

2015

Aguila / Upper Centennial Watershed Flood Response Plan



The Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009

DISCLAIMER

The user should read this entire Flood Response Plan (FRP) carefully and should be aware of all elements of this plan, including strengths and limitations, and individual responsibilities. This FRP is useful as one component in developing a flood warning system for Aguila. However, the possibility of inadvertent error in design or failure of equipment to function exists and may prevent the system from performing perfectly at all times. Therefore, nothing contained herein may be construed as a guarantee of the system or its operation, or create any liability on the part of any party or its directors, officers, employees or agents for any damage that may be alleged to result from the operation, or failure to operate, the system or any of its component parts. This constitutes notice to any and all persons or parties that the National Weather Service, Flood Control District of Maricopa County, Maricopa Department of Emergency Management, Maricopa County Department of Transportation, Arizona Department of Transportation, Maricopa County Sheriff's Office, Arizona Department of Public Safety, American Red Cross, The Salvation Army, Arizona Division of Emergency Management, Aguila Volunteer Fire Department, Aguila Elementary School, Martori Farms, or any officer, agent or employee thereof, shall not be liable for any deaths, injuries, or damages of whatever kind that may result from reliance on the terms and conditions of this FRP.

This plan was produced by The Flood Control District of Maricopa County.

For matters regarding this plan:

Steve Waters, Flood Warning Branch Manager, Engineering Division

The Flood Control District of Maricopa County

2801 West Durango Street

Phoenix, Arizona

Phone: (602) 506-1501

Fax (602) 506-4601

www.fcd.maricopa.gov



Table of Contents

Table of Contents	ii
LIST OF FIGURES	iii
LIST OF TABLES	iv
TERMINOLOGY	iv
INTRODUCTION	5
Project Need	5
LOCATION	5
Description of Upstream Watershed	6
Involvement	7
FLOOD DETECTION	7
Weather Monitoring	7
ALERT Gage Network Monitoring	9
Flood Control District of Maricopa County (FCDMC) Gages	9
Location of Essential Facilities	11
Evacuation Guidance	12
Aguila Flood Response Plan Zones	13
Other Data Sources	14
Available Lead Times	15
Travel Times for Aguila Farm Channel	15
Travel Times for Grass Wash	15
FLOOD THREAT RECOGNITION	16
Major Roadway Crossings	16
Minor Roadway Crossings	16
Structures at Risk within FEMA Flood Hazard Zone	19
Residential Structures at Risk in a FEMA Flood Zone	19
Other Structures at Risk in a FEMA Flood Zone	20
Structures Removed from FEMA Floodplains with Elevation Certificates	20
DISSEMINATION OF INFORMATION	24
EMERGENCY RESPONSE ACTIONS	26
Flood Conditions	26
GREEN ALERT	26
ORANGE ALERT	26

RED ALERT	26
Routine Operational Procedures	28
Routine Operational Procedures Flowchart	29
GREEN ALERT Procedures	30
GREEN ALERT Operational Procedures Flowchart.....	32
ORANGE ALERT Procedures	33
ORANGE ALERT Operational Procedures Flowchart.....	35
RED ALERT Procedures.....	36
RED ALERT Operational Procedures Flowchart.....	38
ALL CLEAR Procedures	39
ALL CLEAR Procedures Flowchart	40
POST FLOOD ACTIONS.....	40
TRAINING, EXERCISES, AND UPDATES	41
REFERENCES.....	44
APPENDIX A - Flood Response Plan Flood Condition Maps.....	A-i
APPENDIX B - Updates to the ARFP	A-i
APPENDIX C -Notification Data	A-i

LIST OF FIGURES

Figure 1 : Aguila Location Map.....	5
Figure 2 : Watershed Location Map.....	6
Figure 3 : Countywide MSP Forecast Zones Map	7
Figure 4 : Aguila MSP Forecast Zones Map.....	8
Figure 5 : Location of ALERT Gages.....	11
Figure 6: Essential Facility Locations.....	12
Figure 7: AFRP Flood ALERT Map Zones	13
Figure 8: AFRP Roadway Crossings	17
Figure 9: Structures Removed from FEMA Floodplain with Elevation Certificate.....	20
Figure 10: Structures in a FEMA Flood Zone (West Map).....	21
Figure 11: Structures in a FEMA Flood Zone (Central Map)	22
Figure 12: Structures in a FEMA Flood Zone (East Map)	23
Figure 13: Flood Threat Recognition Diagram	27
Figure 14 : Routine Operation Procedures Flowchart	29
Figure 15: GREEN ALERT Flowchart	32
Figure 16 : ORANGE ALERT Flowchart	35
Figure 17 : RED ALERT Flowchart	38
Figure 18 : ALL CLEAR Flowchart.....	40
Figure 19: Aguila Farm Channel at Eagle Eye Road Image.....	42

LIST OF TABLES

Table 1: ALERT Gages within the AFRP	10
Table 2 : Travel Times for Aguila Farm Channel.....	15
Table 3 : Travel Times for Grass Wash	15
Table 4: Major Roadway Crossings	16
Table 5: Minor Roadway Crossings	17
Table 6: Locations of Special Flood Vulnerability	18
Table 7: Definitions of FEMA Flood Zone Designations	19
Table 8: Updates to the Aguila FRP.....	B-ii

TERMINOLOGY

Term	Definition
ADPS	Arizona Department of Public Safety
ALERT	Automated Local Evaluation in Real Time
AVFD	Aguila Volunteer Fire Department
District	Flood Control District of Maricopa County
FCDMC	Flood Control District of Maricopa County
FEMA	Federal Emergency Management Agency
FRP	Flood Response Plan
HAZUS	Hazard Mitigation Software from FEMA
MCDEM	Maricopa County Emergency Management
MCDOT	Maricopa County Department of Transportation
MSCO	Maricopa County Sheriff's Office
MSP	Meteorological Services Program
Average Watershed Precipitation	The average recorded rainfall from all ALERT rain gages within the Upper Centennial Watershed

INTRODUCTION

The Flood Control District of Maricopa County (District) provides flood hazard identification, prevention, regulation and remediation to reduce the risk of injury, loss of life and property damage from flooding in the County. The purpose of this comprehensive Flood Response Plan (FRP) is to ultimately reduce the potential for property damage and loss of life resulting from floods in and near Aguila, Arizona.

Project Need

Aguila is subject to future floods that can occur with little warning. This is a remote community within Maricopa County and regional coordination is extremely important. Readiness measures and warning actions taken in advance of flooding are essential to safeguard lives and property. This FRP provides a means to coordinate the District's flood data collection and monitoring activities with the emergency response activities specific to flooding.

LOCATION

Aguila is a CDP (Census-designated place) in Maricopa County, Arizona. It is located on U.S. Route 60 approximately 25 miles west of Wickenburg (Figure 1).

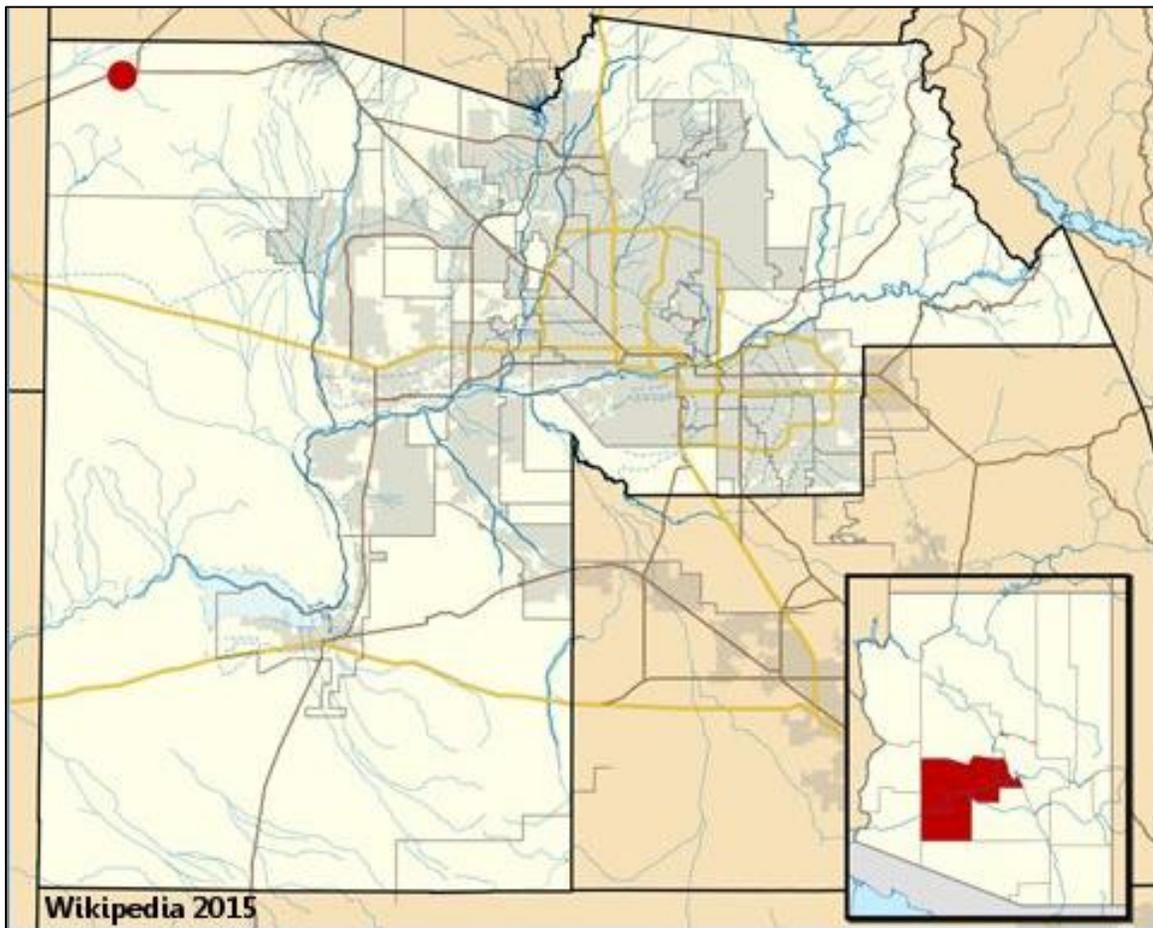


Figure 1 : Aguila Location Map

Description of Upstream Watershed

Aguila is located in the Upper Centennial Watershed (Figure 2). Water generally flows in a northeast to southwest direction through Aguila. The main watercourse that runs through this watershed is Centennial Wash. Centennial Wash flows generally in a southwest direction from Yavapai County into Maricopa County and then into La Paz County. At the Town of Salome, in La Paz County, Centennial Wash turns and heads in a southeast direction back into Maricopa County. The watercourse eventually terminates at the Gila River.

The Upper Centennial Basin is bounded on the north by the Harcuvar and Date Creek Mountains and on the south by the Harquahala and Vulture Mountains. Centennial Wash flows in a southwesterly direction through the McMullen Valley before making an abrupt turn near Salome and continuing in a southeasterly direction to the Narrows Damsite rain gage (#5150). A majority of the Upper Centennial Basin remains in a natural state and is currently only impacted by minor flood control measures, highways, railroads and irrigated cropland.

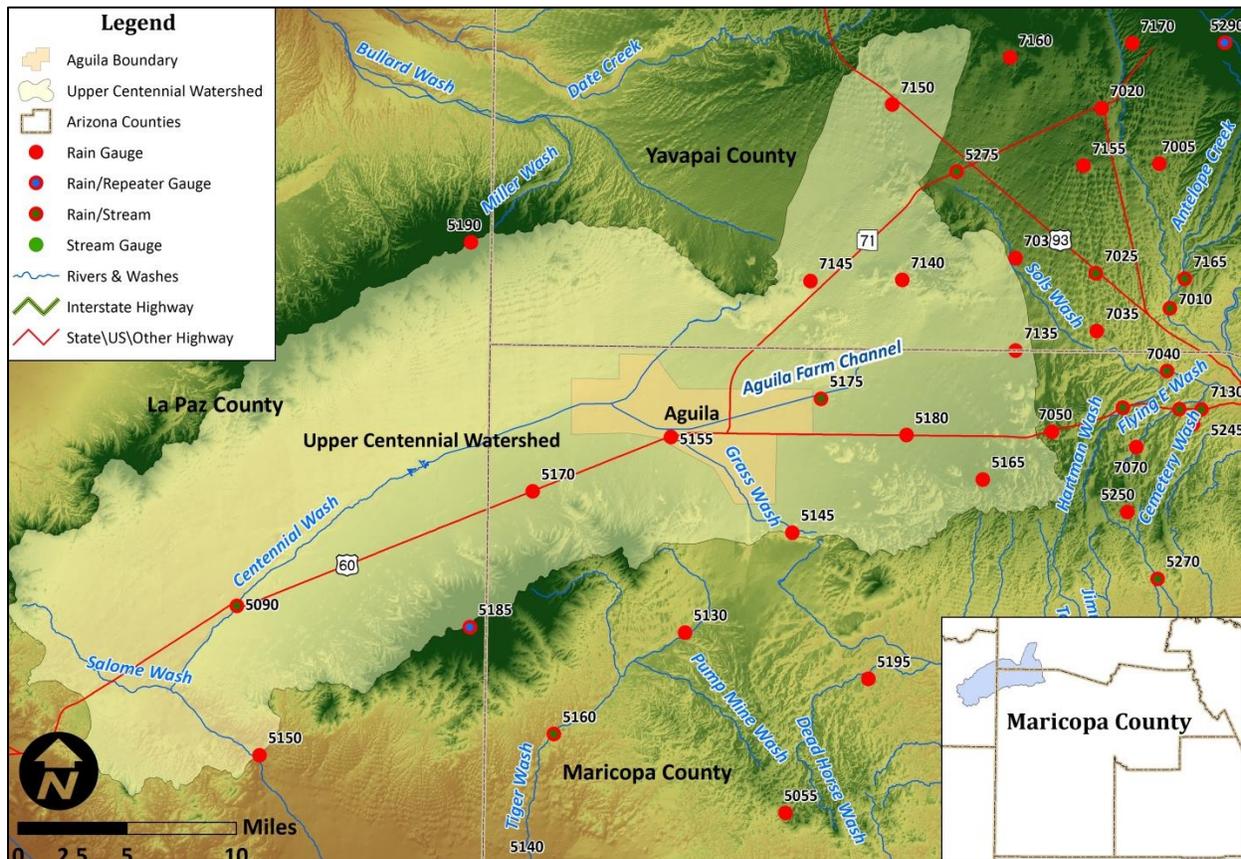


Figure 2 : Watershed Location Map

Involvement

This FRP will involve special coordination with Aguila Volunteer Fire Department, Aguila Elementary School, Martori Farms, Maricopa County Department of Transportation, Maricopa County Sheriff's Office, Arizona Department of Transportation, Maricopa County Department of Emergency Management, Arizona Division of Emergency Management, Arizona Department of Public Safety, American Red Cross, The Salvation Army, Arizona & California Railroad and possibly other agencies and responders, as applicable.

FLOOD DETECTION

The District provides early warning to agencies and responders through weather monitoring and an elaborate ALERT gage network. The District's ALERT gage network provides real-time data for rainfall, streamflow, water levels, and weather information 24 hours a day 365 days a year. All of this information is easily accessible via the District's website: <http://www.fcd.maricopa.gov/Weather/Rainfall/raininfo.aspx>.

Weather Monitoring

The District's in-house meteorologist monitors satellite data, radar data, National Weather Service (NWS) products and other tools to develop rainfall forecasts for the County. The forecasts are used as an early "heads up" for flood threat within the County. The daily weather outlook is prepared and posted at <http://www.fcd.maricopa.gov/Weather/outlook.aspx> each afternoon for the subsequent 24 hours, covering all Meteorological Services Program (MSP) Forecast Zones (Figure 3). If requested, these forecasts are made available to local jurisdictions by fax or email notification. Aguila falls within the Upper Centennial MSP Forecast Zones (See Figure 4).

