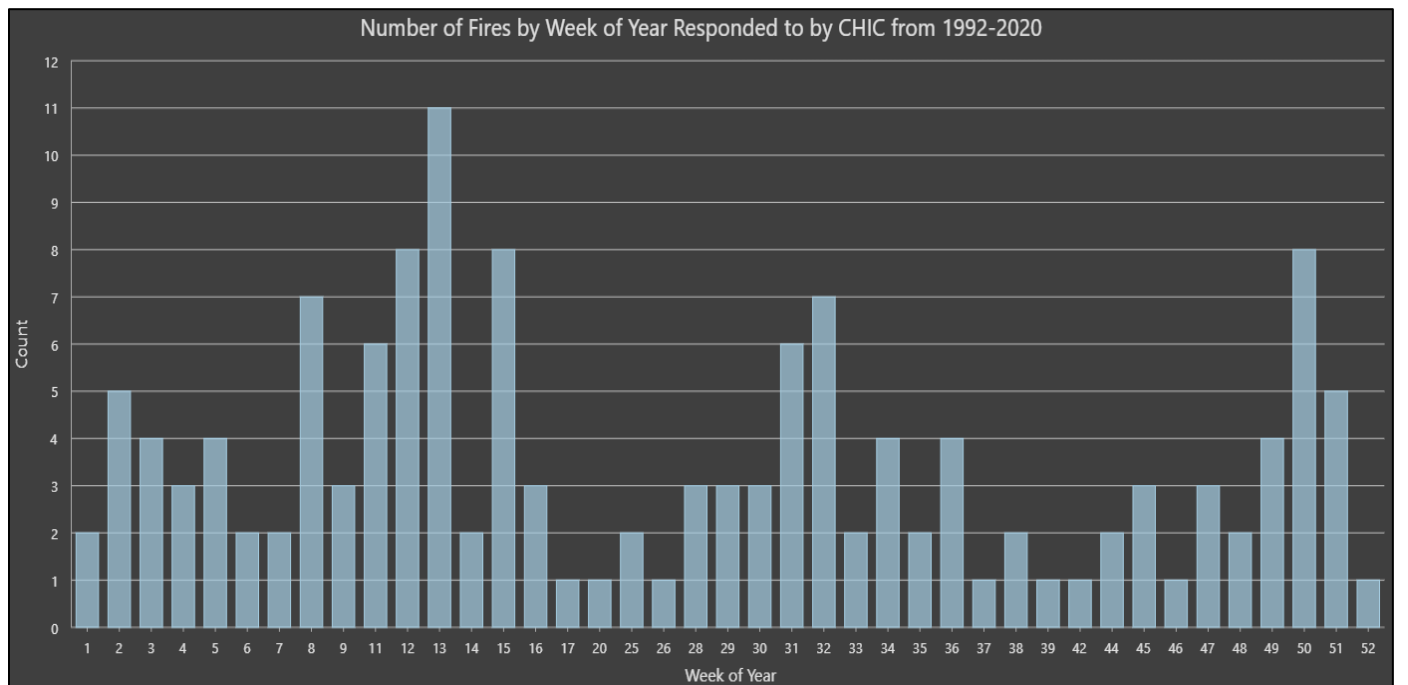


Figure E-17. Weeks of the year with the largest number of fires responded to by fire personnel at CHIC include weeks 11-13 (Feb. 11-March 30), week 15 (April 7-13), weeks 31-32 (July 28-Aug. 10) and week 50 (Dec. 8-14).

