



## Museum Flood Area Frequently Asked Questions

**Q: What is being done to explore options for more long-term flood mitigation projects for the Museum Area?**

**A:** On August 26 & 27, 2021 more than 50 engineers & government officials met on Thursday and Friday for a Museum Flood Area post-wildfire engineering summit to brainstorm long-term mitigation options for the Museum Flood Area. Some of the options that were discussed can be viewed at [www.youtube.com/coconinocnty](http://www.youtube.com/coconinocnty).

**Q: Is more long-term flood mitigation necessary for the Museum Area?**

**A:** The flooding of 2021 has demonstrated the critical need for more long-term mitigation in the Museum Flood Area, which will remain at high risk for post-wildfire flooding for years to come. The Flood Control District (FCD) and its partners continue to gather information about post-wildfire flood mitigation to evaluate the most feasible measures to help mitigate this flood threat. Due to the very high cost of flood mitigation, the team also will continue working to incorporate potential funding agencies in this process, which could include:

- ❖ Federal Emergency Mgt. Agency
- ❖ Natural Resources Conservation Service
- ❖ U.S. Forest Service
- ❖ Army Corps of Engineers
- ❖ AZ Dept of Water Resources
- ❖ AZ Dept of Water Quality

**Q: What are some of the impacts from this year's Museum Area flooding?**

**A:** The Museum Area flooding in summer 2021 was unlike anything experienced in Coconino County since the post-wildfire flooding after the Schultz Fire in 2010. As we learned from this experience (and have shared repeatedly with Museum Flood Area residents before monsoon season), the threat of flooding is real, and the Museum Flood Area will remain at high risk for post-wildfire flooding for many years.

As of August 31, 2021, the impact metrics of Museum Flood Area flooding during the 2021 monsoon season include the following:

- ❖ The Flood Control District's monsoon flooding response has cost \$1,048,056.
- ❖ 46 interior private property assessments have been conducted with a total damage estimate of \$1,013,900.
- ❖ 52 City of Flagstaff public infrastructure sites have been damaged with a total damage estimate of \$2.3 million.
- ❖ Over 8,200 tons of sediment and debris transported to Cinder Lake Landfill.
- ❖ 700,000 total sandbags and 7,600 lineal feet of barrier installed in the Museum Flood Area.

**Q: What caused the flooding in the Museum Flood Area on August 17, 2021?**

**A:** The flooding in the Museum Flood Area was caused by the largest rainfall event to date over the Museum Fire Burn Scar. The gauges located throughout the burn scar recorded hourly rainfall as follows: 3.07 inches in south gauge, 2.4 inches in western gauge, 1.5 inches in the eastern gauge, .75 inches at northern gauge. In addition, the rainfall was intense with over 1.14 inches recorded in at the south and west gauges in 15 minutes and 1.06 inches recorded at the east gauge. Not only was significant rainfall experienced on the burn scar itself, but also in the Sunnyside neighborhood. In an hour, 1.22 inches fell at Linda Vista and 1.5 inches was recorded downstream in neighborhoods. The rainfall recorded at the south gauge equates to a 200- to 500-year rainfall event.

The rainfall over the entirety of the burn scar, combined with the significant rainfall in the neighborhood, resulted in flooding that closed roads and overtopped mitigation. Significant debris was seen in the storm water given that a large area of the burn scar had not previously experienced heavy rainfall.

**Q: Was the flooding in the Forest Hills neighborhood caused by runoff from the Museum Fire Burn Scar?**

**A:** No. It is very important to understand that this flooding was not a result of the Museum Fire Burn Scar, but a separate rainfall event outside of the burn scar.

**Q: What was the size of the storm that impacted the Forest Hills neighborhood, and what was the resultant damage?**

**A:** Based on the weather radar, this appears to have been a near 400-year rainfall event that severely impacted the Forest Hills area watershed. It is estimated that the Rio de Flag ran at 1,451 cubic feet per second with a depth of over 3 feet at Boldt Drive in Cheshire at the height of this event, which was



extremely dangerous and damaging. A home in Forest Hills was destroyed by the flooding when 4 feet of floodwater went through the entire home. Two other homes received several inches of floodwater. The County immediately deployed Public Works crews to address impacts to the roadway and to begin installing mitigation in the Forest Hills area.

