



MEMORANDUM

Date: September 11, 2018

To: The Honorable Sharon Bronson, Member
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

A handwritten signature in black ink, appearing to be "CHH", is written over the printed name "C.H. Huckelberry".

Re: **Preliminary Storm Report for Amado, Arizona in the Sopori Wash**

Attached is a preliminary storm report from the Regional Flood Control District (RFCD) regarding storm events that occurred on September 2 and 3, 2018. These storms inundated a number of properties on both sides of the County line, including the Cow Palace, Amado Teen Center and other buildings.

The primary cause of the flooding was an extraordinarily intense rainfall event that likely measured four to five inches of rain in a short period of time centered over the Sopori Wash. The combination of dikes, fences as well as other factors may have caused the floodwaters to exceed the capacity of the Frontage Road culvert and flow northward. The waters then ponded against the elevated Frontage Road.

The RFCD and the US Geological Survey are undertaking additional analysis for more detailed information regarding this storm and flooding event. As more information and reports are identified, we will provide this information to you and the Board of Supervisors.

CHH/anc

Attachment

c: The Honorable Chairman and Members, Pima County Board of Supervisors
Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District

DATE: September 10, 2018



TO: C. H. Huckelberry
County Administrator

FROM: Suzanne Shields, P.E.
Director

SUBJECT: Preliminary Storm Report for September 2 and 3, 2018

SUMMARY

On the night of September 2, 2018, there was an intense storm over the Sopori Wash watershed with rainfall totals estimated between three to four inches at the center of the storm upstream of Amado, Arizona. The estimated peak discharge in Sopori Wash was 19,000 cubic feet per second (cfs), which would be more than the 100-year flood. The U.S. Geological Survey (USGS) will be conducting field surveys and analysis in an attempt to more precisely determine the peak discharge value and to document the flood extent and depths. The Regional Flood Control District (District) is investigating the flooding, damages, and any contributing factors that could affect the extent of damages. However, this was a very significant storm and extreme flood event.

STORM AND FLOODING IN AMADO

Residents in Amado reported approximately three inches of rain. Floodwaters over topped the Sopori Wash channel resulting in flooding of properties in both Santa Cruz County and Pima County (see radar data for September 2, 2018).

The peak flood flow in Sopori Wash has been estimated at about 19,000 cubic feet for second (cfs) which would be more than the 100-year flood. This estimated peak flow is based on the stream gage for the Santa Cruz River at Elephant Head Bridge, which registered a peak flood flow of 22,799 cfs. There was no flow in the Santa Cruz River upstream of Sopori Wash, no flow in adjacent tributaries to the west of the Santa Cruz River, except for Sopori Wash and some flooding from tributaries on the east side of the Santa Cruz River. The U.S. Geological Survey will be conducting field surveys and analysis to better determine the peak flood discharge value and to document the flood extent and depths.

INVESTIGATION

District staff performed field inspections on September 4 and 5 to document and investigate the flooding (see attached reports). The attached map illustrates the area of inundation in Amado.

Numerous factors may have contributed to the flooding. There are farm dikes and levees along the Sopori Wash floodplain as well as fences. When a levee or fence fails due to debris, there would be a sudden increase in downstream flooding depths due to the flood wave. Generally, the impact is minor, but once an area is flooded behind a levee, the area cannot drain. This was the case regarding the feed store and RV storage area in Santa Cruz County.

The Nogales Highway is also generally about two to four feet higher than the upstream

C. H. Huckelberry, County Administrator

Preliminary Storm Report for September 2 and 3, 2018

September 10, 2018

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property. The bridge over Sopori Wash at Nogales Highway would control the flow of floodwaters and the degree in which water will back up and pond in adjacent low-lying areas. Interstate 19 is elevated because of the interchange at Arivaca Road. The bridge over the Sopori Wash at Nogales Highway is a four-cell structure. The two northern cells have 15 feet of clear height; the two southern cells were filled with sediment and heavy vegetation leaving only a five foot eight inch opening (see photos). Floodwater depths in the south and north overbanks closest to the channel were five to six feet in height. Floodwaters primarily went north affecting residential structures and businesses along Nogales Highway including the Cow Place Restaurant, Valley Manor subdivision, Auto Center, and Amado Teen Center. The depth of floodwaters in these areas ranged from two to three feet.

