



Forest Service  
U.S. DEPARTMENT OF AGRICULTURE

Southwest, Region 3, Carson National Forest

February 2025

# Biennial Monitoring Evaluation Report for the Carson National Forest

Fiscal years 2022-2024



*Cover photo: Cabresto Lake on the Questa Ranger District. Photo of mountain lake and trees. Photo taken by Leeann Murphy.*

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## Why Monitoring Matters

There is no single correct approach to managing a forest or grassland. Each decision maker must weigh the ecological complexity of these ecosystems, the changing environmental conditions, the many different viewpoints of the public, and uncertainty about long-term consequences.

Data from monitoring can therefore be extremely useful. A robust, transparent, and meaningful monitoring program can provide information on specific resources, management impacts, and overall trends in condition – in other words, feedback on whether we are meeting our management objectives or not.

Each national forest or grassland has a land management plan or “forest or grassland plan” that balances tradeoffs among recreation, timber, water, wilderness, wildlife habitat, and other uses. The plan describes a set of desired conditions – a science-based vision for what forest or grassland conditions should be once the goals of the plan are met. The forest or grassland plan also includes a monitoring program, organized around a set of monitoring questions and indicators that are designed to track progress toward achieving the desired conditions in the plan.

Monitoring of certain resources is required by law, regulation, or directive (see box below for the required nine monitoring topics). Other monitoring occurs depending on specific needs of the national forest or grassland. Every 2 years, each forest or grassland compiles and evaluates the monitoring results and drafts a report like this one. Decision makers, such as forest and grassland supervisors, use these biennial monitoring evaluation reports (BMERs) to update their knowledge and assess progress toward the desired conditions in the forest or grassland plan. The public use these BMERs to understand what’s happening on the land that they depend upon and enjoy.



Figure 1. Adaptive Management Cycle

If the report reveals that we are not quite meeting the mark, then there’s a need to change management in some way; this is adaptively managing. Monitoring data allows us to learn through management and adjust our

strategies based on what we learned. Monitoring also helps us be accountable and transparent to interested and affected parties and colleagues.

**Forest Service monitoring programs include questions and indicators that address eight topics.**

1. Status of select watershed conditions.
2. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
3. Status of focal species to assess the ecological conditions.
4. Status of a select set of the ecological conditions 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. 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 might be affecting the plan area.
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
8. Effects of each management system to determine that they do not substantially and permanently impair the productivity of the land.

Because monitoring can be expensive, time-consuming, and labor-intensive, we rely on the help of our partners and work collaboratively with them to accomplish monitoring objectives. We also rely on existing data sources such as national and regional inventory, monitoring, and research programs; federal, state, or local government agencies; scientists, partners, and members of the public; and information from Tribal communities and Alaska Native Corporations.

BMERs, like this one, are critical to adaptive management because they tell us and the public whether the land management plan is working. We don't make any decisions in BMERs; instead, we simply document and share monitoring results.

## Partnerships and Data Sources

To accomplish our mission, the Forest Service partners with land management agencies across all levels of government, with nonprofit and for-profit entities, universities, and communities large and small. The diversity of our partners parallels the breadth of Forest Service work that includes: managing the nation's 193 million acres of National Forest System lands to sustain healthy terrestrial and aquatic ecosystems; conducting collaborative research that connects the agency to hundreds of partners around the world; supporting States, Tribes, communities, and nonindustrial private landowners through technical and financial assistance; protecting communities and the global environment from catastrophic wildland fires, climate change and invasive species; and inspiring life-long connections to nature for every American. Monitoring can be expensive, time-consuming, and labor-intensive, so we rely on the help of volunteers and our partners and work collaboratively with them to accomplish monitoring objectives. We also rely on existing data sources such as national and regional inventory,

monitoring, and research programs; Federal, State, or local government agencies; scientists, partners, and members of the public; and information from Tribal communities and Alaska Native Corporations.

## Report Summary

This 2024 biennial monitoring evaluation report for the Carson National Forest documents monitoring activities that occurred during fiscal years 2022 through 2024. After the completion of the Land Management Plan, the Forest developed a Strategic Plan that outlined the priorities of work for the next three to five years, focusing on specific themes tied to the Land Management Plan. These themes include Provide Clean and Abundant Water, Restore Fire and Ecological Resiliency to our Forest Landscapes, Provide Sustainable Recreation, Connect People to Land and their Heritage through Building on a Strong Foundation and Rooted in Forest Service Values. Along with the Strategic Plan, National priorities such as Great American Outdoor Act (GAOA) and the Wildfire Crisis Strategy, and disaster response to the Hermits Peak Calf Canyon Fire occurred, focusing the Forest’s work on forest restoration and fuels reduction work. This focus has lent to some of the information provided in this report for indicators that tie to objectives in the Land Management Plan. While the Forest will continue to work toward all the objectives in the Land Management Plan, shifting priorities and changes in work force capacity may impact the results shown in this report.

Resource specialists answered 18 of the 49 monitoring questions to determine if current activities and monitoring described in Chapter 4 (the monitoring program) of our forest plan are moving the forest toward or maintaining the desired conditions or objectives. Using data collected, specialists identified where more data were needed and recommended changes to our forest plan, monitoring plan, or management activities or if a new assessment is needed.

If monitoring questions are not answered in this report, it is either the available data was unclear, or they do not indicate a statistically significant trend. This might be because data for some resources is collected on 5-year or other cycles or there was insufficient data, at this time. We will address the status of these monitoring questions in the next monitoring report. Some monitoring questions need to be answered every 3-years, 5-years, 10-years or as needed, and were not yet answered after the first two years of this forest plan, and some will be addressed in the next monitoring report.

Of the 18 monitoring questions reviewed, we are meeting both plan objectives and progress towards our desired conditions in 14 monitoring questions. Four of the monitoring questions are uncertain in whether we are meeting Forest Plan direction because data was not gathered, or trends could not be assessed at this time. Overall, the majority of indicators are showing moving toward meeting plan direction or are meeting plan direction. The indicators where there may be a trend toward not meeting plan direction may be a result of Forest priorities, funding, or capacity to work on the objectives the indicator is measuring.

