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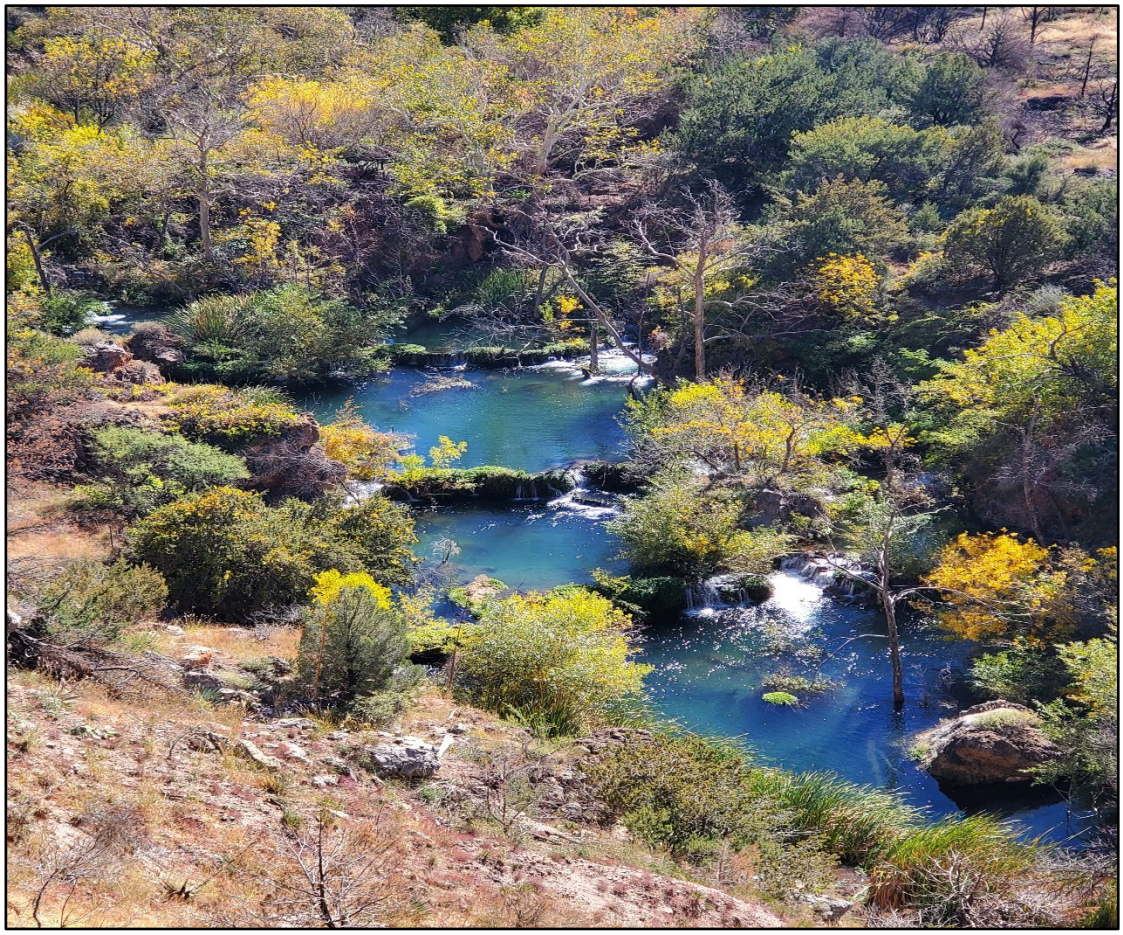
# 2023 Monitoring Report

# Fossil Creek Comprehensive River Management Plan

# Coconino & Tonto National Forests



Forest Service

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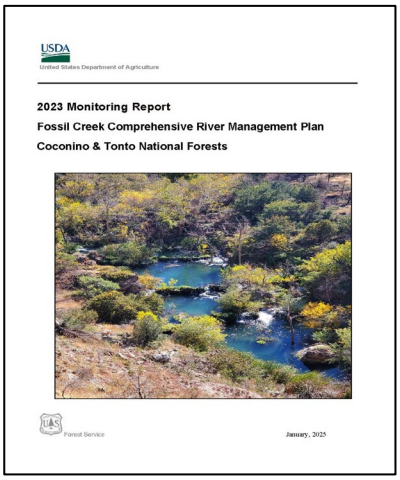
# About the Fossil Creek CRMP Monitoring Plan

## Purpose

The purpose of this 2023 Fossil Creek Comprehensive River Management Plan (CRMP) Monitoring Report is to inform the public, partners, stakeholders, other government agencies, and tribes of the current status of the monitoring prescribed in the Fossil Creek CRMP monitoring plan, as well as other ongoing monitoring in the drainage.




In the Fossil Creek CRMP, monitoring and adaptive management is related to multiple river values (water, biological, geology, recreation, and cultural values). Monitoring is intended to protect river values, inform CRMP implementation, and highlight the need for adaptive management actions.

If assessment of monitoring data indicates adverse impacts attributable to management actions or visitor use may be occurring, adaptive management actions that are anticipated to lessen these impacts will be implemented. Reaching a soft threshold indicates adverse impacts may be occurring.

The monitoring results presented in this report help the district ranger and forest supervisor assess monitoring results, and recommend and implement adaptive management actions where needed. Partners, community members, and subject matter experts can lend valuable expertise and institutional knowledge to this process, which can increase capacity, promote innovation, develop a shared sense of stewardship, and build trust in the management of Fossil Creek.

The Fossil Creek CRMP monitoring and adaptive management plan (Fossil Creek CRMP, pp. 115-145) addresses the following monitoring topics. These topics are grouped in this report as follows.

- ❖ Bare soil/Potential for delivery of sediment or fecal matter to Fossil Creek
- ❖ Stream flow
- ❖ Common black-hawk occupied territories
- ❖ Fossil springsnail habitat and populations
- ❖ Aquatic macroinvertebrate index of biological integrity (IBI)
- ❖ Non-native plant species
- ❖ Travertine dams
- ❖ Visitor use data/Opportunity for river-based recreation
- ❖ Visitor satisfaction
- ❖ Traditional cultural use

## Objectives

- Track monitoring and adaptive management plan implementation.
- Evaluate monitoring data for indicators of adverse impacts attributable to management actions or visitor use (reaching a threshold), and implement adaptive management actions that are anticipated to lessen these impacts.
- Document and report the results of completed monitoring. Document monitoring that has not been completed and the reasons and rationale why. Determine if updates to the monitoring plan are needed to increase the CRMP's efficiency or effectiveness.
- Present recommendations to responsible officials.

## Summary

Some monitoring was conducted in 2023 to address the following monitoring topics in the Fossil Creek CRMP Monitoring and Adaptive Management Plan.

- Stream flow
- Fossil springsnail habitat and populations
- Aquatic macroinvertebrate index of biological integrity (IBI)
- Non-native plant species
- Visitor use data/Opportunity for river-based recreation
- Traditional cultural use practitioners/Cultural sites

Monitoring for the following topics was not conducted in Fossil Creek in 2023, primarily due to adjustments to monitoring protocols, repairs needed to baseline data, or simply that monitoring for a topic was not planned or needed in 2023. Monitoring for these topics will be reported in subsequent years as monitoring methods are finalized and capacity increased.