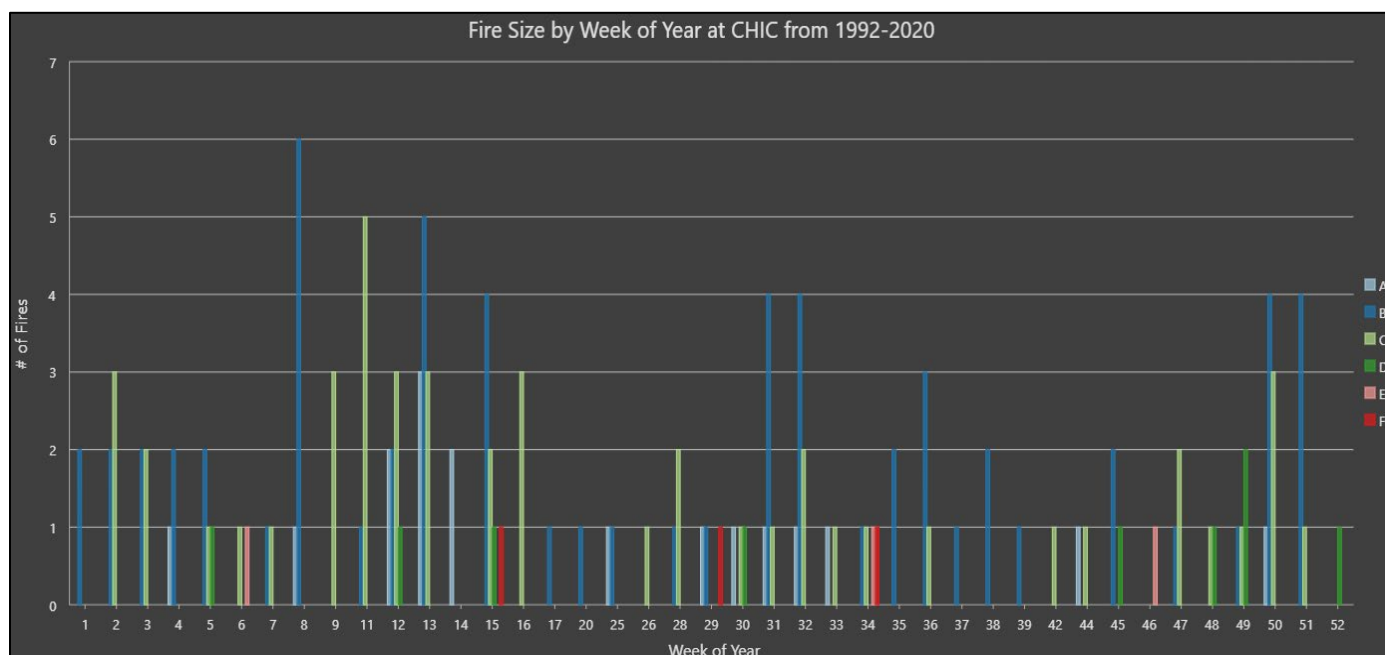


Figure E-18. Weeks of the year with the largest sized fires responded to by fire personnel at CHIC include weeks 6 (Feb 9-15), 15 (April 7-13), 29 (July 14-20), 34 (Aug. 18-24) and 46 (Nov. 10-16).