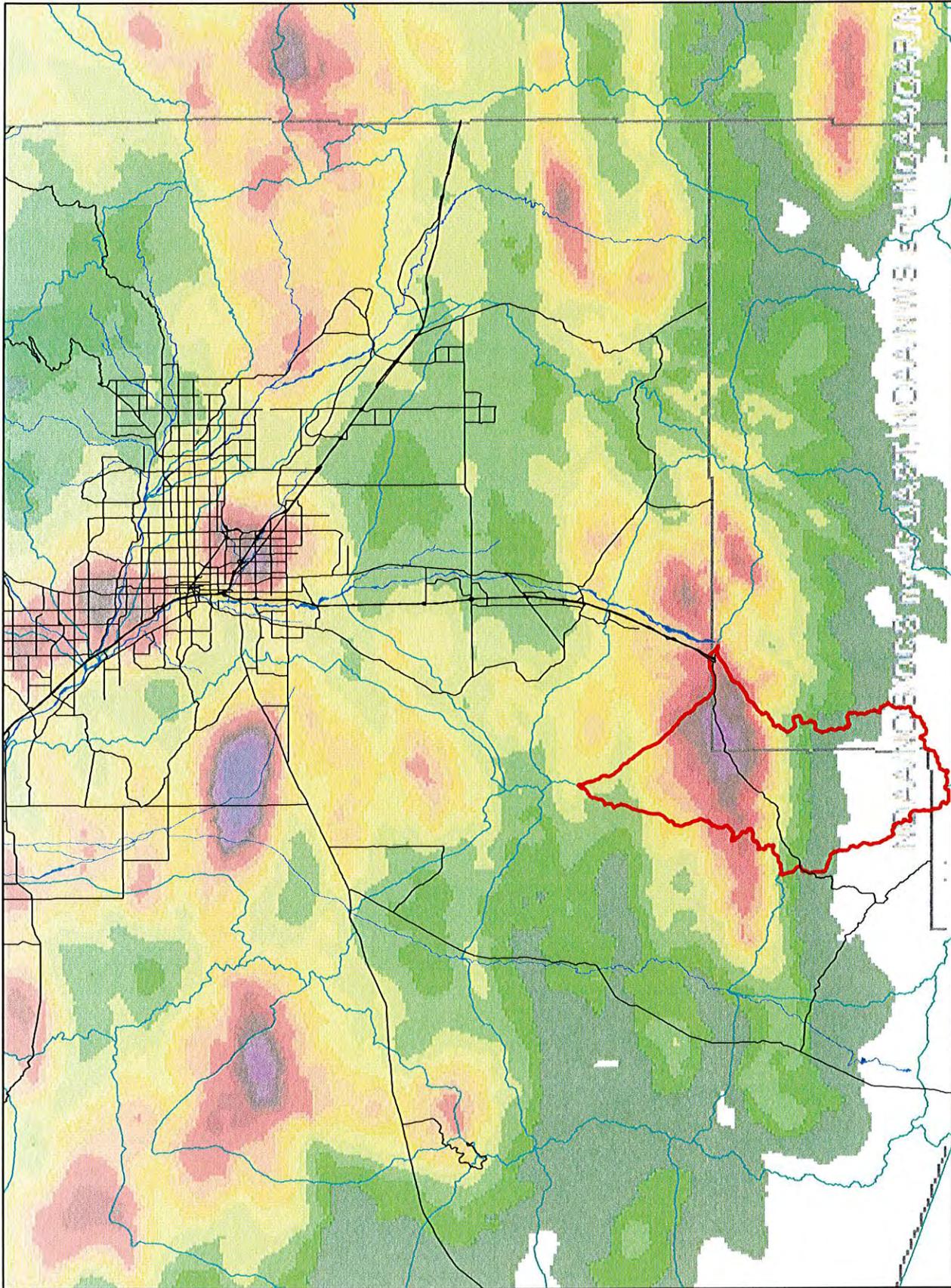
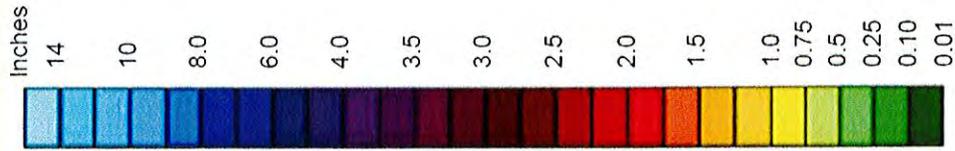
Residents expressed concerns over the construction activities of the future Dollar Store. A field inspection on September 4 showed erosion of the building pad and debris on the wooden forms for the foundation. The District issued a stop work order, and is currently reviewing the plans and site conditions.