- Bare soil/Potential for delivery of sediment or fecal matter to Fossil Creek
- Common black-hawk occupied territories
- Travertine dams
- Visitor satisfaction

The monitoring results that we do have for 2023 show that, in general, monitoring conducted per the Fossil Creek CRMP monitoring plan has not shown any resource topics approaching either their soft or hard thresholds.

Table 1 summarizes the findings of the monitoring in 2023 for each of the Fossil Creek CRMP monitoring topics and its identified thresholds.

**Table 1. Summary of Findings by Fossil Creek CRMP Monitoring Topics**

| Monitoring Topic | Progress Implementing CRMP? | Thresholds Reached? | | Recommendation/Adaptive Actions Needed |
|---|---|---|---|---|
| | | Soft | Hard | |
| Bare soil/Potential for delivery of sediment or fecal matter to Fossil Creek | **No.** There were not adequate personnel to complete this monitoring.<br><br>Water quality was monitored at three locations, near the old Irvine Power Plant road crossing, at the bridge, and near the Irving Power Plant by Camp Verde. The key parameters collected include temperature, dissolved oxygen, pH, *Escherichia coli*, total dissolved solids, and turbidity. | Unknown | Unknown | Train a large group of employees in the monitoring protocol for bare soil areas, to maintain that ability on the district over time.<br><br>Survey bare areas before and after recreation permit season. Maintain a calendar for this monitoring requirement (district hydrologist).<br><br>Update the bare soil monitoring protocol as needed as data are collected.<br><br>Decommission unauthorized access routes that are hydrologically connected to Fossil Creek.<br><br>Report on water quality monitoring completed in 2024. |
| Stream flow | **Yes.** In 2023, mean annual flows were collected and recorded, then compared to the five-year flow data (2018-2022). | No | No | Provide updated flow data next year, comparing 2019-2023 to 2024. |

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| Common black-hawk occupied territories | **No.** Although monitoring was not required in 2022, it was completed, so no monitoring occurred in 2023. | No | No | Conduct surveys for black-hawks in Fossil Creek in 2024 or 2025 for occupied territories and the presence of any user-created trails within 300 yards of nesting areas.<br><br>Actively restore unauthorized trails or other bare soil areas in refugia areas.<br><br>Educate recreationists on their impacts on riparian habitat and wildlife.<br><br>Conduct an estimation of and enforcement of the proper human capacity levels in Fossil Creek.<br><br>Encourage gallery forest and nest tree regeneration through appropriate water management when and where possible.<br><br>Manage grazing as needed to encourage success of young cottonwoods, willows, and sycamores. |
| Fossil springsnail habitat and populations | **Yes.** Springsnail surveys were conducted at six sites in 2023. | No | No | Establish a submeter resolution baseline location for each spring to ensure that springs can be successfully and efficiently relocated, and habitat parameters can be more accurately compared among each survey effort in the future. Implement the following: (1) georeference each springhead and its boundaries using submeter GPS unit, and/or (2) create a photo library that includes photos that show and describe each spring and springhead. The wetted area of each spring may vary between years, but having a baseline reference for the spring site will ensure survey repeatability.<br><br>Consider thinning/treating non-native plants enveloping the spring at known springsnail sites to allow solar radiation to reach open water and enhance aquatic vegetation growth. |

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| Aquatic macroinvertebrate index of biological integrity (IBI) | **Yes.** In 2023, macroinvertebrate samples were taken at nine sites. Six of those samples were prioritized for analysis but the data is not back yet. | No | No | Continue macroinvertebrate sampling and monitoring to calculate IBI scores. Identify potential improvements to monitoring methods such as Surber sampling.<br><br>Monitor aquatic habitat to identify post-fire impacts.<br><br>Set up a contract species for macroinvertebrate sample analysis.<br><br>Include monitoring at recreation sites to track recreation effects on macroinvertebrates. |
| Non-native plant species | **Yes.** Treatments were conducted for tamarisk and arundo in February 2023 (Lower Fossil, Stehr Lake, Narrows), and for arundo in November 2023 (Middle Fossil).<br><br>Treatment continued on Himalayan blackberry (November 2023, Fossil Springs) and yellow bluestem mechanically removed (Irving area, Flume Trailhead). | No | No | Per the Fossil Creek CRMP, continue to monitor one-third of the Fossil Creek corridor each year. Compare monitoring results in future years to the 2020 baseline for lower Fossil Creek.<br><br>In areas where Himalayan blackberry has been prioritized for treatment, continue to manage and treat blackberry with an aquatically-approved glyphosate in 2024. Mechanical removal of canes with a targeted, spot herbicide treatment is necessary to control regrowth and spread of Himalayan blackberry, which is dominant at Fossil Springs.<br><br>Coordinate with Friends of the Verde River staff to set specific objectives and priority treatment areas for Himalayan blackberry. Focus should be on buffering native Arizona dewberry stands near Fossil Springs to allow native plant release. Maintain the initial investment of time and resources by treating Himalayan blackberry seasonally to limit regrowth in areas where treatment is ongoing.<br><br>Monitor the mechanically-treated population of yellow bluestem near Irving in 2024.<br><br>Continue treatment of Class E species in lower Fossil |

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| | | | | Springs in Fall 2024.<br><br>Monitor for new occurrences of undocumented Class A invasive species populations within Fossil Creek in 2024.<br><br>Treat the small stands of salt cedar and giant reed above Stehr Lake, working downstream to the Narrows, then from the confluence of Fossil Creek and the Verde River upstream.<br>Consider including Class A species, as well as mulberry, in subsequent treatments if 2023 monitoring shows an increase in their percent of relative vegetative cover.<br><br>Consider changing the monitoring metric for invasive plants from "acres occupied" by Class A or E plants to "percent relative cover by species by reach." |
| Travertine dams | **No.** While forest staff have discussed bringing on experts from RMRS or a university, no progress has been made in identifying a travertine contact to advise on photo point development. | Unknown | Unknown | Identify a travertine expert who is interested in advising on photo point development.<br><br>Explore additional ways to monitor travertine formations over time (magnets?). |

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| Visitor use data/Opportunity for river-based recreation | Yes. | No | No | Address the number of no-shows in 2023. Securing permits so far in advance led to a high no-show rate. The permit system will be changing next year in how permits are released.<br><br>In 2024, release permits in two different ways to decrease mass purchasing by groups over multiple dates, and guide users to purchase permits closer to the actual permit date.<br><br>Release 80% of permits on a one-month, daily rolling basis. Release 20% of permits three days in advance.<br><br>Renew discussions on charging a cancellation fee. This topic has been tabled until 2025 discussions.<br><br>Work on better planning and data collection strategies for 2024. The Fossil Creek work coordinator/supervisor will be responsible for improved data collection direction.<br><br>Set up an administrative camp along Fossil or Towel Creek to decrease the number of trips needed in and out of the canyon and to lessen wear on vehicles. Address this in the budget to provide MI&E for personnel.<br><br>Continue conversations surrounding YAN Tribal Access Permits and continue to move forward in providing amicable options for this user group. |