**Q: What is the purpose of the Mt. Elden Estates NRCS Exigency Project?**

**A:** Completed in early August 2021, the Mt. Elden Estates NRCS Exigency Project will decrease serious erosion from repetitive flooding that is destroying private properties, roads and threatens area homes. This erosion also sources sediment, which is then transported downstream and negatively impacts downstream infrastructure and homes. The FCD was able to secure \$600,000 in exigency funding from the Natural Resources Conservation Service (NRCS) for this emergency channel stabilization project on July 30. This represented 75% of the project's cost with the FCD providing a 25% match of \$152,000.

**Q: What caused the flooding in the Museum Flood Area on July 13, 2021?**

**A:** This flooding was caused by the first significant monsoon storm to hit the Museum Burn Scar since the Museum Fire in July 2019. More than 0.75 inches of rain fell in 15 minutes over the Museum Fire burn scar, which triggered an Emergency Notification Alert to be issued to the entire Museum Flood Area. This area includes Mt. Elden Estates, Paradise, Grandview, and the Sunnyside area. Flows in the channel overtopped the roadway at Linda Vista Drive and Cedar Ave. Street crews closed this section of Linda Vista and Cedar Ave. Fast-moving floodwaters and debris in flows approximately one foot deep were reported in the Sunnyside area running curb-to-curb on Main Street. Streets impacted due to flooding include Linda Vista, Main, Rose, Grandview, 4th Street, and Route 66. For more information please visit <https://www.coconino.az.gov/CivicAlerts.aspx?AID=2498>.

**Q: Is the Museum Flood Area still at high risk for flooding?**

**A:** Yes. In early 2021 the technical consultant hired by the City and FCD recently validated the original model used to gauge flood risk in the Museum Flood Area. The original model generated in 2019 determined that the flood risk was increased ten-fold over pre-wildfire conditions. Our consultant was able to review the limited number of rain events impacting the Museum Burn Scar over the last two years and determine that the original model was still valid.

As we learned during the flood events of the very active 2021 monsoon season, the threat of flooding remains real, and you should keep your sandbags and any other mitigation measures in place. This science-based model indicated that the moderate- to high-burn severity sections of the watershed have experienced very little natural recovery over the last two years and will pose a serious flood threat to over 400 homes and 50 businesses in the Museum Flood Area for years to come.

**Q: Do I need sandbags or barriers for my property?**

**A:** If you have not received mitigation but feel that you might need it, then you can call 928-679-8525 to schedule an engineering assessment. Please note all property owners must sign a Cooperator Agreement to allow the Flood Control District to install emergency flood mitigation measures on their properties.

**Q: Should I regularly inspect and maintain my sandbags?**

**A:** Yes. The City and FCD strongly encourage all property owners to keep their sandbag structures in good condition. Sandbags are susceptible to the elements, especially the ultraviolet (UV) rays of sunlight, and should be replaced if torn. Over time all sandbags will need to be replaced. Before the 2021 monsoon season, the City/FCD team conducted an evaluation of current in Museum Flood Area neighborhoods and found that, after less than two years, 30% - 40% of sandbags were deteriorated and need to be replaced prior to monsoon season.

For more information on sandbag walls and other flood preparation resources, please visit [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea).

**Q: Where can I find sandbags?**

**A:** A self-fill sandbag station is located in the lot just north of Coconino County Health and Human Services, 2625 King Street. Filled sandbags are available in the lot just south of Health Services behind Cal Ranch. For more information, please visit <https://www.coconino.az.gov/2134/Sandbag-Information>.

**Q: What if I need help with shoring up my sandbags?**

**A:** Residents who are elderly or disabled can contact the Museum Flood Call Center at 928-679-8525 to request assistance.