LAMR

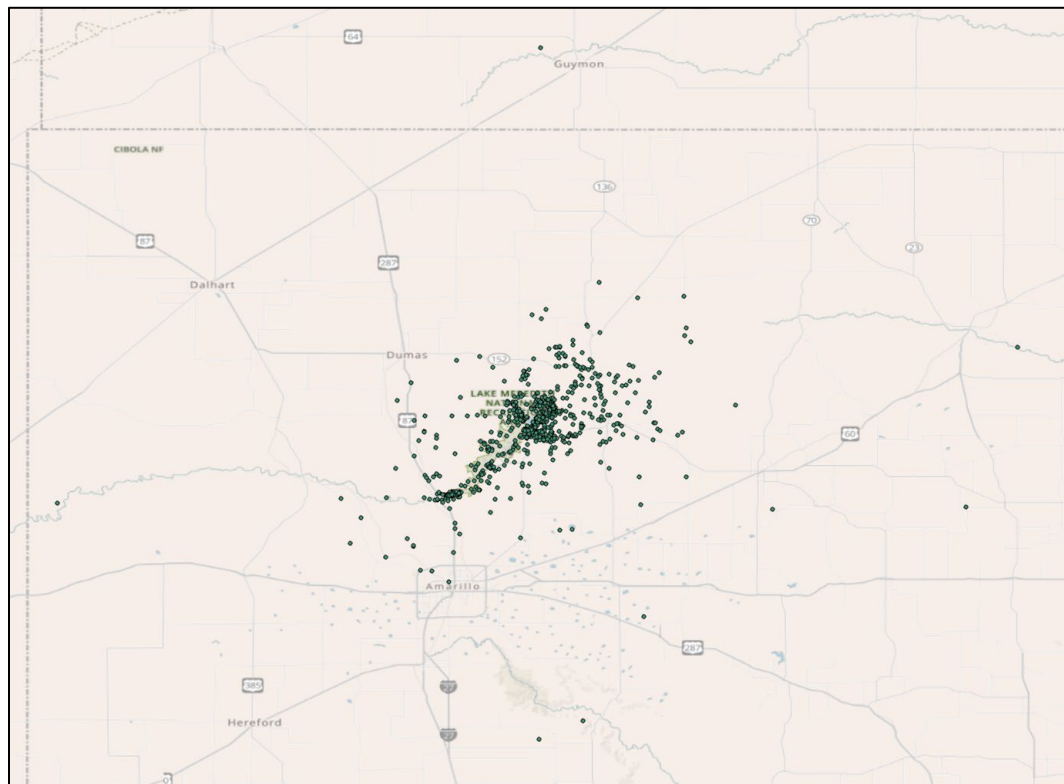


Figure E-19. Wildfire locations at LAMR from 1992-2020.

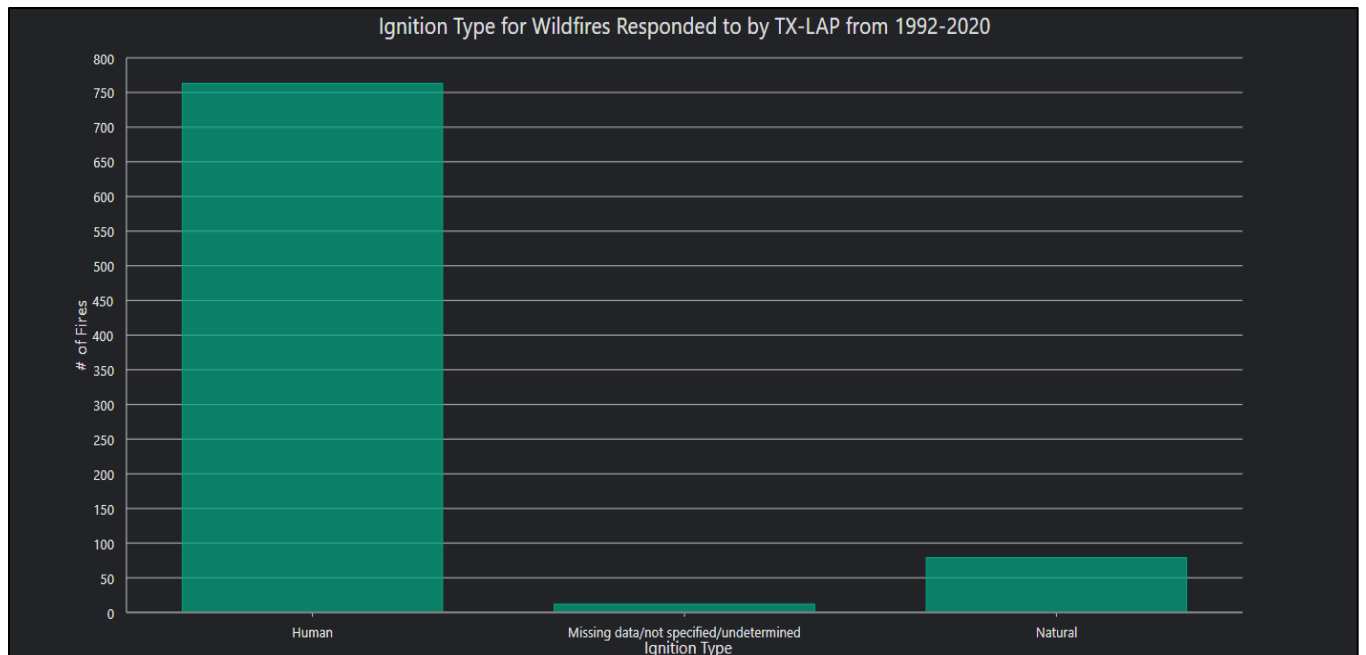


Figure E-20. The majority of wildfires responded to by fire personnel at LAMR were ignited by humans.