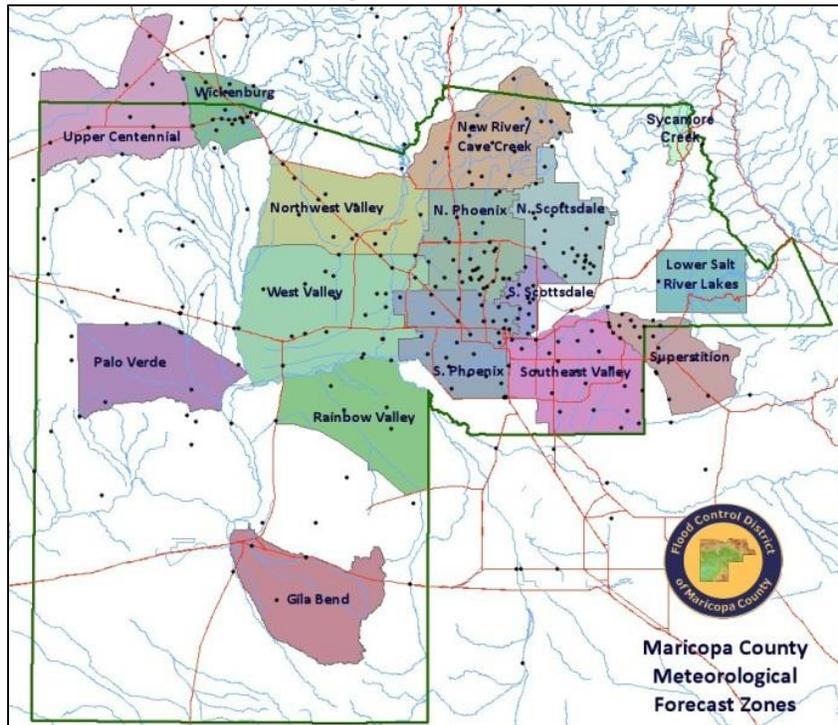


Figure 3 : Countywide MSP Forecast Zones Map

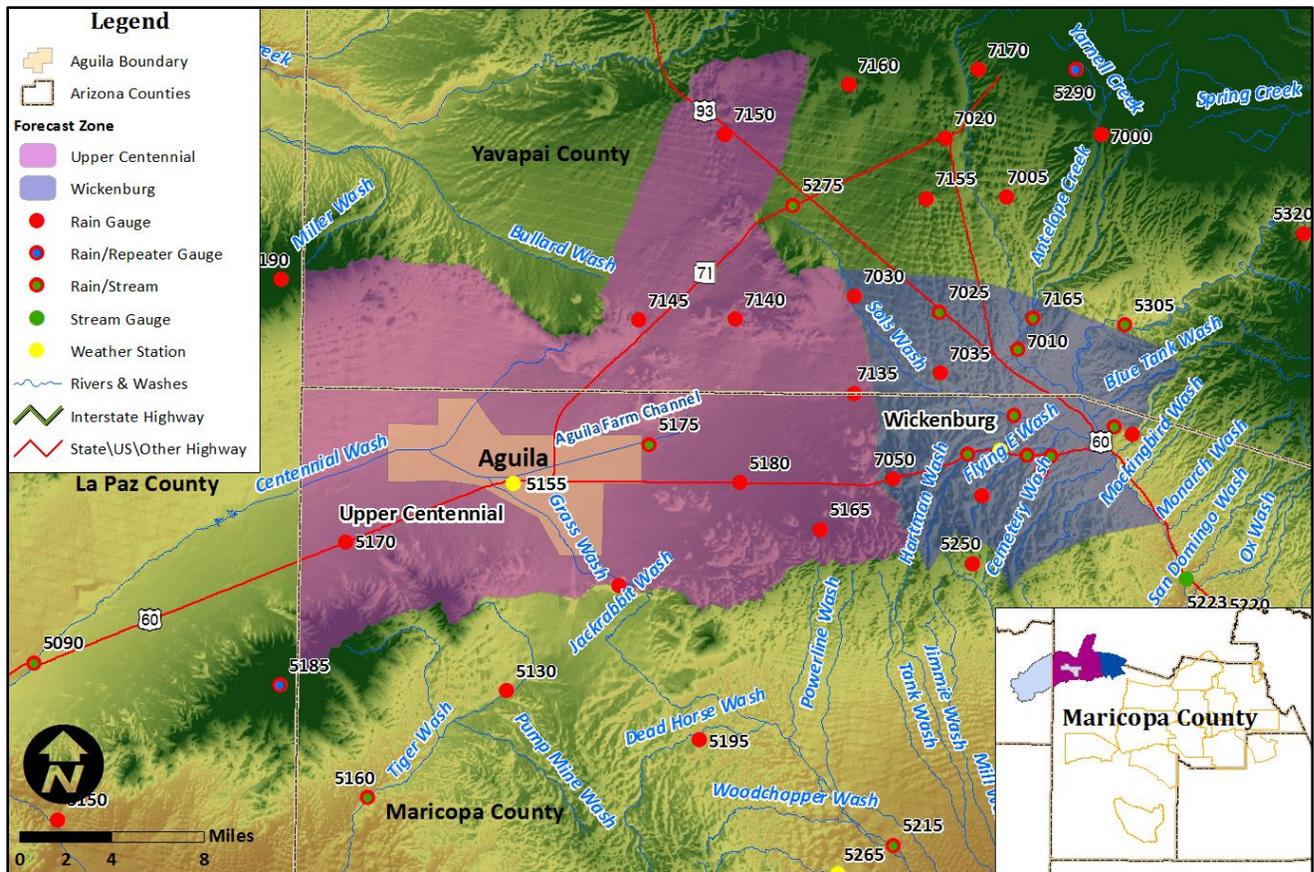


Figure 4 : Aguilá MSP Forecast Zones Map

According to the District’s MSP Standard Operating Procedure, if meteorological conditions warrant, the following messages are delivered for individual zones:

District Meteorological Services Program (MSP) Standard Operating Procedure:

Weather Outlook The Daily Outlook will be disseminated to all clients Monday through Friday (daily during monsoon season), between 1:00 pm and 1:30 pm. In addition, from about October 1 to July 1, a preliminary Outlook is issued around 8:00 am Monday thru Friday. Outlooks include synopsis of expected weather conditions for the remainder of the day, the coming night and the following morning. Expected weather trends for the following 2-3 days and expected wind conditions will also normally be included in the synopsis portion of the Outlook if time and space permits. The Outlook also includes the expected hours the bulk of the rain will fall, the probability of rain during this time and the amount of rain expected during this period.

Message 1 Developing weather conditions may lead to flooding and/or destructive winds. Lead times will generally be 1 to 3 hours in advance of the expected event. The alert will normally include the zones to be affected, the time frame of the expected event, and the type of areas that will be impacted- such as roads, washes, or streams.

Message 2 Developing weather event may lead to flash flooding. This message is similar to NWS Flood Watch. Lead time will generally be 1 to 2 hours in advance of the expected event.

Message 3 Flash flooding is imminent or occurring. This message is similar to a NWS Flood or Flash Flood Warning. Lead time will generally be less than an hour. The magnitude of flooding is variable – a Message 3 does not necessarily signify major flooding.

Message 4 ALL CLEAR. Event no longer poses a threat and previous messages have expired or have been cancelled.

Message 1, 2 & 3 Update These messages will update the existing Alert, Watch or Warning.

Lake Alerts In addition to the above MSP products, weather guidance is provided for Maricopa County lakes/reservoirs from June 15th through October 15th. Lake Alerts are issued as needed to inform of approaching adverse weather conditions. Emphasis in these statements is placed on expected wind gusts and lightning activity.

Track Forecast At times the depiction of expected thunderstorm movement may best be shown by a graphic, including location of the primary thunderstorms of concern, and a 1-hour forecast track of these storms.

Quantitative Precipitation Forecast (QPF) This graphical product may be issued when the forecaster believes he has a good grasp as to how much rain will fall, where it will fall and when it will fall (valid time).

ALERT Gage Network Monitoring

The District monitors a sophisticated network of automatic rain gages, stream gages, and weather stations in and around Maricopa County. The network uses ALERT (Automated Local Evaluation in Real Time) technology to detect and monitor rainfall and runoff during storms. The system is monitored continuously (24/7) by using threshold alarm features available onsite or by remote notification and access.

Flood Control District of Maricopa County (FCDMC) Gages

Lists of ALERT gages located near Aguila and/or within contributing watersheds with their specific alarm values, are listed below in Table 1. See Figure 5 for a map of the ALERT Gage Locations.

ALERT Gages within AFRP					
Gage Name	Location	Owner	ID #	Type	Alarm Value
Narrows Damsite	5 mi. SE of Salome of Salome Hwy	FCDMC	5150	Precip	N/A
			5090	Precip	N/A
Centennial Wash at Wenden	5.5 mi. NE of Salome on US 60 Bridge	FCDMC	5093	Stream	2.0 ft. / 675 cfs 6.0 ft. / 7,475 cfs 7.0 ft. / 10,435 cfs
Harquahala Mountain	Top of Harquahala Mtn., 36 miles WSW Wickenburg	FCDMC	5185	Precip/Repeater	N/A
Gladden	US60 at Gladden. 34 mi. W of Wickenburg	FCDMC	5170	Precip	N/A
Smith Peak	Harcuvar Mtns, 13 mi. NW of Aguila in La Paz County	FCDMC	5190	Precip/Repeater	N/A

Gage Name	Location	Owner	ID #	Type	Alarm Value
Aguila VFD	Aguila Volunteer Fire Dept.	FCDMC	5155	Precip/Weather	2 in. / 24 hours 1 in. / 3 days
			5158	Temperature	N/A
			5149	Dewpoint	N/A
			5157	Humidity	N/A
			5159	Wind Direction	N/A
			5152	Wind Speed	N/A
			5154	Peak Wind	N/A
Upper Tiger Wash	11 mi. S of Aguila off Eagle Eye Road	FCDMC	5130	Precip	N/A
Upper Grass Wash	7 mi. SE Aguila	FCDMC	5145	Precip	2 in. / 24 hours 1 in. / 3 day`s
Centennial Wash nr Aguila	5 mi. NNE of the US60/SR71 JCT	FCDMC	5175	Precip	2 in. / 24 hrs 1 in. / 3 days
			5178	Stream	3.2 ft. / 500 cfs 4.0 ft. / 1,015 cfs 5.0 ft. / 1,845 cfs
Centennial Wash	19 mi. W of Wickenburg	FCDMC	5180	Precip	2 in. / 24 hours 1 in. / 3 days
Outlaw Hill	S of US60, 14 mi. E of Aguila	FCDMC	5165	Precip	2 in. / 24 hours 1 in. / 3 days
Black Mountain	Along US60, 9 mi. W of US60/US93	FCDMC	7050	Precip	1.25 in. / 1 hour 2 in. / 24 hours 1 in. / 3 days
Centennial Divide	7 mi. W of US89/US93 JCT	FCDMC	7135	Precip	1.25 in. / 1 hour 2 in. / 24 hours 1 in. / 3 days
Sols Tank	6.3 mi. WNW of the US93/US89 JCT	FCDMC	7030	Precip	1.25 in. / 1 hour 2 in. / 24 hours 1 in. / 3 days
Ritter Dam	9 mi. NE Aguila	FCDMC	7140	Precip	2 in. / 24 hours 1 in. / 3 days
Wood Tank	8 mi. NE of Aguila	FCDMC	7145	Precip	2 in. / 24 hours 1 in. / 3 days
Joshua Tree	4.5 mi. NW of the SR71/US93 JCT	FCDMC	7150	Precip	2 in. / 24 hours 1 in. / 3 days
Sols Wash at SR 71	1 mi. W of SR71 and US93, 16 mi. NW of Wickenburg	FCDMC	5275	Precip	0.75 in. / 1 hour 1.25 in. / 1 hour
			5276	Stream	1.5 ft. / 260 cfs 5.0 ft. / 2,065 cfs 6.0 ft. / 2,910 cfs

Table 1: ALERT Gages within the AFRP

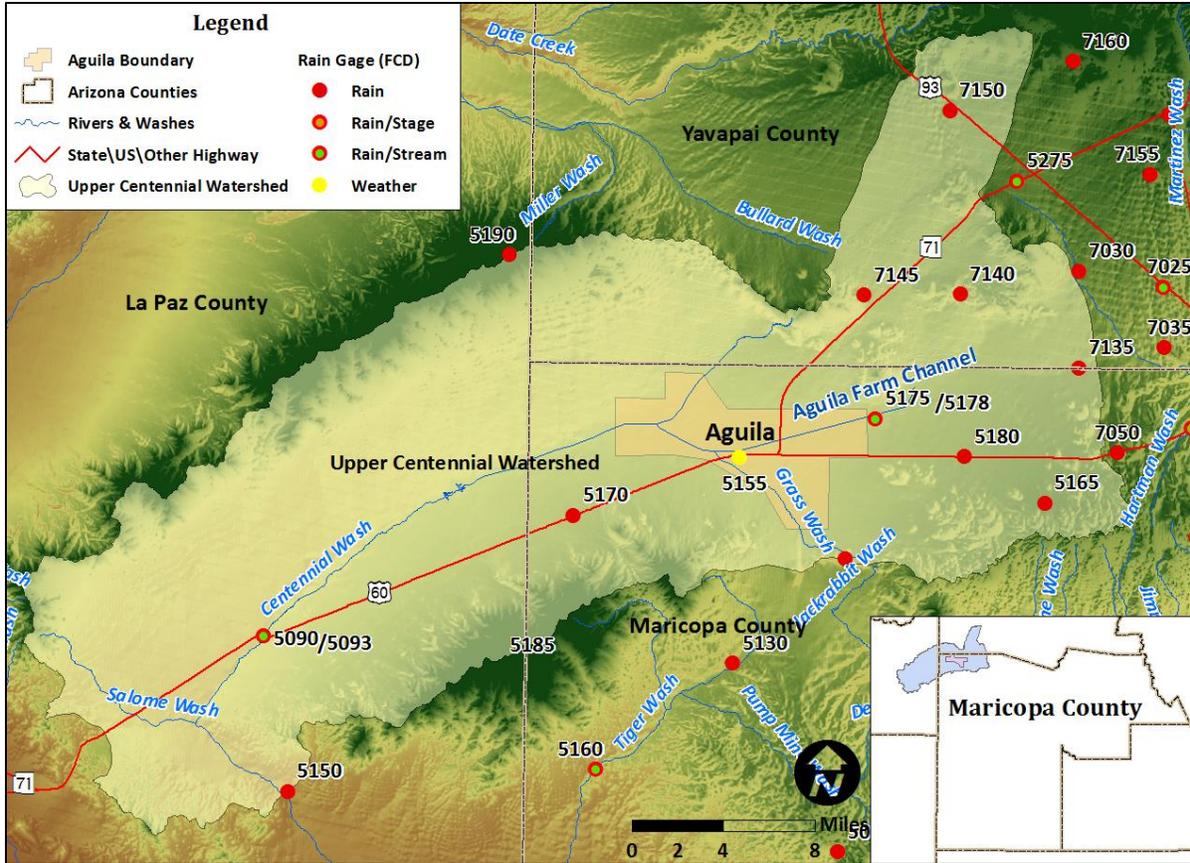


Figure 5 : Location of ALERT Gages

Location of Essential Facilities

During a flood event it is important to know the location of essential facilities. Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. Aguila has one volunteer fire station and one elementary school (Figure 6).

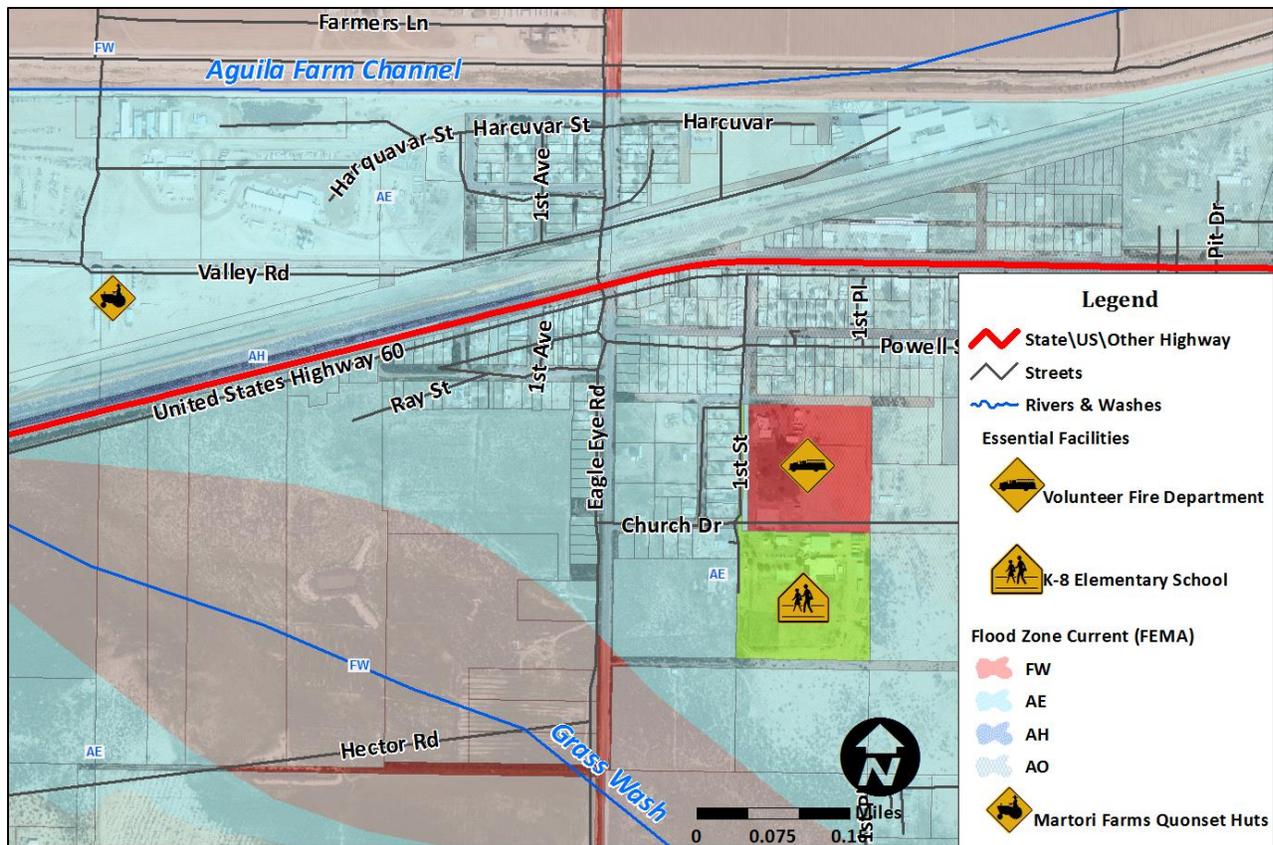


Figure 6: Essential Facility Locations

Evacuation Guidance

If an evacuation has been declared for Aguilá by emergency response agency personnel, there are two areas that may serve as temporary emergency gathering points: the Aguilá Volunteer Fire Station and the Aguilá Elementary School (Figure 6).

Residents should proceed to the Aguilá Volunteer Station, located on the southeast corner of 1st and Ray Street, where instructions will be provided about the evacuation process. All staff, teachers and students at the Aguilá Elementary School should proceed to the school gymnasium located at 50023 North 514th Avenue. The School will be in communication with the Incident Commander at the Incident Command Post for information and updates.

These locations have been identified as being located in FEMA designated Zone AE and have the potential to be impacted during a flood event. Zone AE is defined as an area that has a 1% chance of being flooded any given year. The Aguilá Elementary School gymnasium has an elevation certificate that shows the top of the reference level floor has an elevation 1 foot above the base flood elevation (<http://www.fcd.maricopa.gov/ec/EC-00015.pdf>). The Aguilá Volunteer Fire Station has been identified by the Fire Chief and Volunteers as a community temporary emergency gathering point. The District's Floodplain Management Division completed a Flood Hazard – Flood Insurance Rate MAP (FIRM) Information document for the Fire Station which is located in Appendix F of the AFRP Technical Addendum.

