

YAVAPAI COUNTY FIRES AND POST-BURN FLOODING POTENTIAL

Linda Potter, P.E., CFM—Atkins Global

June and July of 2013 were scorching in Yavapai County. Two wildfires, the Doce and Yarnell Hill Fires, consumed over 14,800 acres of the County between June 18th and July 10th. The Yarnell Hill Fire is infamous for the tragic loss of the 19 Granite Mountain Hotshot fire-fighters.

The human-caused Doce Fire began on June 18th at the Doce Pit, a popular recreational area off of Iron Springs Road near Prescott. Within the first day of the fire, it had consumed 5,000 acres in the Granite Mountain Wilderness area. The fire was fully contained by the Fourth of July with a total burn area of approximately 6,800 acres.

The Yarnell Hill Fire was started by lightning on June 28th and was fully contained by July 10th. Like the Doce fire, the initial advance rate of the fire was extreme. In addition to the grievous fatalities, over 8,000 acres and portions of the town of Yarnell were burned and 130 structures were destroyed.

The community of Yarnell was devastated. While residents were figuring out how to recover from the fire, a new threat was revealed: an increased risk of flooding. Fires typically cause increased runoff in storm events due to lack of vegetation, quicker watershed response, hydrophobic soils, and sediment bulking.



Destroyed residence in Yarnell, AZ

Post Burn Flooding Response

Since the fires occurred during an active monsoon season, characterizing the increased risks of flooding was a priority for the County to prevent further losses in the communities. The threat of post-fire flooding was genuine. The County immediately began work characterizing the post-burn hydrology and hydraulics to determine areas of greater flooding risk. The fires burned portions of several watersheds, with the biggest impacts occurring to Mint Wash, Miller Creek, and Model Creek in the communities of Williamson Valley, Yarnell, and Peoples Valley. With the help of pre- and post-processing modeling tools (and a few late nights), preliminary post-burn inundation maps were created within 48 hours of fire containment.

The Doce fire consumed public lands managed by the United States Forest Service (USFS), and the Burned Area Emergency Reponse (BAER) team provided assistance to the County in the form of burn intensity mapping and the potential for soil erosion, landslides, and debris flows in the area. The Yarnell Hill fire, however, occurred on mostly on State and private land. Despite a request by the Governor, the BAER team was not authorized to provide the same level of assistance on the Yarnell Hill fire. It was up to the County to prepare risk assessments in the Yarnell area.

Hydrology models for both areas did not exist at the time of the fires, which increased the amount of work necessary to develop post-burn runoff estimates. Due to the active monsoon season, time was of the essence. Post-burn hydrology models were prepared for the fire areas using the USFS method of runoff curve number increases based on burn severity. This

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YAVAPAI COUNTY DECISION SUPPORT SYSTEM (CONT'D)

runoff curve number increases based on burn severity. This method was chosen due to the amount of documentation that exists and also the speed at which a model could be produced using HEC-HMS.

Hydraulic models using HEC-RAS and inundation maps and flood depth grids in GIS were developed with the help of custom GIS tools. The creation of hydraulic models and inundation maps within such an accelerated time period was only possible because topography was readily available for the washes. Topographical mapping was previously obtained in 2010 to 2012 in many areas of the County in advance of anticipated development and floodplain mapping needs. By chance, the washes impacted by the fires had been included in the mapping effort.



Bamboo in Yarnell – making a comeback two days after the fire...

Structural solutions to reduce flooding were also investigated. An elevated roadway crossing in Yarnell was found with an undersized culvert that causes a large backwater effect. The County worked with the NRCS as part of an Emergency Watershed Protection Grant to remove this structure to help reduce the flooding potential to the upstream houses. The project will reduce water surface elevations upstream of the crossing by approximately 2 ½ feet. Removal of the roadway fill and construction of a culverted low-water crossing is currently underway.

The County has a robust GIS database. Using site specific finished floor surveys along with the post-burn water surface elevations, GIS tools allowed quick identification of at-risk properties. The County held several public meetings and performed outreach efforts with the residents to inform them of the potential increased flooding risk. Additionally, the community and many volunteers set up sand-bag stations for residents to help protect their homes from flooding.

Observations and Conclusions

Several storms and runoff events have occurred since the fires happened, but luckily none of them have approached flood levels... yet. Watershed recovery will likely take many years. Some observations:

- ◆ Both fires occurred in extremely rocky areas with relatively sparse vegetation that already had fairly high unit runoff numbers. The post-burn runoff increases were not as extreme as might be seen in other soil horizons or heavily forested areas. Additionally, a majority of the burn intensity was estimated at low to moderate, with limited areas of high intensity burn.
- ◆ The effort and dedication of County staff was impressive, but back-to-back fires put a huge strain on County personnel and resources.
- ◆ Having the topography in-hand prior to the incident was key to developing quick inundation maps.

The work preparing the post-burn hydrology and hydraulics served the immediate need of the community to protect against flooding damage. Additionally, the efforts will help the communities and County in the future. The data will be refined and formatted for submittal to FEMA. As the community of Yarnell rebuilds, the refined floodplain information will help establish better finished floor elevations to protect them in the future.