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| Visitor satisfaction | **Yes.** In 2023, the Coconino National Forest U.S. Forest Service Rocky Mountain Research Station finalized the survey instrument and readied it to submit for Office of Management and Budget review. Funding was placed into an agreement with non-profit organization Conservation Legacy to hire a survey administrator. | Unknown, baseline monitoring still underway | Unknown, baseline monitoring still underway | With the area once again open to the public, the Coconino National Forest plans to complete visitor surveys in 2024. Related to this goal, the following tasks are expected in 2024:<br>• Complete the required Office of Management and Budget review<br>• Hire a survey administrator through Conservation Legacy<br>• Administer the survey and collect data<br>• Input data and begin analysis<br>• Record lessons learned for benefit of future survey efforts |
| Traditional cultural use practitioners/ Cultural sites | **Yes.** Yavapai Apache Nation (YAN) and Forest Service arranged to resume culturally sensitive site monitoring in 2023 after a lapse in 2022 due to the vacant Red Rocks District Archaeologist position.<br><br>In 2023, all four cultural sites marked for annual monitoring were visited by Forest Service archaeologists in conjunction with members of the YAN. | No | No | At Bah'loon's Place and Dance Ground, Emory Oaks, recreation impacts are still prevalent, and it is recommended monitoring continue to occur on an ongoing, annual basis. The Flume Construction Work Camp should be visited in 2024 as well to establish an impact trend, as it was not visited in 2021. If site conditions at the four sites remain similar to unchanged from 2023, then monitoring may decrease to every three years (CRMP, p. 143).<br><br>With staff turnover it can be challenging to determine if site conditions remain the same over time. Unauthorized trails or paths within sites should be recorded geospatially for future comparison and to determine if public access is increasing or decreasing in cultural sites. Modern trash should be removed as much as possible to mitigate public-related impacts on Fossil Creek's ORV.<br><br>Coordinate early on cultural site visits with Tonto NF archaeologists to ensure their participation.<br><br>Revisit cultural sites in the future to assess the need for additional vegetation seeding for camouflaging and reducing erosion. |

## Forest Supervisors' Certification

This report documents the status of monitoring activities in the Fossil Creek drainage in 2023 per the Fossil Creek Comprehensive River Management Plan (CRMP). It includes both the status of the monitoring required by the Fossil Creek CRMP and other monitoring also performed in the Fossil Creek subwatershed.

We have evaluated the status of Fossil Creek monitoring, the results of completed monitoring, and the recommendations presented in this report and endorse them. We have found that there are no recommended changes to the Fossil Creek CRMP monitoring plan at this time. There is, however, work to be done to increase the monitoring conducted to meet the requirements in the CRMP. The recommendations contained in this report will be carried forward by the Coconino and Tonto National Forests, and a deeper examination of them conducted with district and forest leadership and resource specialists.

The Fossil Creek CRMP monitoring plan may be modified in the future if more effective or efficient monitoring methodologies become available; if changes to objectives, indicators, metrics, measurement and assessment frequencies, thresholds, or adaptive management actions are needed as understanding of the river values improves; to answer monitoring questions more effectively; or to better ensure protection of river values (Fossil Creek CRMP, p. 120).

This 2023 Fossil Creek CRMP Monitoring Report is posted on the forest website and available for public review here: https://www.fs.usda.gov/goto/coconino/planning

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Aaron Mayville
Forest Supervisor
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Date

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Date

# Bare Soil/Potential for Delivery of Sediment or Fecal Matter to Fossil Creek

The monitoring topics of Bare Soil and Potential for Delivery of Sediment or Fecal Matter to Fossil Creek are combined in this report.

These two topics are to be monitored together annually with the Fossil Creek Bare Soil app, designed with ArcGIS Online for use with the ESRI mobile application, Field Maps. Per the CRMP Monitoring Plan, "Bare soil monitoring should be completed in conjunction with dispersed recreation BMP monitoring to provide additional information about potential water quality impacts" (p. 121). The application is used by FS employees, interns, volunteers, and other stakeholders to map bare soil around developed and dispersed recreation areas within the Fossil Creek Wild and Scenic River corridor. Detecting areas of bare soil such as unauthorized trails outside of locations of planned visitor use may indicate a need to adjust management of visitor use in the WSR corridor to protect river values. The location (upland, floodplain, or stream bank, as well as hydrological connectivity to Fossil Creek), type (e.g., unauthorized trails and roads or other denuded areas), and amount of bare soil caused by visitor use outside of recreation sites, roads, and trails within the Fossil Creek WSR corridor are monitored.

Potential impacts on water quality will be measured with bare soil monitoring and dispersed recreation best management practice (BMP) monitoring. Indicators have been chosen because of their ability to directly detect impacts such as erosion and fecal matter that may affect water quality before water quality is affected, rather than water-borne sediment and fecal bacteria that show pollution is already occurring and not related to visitor use. The dispersed recreation BMP protocol will be implemented in conjunction with bare soil monitoring. Bare soil monitoring will support detecting streambank impacts that may influence the findings of the dispersed recreation BMP monitoring. This protocol looks for evidence of bank trampling or instability (streambank alteration); erosion and sediment input to the stream; and trash, domestic animal, and human waste (human-related waste deposition), and chemical spills or leaks.

Thresholds for which adaptive management actions have been identified based on bare soil monitoring results are when:

- Black-hawk – There is evidence of increased bare soil caused by visitor use within 300 yards of a nest site within those territories (soft threshold). Unauthorized trails or other areas of bare soil caused by visitor use within 300 yards of a nest site are expanding

despite implementation of adaptive management actions (hard threshold).

- Bare soil – New unauthorized trails or other areas of bare soil caused by visitor use are detected in refugia areas (soft threshold). Unauthorized trails or other areas of bare soil in refugia areas caused by visitor use are expanding despite implementation of adaptive management actions, or recreation sites at the segment-wide scale are connected by unauthorized trails (hard threshold) (CRMP, p. 122).
- Water quality – Evidence of sediment transport or visitor use-related waste within the AMZ but not reaching Fossil Creek (soft threshold). Evidence of sediment from erosion or waste caused by visitor use reaching Fossil Creek (hard threshold).

## Monitoring Results

Bare soil area monitoring did not occur in 2023. Trained staff was not available due to employee turnover.

A baseline dataset was collected in November 2022, covering all developed areas off of Forest Roads 708 and 502 along Fossil Creek, as well as the areas adjacent to the Dixon-Lewis Trail up to the waterfall.Additional monitoring is needed to provide baseline data for the area above (NE of) the waterfall, the Flume Trail, and the Fossil Springs area.