Each of these temporary gathering areas needs to be in constant communication with the Incident Commander at the Incident Command Post (Aguila Emergency Operations Center) located at AVFD. MCSO will monitor these locations during a flood event. If at any point these temporary gathering points become unsafe, alternative evacuation plans need to be formulated by the appropriate emergency response personnel. If any of these locations are deemed unsafe, an alternate shelter location and transportation needs to be arranged. MCDEM will coordinate with Aguila Incident Command Post, American Red Cross and the Arizona of Division of Emergency Management.

Martori Farms will also need to be in communication with the Incident Command Post for information and updates. MCSO and Martori staff will monitor the Farm during a flood event and either may notify the Incident Command Post if an evacuation may be necessary. The Incident Commander is responsible for notifying MCDEM who will coordinate with American Red Cross and Arizona Division of Emergency Management.

Aguila Flood Response Plan Zones

The AFRP has been divided into three different zones; west, central and east. These three zones have similar geography, flooding sources and rural settings. They were created to easily display all the elements necessary on the FRP maps. Appendix A has the detailed maps for all three zones. Figure 7 below shows the boundaries of these zones.

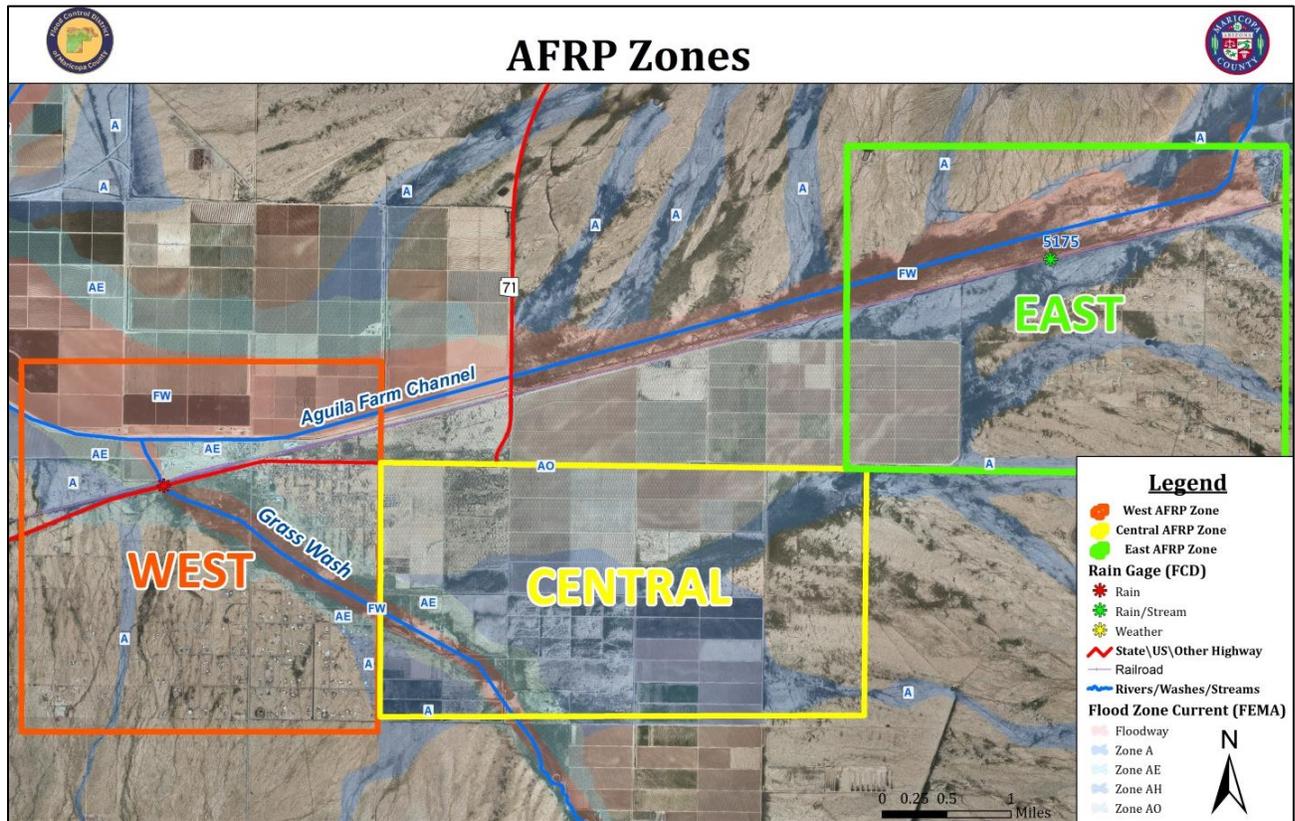


Figure 7: AFRP Flood ALERT Map Zones

Other Data Sources

Many additional data sources are available online that help provide information about the weather and flooding conditions in Maricopa County and throughout Arizona. The District is a partner with Arizona Flood Warning System (<http://www.afws2.org>). The National Weather Services' Phoenix Forecast Office issues meteorological and hydrological forecasts and warnings to the public and to local jurisdictions (<http://www.wrh.noaa.gov/psr>). The Colorado Basin River Forecast Center (CBRFC) in Salt Lake City, Utah, prepares forecasts using computer-based river forecast models (<http://www.cbrfc.noaa.gov>). The United States Geological Survey also operates an elaborate network of rain and stream gages (<http://water.usgs.gov/>) as well as Yavapai County Flood Control District <http://weather.ycflood.com/>.

FCDMC offers numerous products on our website and they are available 24/7.

A list of some of our products specific to Aguila are listed below:

- The Aguila Flood Response Plan Information Map is located at <http://alert.fcd.maricopa.gov/alert/Google/v3/aguila.html>. See [Appendix D](#) for the AFRP Information Map Standard Operating Procedure.
- The Flood Condition Maps are located at http://alert.fcd.maricopa.gov/alert/Google/docs/afrpmap_west.pdf, http://alert.fcd.maricopa.gov/alert/Google/docs/afrpmap_central.pdf and http://alert.fcd.maricopa.gov/alert/Google/docs/afrpmap_east.pdf.

Available Lead Times

Early flood detection is one of the most important aspects to being able to provide an early warning to communities and their residents. When a threshold value has been met at a sensor, the District’s ALERT software sets off an alarm. This alarm alerts an operator to a hazardous condition. By monitoring the streamgages the District is able to estimate travel times from when the water is at the gage to when it will reach a particular road crossing. Certain road crossings are more vulnerable to flooding and need to be barricaded during an event to prevent injury, property damage or loss of life. The following tables present calculated travel times for selected discharge values along the major streams in the study area. Specific locations and travel times are displayed on the AFRP FLOOD ALERT Maps located in [APPENDIX A](#).

Travel Times for Aguila Farm Channel

Aguila Farm Channel collects flood flows north of the Arizona & California Railroad in northwestern Maricopa County and conveys them westerly across Aguila Farm Channel to Grass Wash. The Centennial Wash near Aguila #5178 stream gage is located just west of Forepaugh Park Rd along the Railroad/Channel. The current conditions graphic for the Centennial Wash near Aguila stream gage is located at <http://alert.fcd.maricopa.gov/alert/Flow/5178.htm>. There are multiple rain gages upstream to help estimate rainfall/runoff potential.

Aguila Farm Channel			
Location	100 - year Discharge (cfs)	Velocity (ft./sec)	Time (min)
Aguila Farm Channel stream gage (#5178) to Eagle Eye Road	19,300	2.6	75
Aguila Farm Channel stream gage (#5178) to Grass Wash	16,900	3.2	88

Table 2 : Travel Times for Aguila Farm Channel

Travel Times for Grass Wash

Grass Wash flows northwesterly through Aguila to its confluence with Centennial Wash in northwestern Maricopa County. There is currently no stream gage located along this wash. There are two rain gages; Upper Grass Wash and Aguila VFD.

Grass Wash			
Location	100 - year Discharge (cfs)	Velocity (ft./sec)	Time (min)
Grass Wash at Eagle Eye Road to US 60 (0.8 miles)	11,100	2.5	28
Grass Wash at NW corner of Section 24, T7N, R9W which is Black Eagle Road/507 th Ave & Alvin Rd to US 60 (1.9 miles)	7,500	3.1	54
Grass Wash at SE corner of Section 25, T7N, R9W which is 499 th Ave and Pete Rd to US 60 (3.3 miles)	4,870	2.6	112

Table 3 : Travel Times for Grass Wash

FLOOD THREAT RECOGNITION

This section of the FRP will define major roadway crossings, minor roadway crossings and locations that have a 1-percent annual chance of being inundated by flood waters. This is also referred to as the base flood or 100-year flood. There are particular road crossings noted within this FRP that are vulnerable to dangerous flooding. At any point in a storm event road crossings may become impassable and alternate routes may need to be taken by pedestrians, residents, and emergency vehicles to access a particular crossing. Some of the crossings are low flow pedestrian/bike paths and some are along major roadways. These crossings on major roadways need to be barricaded in a timely manner to prevent motorists from trying to cross the wash. The responsibility of maintaining, monitoring and barricading these roads lies with the road owner. Specific tasks are detailed in the [Emergency Response Actions](#) section of this FRP, the Flowcharts for **GREEN ALERT**, **ORANGE ALERT** and **RED ALERT**, and AFRP FLOOD ALERT Maps located in [APPENDIX A](#).

Major Roadway Crossings

Major roadway crossings are defined as road crossings that have a combination of being highly travelled, have a high discharge (cubic feet per second) value or have a high velocity (feet per second) value. High flows in these watercourses can make particular crossings very dangerous during a flood event. Locations of major roadways that are vulnerable to flooding are identified in Table 4. The Average Daily Traffic (ADT) count was provided by Maricopa County Department of Transportation (MCDOT) and Arizona Department of Transportation (ADOT). The ADT Count Data is from 2013 and the discharge below was estimated using FEMA Flood Insurance Studies. For the AFRP a major roadway has been defined as any road that has an ADT greater than 450 total cars per day.

Major Roadway Crossings						
Crossing	River/Wash Name	Type of Crossing	Owner	ADT	Design Capacity	FEMA Discharge (Q)
US 60	Grass Wash	Bridge	ADOT	1,524	N/A	10 yr = 3,340 cfs 50 yr = 8,660 cfs 100 yr = 11,100 cfs
SR 71	Aguila Farm Channel North	Box Culvert (4 - 5'x4')	ADOT	498	N/A	10 yr = 4,880 cfs 50 yr = 16,400 cfs 100 yr = 21,700 cfs
SR 71	Aguila Farm Channel	Culvert (4 - 6' diameter)	ADOT	498	N/A	10 yr = 3,620 cfs 50 yr = 12,700 cfs 100 yr = 16,900 cfs

Table 4: Major Roadway Crossings

Minor Roadway Crossings

Minor roadway crossings are defined as road crossings that have a decreased level of traffic compared to a major roadway. These roads can still have high discharge (cubic feet per second) values and/or high velocity (feet per second) values. They are at-grade crossings that pose a very real danger to motorists (an at-grade crossing is defined as a point on the roadway that is periodically inundated by moving floodwaters). Locations of minor roadways that are vulnerable to flooding are identified in Table 5. For the AFRP a minor roadway has been defined as any road that has an ADT of less than 450 total cars per day. The discharge values in the table below were estimated using FEMA Flood Insurance Studies.

In a continuous effort to reduce the risk of injury and death to Maricopa County residents due to flooding, the Flood Control District of Maricopa County (FCDMC) and Maricopa County Department of Transportation (MCDOT) have established the MCDOT Flooded Roadway Response Program (MFRRP). Together we identified hazardous road crossings that need to be barricaded in storm events. Eagle Eye Road has two unbridged road crossings that are vulnerable to flooding. These crossings are at Grass Wash and Aguila Farm Channel which are bold in Table 5 below. On the Aguila FRP Information Map, these locations will be displayed as a green dot. When the Centennial Wash near Aguila stream gage (#5178) reaches a set criteria, the green dot will turn red. When this happens the wash crossing should be CLOSED. MCDOT barricade crews are sent to these particular locations. See Figure 8 for a map of all major and minor road crossing locations.

Minor Roadway Crossings					
Crossing	River/Wash Name	Type of Crossing	Owner	2013 MCDOT ADT	FEMA Discharge (Q)
Eagle Eye Road	Aguila Farm Channel	Unbridged	MCDOT	N/A	100 yr = 16,900 cfs
W Valley Road	Grass Wash	Ponding	MCDOT	N/A	100 yr = 11,100 cfs
Railroad	Grass Wash	Bridge	Railroad	N/A	100 yr = 11,100 cfs
Eagle Eye Road	Grass Wash	Unbridged	MCDOT	NB - 239 SB - 184 Total - 423	100 yr = 11,100 cfs
W Alvin Road	Grass Wash	Unbridged	MCDOT	N/A	100 yr = 4,870 cfs
507 th Avenue	Grass Wash	Unbridged	MCDOT	N/A	100 yr = 4,870 cfs
Centennial Drive	Grass Wash	Unbridged	MCDOT	N/A	100 yr = 4,870 cfs
491 st Avenue & Alvin Road	Tributary of Grass Wash	Unbridged	MCDOT	N/A	N/A

Table 5: Minor Roadway Crossings

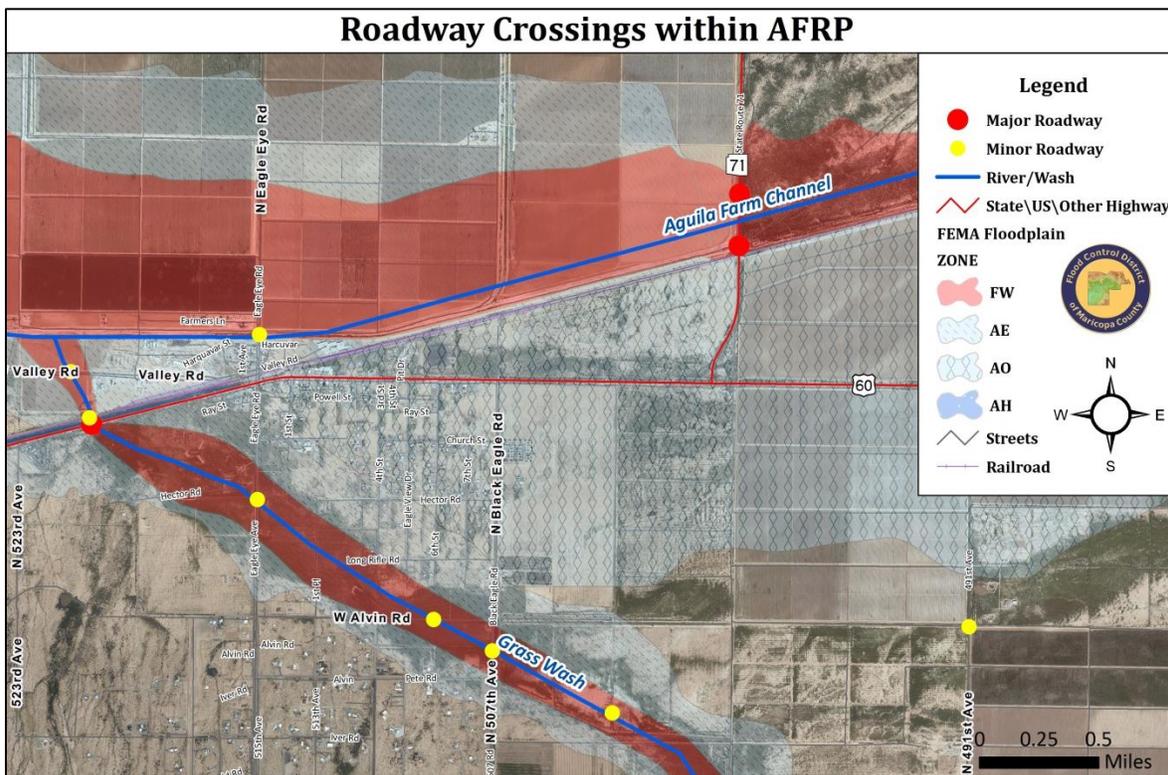


Figure 8: AFRP Roadway Crossings

Locations of Special Flood Vulnerability

There are other areas of concern besides roadways within Aguila. A list of specific areas of flood vulnerability within Aguila is presented in Table 6. **Note: These may not be every location of flood vulnerability during a large flood event. The locations that have been identified are all along FEMA Mapped Floodplains.**

Location of Special Flood Vulnerability	
Location	Concern
Aguila Elementary School	The school has recreational fields that are located in the floodplain. These recreational fields may be in use when school is not in session. This location is used as a temporary emergency gathering location. It is in a FEMA Floodplain Zone AE and has the potential to be flooded.
Martori Farms	There are fields and packing facilities that are located in the floodplain. The Farm is in a FEMA Floodplain Zone AE and has the potential to be flooded.
Volunteer Fire Station	The fire station has a park, soccer field and softball field on its property. These recreational facilities are located in the floodplain. This location is used as a temporary emergency gathering location. It is in a FEMA Floodplain Zone AE and has the potential to be flooded.

Table 6: Locations of Special Flood Vulnerability

Structures at Risk within FEMA Flood Hazard Zone

There are a total of three hundred thirty four (334) structures within the Aguila FRP that are located within a FEMA designated Flood Hazard Zone. These flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. Each Zone reflects a severity or type of flooding in the area. For this FRP, all the structures within the High Risk Areas, including Zones FW, AE and A1-A30, and Zone AO, have been documented because in these areas mandatory flood insurance purchase requirements apply. Below is a table with the definitions of the FEMA Zone Designations.

Definitions of FEMA Flood Zone Designations	
Zone	Description
High Risk Areas	
Zone AE and A1-A30	Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by detailed methods of analysis. In most instances, Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AH	Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding with a constant water-surface elevation (usually areas of ponding) where average depths are between 1 and 3 feet. The Base Flood Elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
Zone AO	Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from the detailed hydraulic analyses are shown within this zone. In addition, alluvial fan flood hazards are shown as Zone AO on the Flood Insurance Rate Map. Mandatory flood insurance purchase requirements apply.
Moderate to Low Risk Areas	
Zone X (shaded)	Zone X is an area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Also used to designate floodplains of lesser hazards, such as areas protected by levees from 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile. Flood insurance purchase requirements do not apply.