Table 2 is a snapshot of the recommended changes.

This report includes monitoring indicator status summary tables. The tables represent the current condition, level or value of the indicator, and the recent trend. The trend is the trajectory of the data over time. The results contained in the report are too early to draw conclusions and subsequent reports should provide insight on trends. The target can be a limit, threshold, or a range, but usually it is a range. If applicable the measure of if the target is related to the objectives defined in the Forest Plan. For more information on the selected plan components for each monitoring question and indicator, see the Chapter 4 of the [Land Management Plan](#). The key for the results column is displayed below. Green is good, yellow is marginal, red needs attention, and grayed



out means there is not enough data to determine the current status or trend. The first symbol represents the current status, and the second symbol represents the recent trend.

**Table 1 Monitoring Indicator Status Summary Results Key**

Result	Description
++	Green is good. Current status is within target; recent trend is towards target.
+-	Yellow is marginal. Current status is within target; recent trend is away from target.
-+	Yellow is marginal. Current status is outside target; recent trend is towards target.
--	Red needs attention. Current status is outside target; recent trend is away from target.
	Grayed out means there is not enough data to determine the current status or trend.

Table 2 summarizes the results of evaluating the monitoring questions covered in this report. The table provides the overall totals for how many monitoring questions are meeting the Forest Plan direction, or whether changes to the Forest Plan, management activities, monitoring plan, or new assessment should be considered to help us move toward the direction outlined in the Forest Plan. See a summary of the results and recommendations table at the end of this report for a more detailed summary of the monitoring questions, results, and recommendations.

**Table 2. Summary of recommendations for all 21 monitoring questions**

Recommendation Factors	Need For Change	Uncertain	No Need for Change
Forest plan direction met	0	4	14
Change to forest plan recommended	0	0	0
Change to management activities recommended	0	0	0
Change to plan monitoring program recommended	0	0	0
Assessment recommended	0	0	0

The detailed resource reports that were used to build this monitoring report are available in the project record upon request. For a complete listing of monitoring elements, including method of data collection, monitoring frequency, and reporting interval for each, see Appendix D in the forest plan. This BMER and previous monitoring reports are available at: <https://www.fs.usda.gov/main/carson/landmanagement/planning>.

## Forest Supervisor's Certification

This report documents the results of monitoring activities that occurred through fiscal year 2024 on the Carson National Forest. Monitoring on some topics is long-term, and evaluation of those data will occur later in time.

I have evaluated the monitoring and evaluation results presented in this report. The monitoring data is limited to the first two years after the approval of the Forest Plan and therefore it is too soon to draw any conclusions resulting in changes to the 2022 Land Management Plan. I therefore consider the 2022 Land Management Plan sufficient to continue to guide land and resource management of the Carson National Forest for the near future and plan a deeper examination of the recommended changes through engagement with resource specialists and the public.

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James D. Duran  
Forest Supervisor



## Status Of Select Watershed Conditions

Water from the Carson supports many uses throughout New Mexico, and further downstream (provisioning ecosystem services). Streams, springs, lakes, and other natural waters are centers of high biological diversity in arid landscapes, and their ecological health is important for forest ecosystem sustainability. The Carson is a vital source of groundwater recharge (regulating ecosystem service). It sits above three state-declared groundwater basins – the Canadian, Rio Grande, and San Juan.

Watershed condition is integral to all aspects of resource management and use. Good watershed management maintains the productive capacity of soils; protects water quality and quantity; sustains native species; provides State designated water uses; and reduces threat of flood damage to Forest Service infrastructure and downstream values (supporting, provisioning, and regulating ecosystem services).

Carson intersects 131 6th level hydrologic unit code watersheds. The 2015 Assessment shared that the percentage of watersheds Functioning Properly is 13%, Functioning at Risk 87% and Impaired Function <1% (see Figure 2). Plan direction is aimed at supporting watersheds that are functioning properly, resilient to disturbance, support multiple uses, and have high water quality.