## Recommendations

- Train a large group of employees in the monitoring protocol for bare soil areas, to maintain that ability on the district over time.
- Bare area monitoring should occur:
  - Along both sides of Middle Fossil Creek, from one-half mile below Mazatzal site to one-half mile above the large waterfall.
  - Along both sides of Fossil Creek from the junction of the Bob Bear Trail and the Fossil drainage downstream to the Historic Dam.
  - On the Coconino side of Fossil Creek from the Historic Dam to downstream of the administrative camping area.
- Survey bare areas after the recreation permit season but before fall when leaves obscure the bare areas. Maintain a calendar for this monitoring requirement (district hydrologist).
- Update the bare soil monitoring protocol as needed as data are collected.
- Decommission unauthorized access routes that are hydrologically connected to Fossil Creek.
- Work with team members when bare area monitoring reveals user-created routes in refugia areas outside of developed recreation polygons and the corresponding dispersed recreation polygons.
- Report on water quality monitoring completed in 2024.

# Stream Flow

The monitoring topic of Stream Flow in the Fossil Creek CRMP is intended to support detection of conditions that may adversely impact flows within Fossil Creek, and other key components of Fossil Creek's water, a specific river value.

Flow data from the USGS stream gage located at the Fossil Creek Bridge is assessed to track changes in flow and provide context for assessing other monitoring data (such as to help determine whether conditions have been influenced by flood events). This gage is upstream of perennial tributaries and therefore serves as an indicator for spring discharge.

Because Fossil Creek's base flow is comprised of groundwater discharge from springs, flow data collected at this gage serves as an indicator for spring discharge. Continued operation of this gage is essential to understanding resource conditions in Fossil Creek.

No thresholds for adaptive management actions have been identified for this monitoring topic.

## Monitoring Results

A five-year average of the mean annual flow is used in lieu of just the prior year in order to remove interannual variability. The time frame used is based on the USGS "water year" which begins on October 1 and ends on Sept 30 of the next year.

During the 2023 water year, mean annual flows were 68.2 cfs above the previous five-year average.

**Table 2. Five year (2018-2022) and 2023 Mean Annual Flow Comparison**

| Mean Annual Flow 2018-2022 (in cfs) | Mean Annual Flow 2023 (in cfs) | Difference 5-year average – 2023 (in cfs) |
|---|---|---|
| 51.2 | 119.4 | 68.2 |

## Recommendations

- Provide updated flow data next year, comparing 2019-2023 to 2024.

# Common Black-hawk Occupied Territories

The monitoring topic of Common Black-hawk Occupied Territories is one of three (3) topics geared to address the Biological Outstandingly Remarkable Value (ORV) for the Fossil Creek Wild and Scenic River. Common black-hawks in Fossil Creek are used as an indicator for the biological ORV because they are an indicator for other canopy-nesting, riparian-obligate bird species. They are susceptible to disturbance that may result from high levels of recreational use.

Black-hawk monitoring has occurred during nine field seasons (2005-2009, 2011, 2019, 2020, and 2022) in Fossil Creek (Johnson et al. 2012, Johnson and Calvo 2012, Johnson and Calvo 2020). Data collected through this monitoring informed soft and hard thresholds, as well as where monitoring is likely needed.

A rapid assessment monitoring effort for black-hawks is being employed and focuses on nests or regular territories that occur in refugia and within 300 yards of high-use recreation sites (which currently are Fossil Springs, Waterfall, and Irving), or when unplanned trails in refugia are detected within 300 yards of black-hawk nest territory (if nest location is unknown). The intent is early detection of increasing recreation use within refugia in close proximity to a regular territory or a known nest.

Monitoring will be completed in black-hawk territories once every three to five years or in the nesting season after unauthorized trails are detected in refugia within 300 yards of a territory or nest. However, if adaptive management actions are needed, monitoring will be conducted in the breeding season following implementation of the adaptive management action for those specific nest sites.

Thresholds for which adaptive management actions have been identified for common black-hawk occupied territories are when:

- Black-hawks abandon a regular territory near a high use site and/or there is evidence of increased bare soil caused by visitor use within 300 yards of a nest site within those territories (soft threshold).
- Black-hawks abandon two or more regular territories near high use sites and/or unauthorized trails, or other areas of bare soil caused by visitor use within 300 yards of a nest site are expanding despite implementation of adaptive management actions (hard threshold) (CRMP, pp. 127-128).

## Monitoring Results

No monitoring for Common Black-hawks was done in 2023. However, FS personnel reported a black-hawk at Fossil Springs in September of 2023. AZGFD fish bios reported seeing black-hawks in Fossil Creek in 2023 (eight in number plus two nests), but they did not provide nest locations.

### Other Biological ORV Monitoring

#### Bat Monitoring

Northern Arizona Bat acoustic monitoring occurred at the Heinrich site in 2023, but the data is still being analyzed by Bat Conservation International.

#### Firefly Inventory

Dr. Joe Cicero contacted RRRD about conducting firefly surveys in order to document the continued existence of the recently petitioned-for-listing species, Southwest Spring Firefly, *Bicellonycha wickershamorum piceum*. The only record of this species in the Verde Valley is from 1950 at Sycamore Spring along the Fossil Creek Road. On June 14, Dr. Cicero trained numerous volunteers and agency biologists on how to inventory for flashing fireflies. Dr. Cicero helped write two protocols: one for surveying all groups of fireflies and one for targeting flashing fireflies. A total of 23 surveyors made 34 visits to 21 sites throughout the Verde Valley from June 14th to August 27th, 2023. Seven sites were surveyed along Fossil Creek between June 28th and August 15th. Flashing fireflies were observed at two Fossil locations: Irving and Purple Mountain. The flashing firefly was captured at Windmill Park along Oak Creek. The specimen was transported to Dr. Cicero in Tucson who confirmed it as the rare Southwest Spring Firefly.


#### Native and Non-native Fish

In May 2023, AZGFD completed a snorkel survey in Fossil Creek, the first such survey since 2020. One hundred pools were snorkeled, from just below the barrier up to Irving Falls. More than 138,810 fish were counted. It appears that the winter flood pulse was a scouring event, with many of the pools deep, clear, and free of alluvium. The general condition of the stream looked good.

The roundtail chubs were able to get off a great spawn as 129,597 of the total number of fish were young chub. Roundtail numbers for juveniles and adults have stayed fairly stable, with 8,469 surveyed this year compared to 8,347 in 2020. Numbers for all other species have shown a sharp decrease from 2020.

In addition to fish, Arizona blacktail rattlesnakes, prairie rattlesnakes , Sonoran mud turtless, canyon treefrogs and tadpoles, virile crayfish, common black-hawks, and black bear (sow and cub) were observed while hiking the stream for the snorkel survey in May 2023.

In July 2023, six stock tanks were surveyed in the Fossil Creek Watershed (Mack's Tank, Contractors Tank, Apron Tank, Sandrock Tank, Sandrock Draw Tank, and Soldier Mesa Tank). No non-native fish were found in any of these tanks. Sandrock, Sandrock Draw, and Soldier Mesa Tanks contained tiger salamanders. Mack's and Contractors Tanks had crayfish.