Table 7: Definitions of FEMA Flood Zone Designations

Residential Structures at Risk in a FEMA Flood Zone

There are a total of two hundred forty seven (247) parcels with residential structures within a FEMA Flood Zone. Of these 247 parcels, three are residential duplexes; four are motels; five are mixed residential (containing 2 or more mixed residential buildings); thirty one are mobile home parks (total parcels); ninety seven are residential mobile homes; and one hundred and eight are single family residential homes. These residential structures may be prone to ponding and/or shallow flow during a 100-year event. During an event these areas need to be monitored closely and if any people are within the floodplain they need to be informed of the possible danger during a flood event. For a complete list of all the residential structures in a FEMA Floodplain see Table 1 in the AFRP Technical Addendum. For maps showing the locations of all structures in a FEMA Floodplain see Figures 10-12.

Other Structures at Risk in a FEMA Flood Zone

In addition to the residential structures listed above, there are also eighty-six (86) parcels with other structures within the FEMA Flood Zones. These zones include A, AE, and AO Zones. These areas will have ponding and/or shallow flow during a 100-year event. During an event these areas need to be monitored closely and if any people are within the floodplain they need to be informed of the possible danger during a flood event. These structures include but are not limited to Churches, Utilities, Commercial Property, Railroads, a Fire Station, a Library, Restaurants, and sheds. For a complete list of all other structures in a FEMA Floodplain see Table 2 in the AFRP Technical Addendum. For maps showing the locations of all structures in a FEMA Floodplain see Figures 10-12.

Structures Removed from FEMA Floodplains with Elevation Certificates

The National Flood Insurance Program (NFIP) Elevation Certificate (EC) is an administrative tool of the NFIP which is to be used to provide elevation information necessary to ensure compliance with community floodplain management ordinances, to determine the proper insurance premium rate, or to support a request for a Letter of Map Amendment (LOMA).

In addition to the structures listed above, there are an additional 44 parcels that have approved Elevation Certificates. The total amount of elevation certificates in the AFRP is 50 because four of these parcels have multiple structures on them. All the addresses, parcel numbers and elevation certificates are listed in the Table 3 in the AFRP Technical Addendum. These parcels have been excluded from the total building count above because they have met the base flood elevation requirement for the 100-year event. During an extreme event, these parcels and structures do have the potential to also be at risk. For a map showing the locations of the structures with elevation certificates see Figure 9.

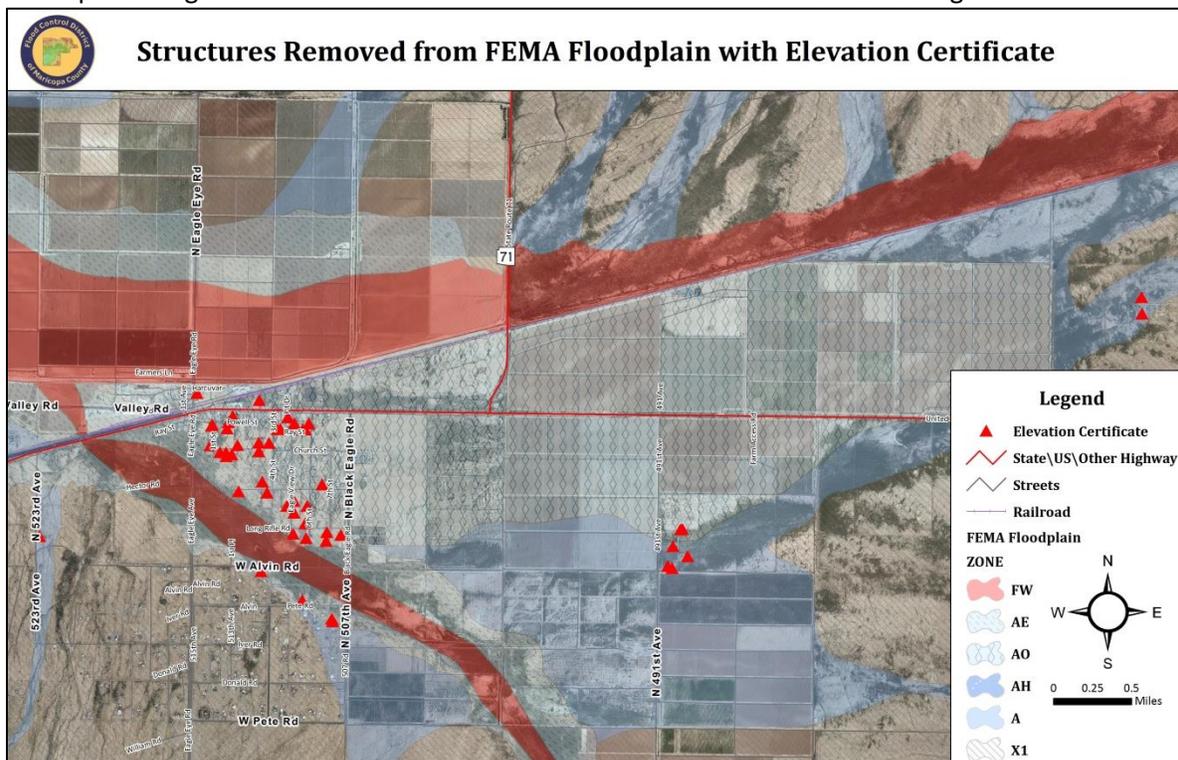


Figure 9: Structures Removed from FEMA Floodplain with Elevation Certificate



Structures in a FEMA Flood Zone - West

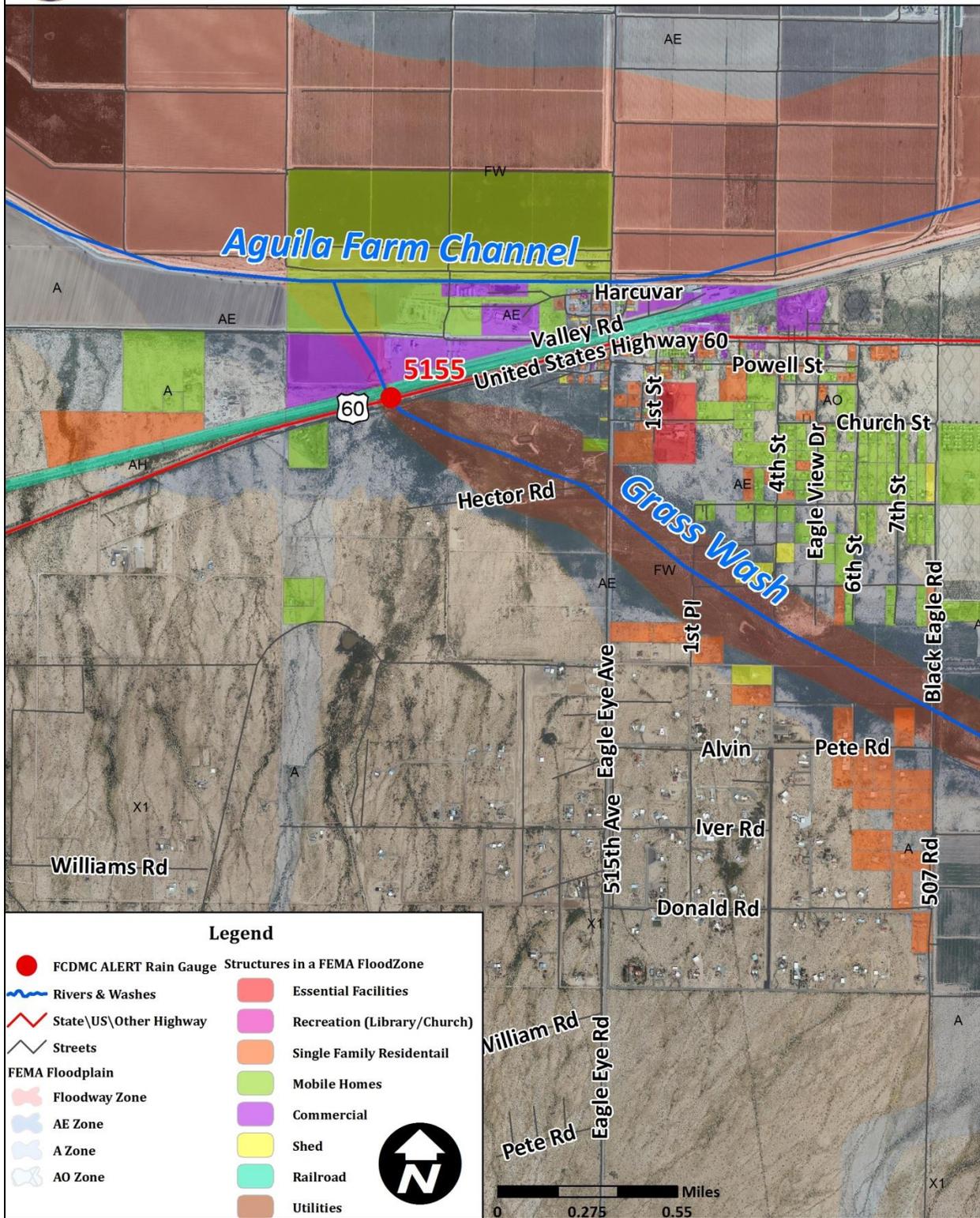


Figure 10: Structures in a FEMA Flood Zone (West Map)



Structures in a FEMA Flood Zone - Central

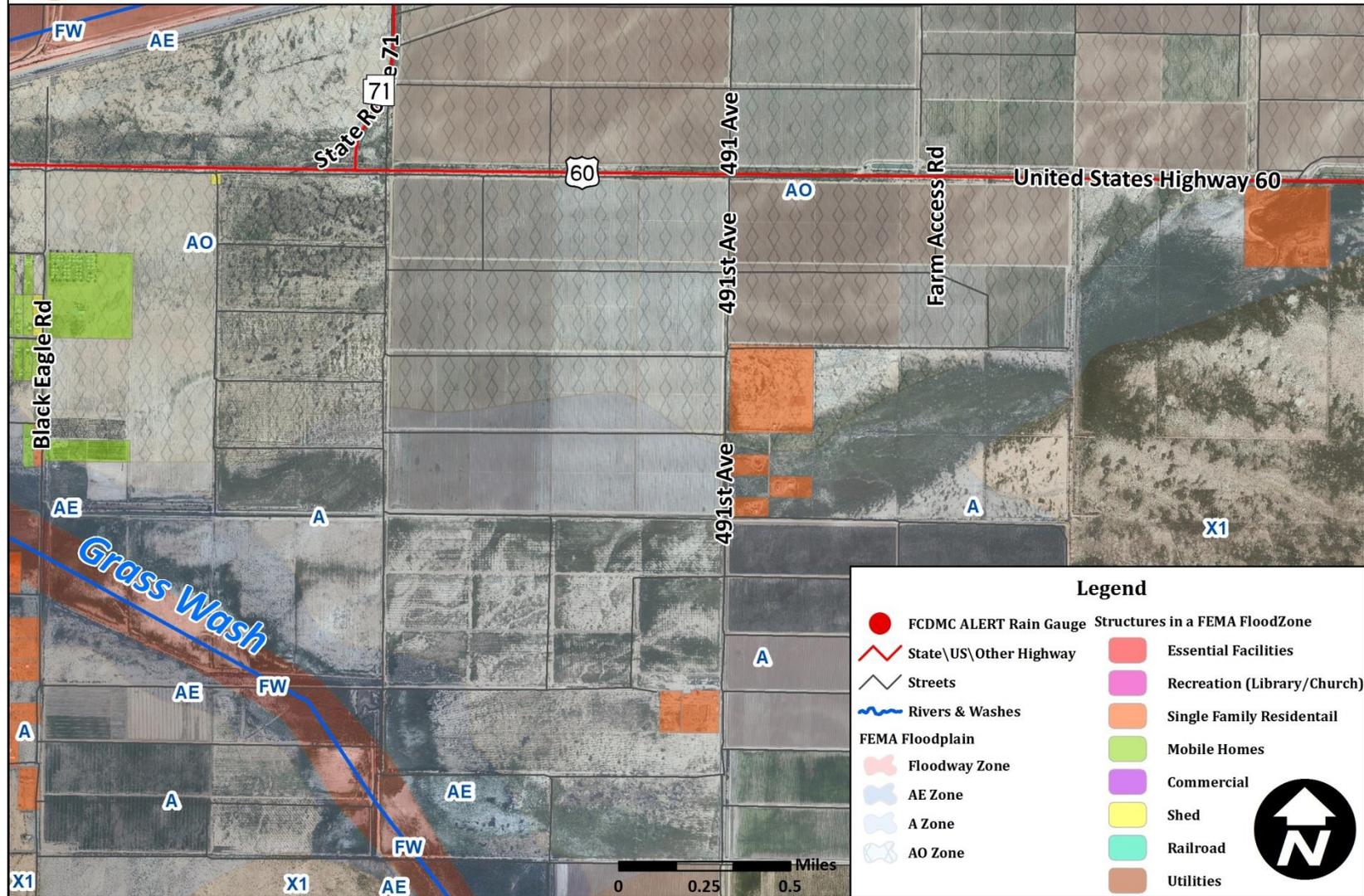


Figure 11: Structures in a FEMA Flood Zone (Central Map)



Structures in a FEMA Flood Zone - East

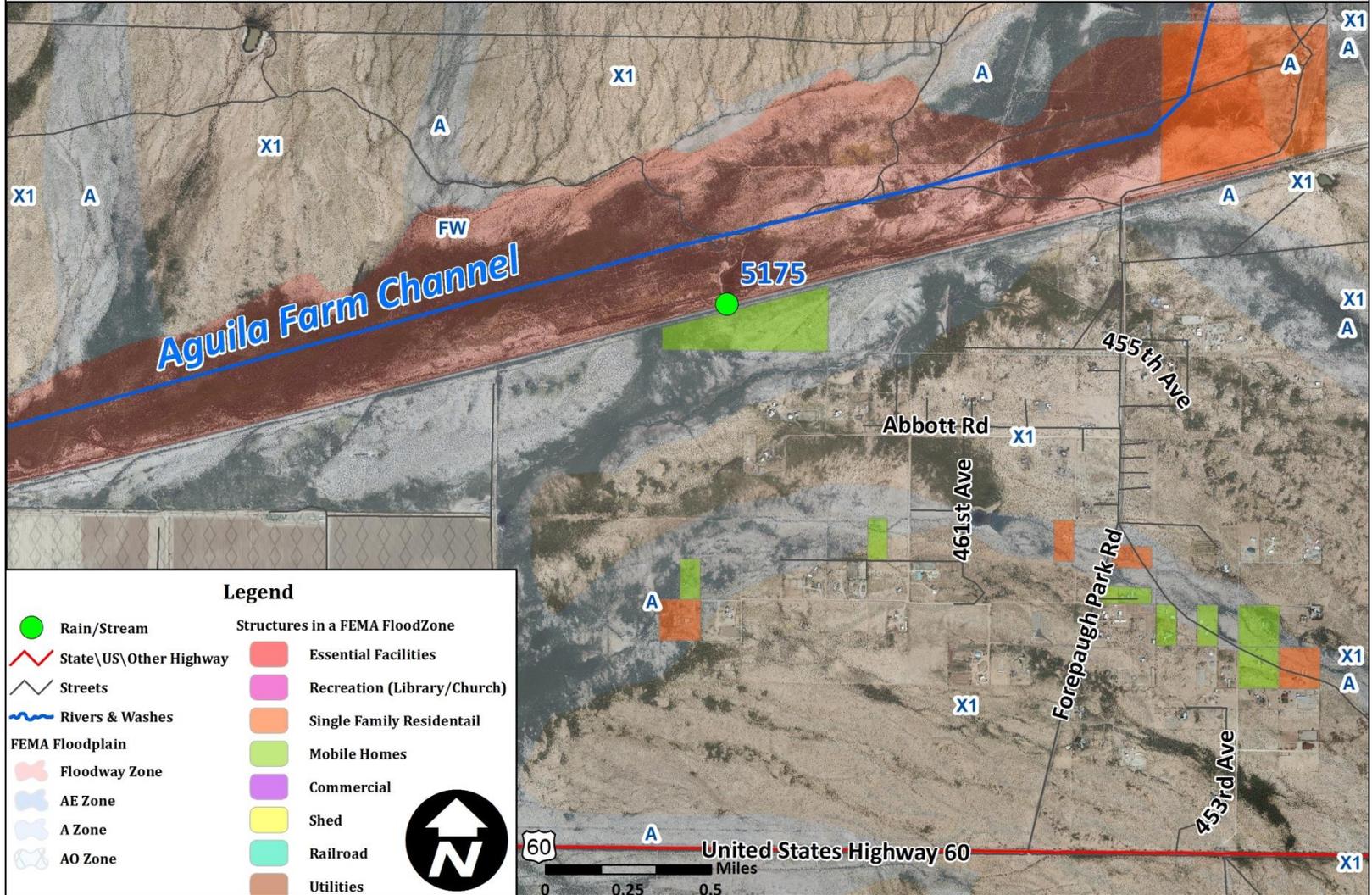


Figure 12: Structures in a FEMA Flood Zone (East Map)

DISSEMINATION OF INFORMATION

Good communication among the participating agencies is critical to the success of the Aguila FRP. The responsibilities of the entities involved are identified below.

District Responsibilities

An important function of the District is to monitor rainfall and runoff conditions through its county-wide real-time flood detection and data collection network to support its flood control facilities and local jurisdictions within the County. While not responsible for notifying the citizens in and around Aguila of potential or occurring flooding within the Upper Centennial Watershed, the District will provide available weather and flooding information to Aguila emergency responders and MCDEM. The District may offer opinions of flood threat based on the information it collects. Notifications include products prepared by the in-house MSP describing anticipated heavy storms that are likely to fill washes and temporarily restrict passage, as well as more specific data from area precipitation and stream gages.