**Q: Why does the system of emergency flood mitigation measures need to be contiguous?**

**A:** The placement of flood mitigation in your neighborhood was based on science designed to help mitigate the impact of post-wildfire flooding to downstream residences and businesses. Because of the nature of water, flood mitigation should be contiguous – not piecemeal - with no gaps. The mitigation installed in the Museum Flood Area was mostly designed to convey floodwaters downstream and out of your neighborhood. Removal of any section of this mitigation – sandbags or barriers - from an individual property may compromise the effectiveness of this system and could result in adverse flooding effects on adjacent properties, for which the private property owner who removed the mitigation could be held responsible for any damage.

**Q: How long will flood mitigation be in place around my property?**

**A:** The emergency flood mitigation measures that have been installed by the Flood Control District should probably remain in place for at least the next three to five years.

**Q: Should I install berms, ditches, or other measures on my property to divert floodwaters?**

**A:** Efforts by property owners or tenants to keep water off their property could have consequences for their neighbors and result in liability for the person diverting the water. The law in Arizona regarding water diversion is based primarily on court decisions rather than statute. Different rules apply depending on whether the water that is diverted is surface water, flood water or water that has been previously captured in a stream or water course.

It is important to be careful that your mitigation efforts do not increase the flood hazard to your neighbors both upstream and downstream. You may be legally liable for damage. The County cannot consult as to the legality or illegality of water diversion on private property.

The Arizona Attorney Magazine published an article by attorney David L. Abney that has a good summary of water diversion law in Arizona. This article is available in the County's Law Library and can be found on the Museum Fire/Flood web page at [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea).

**Q: Where can I find more information about the Museum Flood Area, flood preparedness and flood response?**

**A:** Much more information is available at [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea) and in the 2021 Museum Flood Guide, which is available at [www.coconino.az.gov/2021MuseumFloodGuide](http://www.coconino.az.gov/2021MuseumFloodGuide).

**Q: How should I prepare for a flood emergency?**

**A:** Severe monsoon storms and post-wildfire flooding can occur with little or no warning. There are several important steps that you can take to prepare you, your family, and your property from monsoon flooding:

- ❖ **Secure Flood Insurance:** The Flood Control District **strongly encourages** all property owners in the Museum Flood Area to purchase and maintain flood insurance and take other suitable precautions to protect their properties and themselves from injury due to flooding. Please also note that the only way to protect your investment either as a tenant or property owner is to purchase a separate flood insurance policy. If you are renting a home, then consider purchasing renter's insurance to insure your belongings. For information about the National Flood Insurance Program (NFIP), please call 1-800-427-4661 or visit [www.floodsmart.gov](http://www.floodsmart.gov)

- ❖ **Sign Up for Emergency Alerts:** Sign up for emergency alerts at <https://coconino.az.gov/207/Emergency-Management>.
- ❖ **Track Weather:** For the latest Museum Fire scar weather conditions and NWS notifications during monsoon season please visit <https://www.weather.gov/fgz/MuseumFireFloodRisk>.
- ❖ **Know the Alert Process:** Be sure that you, your friends, and your family know the “Museum Flood Area Emergency Alert Process,” which is available at [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea).
- ❖ **Review the Flood Guide:** the most recent (2021) Museum Flood Preparedness & Mitigation Guide, which is available on the web page and directly at [www.coconino.azgov/2021MuseumFloodGuide](http://www.coconino.azgov/2021MuseumFloodGuide), has information to help keep you and your family aware, informed, and safe during monsoon season.

**Q: What should I do in a flood emergency?**

**A:** The risk of flooding from the Museum Fire will exist for years to come. As such, it is imperative to stay aware and prepared for flood emergencies. Some critical points for your safety include the following:

- ❖ **Shelter in Place:** During flood events, residents should shelter in place. Have a [Stay Kit](#) ready.
- ❖ **Stay Out of Drainages:** Do not enter drainages at any time, even if they’re dry.
- ❖ **Keep Kids Out of Drainages:** Don’t let your children play in drainages at any time, even if they’re dry.
- ❖ **Get to High Ground:** If outdoors, then get to high ground or go into your home.
- ❖ **Know Where your Kids & Pets Are:** Know where your children and pets are all times.