In September 2023, the AZGFD Region 2 aquatics program completed a hoop netting survey on

four reaches of Fossil Creek, from Sally May Wash up to the Fossil Creek Waterfall. This is the first hoop net survey since 2019. This survey captured 2,482 individuals from these reaches, compared to 3,607 in 2019. Although there was a decline in the numbers of chub and speckled dace, they were still within the range of healthy populations. This is good news for stream recovery after the Backbone Fire.

## Recommendations

- Conduct surveys for black-hawks in Fossil Creek in 2024 or 2025 for occupied territories and the presence of any user-created trails within 300 yards of nesting areas.
- Actively restore unauthorized trails or other bare soil areas in refugia areas.
- Educate recreationists on their impacts on riparian habitat and wildlife.
- Conduct an estimation of and enforcement of the proper human capacity levels in Fossil Creek.
- Encourage gallery forest and nest tree regeneration through appropriate water management when and where possible. Manage grazing as needed to encourage success of young cottonwoods, willows, and sycamores.

# Fossil Springsnail Habitat Condition/Populations

Fossil springsnails are a species of interest in Fossil Creek because 1) they are a Forest Service sensitive species; 2) they are only known to occur in the Fossil Creek corridor (they are endemic to Fossil Creek); 3) there are only a few small populations isolated to specialized ecological niches within a narrow geographic range, so they are vulnerable to population die-offs and risk of extinction; and 4) they can be indicators of spring health.

The habitat assessment rating protocol developed by AZGFD is used to assess the condition of riparian areas occupied by Fossil springsnails, and Fossil springsnail population counts are used to assess the abundance of springsnails at key locations in Fossil Creek. Collaboration with the U.S. Fish and Wildlife Service and AZGFD facilitate monitoring Fossil springsnail populations and habitat. Springs that support suitable habitat for the Fossil springsnail are surveyed to protocol in order to determine occupancy. The numerous springs that occur on steep slopes and where access is difficult are a lower priority for inventory.

Thresholds for which adaptive management actions have been identified for Fossil springsnail habitat and populations are when:

- Monitoring shows the habitat rating of occupied springs is trending downward as a result of visitor use. Monitoring shows a reduction of 25-50% of the mean cumulative Catch-Per-Unit-Effort (CPUE) estimates (soft thresholds).
- Visitor use interferes with occupied springs' ability to attain and maintain high or moderate habitat condition in the long term. Monitoring shows a reduction of >50% of the mean cumulative CPUE estimates (hard thresholds) (CRMP, pp. 128-130).

## Monitoring Results

No springsnail surveys were conducted in 2023.

In November of 2023, a recreation trail crew replaced a 20-foot flood-damaged footbridge over the Fossil Springsnail Spring along the Waterfall Trail with a 40-foot plank boardwalk. The new longer footbridge covers the expanded wetted area.

Forest Service and AZGFD bios met to clarifying historic locations and names and set a 2024 survey schedule.

## Recommendations

- Establish a submeter resolution baseline location for each spring to ensure that springs can be successfully and efficiently relocated, and habitat parameters can be more accurately compared among each survey effort in the future. Implement the following: (1) georeference each springhead and its boundaries using submeter GPS unit, and/or (2) create a photo library that includes photos that show and describe each spring and springhead. The wetted area of each spring may vary between years, but having a baseline reference for the spring site will ensure survey repeatability.
- Consider thinning/treating non-native plants enveloping the spring at known springsnail sites to allow solar radiation to reach open water and enhance aquatic vegetation growth.

# Aquatic Macroinvertebrate Index of Biological Integrity

Macroinvertebrate populations are a common indicator that integrate many aquatic impacts over time, and macroinvertebrate studies are used as a safety check that aquatic resources are indeed being protected. Negative results indicate the potential that there is a problem and that more analysis is needed to identify the cause.

Fossil Creek CRMP monitoring of macroinvertebrate populations is conducted annually during the spring index period (April – May), and uses the warm and cold-water criteria and protocols developed by the Arizona Department of Environmental Quality (ADEQ). These use benthic macroinvertebrate abundance and diversity to calculate an Index of Biological Integrity (IBI) score that is then used to monitor the "health" of aquatic systems (ADEQ 2015).

The five sites sampled are: 1) near Fossil Springs; 2) about ¼ mi above the waterfall; 3) less than ¼ mile below the waterfall; 4) near the Irving power plant; 5) below Sally May Wash. Because travertine may affect the diversity and density of aquatic invertebrates, ADEQ does not sample Fossil Creek below the Fossil Creek springs (avoiding any area with travertine deposition), so it is important to establish baseline collections and identify appropriate methods and metrics for future monitoring.

Thresholds for which adaptive management actions have been identified for aquatic macroinvertebrate monitoring are when:

- An Index of Biological Integrity (IBI) score that falls between the 10th and 25th percentile of reference score (score of 40-49 for warm water streams), which is inconclusive and requires a repeat test (soft threshold).
- An IBI score that falls below the 10th percentile of reference score violates the biocriterion (less than or equal to 39 for warm water streams) or a repeat test that falls below the 25th percentile (hard threshold) (CRMP, p. 131).

## Monitoring Results

Samples were collected with ADEQ guidance and protocols. The samples from six sites were sent to an external contractor for sorting and identification (Rhithron, Missoula MT).

In 2023, macroinvertebrate sampling was completed at sites along Fossil Creek at Tonto Bench, Boulder Creek, Sally May, and Purple Mountain. Three distinct samples were collected at each

site, with the intent of capturing a range of microhabitats or substrates. The three samples were then combined to make one composite sample, representative of the entire site and capturing different invertebrate taxa present on different substrates.

Samples were taken for general forest health assessments as well as to monitor specific disturbances. For example, sites subject to high levels of recreational activity have been subject to sampling both above and below (or directly at) designated recreation sites. This adjustment should be included in the future to track recreation effects on macroinvertebrates, serving as indicators of water quality and habitat conditions, and providing inferences regarding the broader food web dynamics. Samples from 2023 have been shipped to the lab for analysis but results are not yet available.

## Recommendations

- Continue macroinvertebrate sampling and monitoring to calculate IBI scores. Identify potential improvements to monitoring methods such as Surber sampling.
- Monitor aquatic habitat to identify post-fire impacts.
- Set up a contract species for macroinvertebrate sample analysis
- Include monitoring at recreation sites to track recreation effects on macroinvertebrates.

# Class A or E Non-native Plant Species

Class A species are defined as those that are newly established or have the potential to become established and pose unacceptable threat to watershed condition. Yellow bluestem is a Class A invasive found along the Flume Trail.

Class E (for extreme) species have wide distribution within a particular area and pose an unacceptable, extreme hazard to watershed condition. Class E species that have been detected in the Fossil CRMP corridor include tamarisk, tree of heaven, Siberian elm, giant reed, Himalayan blackberry, and Malta star-thistle. Of these, the only Class E species detected in lower Fossil Creek have been detected are tamarisk, giant reed, and Himalayan blackberry. While mulberry, Johnson grass and red brome are invasive plants, they are not Class A or E non-native invasive plants.