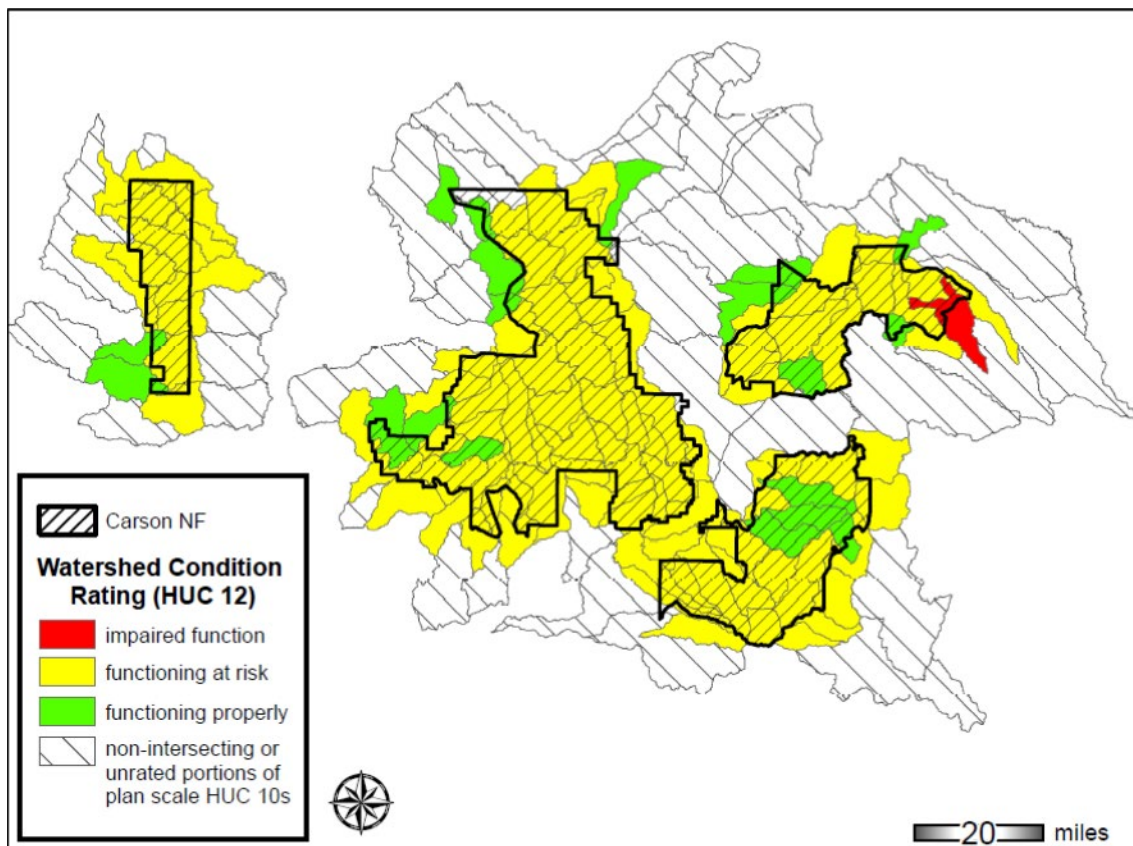


Figure 2 2015 Watershed Condition Classification, Carson National Forest

## Monitoring Questions and Key Results

Questions below are being analyzed in this monitoring report. These are included because their indicators are

monitored annually. Additional questions noted in the Forest Monitoring Program are not included because their indicators are monitored at different time intervals (not annually).

**MQ1: Are watersheds functioning properly? Are “impaired” or “functioning-at-risk” watersheds moving towards desired conditions?**

**Table 3 Monitoring Question 1 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Uncertain
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Since the new forest plan was signed, 17,076 acres have been treated to improve watershed condition and address threats. While we have been implementing watershed condition restoration activities, no watersheds have yet been moved to an improved condition class under the new forest plan. Three watersheds were impacted by wildfires of sufficient size and severity to warrant reclassification since the initial classification in 2011, but that has not yet been completed. The percentage of watersheds Functioning Properly remains 13%, Functioning at Risk 87% and Impaired Function <1%.

Over the last two years no road decommissioning occurred within riparian areas.

**Table 4 Monitoring Question 1 Indicator Status Summary**

Indicator	Result
Percentage of watersheds in proper functioning condition.	
Number of acres treated to improve watershed condition.	+ -
Miles of road decommissioning.	

**MQ2: To what extent are forest management activities improving ecological condition for Aquatic At-Risk Species and provide habitat connectivity?**

**Table 5 Monitoring Question 2 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Project specific work occurred within the Rio Costilla and Bitter Creek watersheds, with 4.8 miles of stream channels repaired and restored. Nonnative invasive species removal occurred along 34.81 miles of stream; focusing on removal of nonnative brook, rainbow, and brown trout to restore the Comanche, Rio Costilla, and Placer streams to native Rio Grande Cutthroat trout, chub, and sucker. This also includes invasive weed removal along riparian streams of McCrystal and Rito de la Olla. While this work is project specific, returning native species and addressing incised and head cut streams does led to overall watershed benefits.

Over the last two years the Forest was focused on maintaining native fish habitat and maintaining fish barriers are a key part to managing those species. No fish barriers were removed, but in the future, there are many that have been identified for removal. This is the same for culverts.

**Table 6 Monitoring Question 2 Indicator Status Summary**

Indicator	Result
Number of fish passage barriers removed or created.	- -
Number of roads decommissioned within the riparian management zone.	- -
Number of culverts removed or upgraded.	+ -
Number of activities with stream miles of habitat improvements.	- +
Stream miles treated for nonnative invasive species.	- +

## Summary of Key Results

The Forest is working toward improving watershed conditions through fuels reduction projects, watershed improvement projects, and a focus on native fish species restoration efforts. While the work conducted over the last two years hasn't resulted in larger changes to the percentage of watersheds in proper functioning condition, the work has resulted in improvements in at the smaller scale. Native fish species restoration was a priority for the Forest the last several years, prior to the revised forest plan. Work the last two years has focused more on forest health and restoration and fuels reduction at the larger-scale, while watershed restoration has occurred at the smaller, project-specific scale. The Forest's Strategic Plan does outline priorities for watershed work, and it is expected that there will be an increase in meeting the objectives in the Forest plan over the next several years.

## Status Of Select Ecological Conditions for Terrestrial and Aquatic Systems

Monitoring a select set of important ecological conditions required by a select set of species at risk, along with monitoring for ecosystems and watershed conditions, provides information about the effectiveness of the ecosystem and species-specific plan components related to the ecological conditions monitored.

The 2022 Forest Plan direction for ecosystems support the return of natural disturbance processes (fire) that maintain or restore appropriate vegetation and structure, thereby improving wildlife habitat and reducing uncharacteristic wildland fire. The Forest Plan emphasizes returning vegetation to reference conditions in frequent fire adapted forested and non-forested types using silvicultural treatments (average 15,000 acres annually) and fire (prescribed and natural, average 32,500 acres annually) to protect life and property, as well as cultural and ecological resources.

### Monitoring Questions and Key Results

Questions below are being analyzed in this monitoring report. These are included because their indicators are monitored annually. Additional questions noted in the Forest Monitoring Program are not included because their indicators are monitored at different time intervals (not annually), as indicated with the question.