Despite the destruction, community resilience was evident. The residents maintained positive attitudes and were thankful for information. It's not often a floodplain administrator tells people that they might be flooded and gets thanked for it!

GAUGE OF THE MONTH



TURTLE PEOPLE
 Gauge ID: 305
 Gauge Type: Precipitation
 Watershed: Verde River
 Sub-basin: Granite Creek
 Location: 4.5 miles SE of Prescott
 Installed: 11/07/1990

NATIONAL PREPAREDNESS MONTH

September 2013 is National Preparedness Month (NPM). Launched in 2004, NPM is FEMA's national annual preparedness outreach campaign. NPM is sponsored by FEMA's Ready Campaign. The Ready Campaign, in conjunction with the Ad Council, aims to educate and empower Americans during NPM and throughout the year to prepare for and respond to all types of emergencies, including natural disasters and potential terrorist attacks.

Self-Sufficiency

Local officials and relief workers will be on the scene after a disaster but they cannot reach everyone immediately. You may need to survive on your own after an emergency. This means having your own food, water and other supplies. Prepare and plan in the event you must go without electricity, water service, and access to a supermarket, or local services for several days. You should keep an emergency kit at places you spend a lot of time such as your home, car, and work. A basic emergency supply kit should include: (ready.gov/build-a-kit)

- o Water, people require at least one gallon per day
- o Food - ready to eat canned meats, fruits, vegetables and a can opener; protein or fruit bars, dry cereal or granola, peanut butter, nuts, crackers, high energy foods, etc.
- o Battery-powered or hand crank radio and a NOAA Weather Radio with tone alert and extra batteries for both
- o Flashlight and extra batteries
- o First aid kit
- o Whistle to signal for help
- o Dust mask to help filter contaminated air
- o Moist towelettes, garbage bags and plastic ties for personal sanitation
- o Manual can opener for food
- o Local maps
- o Cell phone with chargers, inverter or solar charger

Additional supplies you should consider:

- o Prescription medications and glasses
- o Infant formula and diapers
- o Food and water for your pet
- o Cash or traveler's checks and change
- o Sleeping bag or warm blanket for each person
- o Change of clothing
- o Water sanitation materials
- o Fire extinguisher
- o Matches in a waterproof container
- o Feminine supplies and personal hygiene items
- o Mess kits, paper cups, plates, paper towels and plastic utensils
- o Paper and pencil
- o Books, games, puzzles or other activities for children



Maintaining your kit: (ready.gov/maintaining-your-kit)

- o Keep canned food in a cool, dry place.
- o Store food in tight containers to protect from pests and to extend shelf life.
 - o Throw out any canned good that becomes swollen, dented or corroded.
 - o Use foods before they go bad and replace them with fresh supplies.
- o Place new items at the back of the storage area and older ones in the front.
 - o Change stored food and water supplies every six months.
 - o Write the date you store it on all containers.
- o Re-think your needs every year and update your kit as needs change.



Verde River Days 2013!

On September 28, the Flood Control District participated in the annual event Verde River Days, celebrating preservation along the Verde River. People stopped by the booth to see how the ALERT rain gauges work from the inside, check the flood hazard on their property, and ask questions about the District. Many walked away with 4" District gauges and preparedness activity books for kids.

The District has had a booth at the Verde River Days festival since 1992, when one of our first visitors was Barry Goldwater



YCFCD CONTACT INFORMATION

LOCATIONS:

1120 Commerce Dr. Phone: 928.771.3197
 Prescott, AZ 86305 Fax: 928.771.3427

10 S. Sixth St. Phone: 928.639.8151
 Cottonwood, AZ 86326 Fax: 928.639.8118

Please visit the County website for more information:

- Applications, Forms and Instructions
- Building Codes
- Community Plans
- Drainage Criteria Manual
- Fees/Impact Fees
- Flood Hazard Status Reports
- Flood Protection Information
- General Plan
- Ordinances
- Regulations
- Storm Water Management Program
- Related Links & More

www.yavapai.us

COUNTY TOLL FREE TELEPHONE NUMBERS

Ash Fork, Bagdad, Seligman, Yarnell 800.771.2797
Black Canyon City and Phoenix Area 602.495.8800

COUNTY SWITCHBOARD NUMBERS

Prescott 928.771.3100 - Verde Valley 928.639.8100

The Yavapai County Board of Supervisors also serve as The Board of Directors for the District.

The initial floodplain ordinance was adopted December 1981, and has been revised over the years.

The Drainage Criteria Manual, was first adopted November 1998, and revised August 2005. The current Ordinance and Drainage Criteria Manual are available on line at the County website or may be purchased at the Prescott and Cottonwood District offices.

Services Performed

The District is available for assistance or technical advice on the following topics:

- National Flood Insurance Program
- District ALERT System
- Flood Insurance Rate Maps
- Flood Status Information on a Parcel of Land
- Flood Protection & Safety
- Local Flood Hazard
- Development & Permitting within the 100 year floodplain
- Construction in or adjacent to a significant watercourse
- Storm Water Quality and Pollution Control

Flood protection information and links to other agencies are available on the County website. Visit www.ycflood.com for archived issues of this newsletter.