As additional information is gathered, we will update this storm report. Please contact me if you have any additional information.

SS/tj

Attachments

- c: Carmine DeBonis, Deputy County Administrator – Public Works
- Jan Leshner, Deputy County Administrator – Community and Economic Development
- Jeff Guthrie, Director – Office of Emergency Management
- Eric Shepp, P.E., Deputy Director – Regional Flood Control District
- Andy Dinauer, P.E., Deputy Director – Regional Flood Control District



The information depicted on this display is the result of digital analysis performed on a variety of databases provided and maintained by several governmental agencies. The accuracy of the information presented is limited to the accuracy of the information provided to the Pima County Regional Flood Control District. The Pima County Regional Flood Control District makes no claims regarding the accuracy of the information depicted herein.

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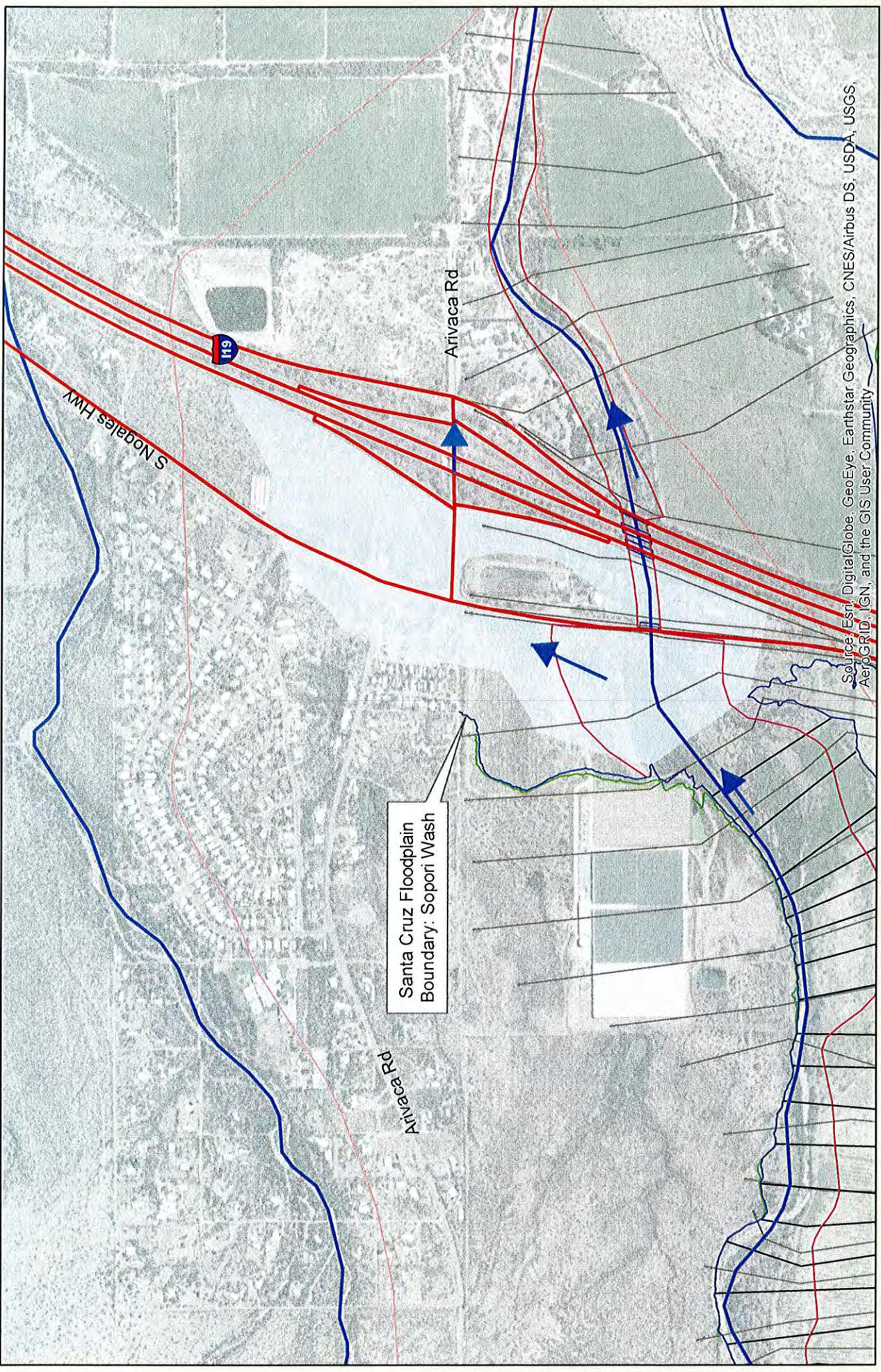
Major Roads
 Sopori Watershed
 Major Washes
 HUCs