**MQ3: What is the condition and trend of key characteristics of vegetation? Are management actions moving fire regimes toward desired conditions?**

Table 7 Monitoring Question 3 Recommendation Summary

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

While insect and disease outbreaks are a natural occurrence within many vegetation types on the Forest, a recent Douglas fir Tussock moth outbreak has impacted approximately 3,000 acres on the East Zone, mainly Douglas and white fir vegetation types. This outbreak is occurring within the Enchanted Circle Wildfire Crisis Strategy Landscape and in areas where current fuels reduction and forest restoration work is occurring. The Forest will be addressing this issue, and any new outbreaks, in the coming years. These outbreaks may lead to an increase in affected areas and has the potential to trend away from desired conditions in the short-term.

**Table 8 Monitoring Question 3 Indicator Status Summary**

Indicator	Result
Acres and location of insect and disease infestations and tree mortality	+ -

**MQ 4: Are management activities moving terrestrial habitat toward desired conditions?****Table 9 Monitoring Question 4 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Management activities are moving toward desired conditions for terrestrial habitats, including water features. 26 water features were maintained, improved, or restored and 28,827 acres of terrestrial habitat was restored or enhanced. These projects include site-specific work on water features (mainly guzzlers or water drinkers) and habitat enhancement is included in forest restoration projects. Terrestrial habitat restored or enhanced will be increasing over the next few years with forest restoration work increasing across the Forest.

**Table 10 Monitoring Question 4 Indicator Status Summary**

Indicator	Result
Number of water features maintained, improved, or installed	++
Acres of terrestrial habitat restored or enhanced	- +

**MQ5: What is the condition and trend of key ecosystem components for riparian vegetation in the plan area? Are management actions maintaining or moving riparian vegetation toward desired conditions?****Table 11 Monitoring Question 5 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Riparian vegetation is being maintained and moving toward desired conditions. 83 acres of impaired riparian areas and 75 miles of streams have been restored; 34.81 stream miles have been treated for nonnative invasive species. These management activities have occurred in the Valle Vidal Management Area and in some other locations on the West Zone of the Forest.

**Table 12 Monitoring Question 5 Indicator Status Summary**

Indicator	Result
Acres of impaired riparian habitat restored	- +
Stream miles treated for nonnative invasive species	- +

**MQ6: Is aquatic habitat distributed, connected, and in a condition capable of supporting native aquatic species? Are management actions making progress toward desired conditions for native aquatic species?**

**Table 13 Monitoring Question 6 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Management actions to move aquatic toward desired conditions and habitat distribution and connectivity are being achieved, but there is some monitoring data that was not collected during the last two years. 39.8 miles of aquatic habitat restoration activities were implemented, but the amount of large woody debris in streams was not monitored and no barriers were removed. Turbidity and temperature exceedance was also not monitored in 303d listed streams.

**Table 14 Monitoring Question 6 Indicator Status Summary**

Indicator	Result
Miles of aquatic habitat restored	- +
Number of beneficial barriers created/number of barriers removed to reduce undesired fragmentation	- +
Amount of large woody debris in streams	
303d turbidity exceedance	
303d temperature exceedance	

**MQ7: What is the status and trend of invasive plant species in the plan area?**

**Table 15 Monitoring Question 7 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

738 acres were inventoried for nonnative invasive species and 211 acres of invasive nonnative plant species were removed, but inventories of potential new locations of invasive nonnative plant species did not occur.

**Table 16 Monitoring Question 7 Indicator Status Summary**

Indicator	Result
Acres of nonnative invasive species inventoried	+ +
Acres of nonnative invasive species treated	- +

**MQ8: Is air quality meeting defined standards in the plan area? Are air quality related values being impacted in Wilderness Areas and other areas of the Forest?****Table 17 Monitoring Question 8 Recommendation Summary**

<b>Recommendation</b>	<b>Response</b>
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Fine particulate matter (PM2.5) data from permanent air quality monitoring sites near Santa Fe and Taos show concentrations are well below both the annual and 24-hour standards established by the Environmental Protection Agency. Data from two permanent ozone monitoring sites at the Santa Fe Airport and Coyote Ranger Station (Santa Fe NF) show average annual 8-hour ozone concentrations well below national standards. The Wheeler Peak Wilderness is experiencing improvements in regional haze and is below the uniform rate of progress required to meet natural background conditions by 2064.

**Table 18 Monitoring Question 8 Indicator Status Summary**

<b>Indicator</b>	<b>Result</b>
Surface water acidification	++

**Summary of Key Results**

Progress toward ecological conditions for terrestrial and aquatic ecosystems has occurred over the last two years, focused more on the terrestrial ecosystems at a landscape scale. Forest restoration and fuels reduction have been the priority work across the Forest related to the Enchanted Circle Wildfire Crisis Strategy Landscape and Rio Chama Collaborative Forest Landscape Restoration Program (CFLRP). Aquatic ecosystem restoration has occurred at smaller, project-scales. Progress is being made on addressing non-native, invasive plant species, but more work is needed to address larger populations of these species. The Forest's Strategic Plan continues to prioritize work for forest restoration and fuels reduction projects and includes riparian projects as well. Further monitoring is needed to address indicators where no data was available for this report. There may also be a need to adjust the monitoring questions and indicators after two more years of monitoring to see if the Forest has chosen the best questions and indicators for measuring success for terrestrial and aquatic ecosystems.



## Status Of Focal Species

The Carson is an ecologically distinct landscape ranging from desert and grasslands to high-elevation forests. This environment supports rich biodiversity and provides ecological corridors for wildlife. Over 1,000 species of plants and animals occur on the Carson. Resource management practices outlined in the Land Management Plan for the Carson (Chapter 2) aim to either progress or maintain suitable habitat conditions for wildlife within associated vegetation communities. Consistent with the Carson monitoring program, we evaluate landscape quality by studying wildlife interactions with their habitats, monitoring focal species' behavior and patterns across time and space. Focal species are selected based on their affinity for specific habitat types, which may be vulnerable to reduced resource quality and the impacts of climate change. This approach provides valuable insights into ecological system conditions and the effects of management practices.