Thresholds for which adaptive management actions have been identified for Class A or E Non-native Plant Species are when:

- Existing class A or E non-native invasive plant populations increase in size or new populations become established (soft threshold).
- Non-native invasive plant species pose a risk to ecosystem function, including displacing or diminishing native plant and animal species (hard threshold) (CRMP, p. 133).

## Monitoring Results

The Friends of the Verde River, through an agreement with the Coconino National Forest, conduct invasive species mapping and treatment for four non-native invasive species: giant reed (*Arundo donax*), tree of heaven (*Ailanthus altissima*), Russian olive (*Elaeagnus angustifolia*), and salt cedar (*Tamarix spp.*).

In 2023, Friends of the Verde River staff and Southwest Conservation Corps monitoring technicians conducted vegetation monitoring of four miles of Fossil Creek from the Deadman Mesa to the Ike's Backbone area. The crew focused on monitoring and inventory of *Arundo donax* (giant reed) as well as *Tamarix ramosissima* (salt cedar) within the Fossil Springs Botanical Area. Three miles of this stream segment were treated by cutting salt cedar.

Treatment on Himalayan blackberry at Fossil Springs continued in November 2023. Yellow bluestem was mechanically removed (by hand) from the Irving area and the Flume Trailhead.

Continued monitoring in areas where sacred datura has replaced Himalayan blackberry, such as

in the pilot treatment area, has shown that Himalayan blackberry has reestablished and outcompeted sacred datura.

No new occurrences of previously undocumented Class A species were reported in Fossil Creek.

## Recommendations

- Per the Fossil Creek CRMP, continue to monitor one third of the Fossil Creek corridor each year. Compare monitoring results in future years to the 2020 baseline for lower Fossil Creek.
- In areas where Himalayan blackberry has been prioritized for treatment, continue to manage and treat blackberry with an aquatically-approved glyphosate in 2024. Mechanical removal of canes with a targeted, spot herbicide treatment is necessary to control regrowth and spread of Himalayan blackberry, which is dominant at Fossil Springs.
- Coordinate with Friends of the Verde River staff to set specific objectives and priority treatment areas for Himalayan blackberry. Focus should be on buffering native Arizona dewberry stands near Fossil Springs to allow native plant release. Maintain the initial investment of time and resources by treating Himalayan blackberry seasonally to limit regrowth in areas where treatment is ongoing.
- Monitor the mechanically treated population of yellow bluestem near Irving in 2024.
- Continue treatment of Class E species in lower Fossil Springs in Fall 2024.
- Monitor for new occurrences of undocumented Class A invasive species populations within Fossil Creek in 2024.
- Treat the small stands of salt cedar and giant reed above Stehr Lake, working downstream to the Narrows, then from the confluence of Fossil Creek and the Verde River upstream.
- Consider including Class A species, as well as mulberry, in subsequent treatments if 2023 monitoring shows an increase in their percent of relative vegetative cover.
- Consider changing the monitoring metric for invasive plants from “acres occupied” by Class A or E plants to “percent relative cover by species by reach.”

# Impacts to Travertine Dams Attributable to Visitor Use

The presence, extent, and high deposition rate of calcium carbonate forming travertine in Fossil Creek are the key elements of Fossil Creek's geology ORV. In particular, the formation of travertine dams in certain reaches of Fossil Creek contributes to an extraordinary stream channel morphology, creating a complex aquatic habitat. Human impacts to these dams, such as persistent notching from repeated boat passage, may alter the flow of water and indirectly affect travertine deposition, dam formation, and aquatic habitat. Monitoring is focused on impacts to travertine dams that, if found to occur, may indicate a need for management changes to ensure that human activities do not risk adversely impacting the geology ORV.

The focus of monitoring is on physical impacts to travertine due to ease of detection and corresponding ability to adjust management relatively quickly. Monitoring is being performed on the reach of Fossil Creek from 1/4-mile upstream of the waterfall upstream to the historic diversion dam. Photo points are being established in this reach to detect notching or other human impacts to travertine dams. Repeat photography will be performed at least annually, at each established photo point, more often if a significant flood event occurs. The protocols for these photo points follow those detailed in Hall 2002. Ocular monitoring and informal photo documentation will likely supplement photo point monitoring.

Thresholds for which adaptive management actions have been identified for impacts to travertine dams are when:

- Travertine dams in the reach of Fossil Creek from 1/4-mile upstream of the waterfall upstream to the historic diversion dam display new (as of implementation of the CRMP) evidence of impacts resulting from visitor use (soft threshold).
- A series of spatially-connected travertine features in the reach of Fossil Creek from approximately 1/4-mile upstream of the waterfall upstream to the historic diversion dam display measurable evidence of human impacts (hard threshold) (CRMP, p. 136).

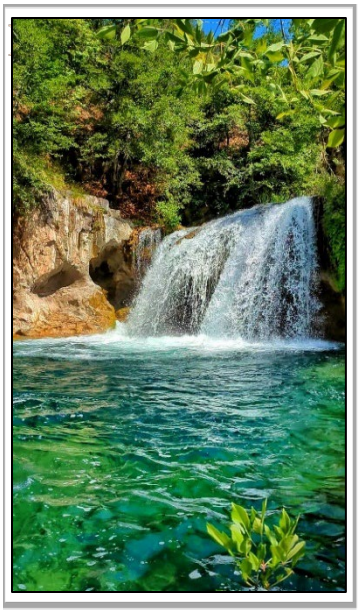
## Monitoring Results

Due to extremely difficult access to the creek in the travertine reach, and concerns about future repeatability, no photos were taken of travertine dams in 2023.

## Recommendations

- Explore additional ways to monitor travertine formations over time.

# Visitor Use Data/Opportunity for River-based Recreation



Forest Service employees collect a variety of visitor use data each year, including the number of visitors, number of vehicles, patterns of use (including the distribution of visitor use), pounds of trash, and number of law enforcement incidents and other emergencies. This information is used to evaluate the effectiveness of current management practices, determine if adjustments are needed, and provide context for assessing other monitoring data. Assessment of these data include whether user capacity established by the CRMP is exceeded and, if so, what actions, such as adjusting the kinds, locations, and amounts of use, could be taken to ensure capacity is not exceeded.

The recreation ORV includes protecting and enhancing outstanding opportunities for river-based recreation in Fossil Creek. The recreation opportunity monitoring indicator uses the total number of people who can access Fossil Creek during the limited entry period (April 1 – October 1) as a proxy for river-based recreation opportunities in the wild and scenic river corridor.

Thresholds for which adaptive management actions have been identified for visitor use and recreation opportunity (river-based opportunity) are when:

- Visitor use – User capacity is exceeded; an increasing trend in incidents is observed.
- Recreation opportunity – Ten (10) percent decline from the 2009 baseline in the number of people who may access Fossil Creek due to management restrictions other than temporary closures for public safety due to extreme fire danger, monsoon storms, or similar hazards (soft threshold). Twenty-five (25) percent decline from 2009 baseline condition in the number of people who may access Fossil Creek due to management restrictions other than temporary closures for public safety due to extreme fire danger, monsoon storms, or similar hazards (hard threshold) (CRMP, pp. 137, 140).