Aguila Volunteer Fire Department

The AVFD has the responsibility to monitor flood conditions and forward information on if necessary to other agencies and departments. AVFD will provide assistance to MCSO and MCDOT to monitor road crossings and structures in the event of flood if necessary. The fire station will become the Incident Command Post (Aguila Emergency Operations Center) during a RED ALERT event. The Maricopa County Sheriff District III Commander/Deputy Commander or the AVFD Chief may act as the Incident Commander. The Incident Command Post will share all information with MCDEM so that evacuation planning, coordination and execution (if appropriate) can be achieved. From field observations, if an evacuation is recommended for Martori Farms, the Incident Commander needs to notify MCDEM. The AVFD will also assist in any fire, injury, illness and/or disaster by providing fire suppression, fire prevention, and emergency medical services to the citizens within the community.

Aguila Elementary School

The Aguila Elementary School will coordinate by phone with the appropriate emergency personnel with regard to the number of students and staff present in the school buildings. If notified that an evacuation has been ordered all staff and students need to be moved to the school gymnasium. The school gymnasium is used as a temporary emergency gathering point if necessary. The School will coordinate with the Incident Command Post (Aguila Emergency Operations Center) located at the Aguila Fire Station.

Martori Farm

Martori Farm will coordinate with the Incident Command Post and MCDEM with regard to the number of staff and employees on site. Martori staff will monitor the Farm during a flood event and notify the Incident Command Post if an evacuation may be necessary. Coordinate with the Incident Command Post (Aguila Emergency Operations Center) and MCDEM.

Maricopa County Department of Transportation

Maricopa County Department of Transportation will perform any road closures on MCDOT roadways and can also provide/transport sandbags and sand if needed. MCDOT will provide road information, barricades and lights, assist sheriff units, and oversee barricade and debris removal when roads are reopened. MCDOT should coordinate with ADOT in their responses.

Maricopa County Sheriff's Office

MCSO is tasked with monitoring flood emergency situations within Aguila and coordinating support, if needed, with Yavapai County Sheriff's Office (YCSO). They are responsible for evacuations and assisting with road closures. MCSO and Martori staff will monitor the Farm during a flood event and either may notify the Incident Command Post if an evacuation may be necessary. If the activation of the Incident Command Post (Aguila Emergency Operations Center) at the AVFD is necessary, the Maricopa County Sheriff District III Commander/Deputy Commander or the AVFD Chief may act as the Incident Commander. The Incident Commander is responsible for notifying and coordinating with MCDEM about Martori Farm.

Maricopa County Department of Emergency Management

Maricopa County Department of Emergency Management is tasked with monitoring information given them from the Flood Control District. Prior to the Aguila Incident Command Post activating, MCDEM will open up the EOC and become the primary contact point for all agencies and departments. MCDEM will be responsible for notifying Arizona & California Railroad, Martori Farms, AZDEM and ADOT of potential flooding issues.

MCDEM administers a regional asset-typed database of equipment that is located throughout Maricopa County. Through existing mutual aid and intergovernmental agreements, MCDEM is able to immediately identify the closest assets, determine their availability, and coordinate for deployment while tracking and gathering costs. MCDEM will enact appropriate Emergency Support Functions of the County's Emergency Action plan to ensure public safety, mass care, public information, and other functions as required.

Arizona Department of Transportation

Arizona Department of Transportation is responsible for road closures on ADOT roadways. ADOT will provide road information, barricades and determine the location of portable changeable message signs. ADOT will oversee barricade and debris removal when roads are reopened. ADOT should coordinate with MCDOT in their responses.

EMERGENCY RESPONSE ACTIONS

Flood Conditions

This Plan defines three types of Flood Conditions; **GREEN ALERT**, **ORANGE ALERT**, and **RED ALERT**. Each Alert describes an intensity of flooding in Aguila (Figure 13).

GREEN ALERT

The term “**GREEN ALERT**” will be used to denote a situation that causes a higher degree of readiness than is normally present. “**GREEN ALERT**” actions could be generated by:

- i. An issuance by the National Weather Service of a severe weather watch or urban/stream flood advisory; and/or
- ii. Notification by the Flood Control District of Maricopa County that weather conditions may develop into a flood situation for Aguila and/or a **Message 1**.
- iii. If one inch (1.00”) of quadrant average precipitation is observed in 72 hours or less and additional one-half to one inch (0.5”to 1.00”) of average watershed precipitation in 24 hours is observed or imminent.

ORANGE ALERT

The term “**ORANGE ALERT**” will be used to denote a situation that presents a greater potential threat than “**GREEN ALERT**”, but poses no immediate threat to life and/or property. This situation includes potential threats that could develop into a hazardous condition. “**ORANGE ALERT**” actions could be generated by:

- i. An issuance by the National Weather Service of a severe weather warning or a flash flood watch and/or;
- ii. Notification by the Flood Control District of Maricopa County that rainfall has been detected upstream of or within Aguila and conditions may develop into a flood situation and/or a **Message 2**.
- iii. If one inch (1.00”) of quadrant average precipitation is observed in 72 hours or less and greater than one inch (1.00”) of average watershed precipitation in 24 hours is predicted.
- iv. Observed floodwaters in Aguila or upstream watercourses.

RED ALERT

The term “**RED ALERT**” will be used to signify that hazardous conditions are imminent or occurring. “**RED ALERT**” denotes a greater sense of danger and urgency and could be generated by:

- i. An issuance of a severe weather or flash flood warning by the National Weather Service combined with factors making the effect more imminent such as a severe storm sighting near or moving toward Aguila or its contributing watersheds.
- ii. Notification by the Flood Control District of Maricopa County of observed flood conditions in and/or upstream of Aguila and/or a **Message 3**.
- iii. If one inch (1.00”) of quadrant average precipitation is observed in 72 hours or less and greater than one inch (1.00”) or more of average watershed precipitation is considered imminent in the next 24 hours.
- iv. Observed floodwaters in Aguila or upstream watercourses.

Note that the flood condition criteria are guidelines only and cannot cover all scenarios of flood emergencies.

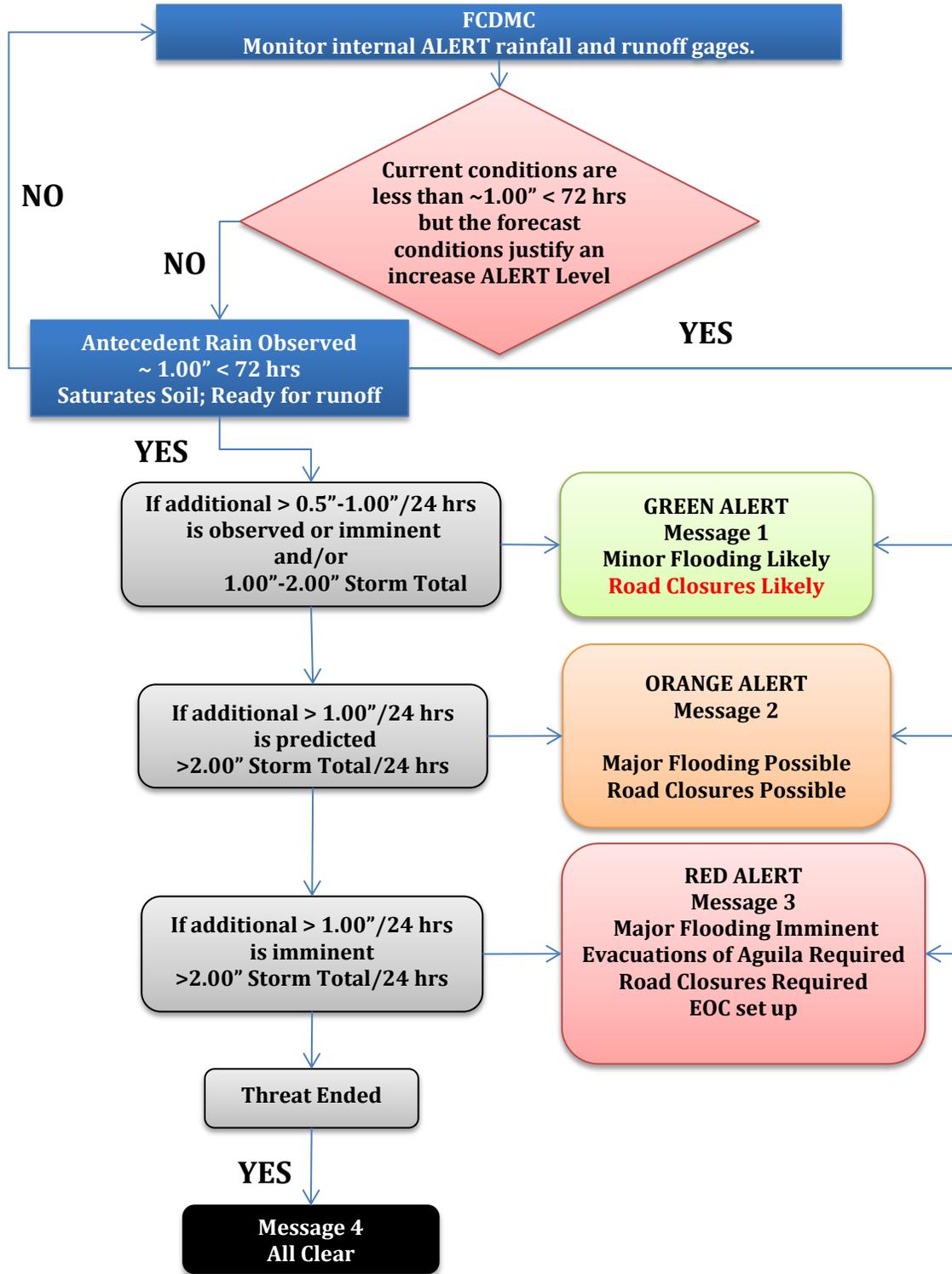


Figure 13: Flood Threat Recognition Diagram

Routine Operational Procedures

Flooding in Aguila is infrequent and unpredictable. Therefore, it is important to perform frequent monitoring procedures so that the staff is familiar with the procedures when a flood occurs. During normal (non-flood) conditions, these actions are recommended (Figure 14):

Flood Control District ALERT Room

FCDMC is responsible for the following during a flood threat or actual flood event within the boundaries of the Aguila FRP:

- a. Monitor internal ALERT rainfall and runoff gages within the Upper Centennial watershed.
- b. Notify the Aguila Volunteer Fire Department and MCDEM if any of the following conditions are met:
 - i. Adverse conditions that could intensify flood hazards in the event of a storm.
 - ii. Criteria for MESSAGE 1, 2 or 3 have been met.
 - iii. Precipitation sensors in the vicinity of Aguila meet or exceed pre-set thresholds and rain is expected to continue.
 - iv. Storm conditions have subsided and the Aguila drainage system poses no further threat to lives or property within the AFRP (ALL CLEAR).

Aguila Volunteer Fire Department

AVFD is responsible for notifying agencies within this FRP if there is an increase of flood threat to Aguila. AVFD should monitor weather data daily during fair weather. Daily monitoring during fair weather consists of the following tasks:

- a. Review weather outlooks from FCDMC and National Weather Service.
 - i. FCDMC Weather Outlooks, Messages and Lake Alerts are sent via email to addresses provided to FCDMC. Weather Outlooks are available online at <http://www.fcd.maricopa.gov/Weather/outlook.aspx>.
 - ii. NWS Quick Forecast is available at <http://forecast.weather.gov/MapClick.php?lon=-113.17307&lat=33.94330>
- b. Distribute FCDMC and NWS forecasts to Aguila Elementary School and Martori Farms.
- c. Monitor daily weather information.

Aguila Elementary School

- i. Review weather information provided by AVFD.

Martori Farms

- i. Review weather information provided by AVFD.

Aguila Flood Response Plan

Routine Operational Procedures Flowchart

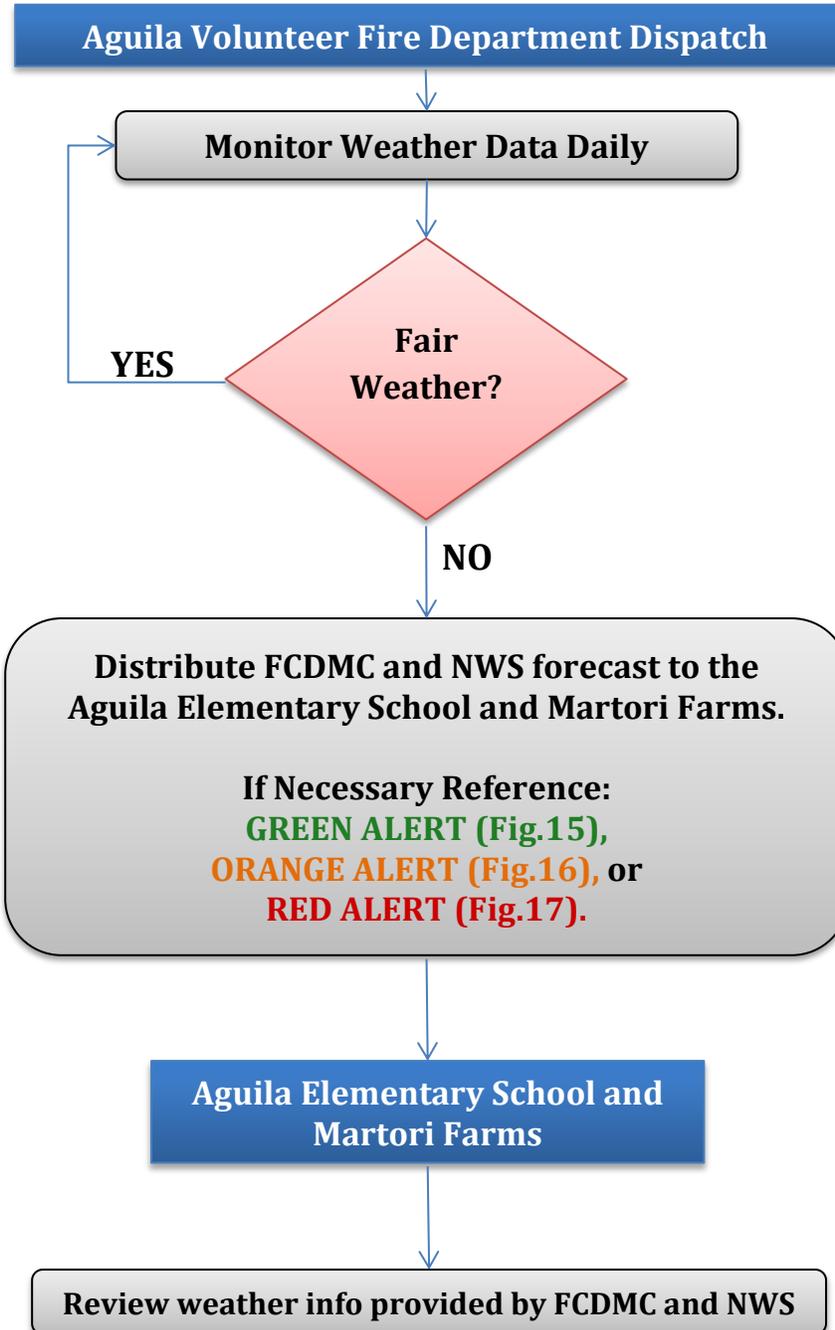


Figure 14 : Routine Operation Procedures Flowchart

GREEN ALERT Procedures

Upon a **GREEN ALERT** notification, all departments shall maintain an increased state of readiness. If **GREEN ALERT** is declared for Aguila, the following additional tasks will be performed (Figure 15):

Aguila Volunteer Fire Department

- i. Advise AVFD personnel of the **GREEN ALERT**.
- ii. Notify Aguila Elementary School, Martori Farms, MCDOT, MCSO, ADOT and MCDEM of the elevated **GREEN ALERT** status.
- iii. Monitor incoming weather information from FCDMC and NWS.
- iv. Provide assistance if necessary.

Aguila Elementary School

- i. Review weather information provided by AVFD.
- ii. Advise school staff of the **GREEN ALERT**.
- iii. Coordinate with AVFD, MCSO and MCDEM with regard to the number of students and staff present in the school buildings.

Martori Farms

- i. Review weather information provided by AVFD.
- ii. Advise staff and employees of the **GREEN ALERT**.
- iii. Coordinate with AVFD, MCSO and MCDEM with regard to the number of staff and employees present on site.

Maricopa County Department of Transportation

- i. Review weather information provided by FCDMC, NWS and AVFD.
- ii. Advise MCDOT personnel of the **GREEN ALERT** and flood threat in Aguila. Coordinate with FCDMC, ADOT, and MCSO to discuss possible street closures. Monitor all minor road crossings within the **GREEN ALERT** Boxes on the FRP Maps located in Appendix A. Barricade if needed.
- iii. Conduct site visits to confirm availability of sand bag filling stations and staging areas for equipment, supplies, and personnel.

Maricopa County Sheriff's Office

- i. Review weather information provided by FCDMC and NWS.

Arizona Department of Transportation

- i. Review weather information provided by FCDMC and NWS.
- ii. Advise ADOT personnel of the elevated **GREEN ALERT** status.

Maricopa County Department of Emergency Management

- i. Review weather information provided by AVFD, FCDMC and NWS.
- ii. Notify MCDEM personnel of the elevated **GREEN ALERT** status.