For example, Grace's Warbler is a focal species for both Ponderosa Pine Forest and Dry Mixed Conifer. It prefers open canopy characteristics and patches of mature trees. They use tall Ponderosa Pines for breeding and foraging, and nest in ponderosa trees averaging 15.1 meters tall. This species shows a small population decline for the state of New Mexico (Sauer et al. 2017), but surveys on the Carson indicate that it is readily present in the area.

The Hermit Thrush is another focal species for Wet Mixed Conifer. It is associated with old-growth, closed-canopy mixed-conifer forested habitats. They nest a few meters above ground in areas with abundant concealment (Dellinger et al. 2021). Hermit thrush abundance declined when substantial modifications were made to forest structure, including removal of interlocking canopies and large trees (Kalies et al. 2010), clearcutting (King and DeGraff 200; Simon et al. 2002), or a reduction in snags (Simon et al. 2002; Schwab et al. 2006). Migratory bird surveys on the Carson National Forest suggest this species is readily detected (Beason et al. 2006, 2007), although the population shows a small population decline for the state of New Mexico (Sauer et al. 2017).

## Monitoring Questions and Key Results

Questions below are being analyzed in this monitoring report. These are included because their indicators are monitored as necessary for project implementation.

### MQ9: What is the area of forest occupied by Grace's warbler?

Table 19 Monitoring Question 9 Recommendation Summary

Recommendation	Response
Forest Plan direction met	Uncertain
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Grace's warbler inhabits dry mixed conifer and ponderosa pine forests. There were two projects that were either ongoing or scheduled to occur in early FY25 within those habitat types. The Capulin Canyon Mayordomo Thinning is an ongoing project occurring on the Camino Real district on the east zone of the forest. American Creek Rx occurred in October 2024 on the Tres Piedras district on the west zone of the Forest. Monitoring efforts for this year were to establish a control plot to determine presence/absence of the species in the project area before management activities occurred (pre-implementation survey). A follow-up survey will be conducted after

management activities are complete to determine if the species is using the habitat after intervention (post-implementation survey). Post-implementation presence of the species may indicate that we are meeting desired conditions for the dry mixed conifer and ponderosa pine vegetation communities as outlined in the Carson National Forest Land Management Plan.

Two automated recording units (ARUs) were deployed within ponderosa pine stands of the project areas in June and July of 2024. Data has not yet been analyzed to confirm presence/absence.

**Table 20 Monitoring Question 9 Indicator Status Summary**

Indicator	Result
Proportion of surveyed habitat in which the species is detected	

#### **MQ10: What is the area of forest occupied by the hermit thrush?**

**Table 21 Monitoring Question 10 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Uncertain
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Hermit thrush inhabits wet mixed conifer forests. There were two projects that were either ongoing or scheduled to occur in early FY25 within that habitat type. The Capulin Canyon Mayordomo Thinning is an ongoing project occurring on the Camino Real district on the east zone of the forest. American Creek Rx occurred in October 2024 on the Tres Piedras district on the west zone of the Forest. Monitoring efforts for this year were to establish a control plot to determine presence/absence of the species in the project area before management activities occurred (pre-implementation survey). A follow-up survey will be conducted after management activities are complete to determine if the species is using the habitat after intervention (post-implementation survey). Post-implementation presence of the species may indicate that we are meeting desired conditions for the wet mixed conifer communities as outlined in the Carson National Forest Land Management Plan.

Two automated recording units (ARUs) were deployed within wet mixed conifer stands of the project areas in June and July of 2024. Data has not yet been analyzed to confirm presence/absence.

**Table 22 Monitoring Question 10 Indicator Status Summary**

Indicator	Result
Proportion of surveyed habitat in which the species is detected	

## **Summary of Key Results**

The Forest is implementing a few projects within focal species habitats, while the survey results are not yet available, the Forest will continue to survey for these species to determine ecological system conditions and the effects of management practices.

## **Status Of At-Risk Species**

Indicators for Status of At-Risk Species monitoring questions have a five-to-ten-year monitoring interval, therefore they will not be included in this report.

## Visitor Use, Satisfaction, And Progress On Recreation Objectives

As many as one million people visit the Carson annually. Most visit specifically for recreation. Hiking, walking, downhill skiing, snowboarding, and wildlife and scenery viewing are the primary recreation activities. The Carson is also one of New Mexico's premier destinations for year-round mountain biking, with trails like the South Boundary National Recreation Trail that attract riders from around the world. It has special trout waters for fishing and high-quality hunting units. Other important recreation activities include off-highway vehicle and motorcycle riding, cross-country skiing, snowmobiling, rock climbing, gathering of forest products, and camping. There is interest in a wide variety of trail-based recreation opportunities. As the population in New Mexico and the popularity of mountain biking and off-highway vehicle use continue to grow, the pressure for more trails will likely increase. Any new trail development needs to strike a balance between opportunities for different types of recreation and other resource concerns. The Forest has seen an increase in recreation activities on the Forest since the pandemic in 2020. Most monitoring results are for every five years, so information included in this report include conditions of roads and trails and maintenance of recreation sites.

The Carson National Forest will continue leveraging partnerships and volunteers for the planning, implementation, and maintenance of trails and work to increase collaboration on specific trail funding via grant proposals and volunteer participation.

### Monitoring Questions and Key Results

Questions below are being analyzed in this monitoring report. These are included because their indicators are monitored annually. Additional questions noted in the Forest Monitoring Program are not included because their indicators are monitored at different time intervals (not annually), as indicated with the question.

#### **MQ11: Are developed recreation sites being maintained to provide a satisfactory user experience?**

**Table 23 Monitoring Question 11 Recommendations Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

The Carson NF received GAOA funding over the past several years, allowing the Forest to focus deferred maintenance needs on some popular recreation sites on the West Zone of the Forest; Echo Amphitheater, El Rito Group Campsite, Canjilon Lakes, and Hopewell Lakes. Implementation is completed at Echo Amphitheater and the El Rito Group Campsite. Additional improvements have been the replacement of La Bobita Campground toilets and removal of toilets and Los Pinos campground (health and safety hazard). Overall, 35% of the developed recreation sites have been maintained to standard. The Forest spent \$130,600 on deferred maintenance for other recreation or administrative sites, this is 2% of the total amount of funding needed to maintain all the recreation and administrative sites on the Forest.