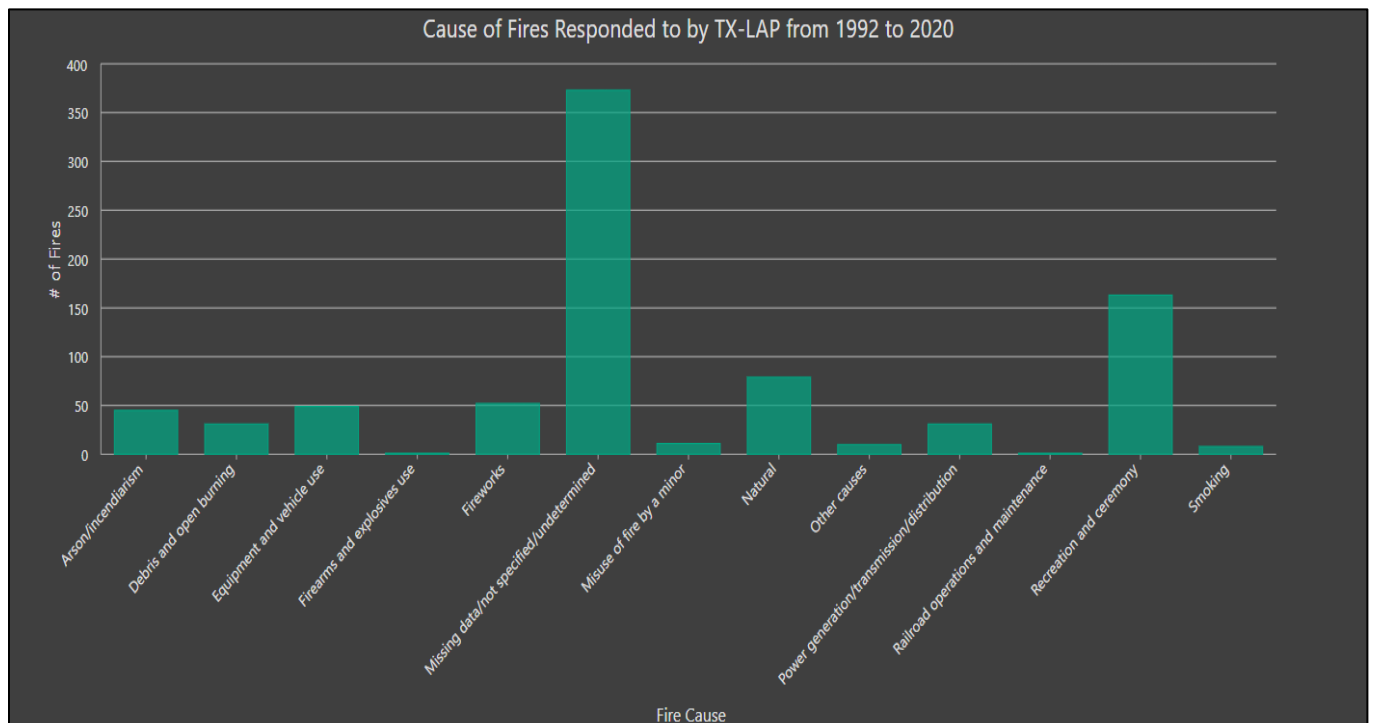


Figure E-21. The majority of fires responded to by fire personnel at LAMR were caused by Missing data/not specified/undetermined followed by Recreation and ceremony, Natural and Equipment and vehicle use.