September 2, 2018 23:55 PM
24 Hour QPE

Date: 9/5/2018

1 inch = 50,000 feet

PIMA COUNTY
 FLOOD CONTROL DISTRICT
 Pima County Regional Flood Control District
 201 N. Stone Ave. - 9th Floor
 Tucson, Arizona 85701-1797
 (520) 724-6000, FAX: (520) 724-4621
<http://www.pfd.pima.gov>



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

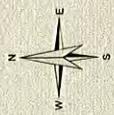
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Washes (Arrows indicate direction of flow)

Inundation Area

Sopor Wash Watershed

1 inch = 1,000 feet



Date: 9/7/2018



PIMA COUNTY
FLOOD CONTROL
Pima County Regional Flood Control District
201 N. Stone Ave. - 9th Floor
Tucson, Arizona 85701-1737
(520) 724-4600, FAX: (520) 724-4621
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South cells of Sopori Wash bridge on
Nogales Hwy, view to E



DATE: September 9, 2018

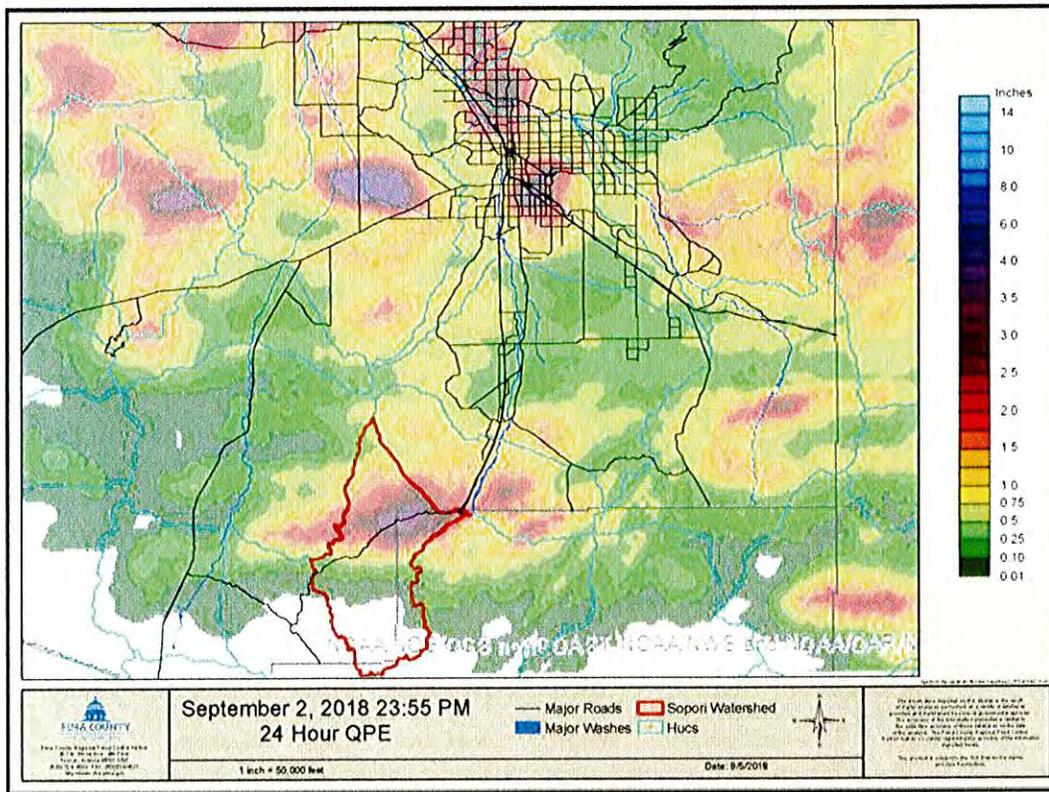
TO: Suzanne Shields, P.E.
Director

FROM: Terry Hendricks
Chief Hydrologist
Basin and Management Studies

SUBJECT: Sopori Wash Flood field investigation September 4, 2018

On September 4, 2018, Jeff Mangold and I went to the Sopori Wash around Amado (Arivaca Junction) to document flooding that occurred the night of Sunday September 2. There was a significant rainfall within the northern half of the Sopori Wash Watershed (see Figure 1). The areas of inundation are to be delineated by Psomas via an upcoming drone survey. Flooding occurred in both Pima and Santa Cruz County.

Figure 1