**Table 24 Monitoring Question 11 Indicator Status Summary**

Indicator	Result
Percent of sites maintained to standard	- +
Amount of deferred maintenance addressed annually	- +

**MQ12: Are system roads and trails located and maintained to prevent resource degradation and do they support designed uses? Are system roads and trails meeting the needs of visitors?**

**Table 25 Monitoring Question 12 Recommendations Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Trails maintained to standard was up from 99.7 miles in 2023 to 134.5 miles in 2024. The Adopt-A-Trail program, volunteers, and partnerships have increased the success in meeting out trails maintained to standard. The Forest is meeting the objective for maintaining at least 10 to 200 miles of trails annually.

With the help of agreements and contract work, road maintenance occurred on 337 miles of road in 2023. That number was down slightly in 2024 because contract work was not at the same level as 2023; 231 miles were maintained in 2024. New partnerships through agreements with the Bureau of Land Management will help increase that number. This work is associated mainly with the Enchanted Circle Wildfire Crisis Strategy Landscape, where road maintenance and improvements are needed for fuels reduction and forest restoration projects. Work is also occurring with the Rio Chama CFLRP project areas.

The Motor Vehicle Use Map (MVUM) received an update in 2024, which cleaned up data errors on the map to reflect the travel management decisions on the Forest. Signage however was not prioritized over the last two years due to funding and capacity issues. There is a focus to improve signage moving forward.

**Table 26 Monitoring Question 12 Indicator Status Summary**

Indicator	Result
Miles of roads and trails maintained	+ +
Miles of roads and trails accurately mapped and signed	- +

## Summary of Key Results

The Forest has been focusing on GAOA projects over the last several years. This funding has allowed the Forest to focus on developed recreation sites that have deferred maintenance and need upgrades to keep up with the demand of the public. While this focus has not allowed the Forest to achieve a higher percentage of sites with deferred maintenance across the Forest, it has allowed several, specific sites to be addressed. Through partnerships the miles of roads and trail maintained has been achieved and the Forest will continue to use partners to meet the Forest Plan objectives for trails maintained.

## Climate Change and Other Stressors

The implications of climate change for both society and natural resources are profound and complex, as are the challenges of integrating adaptation and mitigation responses (FEIS Vol. 1, p. 34). While the Carson is at lower risk of climate-related future change than some other national forests in the Southwestern Region, there are changes that are likely to occur and a high likelihood that communities around the forest will be negatively affected (FEIS Vol. 1, p. 34). Future climate change is likely to exacerbate the effects of natural and altered disturbance regimes, including wildfire, insect outbreaks, flooding, and erosion across all Carson vegetation communities and may prompt abrupt ecological changes (FEIS Vol. 1, p. 48). As climate change continues to bring warmer temperatures, water loss to the atmosphere (through evapotranspiration and soil desiccation) will rise (FEIS Vol. 1, p. 106). Climate change, higher temperatures, and more frequent drought will likely continue to be regional stressors, along with population growth, and an increase in demand for water (FEIS Vol. 1, p. 116). In general, most climate modelers agree that the Southwest is trending toward prolonged drought. Future potential ecological effects may include an increase in more intense disturbance events such as wildfires, monsoons, and wind (FEIS Vol. 1, p. 256).

### Monitoring Questions and Key Results

Questions below are being analyzed in this monitoring report. These are included because their indicators are monitored annually. Additional questions noted in the Forest Monitoring Program are not included because their indicators are monitored at different time intervals (not annually), as indicated with the question.

#### MQ13: What are seasonal temperature and precipitation trends?

**Table 27 Monitoring Question 13 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Uncertain
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

The temperature trend of well above average summer temperatures continued in 2023 and 2024 with temperatures of 2° and 1° F above normal, respectively. Winter temperatures have also trended up in the last 44 years, though with greater variability. The six months ending in March 2023 were nearly 2° F cooler than average, while the next winter was 1.5° F warmer. Precipitation has trended lower, particularly since 2010, though 2023 was wetter than average. The drought that began in 1996 continued, with slight temporary improvement during the winter of 2023. The number of frost-free days was 21 days above average in 2023 and 28 days above average in 2024 and the last spring freeze occurred in early- to mid-May in both years, with May 8<sup>th</sup> in 2024 representing the third earliest last freeze since 1979. 2023 began with above average soil moisture across the forest and record spikes at many sites during spring snowmelt. Most sites fell to below average during the summer of 2023 and remained very low until the spring of 2024 when soil moisture generally recovered to near average. There is not sufficient information based on climate trends or soil moisture trends to determine if these indicators are meeting Forest Plan desired conditions.

**Table 28 Monitoring Question 13 Indicator Status Summary**

Indicator	Result
NOAA climate trends	
Soil moisture trends	

## Summary of Key Results

From the indicators used for the monitoring questions there may be a need in the future to adjust the indicators to better reflect how the Forest is addressing climate change. While temperatures are and climate patterns are known, the ability to monitor these indicators on a yearly basis may not be meeting the needs of the monitoring question. There are other monitoring questions and indicators on a four- or five-year schedule that may better address climate change and other stressors. Currently the Forest continues to provide analysis of climate change effects in project-specific NEPA analysis.



## Progress Toward Meeting Desired Conditions and Objectives

This section addresses the desired conditions, objectives, or other plan components not covered in other monitoring topics. The focus of these monitoring questions is addressing the grazing, recreation, Federally Recognized Tribes, rural historic communities, partnerships, and some vegetation plan components. Most of the monitoring intervals are between 3-10 years, but those few questions with 2-year intervals are included in this report.