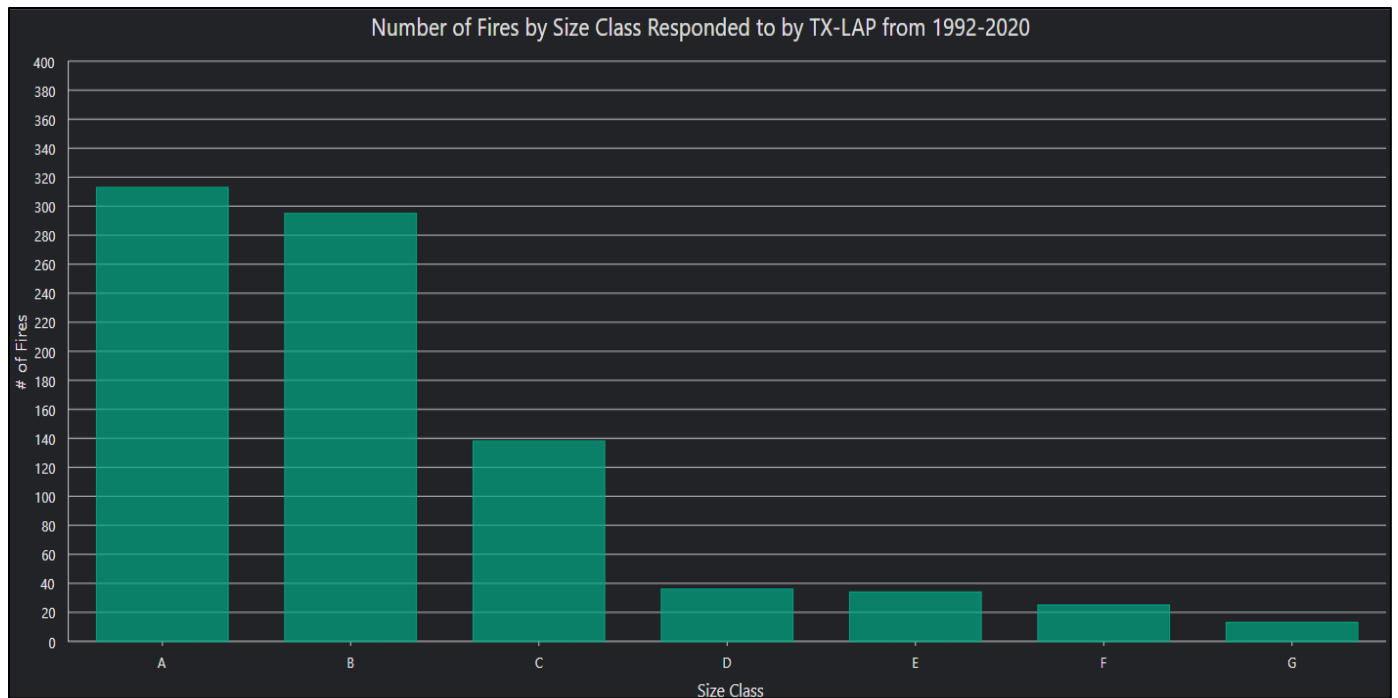


Figure E-22. Fire size class A had the most fires responded to by fire personnel at LAMR followed by size class B, C, D, E, F and G.