## Monitoring Results

Due to the Backbone Fire, the 2023 recreation permit season began on June 26th instead of the typical April 1st**.** 2023 was the seventh year of the Fossil Creek reservation system.

Estimated permit system demand, which is the total number of people turned away added to the total number of people let into Fossil Creek, was approximately 9,620 in 2023, compared to 8,640 in 2021. The no-show rate for 2023 was more than 39 percent, compared to less than 34

percent in 2021. There was an increase in the number of unpermitted vehicles which were turned away, from less than three percent in 2021to more than four percent in 2023, and the average number of people per vehicle increased from 3.1 in 2021 to 3.9 in 2023. There was a dramatic increase in Yavapai Apache Nation tribal members visiting Fossil Creek, from 12 in 2021 to 267 in 2023.

The metric for trash collection changed in 2023 to bags of garbage versus the previous method of weighing trash in pounds. Meaningful comparison is difficult, but moving forward we will count full bags of trash and have a more useful comparison.

Two wet weather road closures occurred in 2023 due to late monsoon rains between August 18th and August 23rd, and September 13th and September 16th, resulting in 10 days of closure. This appears to be more than the potential for six wet weather road closure days in 2021.

There was an increase in parking warnings issued between 2021 and 2023, with four in 2021 and 154 in 2023. Forest Service personnel reported consistent positive feedback from forest visitors who were supportive of the permit system. Visitors who had been to Fossil Creek prior to the implementation of a reservation system expressed gratitude toward the Forest Service for requiring people to have a permit.

**Table 3. Comparison between 2021 and 2023 Visitor Use Metrics**

| Metric | 2021 | 2023 |
|---|---|---|
| Length of season (in days) | 77 | 98 |
| Total number of permits reserved | 8,418 | 9,235 |
| Total number of permit cancellations | 486 | 919 |
| Total number of permitted vehicles | 5,597 | 5,608 |
| Total number of permitted users | 17,216 | 21,954 |
| Average group size | 3.1 | 3.9 |
| Total number of no-show permits | 2,821 | 3,267 |
| Total number of unpermitted vehicles | 217 | 383 |
| Total number of users turned away | 556 | 844 |
| Total amount of garbage collected | 1,237 lbs | 178 large garbage bags |
| Total number of YAN tribal vehicles | Unknown | 48 |
| Total number of YAN tribal users | 12 | 267 |
| Total number of warnings issued | 12 | 154 |

## Recommendations

- Address the number of no-shows in 2023. Securing permits so far in advance led to a high no-show rate. The permit system will be changing next year in how permits are released.
- In 2024, release permits in two different ways to decrease mass purchasing by groups over multiple dates, and guide users to purchase permits closer to the actual permit date.

- Release 80% of permits on a one-month, daily rolling basis. Release 20% of permits three days in advance.
- Renew discussions on charging a cancellation fee. This topic has been tabled until 2025 discussions.
- Work on better planning and data collection strategies for 2024. The Fossil Creek work coordinator/supervisor will be responsible for improved data collection direction.
- Set up an administrative camp along Fossil or Towel Creek to decrease the number of trips needed in and out of the canyon and to lessen wear on vehicles. Address this in the budget to provide MI&E for personnel.
- Continue conversations surrounding YAN Tribal Access Permits, and continue to move forward in providing amicable options for this user group.

# Visitor Satisfaction

The recreation ORV is comprised of outstanding opportunities for a variety of river-related recreational activities. Recreation ORV monitoring addresses the quality of the recreation experience and the variety of recreational activities available.

The quality of the recreation experience in Fossil Creek can be assessed by asking a representative sample of visitors a set of questions that focuses on the key setting attributes, activities, and other relevant topics. Results can then be compared to a 2011 survey conducted by Northern Arizona University. The principal setting attributes Reported by participants in the 2011 study were trash, crowding, current regulations, and facilities. Taken together, these four attributes as well as other topics can provide an indication of change in the quality of the visitor experience.

Thresholds for which adaptive management actions have been identified for recreation experience (visitor satisfaction) are when:

- Five (5) percent decline in satisfaction index (soft threshold). Fifteen (15) percent decline in satisfaction index (hard threshold) (CRMP, pp. 138-139).

## Monitoring Results

In January 2023, University of Montana Ph.D. candidate Jaclyn Rushing, who has led this project, was hired by the U.S. Forest Service Rocky Mountain Research Station's Aldo Leopold Wilderness Research Institute (ALWRI). The agreement with the Forest Service and University of Montana was then closed with the university's acceptance and the intention of Ms. Rushing continuing work as an ALWRI employee. It was agreed that the funding planned for the University of Montana for survey development, administration, and analysis would be diverted to another organization to support the project. Survey development was funded through Forest Service salary cost (Jaclyn's time), and the project's funding was transferred into an existing agreement with the non-profit organization Conservation Legacy to hire a survey administrator position in the future.

The survey instrument was finalized and submitted to the Forest Service National Social Science Program Lead in March 2023. This is a final review before submission to the Office of Management and Budget. The review has unfortunately taken an prolonged period. Many of the questions used in the survey are ones that were approved by the Office of Management and Budget as part of the "Federal Land Management Agencies Compendium of Questions." This is

common social science practice, but these questions are due for review and renewal in April 2024. With the Fossil Creek survey administration planned for summer 2024, after expiration of "the Compendium," the review of the Fossil Creek survey instrument can only take place after the "Compendium" is reviewed.

## Recommendations

With the area once again open to the public, the Coconino National Forest plans to complete visitor surveys in 2024. Related to this goal, the following tasks are expected in 2024:

- Complete the required Office of Management and Budget review
- Hire a survey administrator through Conservation Legacy
- Administer the survey and collect data
- Input data and begin analysis
- Record lessons learned for benefit of future survey efforts

# Satisfaction of Traditional Cultural Practitioners/Impacts at Specific Cultural Sites

Monitoring of the cultural values ORV for Fossil Creek will consist of consulting with the affected Western Apache and Yavapai tribes annually, preferably with traditional practitioners or elders who are recognized as experts by those tribes, to determine the condition and trend of traditional cultural resources within the corridor. It is important to maintain open communication with concerned Western Apache and Yavapai tribes to receive feedback in real time on resource conditions and other cultural concerns.

Two indicators for the condition of this ORV have been developed: monitoring of traditional and contemporary cultural values through consultation with tribes associated with the ORV and monitoring of culturally sensitive sites in the Fossil Creek area. The goals are to: (1) ensure that the Fossil Creek area retains its traditional cultural value for the affected tribes, and (2) ensure specific areas considered to be of the greatest sensitivity are not negatively affected by visitor use.