**Q: What should I do after a flood emergency?**

**A:** There are several things you need to do as soon as possible after a flood, including:

- ❖ **Document all flood damage:** Take photos of any flood damage to your property as soon as it is safe to do so. Do this documentation before conducting any cleanup work to create an accurate record for insurance records, etc.
- ❖ **Contact Insurance Company:** Contact your insurance company or the NFIP (1-800-427-4661) as soon as possible.
- ❖ **Avoid floodwaters, washes, and impacted areas**
- ❖ **Debris on Property:** If you have debris on your property, then you should move the debris to the street if you are able -- only when the water has stopped flowing. This will help County and City Public Works crews remove the debris with their heavy equipment.
- ❖ **Parked Cars:** If you live on one of the streets that has debris as a result of the flood, then please do not park your car on the streets.
- ❖ **Museum Flood Area Call Center:** The Call Center will be operational as needed. Hours of operation may shift depending on any weather events that may occur. The number is 928-679-8525.
- ❖ **Social Services Resource Guide:** [COVID-19 Social Safety-Net Services Coalition-Resource Guide V10 \(az.gov\)](#).
- ❖ **Cleanup of Interior Flooding:** <https://www.coconino.az.gov/2437/After-a-Flood-Event>.
- ❖ **For more information:** Please visit [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea).

**Q: What causes post-wildfire flooding?**

**A:** Wildfires can dramatically change landscape and ground conditions, which can lead to increased risk of flooding. Most of the trees and vegetation within the 1,961-acre Museum Fire scar are now gone, so there is no organic material to provide both deflection and absorption of rainwater. In addition, the fire burned much of the soil in the Spruce Avenue Watershed. High intensity wildfires can leave soil “hydrophobic.” This means that, like a piece of glass, the soil is now unable to absorb water and will rapidly send rainwater downstream. 52% of the Spruce Avenue Watershed’s soils

burned at high or moderate burn severity, which means they will act like a sheet of glass or slough off sheets of soil creating debris flows.

**Q: What factors contribute to post-wildfire flash flooding danger?**

**A:** The biggest threat from wildfire, both in terms of life/safety and property, comes from post-wildfire flash flooding. As Museum Flood Area residents experienced during 2021 monsoon season flood events, the factors that contribute to post-wildfire flash flooding danger include the following:

- ❖ **Rainfall Extent:** The extent of the rainfall over the burn scar, the intensity of the rainfall and the duration of the rainfall are key factors that influence the size of the flood event.
- ❖ **Flow Size:** The size of post-wildfire floodwater flows from a rain event can be five to 10 times greater than normal. This was the case with flooding following the 2010 Schultz Fire. For example, a 25-year rain event on the Schultz burn scar created nearly a 1,000-year flood event.
- ❖ **Flow Consistency:** Post-wildfire flows are much more than just water...they carry sediment and burn debris that can clog and overflow drainages in a very short period. The dense water can carry large debris and rocks into the neighborhoods, which increases the danger.
- ❖ **Monsoon Season:** Post-wildfire flooding typically occurs during monsoon season, which runs from early summer through late fall. Our annual monsoon season can produce intense, localized storms that appear with little or no warning and can range dramatically in size. In a fire-affected area, even a small monsoon storm can cause dangerous flood conditions. Remember: Just six inches of floodwater can knock down an adult and 18 inches can carry away a vehicle.

For more information on flood risk, please review the Museum Flood Risk Advisory,” which is available at [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea).

**Q: Why did the County Flood Control District and the City of Flagstaff originally install emergency flood mitigation measures in 2019?**

**A:** In 2010, the Schultz Fire created catastrophic flooding in the downstream neighborhoods of Timberline, Fernwood, and Doney Park. Two lives were lost as a result of the flooding and NAU’s Rural Policy Institute estimated the economic impact at over \$130 million. During the first monsoon season after the fire, there were upwards of 23 flood events in this area. The next four years saw additional extensive flooding. The County worked tirelessly to implement initial emergency flood mitigation measures, as it is doing now within the neighborhoods that will be impacted by post-wildfire flooding from the Museum Fire.