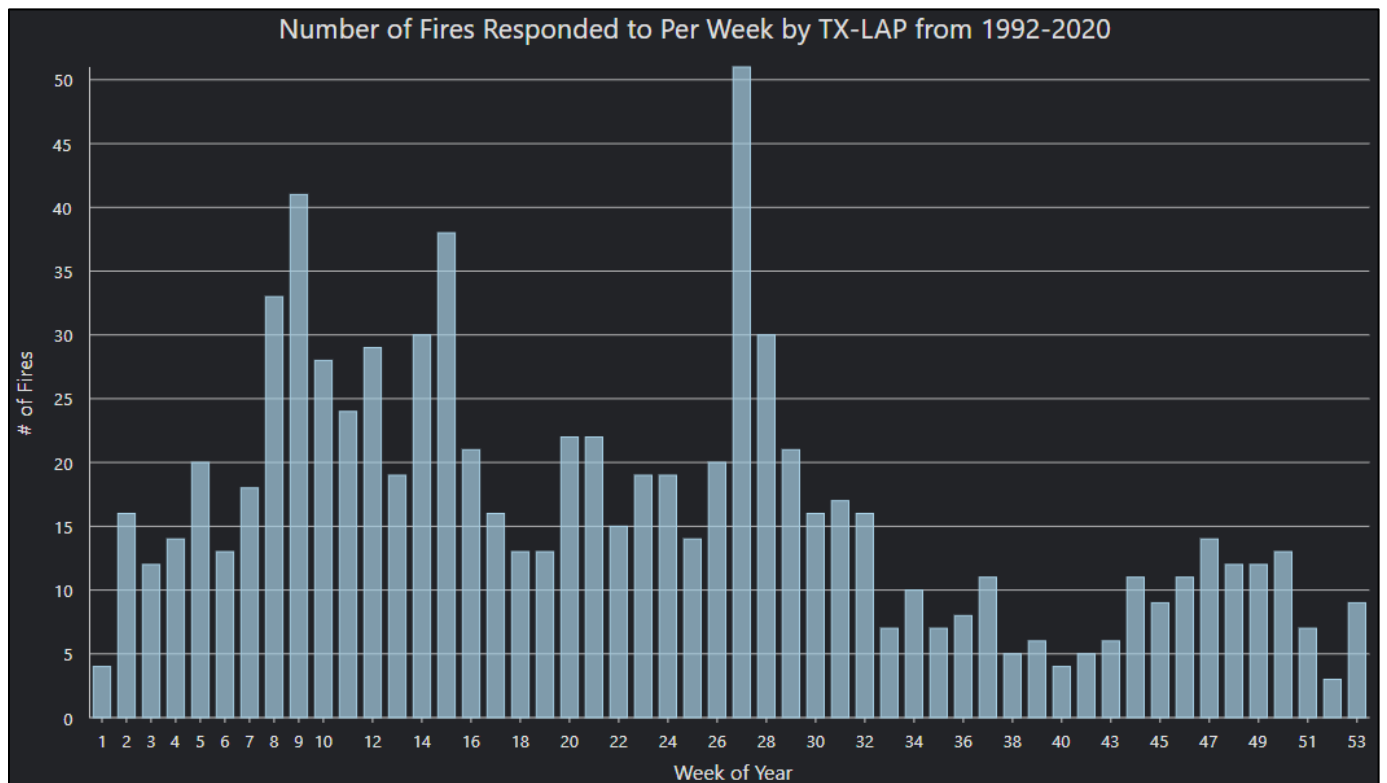


Figure E-23. Weeks of the year with the largest number of fires responded to by fire personnel at LAMR include weeks 8-15 (Feb. 19-April 12), weeks 20-21 (May 12-May 25) and weeks 27-28 (June 30-July 13).

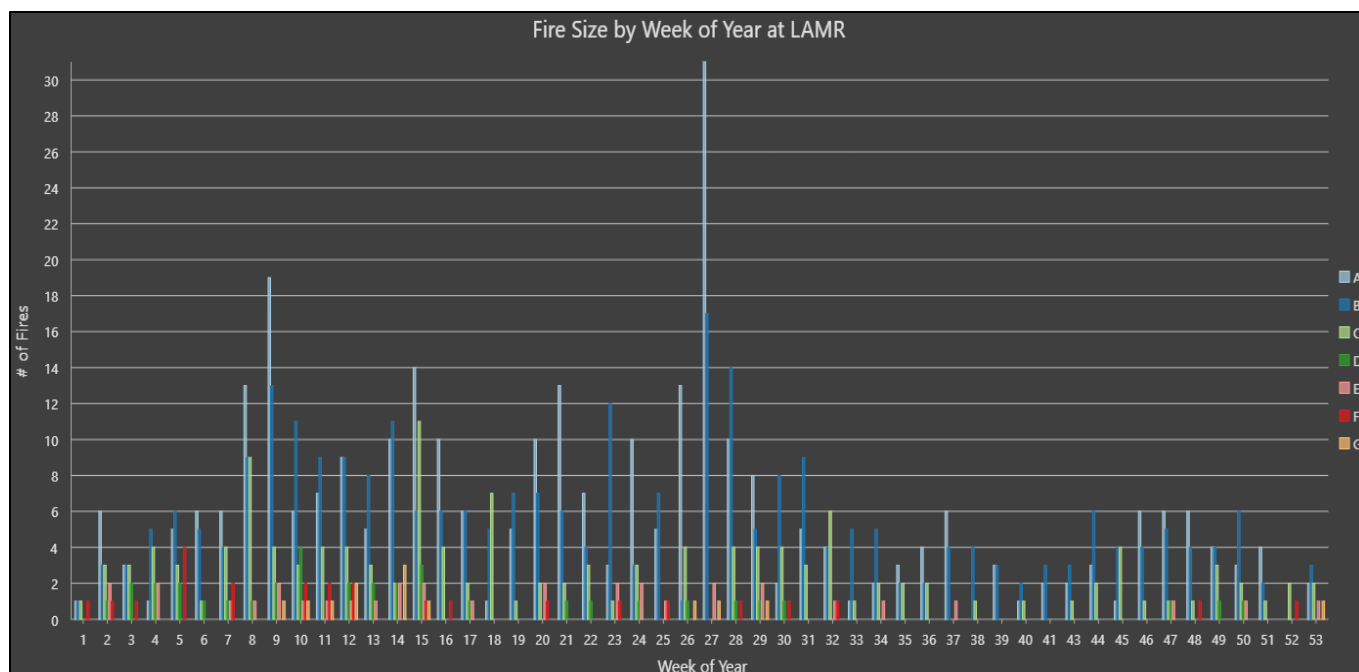


Figure E-24. Fires of all size classes occur almost year-round at LAMR. The largest fires occur weeks 7-15 (Feb. 8-April 10) and weeks 26-29 (June 15-July 4). There is a break in large fires from weeks 38-46 (Aug. 30-Oct. 24).