The stream gage network indicated no flow in the Santa Cruz River at Tubac. The Elephant Head Road stream gage on the Santa Cruz reported a peak flow of 22,700 cfs¹. Flooded property owners in the Amado stated the flow crest was around 9:00 p.m. The area of inundation

appeared to be slightly larger than the current FEMA floodplain mapping (Flood Zone A) for Pima County.

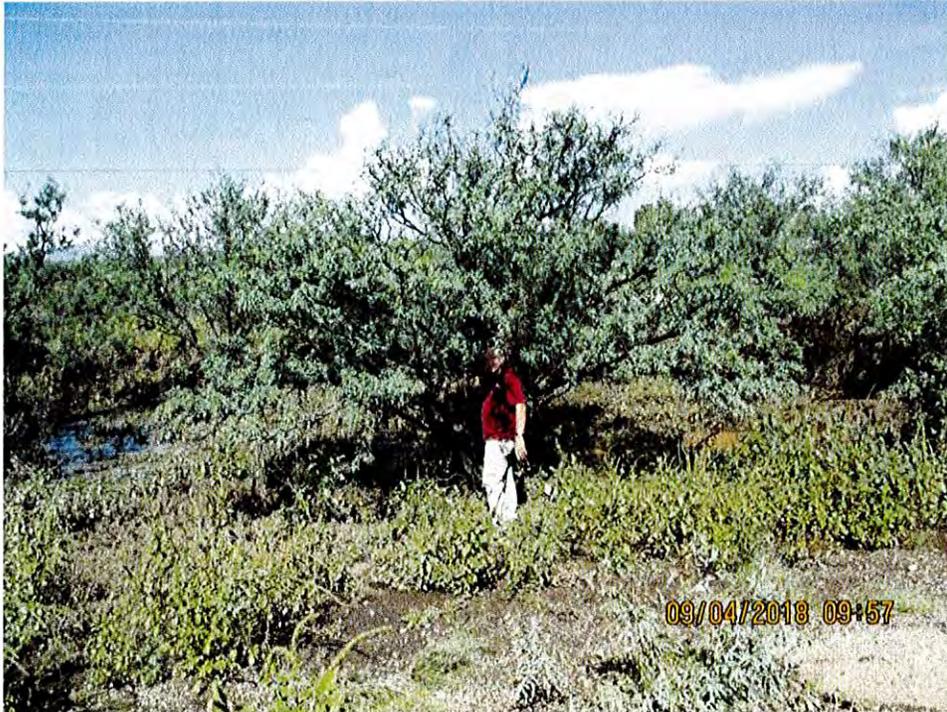
The following photographs were taken on our field visit:



Looking northeast from the northeast corner of the New Arivaca Road and the Nogales Highway. It appeared the flood water overtopped the intersection



Looking southwesterly at the guardrail on the south side of Arivaca Road east of the Nogales Highway. Flow when under the guardrail and crossed the roadway.



Pointing to a debris line in the vegetation southwest of the intersection of the Nogales Highway and Arivaca Road.



Looking east along the access road to the agricultural facility south of the county line and west of the Nogales Highway. The flow width across this road was 600 feet +/-.



Looking south from the access road to the agricultural facility south of the county line and west of the Nogales Highway. Notice the debris on the wire fence indicates the fence was overtopped.



Looking upstream into the Sopori channel while standing on the Nogales Highway.



Looking downstream into the Sopori channel while standing on the Nogales Highway.



A flooded business east of the Nogales Highway and south of the Sopori Wash. The ponded water is trapped on the property due to a levee like berm along the south side of the Sopori wash Channel.