Based on the County's experience with the Schultz flooding, the Federal Emergency Management Agency (FEMA) funded the County to conduct a post-wildfire flooding study of the entire county in 2015. The study identified the Spruce Avenue Watershed, the watershed burned by the Museum Fire, at risk for severe flooding after a wildfire. This was the case because of the steep slopes and poor, overgrown condition of the forest in the Dry Lakes Area. The City of Flagstaff already had plans to thin and restore the forest in the Dry Lakes area, but unfortunately only 40% of that work was completed when the Museum Fire started. The model that was developed through the FEMA study was quickly updated and again projected that the downstream neighborhoods would be subject to severe flooding. Thus, the County Flood Control District immediately began working with residents to install emergency flood mitigation measures.

Given the serious flood events of the 2021 monsoon season, it is very important to note that, had this emergency mitigation not been installed, the impacts from these flood events to home, businesses, and infrastructure would have been exponentially worse.

**Q: Who is responsible for keeping alleyways clear?**

**A:** As part of its response effort, the City of Flagstaff has identified and prioritized alleyways in Sunnyside that are subject to flooding and is taking steps to remove debris and vegetation. The City also is working to identify public utility and drainage easements in these alleyways. However, as property owners and residents also are responsible for maintaining alleyways, the City appreciates any assistance from the public towards keeping alleyways free of debris that could be washed away in a flood event. Please note that the owners and/or the residents of homes are responsible to keep the alleyway behind their respective homes clear to the midpoint of the alley. At the midpoint, it is the responsibility of the homeowners on the other side of the alley.

**Q: What neighborhoods can be affected by flooding from the Museum Burn Scar?**

**A:** The Museum Flood area includes the neighborhoods of Mt. Elden Estates and Lockett Ranches in the County and the neighborhoods of Paradise Road, Grandview Avenue/Monte Vista, and Sunnyside within the City.

**Q: How can I get flood warnings and information?**

**A:** There are several great resources to help keep you aware and informed during monsoon season:

- 1. County Emergency Notifications:** Coconino County has a free Emergency Notification service that alerts residents and businesses about time-sensitive general and emergency situations – including wildfires, thunderstorms, tornadoes, and flash flooding – that can impact our region throughout the year and especially during monsoon season. Users can receive the latest updates on home and cell phones or via text and e-mail messages. Sign up at [www.coconino.az.gov/ready](http://www.coconino.az.gov/ready).

- 2. National Weather Service & Rain Gauge Data:** The National Weather Service (NWS) also has a web page at <https://www.weather.gov/fgz/MuseumFireFloodRisk> that has current storm and flash flood warning information. For radar and rain gauge information in the Museum Fire Burn Scar area, please visit <https://coconino.jefulleralert.com/jefmap/>.

You can also get NWS weather information on Facebook at <https://www.facebook.com/US.NationalWeatherService.Flagstaff.gov> and Twitter at <https://twitter.com/nwsflagstaff>

- 3. Social Media:** For those with smart phones and PC's, social media is a great way to keep apprised of flood-related information and associated County response activities. We encourage everyone who uses social media to "Like" Coconino County on Facebook and to "Follow" us on Twitter: <https://www.facebook.com/CoconinoCounty>
- 4. Weather Apps:** There are many weather apps available for your smart phone to provide storm, radar, and current condition information. Google "weather alert app" for more information.
- 5.** Please review the "Social Media and Important Links" document, which is available at [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea).

**Q: What is the Flood Control District's role and responsibility on private roads during a flood event?**

**A:** The Flood Control District does not have legal authority to maintain private roads and driveways. However, after an emergency flood event if a private road is impassable, then the Flood Control District will make private roads open and passable within reasonable efforts.

**Q: Where Can I Get More Information?**

**A:** For more information, please visit [www.coconino.az.gov/MuseumFire/FloodArea](http://www.coconino.az.gov/MuseumFire/FloodArea) or email [museumfloodinfo@coconino.az.gov](mailto:museumfloodinfo@coconino.az.gov).