Aguila Flood Response Plan

GREEN ALERT Operational Procedures Flowchart

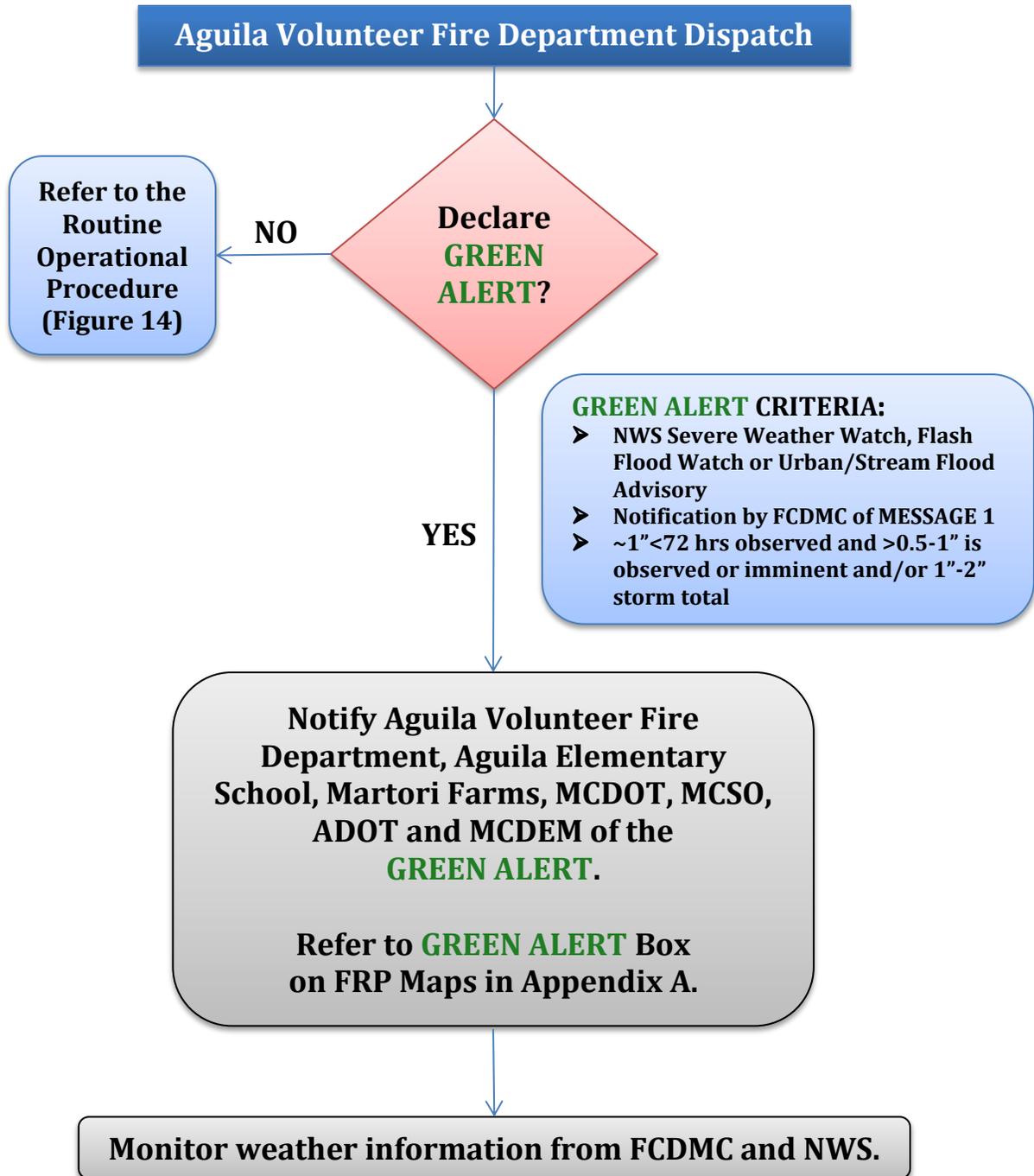


Figure 15: GREEN ALERT Flowchart

ORANGE ALERT Procedures

Upon an **ORANGE ALERT** notification, the following tasks will be performed (Figure 16):

Aguila Volunteer Fire Department

- i. Advise Aguila Volunteer Fire Department personnel of the **ORANGE ALERT** status and the possibility of major flooding and possible evacuation of Aguila residents. Monitor concern areas, road crossings and structures listed in the **ORANGE ALERT** Boxes in Appendix A.
- ii. Notify Aguila Elementary School, Martori Farms, MCDOT, MCSO, ADOT and MCDEM of the elevated **ORANGE ALERT** status.
- iii. Notify Incident Commander of **ORANGE ALERT** status and to consider the possibility of a **RED ALERT** and activation of Incident Command Post at the AVFD. If the Incident Command Post is activated, the MCSO District III Commander/Deputy Commander or the AVFD Chief may act as the Incident Commander.
- iv. Coordinate with MCSO to get updates of Martori Farms. If an evacuation is recommended, the Incident Commander needs to notify MCDEM.
- v. Monitor incoming weather information from FCDMC and NWS.
- vi. Provide assistance if necessary.

Aguila Elementary School

- i. Review weather information provided by AVFD.
- ii. Advise school staff of the **ORANGE ALERT**.
- iii. Coordinate with AVFD, MCSO and MCDEM with regard to the number of students and staff present in the school buildings.

Martori Farms

- i. Review weather information provided by AVFD.
- ii. Advise staff and employees of the **ORANGE ALERT**.
- iii. Coordinate with AVFD, MCSO and MCDEM with regard to the number of staff and employees present on site.

Maricopa County Department of Transportation

- i. Review weather information provided by FCDMC, NWS and AVFD.
- ii. Advise MCDOT personnel of the **ORANGE ALERT** and flood threat in Aguila. Coordinate with FCDMC, ADOT, MCSO and MCDEM to discuss possible street closures. Monitor all minor and major road crossings within the **ORANGE ALERT** Boxes on the FRP Maps in Appendix A. Barricade if needed.
- iii. Consider transporting sand bag filling machines from Wickenburg to the Aguila area to assist with sand bagging efforts.

Maricopa County Sheriff's Office

- i. Review weather information provided by FCDMC, NWS and AVFD

- ii. Advise sheriff personnel of the **ORANGE ALERT** and flood threat in the Aguila area.
- iii. Coordinate with AVFD, MCDOT and MCDEM to discuss the current flood threat and alert level.
- iv. Consider the possibility of a **RED ALERT** and activation of the Aguila Incident Command Post at the AVFD. If the Incident Command Post is activated, the MCSO District III Commander/Deputy Commander or the AVFD Chief may act as the Incident Commander.
- iv. Dispatch sheriff units should plan to monitor all road crossings and structures in the **ORANGE ALERT** Boxes in the FRP Maps in Appendix A. Monitor and evacuate occupied structures if necessary. Monitor and assist with barricades if necessary.
- v. Monitor Martori Farms and relay any type of flooding information back to the Incident Commander. If an evacuation is recommended, the Incident Commander needs to notify MCDEM.
- vi. Provide status updates across the county trunk radio system on any current activities, actions and/or observations in the field.

Arizona Department of Transportation

- i. Review weather information provided by FCDMC and NWS.
- ii. Advise ADOT personnel of the elevated **ORANGE ALERT** status.
- iii. Coordinate with FCDMC, MCSO and MCDEM to develop a flood fighting strategy. The strategy should include, but is not limited to, street closures, barricading assignments, determining location of portable changeable message signs and allocation of staff and resources. Monitor road crossings in the **ORANGE ALERT** Boxes on the FRP Maps in Appendix A. Barricade if necessary.

Maricopa County Department of Emergency Management

- i. Review weather information provided by AVFD, FCDMC and NWS.
- ii. Notify MCDEM personnel of the elevated **ORANGE ALERT** status.
- iii. Notify Arizona Division of Emergency Management, Arizona Department of Public Safety, American Red Cross and The Salvation Army of the current **ORANGE ALERT** status and flood threat in and around the Aguila area.

Aguila Flood Response Plan

ORANGE ALERT Operational Procedures Flowchart

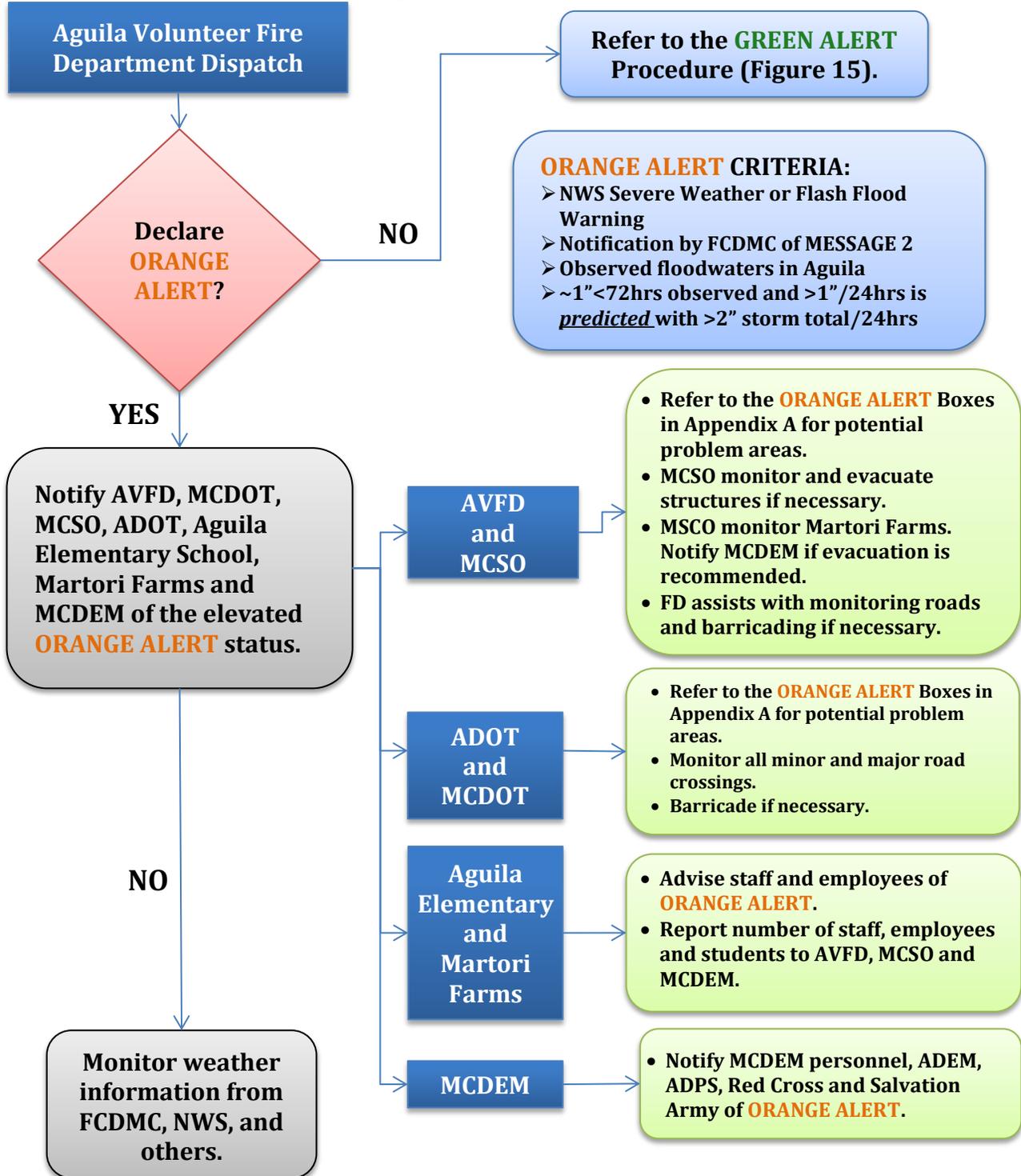


Figure 16 : ORANGE ALERT Flowchart

RED ALERT Procedures

Upon a **RED ALERT** notification, all departments shall maintain an increased state of readiness. If a **RED ALERT** is declared for Aguila, the following tasks will be performed (Figure 17):

Aguila Volunteer Fire Department

- i. Advise Aguila Volunteer Fire Department personnel of the **RED ALERT** status and the possibility of major flooding and probable evacuation of Aguila residents. Monitor concern areas, road crossings and structures listed in the **RED ALERT** Boxes in Appendix A.
- ii. Notify Aguila Elementary School, Martori Farms, MCDOT, MCSO, ADOT and MCDEM of the elevated **RED ALERT** status.
- iii. Notify MCSO District III Commander/Deputy Commander of the **RED ALERT** status. Activate the Aguila Incident Command Post at the AVFD.
- iv. The MCSO District III Commander/Deputy Commander or the AVFD Chief may act as the Incident Commander.
- v. Coordinate with MCSO to get updates of Martori Farms. If an evacuation is recommended, the Incident Commander needs to notify MCDEM.
- vi. Monitor incoming weather information from FCDMC and NWS.
- vii. Provide assistance if necessary.

Aguila Elementary School

- i. Review weather information provided by AVFD.
- ii. Advise school staff of the **RED ALERT**.
- iii. Coordinate with AVFD, MCSO and MCDEM with regard to the number of students and staff present in the school buildings.
- iv. If evacuation has been requested by the Incident Commander or MCDEM, the school should consider moving staff and students to the school's gymnasium.
- v. Provide a representative to the Incident Command Post located at AVFD.

Martori Farms

- i. Review weather information provided by AVFD.
- ii. Advise staff and employees of the **RED ALERT**.
- iii. Coordinate with AVFD, MCSO and MCDEM with regard to the number of staff and employees present on site.
- iv. Martori staff will monitor the Farm during a flood event and will notify the Incident Command Post if an evacuation may be necessary.

Maricopa County Department of Transportation

- i. Review weather information provided by FCDMC, NWS and AVFD.
- ii. Advise MCDOT personnel of the **RED ALERT** and flood threat in Aguila. Coordinate with FCDMC, ADOT, MCSO and MCDEM to discuss probable street closures.
- iii. Monitor all minor and major road crossings within the **RED ALERT** Boxes on the FRP Maps in Appendix A. Barricade if needed.

- iv. If sandbags are necessary, confer with MCDEM prior to transporting sandbag filling machines from Wickenburg to the Aguila area to assist with sand bagging efforts.

Maricopa County Sheriff's Office

- i. Review weather information provided by FCDMC, NWS and AVFD
- ii. Advise Sheriff personnel of the **RED ALERT** and the Incident Command Post status.
- iii. Coordinate with AVFD, MCDOT, ADOT and MCDEM to discuss the current flood threat, alert level, and possible evacuations.
- iv. The MCSO District III Commander/Deputy Commander or the AVFD Chief may act as the Incident Commander.
- v. Dispatch sheriff units to monitor all road crossings and structures in the **RED ALERT** Boxes in the FRP Maps in Appendix A. Monitor and evacuate occupied structures if necessary. Monitor and assist with barricades if necessary.
- vi. Monitor Martori Farms and relay any type of flooding information back to the Incident Commander. If an evacuation is recommended, the Incident Commander needs to notify MCDEM.
- vii. Provide status updates across the county trunk radio system on any current activities, actions and/or observations in the field.

Arizona Department of Transportation

- i. Review weather information provided by FCDMC and NWS.
- ii. Advise ADOT personnel of the elevated **RED ALERT** status.
- iii. Coordinate with FCDMC, MCSO, MCDOT, MCDEM and the Incident Command Post to deploy a flood fighting strategy.
- iv. Monitor road crossings in the **RED ALERT** Boxes on the FRP Maps in Appendix A. Close State Route 71 north and south of the Aguila Farm Channel crossing and US 60 east and west of Aguila if necessary.

Maricopa County Department of Emergency Management

- i. Review weather information provided by AVFD, FCDMC and NWS.
- ii. Notify MCDEM personnel of the elevated **RED ALERT** status.
- iii. Activate the Maricopa County Emergency Operations Center if necessary.
- iv. Coordinate with Incident Command Post, AVFD, ADOT, MCSO, Martori Farms, Aguila Elementary School and MCDOT for continuous updates.
- v. Notify Arizona Division of Emergency Management, Arizona Department of Public Safety, Arizona and California Railroad, American Red Cross and The Salvation Army of the current **RED ALERT** status and flood threat in and around the Aguila area.

Aguila Flood Response Plan

RED ALERT Operational Procedures Flowchart

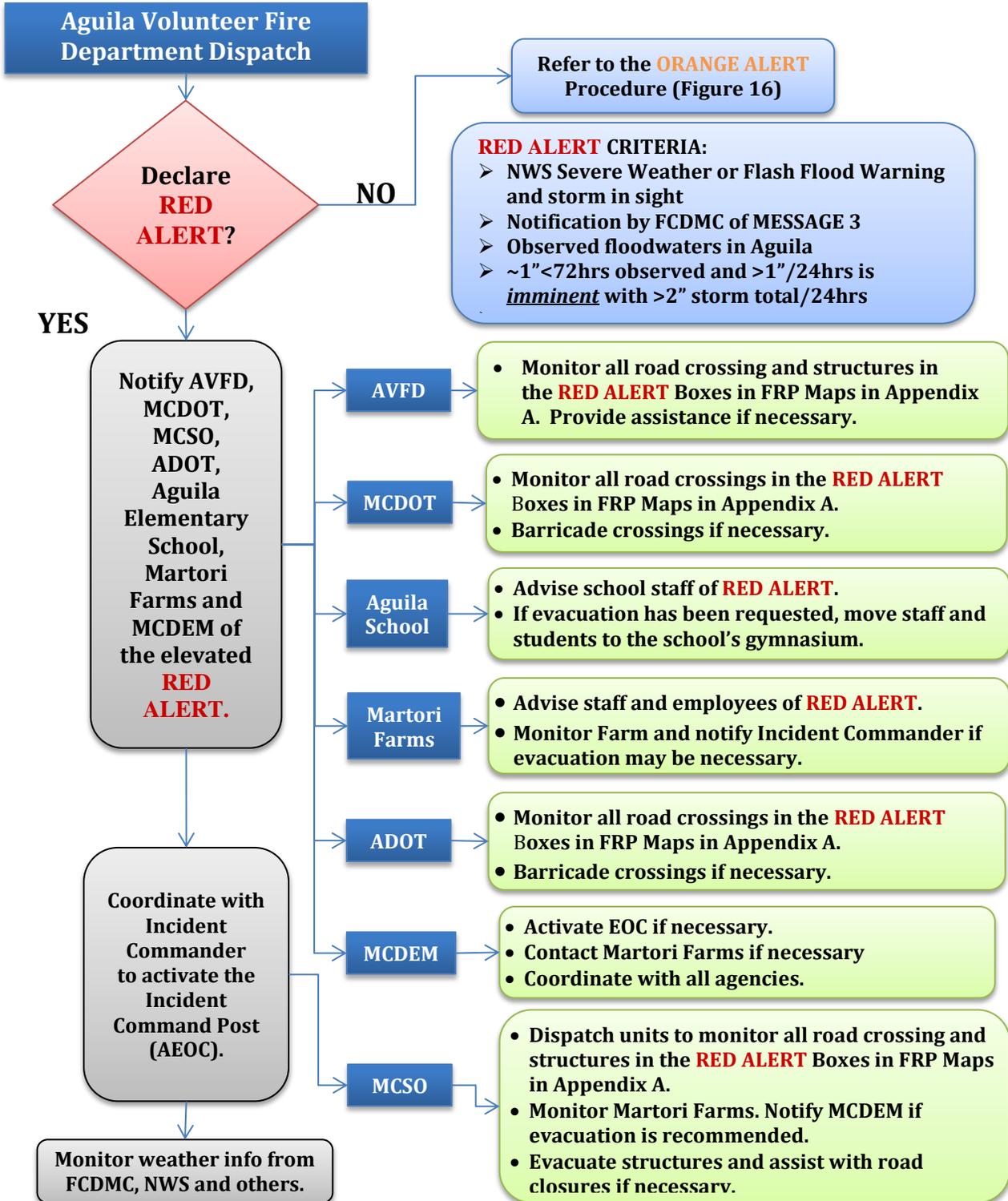


Figure 17 : RED ALERT Flowchart

ALL CLEAR Procedures

Upon an **ALL CLEAR** notification by the Flood Control District of Maricopa County or the National Weather Service that a flood threat has ended, the following tasks shall be performed (Figure 18):

Aguila Volunteer Fire Department

- i. Monitor incoming weather information for FCDMC and NWS.
- ii. Dispatch an observer and/or get confirmation from MCSO Dispatch unit that a flood threat has passed.
- iii. If a flood threat no longer exists, notify the Incident Commander, Aguila Elementary School, Martori Farms, MCDOT, MCSO, ADOT and MCDEM of the **ALL CLEAR** status.