### Monitoring Questions and Key Results

**MQ14: Do federally recognized tribes have adequate solitude and privacy for traditional and cultural activities?**

**Table 29 Monitoring Question 14 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

The Forest has issued two temporary closure orders issued for tribal traditional and ceremonial activities, based on tribal requests over the last two years for Taos Pueblo. This has allowed for adequate solitude and privacy for traditional and cultural activities. The Forest has also partnered with Taos Pueblo to increase capacity in monitoring trespass onto Pueblo lands, both during and outside the temporary closure. The Wilderness Ranger program has led to local Tribal members being hired into this program. This program has increased education and awareness to visitors hiking within the Wheeler Peak Wilderness to the importance of not trespassing on Tribal lands, especially during traditional ceremonial activities.

**Table 30 Monitoring Question 14 Indicator Status Summary**

Indicator	Result
Number of temporary closure orders issued for tribal traditional and ceremonial activities, based on tribal requests	++

**MQ15: Is the Carson engaging with partners to provide opportunities for youth from local communities to participate in educational programs, cultural events and activities, and employment? Is the Carson providing interpretative and educational opportunities to the public about cultural and historic resources?**

**Table 31 Monitoring Question 15 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

The Forest has moved toward increasing exposure within local communities in schools and other local events. In

2023 the Forest partnered with New Mexico Workforce Solutions and an internship program which brought local 16–24-year-olds into the workforce through internships. The Forest hosted one intern and did move toward hiring that individual, but this was delayed due to the 2024 hiring pause due to lack of funds. The Forest did hire two permanent employees in 2023 and early 2024 who were local to the Taos, NM area. This has increased the diversity in the workforce.

Focus for historic and cultural work has been prioritized for surveys and analysis for the Enchanted Circle Wildfire Crisis Strategy Landscape. The Forest has recognized the importance of this work in the future.

**Table 32 Monitoring Question 15 Indicator Status Summary**

Indicator	Result
Number and type of educational programs, events, activities, and employment	++
Number of youths participating in educational programs, events, activities, and employment on the Carson NF	++
Number of historic and cultural interpreted sites, presentation, Passport in Time projects, and tours	- +

**MQ16: Is the Carson using partnerships to provide additional capacity and improve visitor experience?**

**Table 33 Monitoring Question 16 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

The number of partnerships to complete projects has increased over the last two years, specifically within the Enchanted Circle Wildfire Crisis Strategy Landscape. While the Forest had many partners helping with forest restoration and fuels reduction work, the number of partners has increased, meaning people participating in programs such as the mayordomo program, which uses local community members for fuels reduction work (fuelwood cutting). Funding also increased because of this work, bringing new partners or continuing many others. The Forest continues to use partners in work from restoration to wild horse management.

**Table 34 Monitoring Question 16 Indicator Status Summary**

Indicator	Result
Number of agreements with partners, by activity type, that are supporting visitor services	++
Number and type of projects completed with partners	++

## Summary of Key Results

The Forest is achieving desired conditions and objectives included in the monitoring questions and indicators. The chosen monitoring questions and indicators are focused on the Tribal and Rural Historic Communities sections of the Forest Plan and over the last two years the Forest has prioritized work with Tribes and the rural historic communities across the Forest on project planning and implementation. The Forest will continue this work, following Forest Plan direction.

## **Effects of Management Activities on the Productivity of the Land**

Indicators for Effects of Management Activities on the Productivity of the Land monitoring questions have a five-year monitoring interval, therefore they will not be included in this report.

## Social, Economic, and Cultural Sustainability

This monitoring topic addresses contributions to communities, social and economic sustainability of communities.

The Carson National Forest's rugged and scenic terrain has much to offer local communities and beyond. We provide public benefits such as infrastructure, employment, timber, clean air and water, forage, energy production, and cultural connections that go back for centuries.

We also take action to protect cultural treasures. The Carson National Forest contains cultural and historic resources (e.g., pit houses, pueblitos, masonry structures, quarries, rock art, traditional cultural properties, and culturally modified trees) that document almost continuous human presence for at least the last 12,000 years.

The total volume of wood products sold by the Carson has fluctuated overtime, with an overall downward trend since the 1990's. Currently, there is an emphasis on reducing the impacts of wildfire on communities and restoring fire-adapted ecosystems rather than on maximizing timber volume.

### Monitoring Questions and Key Results

Questions below are being analyzed in this monitoring report. These are included because their indicators are monitored annually. Additional questions noted in the Forest Monitoring Program are not included because their indicators are monitored at different time intervals (not annually), as indicated with the question.

**MQ17: Are timber harvests being designed and implemented in a manner that ensures sustained-yield and future productivity?**

**Table 35 Monitoring Question 17 Recommendation Summary**

Recommendation	Response
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Timber harvest activities are occurring on the East and West Zones of the Carson NF. In the past two years there has been an increase in timber harvest activities through removing dead and down and dead and standing material from the Hermits Peak Calf Canyon Fire. The majority of this material was used for fuelwood. The maximum sustained yield on the Forest is 10.7 million cubic feet per year. The Forest has harvested 2,950,000 cubic feet over the last two years, or 27.5% of the maximum allowable harvest. The Forest has developed a 5-year plan, outlining the future harvest areas and has shared this with local contractors and the timber industry members of the State of New Mexico with the goal of increasing harvests in the future.

**Table 36 Monitoring Question 17 Indicator Status Summary**

Indicator	Result
Amount of timber harvested relative to annual amount allowed for sustainable yield	- +

**MQ18: Are partnerships increasing capacity to manage forest resources and achieve mutually shared goals while remaining within the Carson’s management capacity?****Table 37 Monitoring Question 18 Recommendation Summary**

<b>Recommendation</b>	<b>Response</b>
Forest Plan direction met	Yes
Change to Forest Plan	No
Change to management activities	No
Change to monitoring plan	No
Assessment	No

Over the past two years the Forest has increased the number of partnerships, focusing mainly on Hermits Peak Calf Canyon fire response, forest restoration and fuels reduction projects in the Enchanted Circle Wildfire Crisis Strategy Landscape and the Rio Chama CFLRP. These partnerships range from Tribes to National partners, such as National Forest Foundation, to local partnerships with mayordomos. A total of 18 partners was involved with this work.