Thresholds for which adaptive management actions have been identified for tribal consultation (satisfaction of traditional cultural practitioners) and culturally sensitive sites (impacts at specific cultural sites) are when:

- Tribal consultation – Results of consultation indicate the Outstandingly Remarkable Value (ORV) condition has trended downward for two consecutive years (soft threshold). Results of consultation indicate that the Fossil Creek area does not look, sound, and feel natural and untrammeled. Examples include widespread occurrences of overcrowding, numerous recreationists off of system trails and away from established recreation sites, presence of trash and human/pet waste, or vegetation or soil impacts (hard threshold).
- Culturally sensitive sites – Indication of new visitor use (faint indications of unauthorized trails or new ground disturbance) within site boundaries (soft threshold). Development (or continued use) of one unauthorized trail, presence of additional bare soil areas, evidence of ground disturbance, evidence of the removal of artifacts, or evidence of feature disturbance within site boundaries (hard threshold) (CRMP, pp. 142-144).

## Monitoring Results

Forest Service staff met with Yavapai Apache Nation (YAN) tribal members in early December

2023 to hear any concerns from the membership regarding Fossil Creek access. YAN tribal members indicated that they wished to see more reserved access during the busy summer season. YAN and Forest Service arranged to resume culturally sensitive site monitoring in 2023 after a lapse in 2022 due to the vacant Red Rocks District Archaeologist position.

In 2023, all four cultural sites marked for annual monitoring were visited by Forest Service archaeologists in conjunction with members of YAN.

The sites inspected were 04-2070 Dance Ground, Emory Oaks on the Tonto National Forest, and 01-1134 Bah'loon's Place, 01-1138 Purple Mountain Work Camp/Ash Trees Growing Downward, and 01-0712 Flume Construction Camp on the Coconino National Forest. 2023 marks the first year that YAN tribal members and Forest Service staff were able to visit Site 01-712 as the 2021 Backbone Fire prevented monitoring. Tribal members visited additional sites known to them for traditional resources. Data collected during these site visits was entered into the national database (Heritage NRM) and documented with the Coconino Heritage Program's Inventory Standards and Accounting form.

Long-term effects from the Backbone Fire vary across the sites visited. The high burn intensity of the 2021 fire exposed bare mineral soil, resulting in limited vegetation regrowth in two of the monitored sites. The Bah'loon's Place field house and the agricultural terracing portion of the Dance Ground, Emory Oaks site demonstrated that high severity burns had an adverse effect on artifacts exposed to the fire. Structural features at all four sites remain in good condition with no evidence of rock cracking or spalling from the 2021 burn. Despite the increased visibility, there was no evidence of increasing public access to or recreation within these specific sites.

The sites displayed patchy vegetation regeneration, with sections of dense grass cover alternating with bare mineral soil. The fire killed mature vegetation and regeneration in these locations has proven to be slow. These sites should be revisited in the future to assess the need for additional vegetation seeding for camouflaging and to reduce erosion. In areas with heavy grass cover, artifact visibility was significantly reduced and there was less evidence of public access or depredations. YAN tribal members pointed out the general location of an additional roasting pit feature that was completely grown over in one of the sites, demonstrating the utility of vegetation cover in masking site features.

Sites 01-1134 and 01-712 remain in good condition, with little evidence of public access to or recreation inside their boundaries. The Backbone Fire impacts on the sites are minimal, with few burned trees in the area, and the wooden artifact is intact. Site 01-712 is now accessible only by trail, and there is no evidence of increased dumping, unauthorized trailing, or artifact removal, as would be expected. Site 01-1134 covers two terrace systems, with the lower terrace only recently closed off to public camping. The closed off areas still include pockets of bare mineral soil, evidence of camping, and small amounts of modern trash, which were removed by YAN members. Nonetheless, this does not appear to have increased from 2021. The upper portion of the site is relatively undisturbed from public impacts and vegetation has mostly regenerated, post-fire.

Sites 04-2070 and 01-1138 are in good and moderate condition, respectively. These two sites still show evidence of modern trash and camping, yet public impacts appear to have decreased from their 2021 levels. Boulders placed to restrict public access at Site 01-1138 have been effective as vegetation is regrowing on unauthorized trails and campsite locations. Regrowth after the Backbone Fire has been particularly heavy inside the 01-1138 site; this dense vegetation has likely reduced the public's willingness to recreate at this site. Public impacts in Site 04-2070 appear to be similar to those documented in 2021, evidenced by the presence of modern trash. Portions of Site 01-1138 were also heavily regrown after the 2021 fire, which made artifact and feature identification difficult, yet site monitoring did relocate artifacts associated with its historic Apache occupation. Neither Site 01-1138 nor Site 04-2070 had evidence of increased artifact collection or looting. While not an increase from 2021, it is likely that all four sites have had some collection in the past, given the popularity of the Fossil Creek location. Site 04-2070 had the largest amount of modern trash and should be continuously monitored to ensure that artifact collection is not taking place.

## Recommendations

- At Bah'loon's Place and Dance Ground, Emory Oaks, recreation impacts are still prevalent, and it is recommended monitoring continue to occur on an ongoing, annual basis. The Flume Construction Work Camp should be visited in 2024 as well to establish an impact trend, as it was not visited in 2021. If site conditions at the four sites remain similar to unchanged from 2023, then monitoring may decrease to every three years (CRMP, p. 143).
- With staff turnover it can be challenging to determine if site conditions remain the same over time. Unauthorized trails or paths within sites should be recorded geospatially for future comparison and to determine if public access is increasing or decreasing in cultural sites. Modern trash should be removed as much as possible to mitigate public-related impacts on Fossil Creek's ORV.
- Coordinate early with Tonto NF archaeologists for cultural site visits to ensure their participation.
- Revisit cultural sites in the future to assess the need for additional vegetation seeding for camouflaging and to reduce erosion.

## Partnerships

Partners working with the Coconino National Forest on monitoring and data collection in the Fossil Creek drainage include, but are not limited to:

- Tribes
  - San Carlos, Tonto, Yavapai, and White Mountain Apache – Emory oak
  - Arizona Tribes with Northern Arizona University (NAU) – Identification and mapping of traditional use plants
  - Yavapai Apache Nation – traditional use, cultural sites

- U.S. Geological Survey (USGS)

- Arizona Department of Environmental Quality (ADEQ)
  - Aquatic macroinvertebrates

- Oak Creek Watershed Council – recreational trail photo points, trail rehabilitation monitoring, analysis of trail BMPs

- Arizona Department of Game and Fish (AZGFD)
  - Riparian birds
  - Bald and golden eagle flights
  - Fossil springsnail
  - Native fish
  - Ranid frogs program (lowland leopard frog)

- Bat Conservation International

- Bureau of Reclamation – fish barrier inspections

- U.S. Fish and Wildlife Service (FWS)
  - Native fish
  - Western yellow-billed cuckoo, southwestern willow flycatcher

- Northern Arizona University (NAU)
  - Black hawk, western yellow-billed cuckoo, southwestern willow flycatcher

- Bat Conservation International (BCI) – acoustic monitoring recording echolocations

- Friends of the Verde River (FOVR)
  - Inventory, mapping, and treatment of non-native plants
  - southwestern willow flycatcher