Aguila Elementary School

- i. Review weather information provided by AVFD.
- ii. Advise school staff and students of the **ALL CLEAR** status.

Martori Farms

- i. Review weather information provided by AVFD.
- ii. Advise staff and employees of the **ALL CLEAR** status.

Maricopa County Department of Transportation

- i. Review weather information provided by FCDMC, NWS and AVFD.
- ii. Advise MCDOT personnel of the **ALL CLEAR** status.
- iii. Remove any barricades and debris from streets, except as needed to barricade hazardous areas.
- iii. Follow the existing procedure of post-event inspections.

Maricopa County Sheriff's Office

- i. Review weather information provided by FCDMC, NWS and AVFD.
- ii. Advise sheriff personnel of the **ALL CLEAR** status.
- iii. Dispatch sheriff units and verify that the flood threat has passed.
- iv. Provide status updates across the county trunk radio system on any current activities, actions and/or observations in the field.

Arizona Department of Transportation

- i. Review weather information provided by FCDMC and NWS.
- ii. Advise ADOT personnel of the **ALL CLEAR** status.
- iv. Remove any barricades and debris from streets and highways, except as needed to barricade hazardous areas.
- iii. Follow the existing procedure of post-event inspections.

Maricopa County Department of Emergency Management

- i. Notify MCDEM personnel and all other involved agencies of the **ALL CLEAR** status.

ALL CLEAR Procedures Flowchart

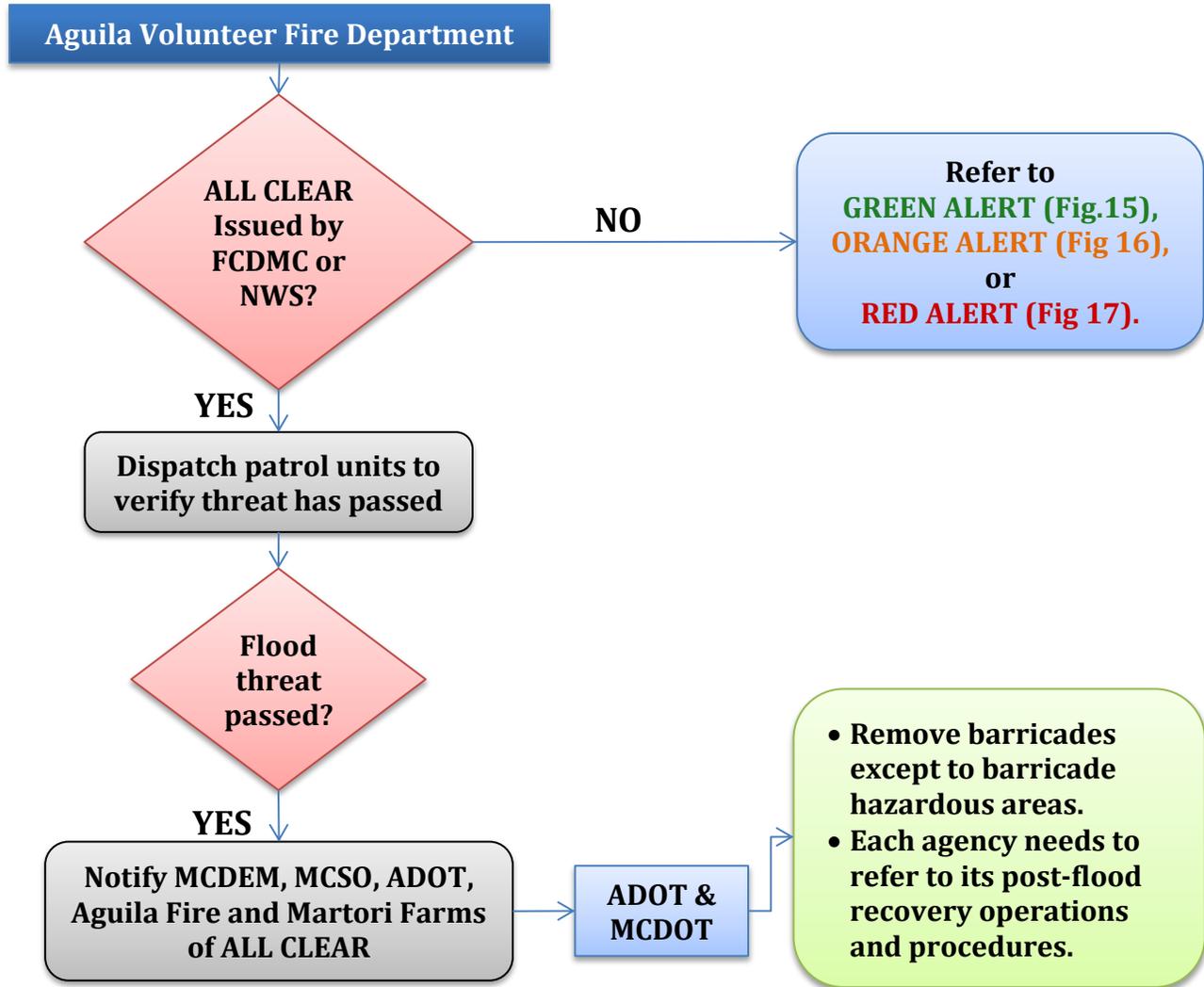


Figure 18 : ALL CLEAR Flowchart

POST FLOOD ACTIONS

After a flood has passed and an **ALL CLEAR** has been issued, each agency needs to refer to its post-flood recovery operations and procedures.

TRAINING, EXERCISES, AND UPDATES

A successful FRP is a result of the preparedness and coordination of all its participants. The following tasks should be performed routinely to ensure that the Aguila FRP is effective in the event of a real emergency.

Training

An initial training/review session with the all agencies involved in the FRP is recommended. Training would include an overview of the FRP which would cover flood detection, flood threat recognition, dissemination of information, emergency response action and post flood actions. This overview would also include specific notification protocols, geographic coverage (watercourses included within the drainage area), locations of concern and an overview of any maps or custom products that were created for this FRP.

Exercises

It is recommended that a table top exercise be conducted annually prior to the start of monsoon season. All departments and agencies within this FRP should participate. Within two weeks after the exercise, hold a post-drill critique meeting with all departments and agencies within this FRP to review procedures and identify any necessary improvements to the Aguila FRP.

FRP Updates

The Aguila FRP is reviewed annually by the District and modifications are made accordingly, which includes notification data. These revisions are distributed to all participating departments and agencies by the District.

ALERT Gage Network

The Flood Control District of Maricopa County operates a 24-hour rain, stream and weather gage network which provides “real-time” information to the County and many other agencies about rainfall, floods and weather conditions in Maricopa County. This network operates in the National Weather Service ALERT (Automated Local Evaluation in Real Time) format and is commonly referred to as an ALERT system.

Early detection of a storm event and closely monitoring a storm can reduce the risk of injury, loss of life and property damage from flooding. To improve the usefulness of warnings it is recommended that additional precipitation, stream, crest, and staff gages be installed. Actual locations of gages will be dependent on land ownership and availability, site access, vulnerability to vandalism, absence of obstructions and an accessible radio path.

Although some stream gage sites have limited ability to enhance lead time, they remain an important component in the FRP because they can provide additional information. Crest gages are used to gather data from streams and washes that are subject to infrequent, but severe flooding. A crest gage is a cost-effective way of gathering peak flow data which can be used in emergency planning, emergency design and hydrologic analysis.

It is recommended that the Grass Wash at US 60 rain gage be relocated to a different location and converted to a full weather station. The rain gage would be upgraded to include Temperature, Humidity, Wind Direction, Average Wind, Wind Speed, Solar and Barometric Pressure. When this becomes a weather station, the data will be used by our meteorologist and injected into our QPF program. This will allow much better weather forecasting for the Aguila area.¹ It is also recommended that a crest gage is installed on the upstream side of the US60 at Grass Wash. This will provide a measurement for any streamflow on Grass Wash.

Staff Gages

A staff gage can be installed near a roadway or pedestrian crossing to provide an estimate of the amount of water flowing over the road or walkway. In order for the staff gages to read properly during an event, the sediment deposited would need to be removed prior to the barricades being removed from the roadway after a flow event. Once inspected and cleared of debris they would be able to display water level accurately during the next storm event. If these aren't cleared of debris the staff gages will not give accurate measurements and may cause motorists to become overly confident when the condition is in fact unsafe.

There is currently 1 location with a staff gage within Aguila FRP which is located at Aguila Farm Channel and Eagle Eye Road. The staff gage is located on the west side of the road along the left bank. The ownership of this staff gage is unknown. See Figure 18 for a photo.



Figure 19: Aguila Farm Channel at Eagle Eye Road Image

¹ This recommendation was completed on 3/26/2015. The ID numbers are: rain #5155, temperature #5158, Dewpoint #5149, humidity #5157, wind direction #5159, wind speed #5152, peak wind #5154.

Public Education

It is critical that the residents and community leaders within Aguila be educated and reminded of the inherent flood hazards around them. New residents may be unfamiliar and current residents may not have experienced a severe flash flood. It is important to let residents know if there may be potential for a flood event so they can avoid driving which will eliminate vehicle traffic and loss of access on the roadways. The District broadcasts commercials and advertisements that are seen throughout the Maricopa County area to help educate and make residents aware of the inherent danger of flooding. The District's website is a public website which has all the ALERT gage data. The District encourages participating agencies and the public to observe and monitor the ALERT gage data in the event of a flood.

The District has provided the Aguila FRP, a wall map and field maps to the departments and agencies involved. This will enable emergency response teams to become more familiar with the areas of concern and in return the community will benefit. It is recommended that the Volunteer Fire Department develop pamphlets or other printed materials which explain the dangers of flooding within Aguila, general flood response procedures, and what residents and motorists should do if notified of a potential flood.

REFERENCES

Federal Emergency Management Agency (FEMA), National Flood Insurance Program, Flood Insurance Studies, 2013, Maricopa County and Incorporated Areas, Flood Maps, Flood Profiles, Summary of Discharges, and Floodway Data.

Aguila, Arizona. In Wikipedia: The Free Encyclopedia. Wikimedia Foundation Inc. Encyclopedia on-line. Available from http://en.wikipedia.org/wiki/Aguila,_Arizona. Internet. Retrieved 07 October 2014.

Aguila Flood Response Plan. HDR Engineering, Inc., Phoenix, AZ. February 2004.

Centennial Wash (Taken at Time of Hurricane Nora), Color Contact Prints. Kenney Aerial Mapping, Inc. 1997.

[Upper Centennial Wash, Grass Wash, Aguila Farm Channel Floodplain Delineation Study \(FDS\)](#). URS Consultants. Project FCD 88-54. April 1990.

[Hydrology Report for Floodplain Delineation Study of Upper Centennial Wash, Grass Wash and Aguila Farm Channel](#). URS Consultants, Inc. Phoenix, AZ. April 1990.

Riverine Flood Modeling in HAZUS-MH: Overview of the implementation, Subrahmanyam Muthukumar, Research Associate, Center for GIS, Georgia Institute of Technology, April 2005.

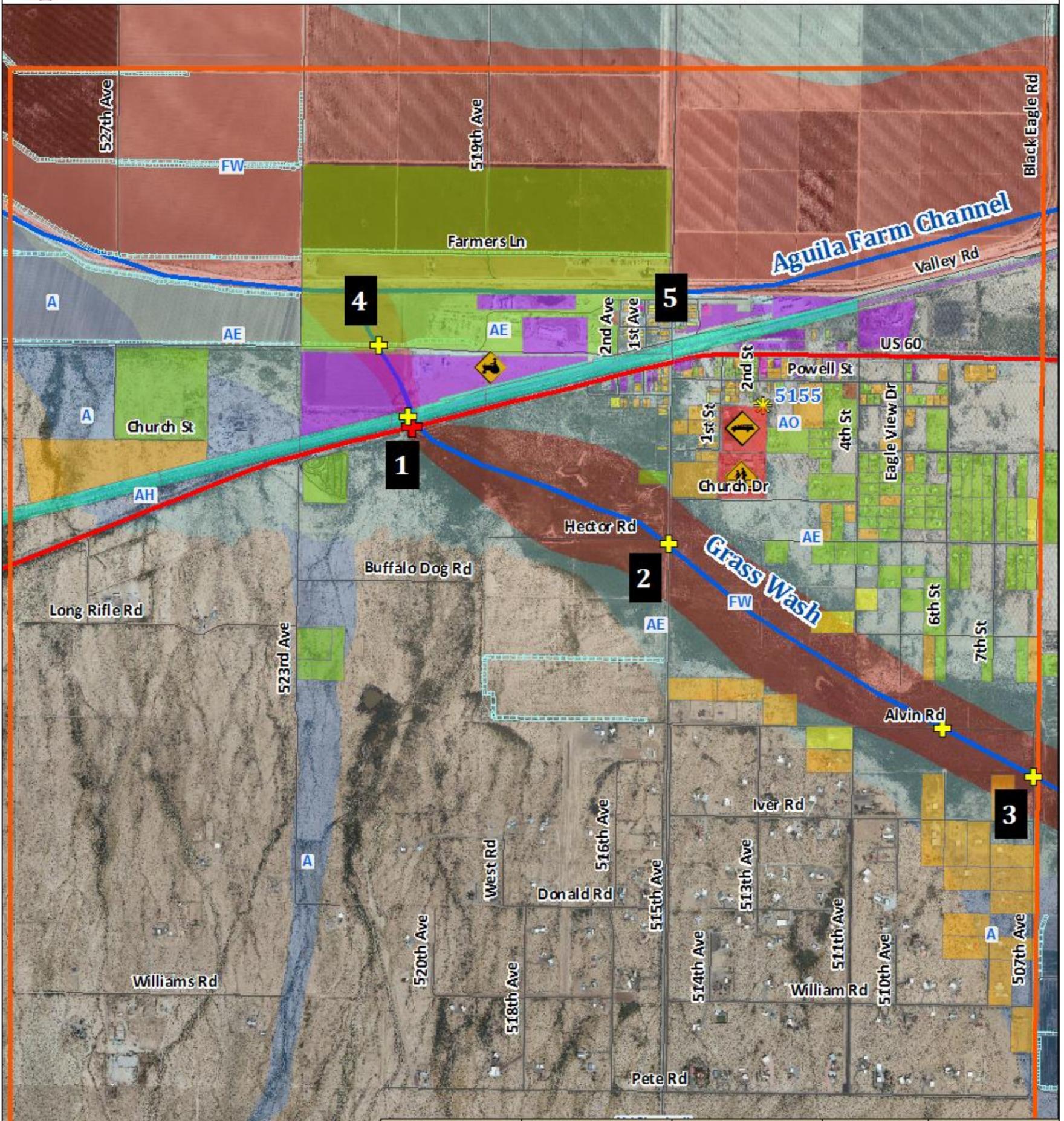
2011 Arizona Agricultural Statistics Bulletin. Issued September 2012. Arizona Agricultural Statistics Phoenix, Arizona 85003.

http://www.nass.usda.gov/Statistics_by_State/Arizona/Publications/Bulletin/11bul/pdfs/2011FullBulletin.pdf

APPENDIX A - Flood Response Plan Flood Condition Maps



Aguila Flood Response Plan - West



ID	Wash	Road Crossing	100-yr FEMA Discharge (cfs)	Flood Wave Travel Time (mins)
2 to 1	Grass Wash	Eagle Eye Rd to US-60	7,500	28
3 to 1	Grass Wash	507th Ave to US-60	11,100	54
6 (on east map) to 5	Aguila Farm Channel	Eagle Eye Rd	19,300	75
6 (on east map) to 4	Aguila Farm Channel	Grass Wash	16,900	88

Legend

County Maricopa
 + Major Roadway
 + Minor Roadway
 + AFRP West Zone
 + Elementary School
 + Fire Station
 + Quonset Huts