**Table 38 Monitoring Question 18 Indicator Status Summary**

<b>Indicator</b>	<b>Result</b>
Number of community-led partnerships the Carson NF is actively participating in	++

**Summary of Key Results**

Forest priorities around forest restoration and fuels reduction have allowed the Forest to achieve social, economic, and cultural objectives in the Forest Plan. Local communities were involved in implementation of forestry projects and this work will continue under the Forest Strategic Plan.

## Summary Table

Carson National Forest plan monitoring questions and evaluation addressed in this report. Possible types of change recommended include changes to the land management plan, changes in management activities or the monitoring program, and recommendations for a new assessment.

**Table 39. Summary of monitoring recommendations**

Monitoring question (MQ)	Progress Toward Land Management Plan Desired Conditions And Objectives	Recommended Action
MQ 1: Are watersheds functioning properly? Are "impaired" or "functioning- at-risk" watersheds moving toward desired conditions?	<i>17,076 acres have been treated to improve watershed conditions.</i>	<i>No change recommended</i>
MQ 2: To what extent are forest management activities improving ecological condition for Aquatic At-Risk Species and provide habitat connectivity?	<i>4.8 miles of stream channels repaired and restored. Nonnative invasive species removal occurred on 34.81 miles of stream.</i>	<i>No change recommended</i>
MQ 3: What is the condition and trend of key characteristics of vegetation? Are management actions moving fire regimes toward desired conditions?	<i>3,000 acres of new Douglas fir Tussock moth outbreak occurred.</i>	<i>No change recommended</i>
MQ 4: Are management activities moving terrestrial habitat toward desired conditions?	<i>26 water features maintained, improved, or restored 28,827 acres of terrestrial habitat was restored or enhanced.</i>	<i>No change recommended</i>
MQ 5: What is the condition and trend of key ecosystem components for riparian vegetation in the plan area? Are management actions maintaining or moving riparian vegetation toward desired conditions?	<i>83 acres of impaired riparian areas and 75 miles of streams have been restored. 34.81 miles of stream have been treated for nonnative invasive species.</i>	<i>No change recommended</i>
MQ 6: Is aquatic habitat distributed, connected, and in a condition capable of supporting native aquatic species? Are management actions making progress toward desired conditions for native aquatic species?	<i>39.8 miles of aquatic habitat occurred.</i>	<i>No change recommended</i>
MQ 7: What is the status and trend of invasive plant species in the plan area?	<i>211 acres of nonnative invasive plant species were removed.</i>	<i>No change recommended</i>
MQ 8: Is air quality meeting defined standards in the plan area? Are air quality related values being impacted in Wilderness Areas and other areas of the forest?	<i>Surface water acidification within the Taos and Santa Fe areas are well below both the annual and 24-hour standards</i>	<i>No change recommended</i>
MQ 9: What is the area of forest occupied by Grace's warbler?	<i>Automated recording units deployed, waiting for results.</i>	<i>No change recommended</i>
MQ 10: What is the area of forest occupied by hermit thrush?	<i>Automated recording units deployed, waiting for results.</i>	<i>No change recommended</i>
MQ 11: Are developed recreation sites being maintained to provide a satisfactory user experience?	<i>35% of developed recreation sites have been maintained to standard. GAOA implementation occurred within the El Rito Group Campsite, La Bobita Campground, and Echo Amphitheater campground.</i>	<i>No change recommended</i>
MQ 12: Are system roads and trails located and maintained to prevent resource degradation, and do they support designed uses? Are system roads and trails meeting the needs of visitors?	<i>Trails maintained to standard:</i> <ul style="list-style-type: none"> <li><i>99.7 miles in 2023</i></li> <li><i>134.5 miles in 2024.</i></li> </ul> <i>Roads maintained to standard:</i> <ul style="list-style-type: none"> <li><i>337 miles in 2023</i></li> <li><i>231 miles in 2024.</i></li> </ul>	<i>No change recommended</i>

Monitoring question (MQ)	Progress Toward Land Management Plan Desired Conditions And Objectives	Recommended Action
MQ 13: What are seasonal temperature and precipitation trends?	<i>Seasonal temperature changes remain as modeled; forest in drought status.</i>	<i>No change recommended</i>
MQ 14: Do federally recognized tribes have adequate solitude and privacy for traditional and cultural activities?	<i>Since 2022, yearly Forest Closure Orders were issued to protect traditional cultural practices.</i>	<i>No change recommended</i>
MQ 15: Is the Carson engaging with partners to provide opportunities for youth from local communities to participate in educational programs, cultural events and activities, and employment? Is the Carson providing interpretative and educational opportunities to the public about cultural and historic resources?	<i>Partnered with New Mexico Workforce Solutions to bring student interns into the workforce.</i>	<i>No change recommended</i>
MQ 16: Is the Carson using partnerships to provide additional capacity and improve visitor experience?	<i>Number of partnerships has increased since 2022; work focused mainly on Hermits Peak Calf Canyon recovery and Enchanted Circle Wildfire Crisis Strategy Landscape.</i>	<i>No change recommended</i>
MQ 17: Are timber harvests being designed and implemented in a manner that ensures sustained-yield and future productivity?	<i>Harvested 2,950,000 cubic feet or 27.5% of maximum allowable harvest.</i>	<i>No change recommended</i>
MQ 18: Are partnerships increasing capacity to manage forest resources and achieve mutually shared goals while remaining within the Carson's management capacity?	<i>18 partnerships occurred over the last two years to help achieve plan desired conditions. These include with Tribes, National partnerships, and local partners.</i>	<i>No change recommended</i>