Rain Gage (FCD)
 * Rain
 * Rain/Stream
 * Weather

State\US\Other Highway
 Street
 Canal
 Railroad

Rivers/Streams/Washes
 Rivers/Streams/Washes

Flood Zone Current (FEMA)
 Floodway
 Zone AE
 Zone AH
 Zone AO
 Zone A

Structures
 Essential
 Recreational
 Single Family Residential
 Mobile Homes
 Commercial
 Shed
 Railroad
 Utilities

0 0.25 0.5 Miles

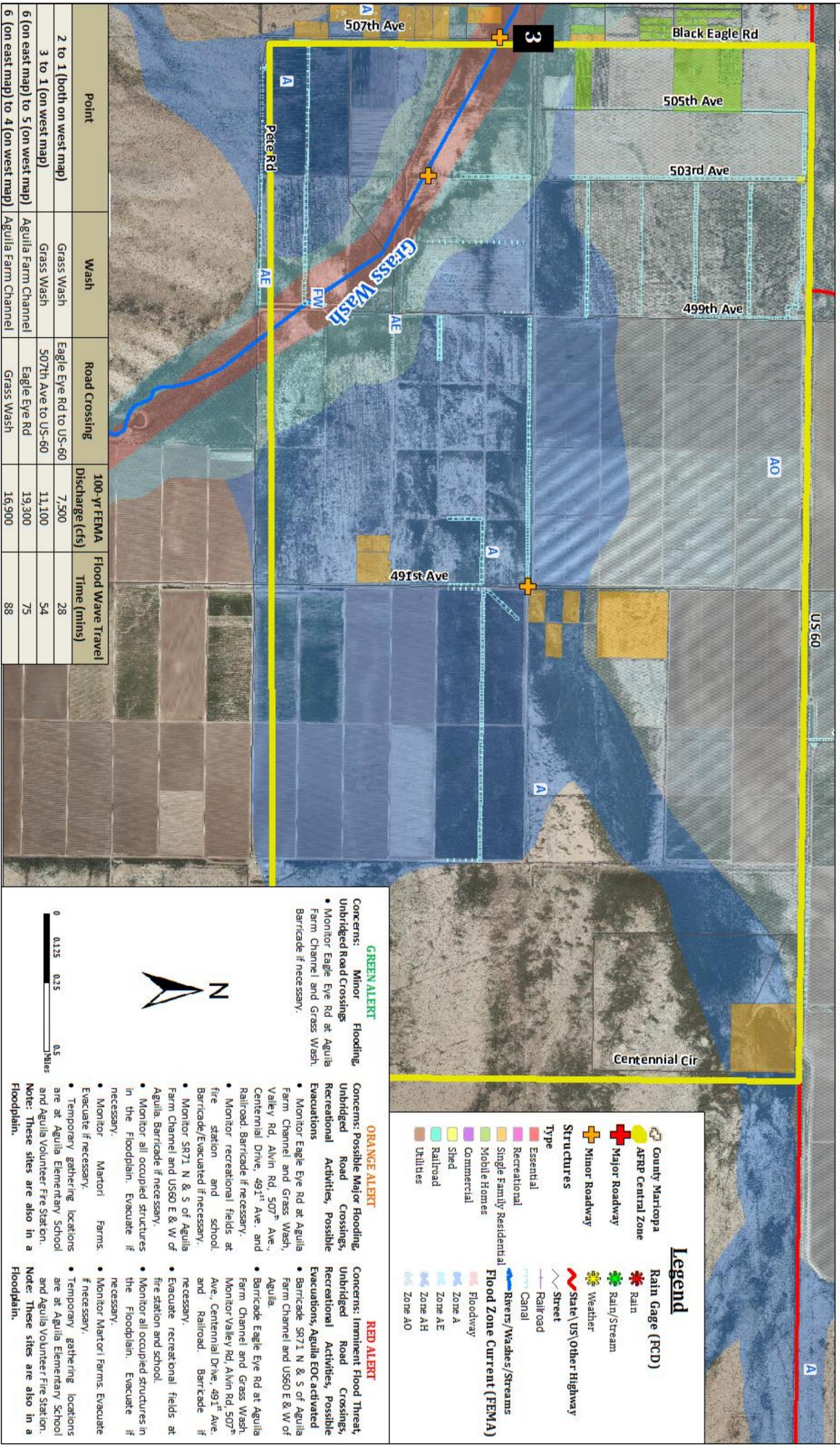
GREEN ALERT
 Concerns: Minor Flooding, Unbridged Road Crossings
 • Monitor Eagle Eye Rd at Aguilá Farm Channel and Grass Wash. Barricade if necessary.

ORANGE ALERT
 Concerns: Possible Major Flooding, Unbridged Road Crossings, Recreational Activities, Possible Evacuations
 • Monitor Eagle Eye Rd at Aguilá Farm Channel and Grass Wash, Valley Rd, Alvin Rd, 507th Ave., Centennial Drive, 491st Ave. and Railroad. Barricade if necessary.
 • Monitor recreational fields at fire station and school. Barricade/Evacuated if necessary.
 • Monitor SR71 N & S of Aguilá Farm Channel and US60 E & W of Aguilá. Barricade if necessary.
 • Monitor all occupied structures in the Floodplain. Evacuate if necessary.
 • Monitor Martori Farms. Evacuate if necessary.
 • Temporary gathering locations are at Aguilá Elementary School and Aguilá Volunteer Fire Station.
 Note: These sites are also in a Floodplain.

RED ALERT
 Concerns: Imminent Flood Threat, Unbridged Road Crossings, Recreational Activities, Possible Evacuations, Aguilá EOC Activated
 • Barricade SR71 N & S of Aguilá Farm Channel and US60 E & W of Aguilá.
 • Barricade Eagle Eye Rd at Aguilá Farm Channel and Grass Wash. Monitor Valley Rd, Alvin Rd, 507th Ave., Centennial Drive, 491st Ave. and Railroad. Barricade if necessary.
 • Evacuate recreational fields at fire station and school.
 • Monitor all occupied structures in the Floodplain. Evacuate if necessary.
 • Monitor Martori Farms. Evacuate if necessary.
 • Temporary gathering locations are at Aguilá Elementary School and Aguilá Volunteer Fire Station.
 Note: These sites are also in a Floodplain.



Aguila Flood Response Plan - Central



Point	Wash	Road Crossing	100-yr FEMA Discharge (cfs)	Flood Wave Travel Time (mins)
2 to 1 (both on west map)	Grass Wash	Eagle Eye Rd to US-60	7,500	28
3 to 1 (on west map)	Grass Wash	507th Ave to US-60	11,100	54
6 (on east map) to 5 (on west map)	Aguila Farm Channel	Eagle Eye Rd	19,300	75
6 (on east map) to 4 (on west map)	Aguila Farm Channel	Grass Wash	16,900	88

GREEN ALERT

Concerns: Minor Flooding, Unbridged Road Crossings

- Monitor Eagle Eye Rd at Aguilas Farm Channel and Grass Wash. Barricade if necessary.

ORANGE ALERT

Concerns: Possible Major Flooding, Unbridged Road Crossings, Recreational Activities, Possible Evacuations

- Monitor Eagle Eye Rd at Aguilas Farm Channel and Grass Wash, Valley Rd, Alvin Rd, 507th Ave., Centennial Drive, 491st Ave. and Railroad. Barricade if necessary.
- Monitor recreational fields at fire station and school.
- Barricade/evacuated if necessary.
- Monitor SR71 N & S of Aguilas Farm Channel and US60 E & W of Aguilas. Barricade if necessary.
- Monitor all occupied structures in the Floodplain. Evacuate if necessary.
- Monitor Martori Farms. Evacuate if necessary.
- Temporary gathering locations are at Aguilas Elementary School and Aguilas Volunteer Fire Station.

Note: These sites are also in a Floodplain.

RED ALERT

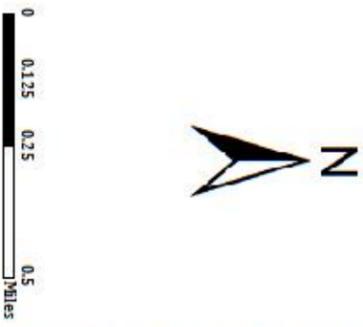
Concerns: Imminent Flood Threat, Unbridged Road Crossings, Recreational Activities, Possible Evacuations, Aguilas EOC activated

- Barricade SR71 N & S of Aguilas Farm Channel and US60 E & W of Aguilas.
- Barricade Eagle Eye Rd at Aguilas Farm Channel and Grass Wash, Monitor Valley Rd, Alvin Rd, 507th Ave., Centennial Drive, 491st Ave. and Railroad. Barricade if necessary.
- Evacuate recreational fields at fire station and school.
- Monitor all occupied structures in the Floodplain. Evacuate if necessary.
- Monitor Martori Farms. Evacuate if necessary.
- Temporary gathering locations are at Aguilas Elementary School and Aguilas Volunteer Fire Station.

Note: These sites are also in a Floodplain.

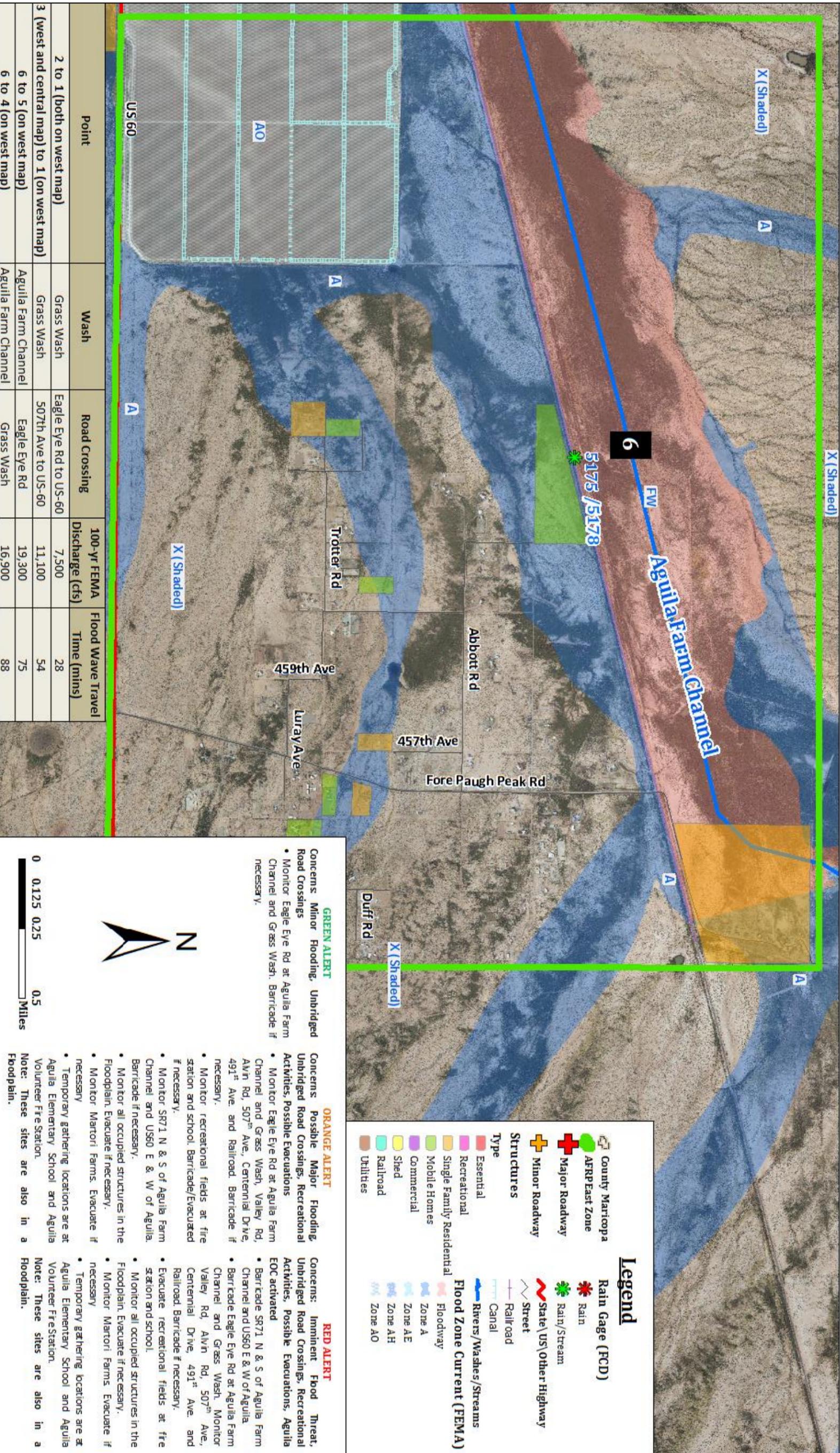
Legend

- County Maricopa
- AFRP Central Zone
- Major Roadway
- Minor Roadway
- Structures**
- Type**
- Essential
- Recreational
- Single Family Residential
- Mobile Homes
- Commercial
- Shed
- Railroad
- Utilities
- Rain Gage (FCD)
- Rain
- Rain/Stream
- Weather
- State\US\Other Highway
- Street
- Railroad
- Canal
- Rivers/Washes/Streams
- Flood Zone Current (FEMA)**
- Floodway
- Zone A
- Zone AE
- Zone AH
- Zone AO





Aguila Flood Response Plan - East



Point	Wash	Road Crossing	100-yr FEMA Discharge (cfs)	Flood Wave Travel Time (mins)
2 to 1 (both on west map)	Grass Wash	Eagle Eye Rd to US-60	7,500	28
3 (west and central map) to 1 (on west map)	Grass Wash	507th Ave to US-60	11,100	54
6 to 5 (on west map)	Aguila Farm Channel	Eagle Eye Rd	19,300	75
6 to 4 (on west map)	Aguila Farm Channel	Grass Wash	16,900	88

GREEN ALERT
 Concerns: Minor Flooding, Unbridged Road Crossings
 • Monitor Eagle Eye Rd at Aguila Farm Channel and Grass Wash. Barricade if necessary.

ORANGE ALERT
 Concerns: Possible Major Flooding, Unbridged Road Crossings, Recreational Activities, Possible Evacuations
 • Monitor Eagle Eye Rd at Aguila Farm Channel and Grass Wash, Valley Rd, Alvin Rd, 507th Ave, Centennial Drive, 491st Ave, and Railroad. Barricade if necessary.
 • Monitor recreational fields at fire station and school. Barricade/Evacuated if necessary.
 • Monitor SR71 N & S of Aguila Farm Channel and US60 E & W of Aguila. Barricade if necessary.
 • Monitor all occupied structures in the Floodplain. Evacuate if necessary.
 • Monitor Martori Farms. Evacuate if necessary.

RED ALERT
 Concerns: Imminent Flood Threat, Unbridged Road Crossings, Recreational Activities, Possible Evacuations, Aguila EOC activated
 • Barricade SR71 N & S of Aguila Farm Channel and US60 E & W of Aguila.
 • Barricade Eagle Eye Rd at Aguila Farm Channel and Grass Wash. Monitor Valley Rd, Alvin Rd, 507th Ave, Centennial Drive, 491st Ave, and Railroad. Barricade if necessary.
 • Evacuate recreational fields at fire station and school.
 • Monitor all occupied structures in the Floodplain. Evacuate if necessary.
 • Monitor Martori Farms. Evacuate if necessary.

Temporary gathering locations are at Aguila Elementary School and Aguila Volunteer Fire Station.
 Note: These sites are also in a Floodplain.

Legend

- County Maricopa
- AFRP East Zone
- Rain Gage (FCD)
- Rain
- Rain/Stream
- State\US\Other Highway
- Street
- Railroad
- Canal
- Rivers/Washes/Streams
- Flood Zone Current (FEMA)
- Floodway
- Zone A
- Zone AE
- Zone AH
- Zone AO

- Minor Roadway
- Major Roadway
- Minor Roadway
- Major Roadway
- Essential
- Recreational
- Single Family Residential
- Mobile Homes
- Commercial
- Shed
- Railroad
- Utilities

APPENDIX B - Updates to the ARFP

APPENDIX C -Notification Data

Aguila FRP Notification Data

Organization	Name/Title	Contact Information
FCDMC	ALERT Room	602-506-8701 or 602-272-0132
	Steve Waters, Flood Warning Branch Manager	602-390-7804 (cell) 480-345-0771 (home)
	Dan Henz, Flood Warning Branch Meteorologist	602-768-2000 (cell)
NWS	Lead Forecaster 24-hr	602-275-7004 or 602-275-7003
AVFD	Dispatch	928-685-2300 (Emergency) 928-685-3469 (office) 928-685-3468 (fax)
	Executive Assistant	Aguilafd@tableoptelephone.com
	Clint White, Fire Chief	928-671-1338 (cell)
Aguila Elementary School	Donald German, Principal	928-685-2222 (office) dgerman@aguilaschool.org
	Gareth Williams, Business Manager/Facilities Director	928-685-2222 ext. 104 gwilliams@aguilaschool.org
MSCO	Dispatch	602-876-1030 1-800-352-4553 Public Toll Free 602-876-1011 Public
	Sgt. Jonathan Halverson, Counter-Terrorism Unit	602-527-5854 (cell) J_Halverson@MCSO.maricopa.gov
ADOT	24-hr Traffic Operations Center (TOC)	602-257-1563
	Brent Brinkley, Maintenance Supervisor (Aguila/Wickenburg Area)	928-684-2131 (office) 928-231-4086 (cell) bbrinkley@azdot.gov
	Courtney Perrier-Bear, Emergency Manager Coordinator	602-712-2988 (office) 520-262-3856 (cell) cperrier-bear@azdot.gov
MCDEM	Duty Officer	602-273-1411 602-273-1412
	Pete Weaver, Director	602-725-7181 (cell) 480-898-1317 (home) peteweaver@mail.maricopa.gov
Arizona & California Railroad	Dispatch	800-800-3490
Martori Farms	Joe Oddo, Manager	602-809-0590 (cell) 928-685-2233 (office) joddo@martorifarms.com