A flooded business east of the Nogales Highway and south of the Sopori Wash. The ponded water is trapped on the property due to a levee like berm along the south side of the Sopori wash Channel.



A flooded business east of the Nogales Highway and south of the Sopori Wash. Sopori wash Channel.



A flooded business east of the Nogales Highway and south of the Sopori Wash. Sopori wash Channel.



Looking west at the southern side of the Dollar General store under construction just north of the county line.



Looking west at the Dollar General store just north of the county line. The framing for the building pad was over topped by flow at the southwest corner.



A closer view of the Dollar General building pad showed erosion damage to the foundation framing in part, due to how a utility trench captured flow. Erosion protection is needed.



Pointing to the approximate high-water mark on a bridge pier on the Elephant Head Bridge on the Santa Cruz River. This was the second set of piers from the east embankment. Flow in the Santa Cruz was bank to bank.



Looking a surface evidence or Pier Scour at the Elephant Head Bridge over the Santa Cruz River. Flow in the Santa Cruz River was bank to bank.



Looking at the debris line on a sand bar just downstream of Elephant Head Bridge the Santa Cruz River downstream.

Other photos were taken at the Continental Road Bridge over the Santa Cruz River. The flow at that bridge was also bank to bank.

¹ Peak discharge occurred on at 1:17 a.m., ALERT gage number 6063. Discharge estimate was based on a stage flow-rating curve. Such rating curves are approximate.

Sopori Wash/Amado Flood Event 9/2/18

Field investigation conducted by Mindy Cox on 9/4/18

Observed debris on fence along south side of 4500 W Arivaca Rd, and additional debris on south side of Arivaca Rd extending toward I-19 underpass. Basins at 4500 W Arivaca Rd and parcel 304-43-012K contained standing water.

Drove south on Nogales Hwy into Santa Cruz County. Observed flooding of businesses on east side of Nogales Hwy (feed store, RV storage lot), chain-link fencing pushed down, standing water, metal canopy crushed and knocked down, RVs askew. Flow was northward on both sides of Nogales Hwy, then northeasterly on east side of road and northwesterly on west side of road. Unclear if flows overtopped road or not, observed minor vegetative debris on sides of road in a couple locations. If there was flow over the road, it would have been about 4' since the road is that much higher than the ditch on the west side. There was a lot of activity in the area- area residents or business owners taking stock of situation, workers out repairing fences, a large excavator (Santa Cruz County workers?) working on the south side of the Sopori Wash just east of the bridge over the Nogales Hwy. Observed large trees pushed down on north bank of the Sopori Wash.

Dollar General building site at 28890 S Nogales Hwy: spoke with construction superintendent John Cambra. He stated that the building pad "was not touched" (however, photo taken at the time shows debris caught on wood forms on south side of pad). Did not observe significant erosion or scour on pad. John stated that the construction trailer was carried north across property, ending up at the northeast corner. John said that the flood occurred around 9 pm Sunday night. The onsite rain gauge for the SWPPP showed 3" of rain.

Auto repair shop at 28860 S Nogales Hwy: did not speak with anybody there. High water mark on west side of building and debris line on chain-link fence on east side of property indicate at least 2' of flow across site.

Cow Palace Restaurant at 28802 S Nogales Hwy: spoke with owner Lynn Greenes. She has owned property for five years. I asked if she had a mortgage and flood insurance; she stated that she does not have a mortgage and didn't think she had flood insurance, mentioned having "storm insurance." Workers were carrying out furniture and items from restaurant. PC Health Dept had been there and ordered them to get rid of food since electricity was turned off. The restaurant was closed at the time of the event. High water mark on west side of building close to 3'. High water mark on interior of east side of building measured at 28".

Amado Youth Center at 28800 S Nogales Hwy: spoke with coordinator Tony Bruno. High water mark close to 2' in interior of south end of building; much less at north end of building. He lives near Elephant Head and said his rain gauge shows 3" of rain.

Market at 28760 S Nogales Hwy: spoke with owner. Measured high water mark of 4" on east side of building interior.

Mobile home park at 4635 W Arivaca Rd. Spoke with Russell Valenzuela, a 40-year resident of area. He stated that this severe a flooding event has never happened before, not even in 1983. High water marks on structures around 2'. He had water right up to his door but not inside mobile home. Said that residents of the other mobile home park on the west side of Arivaca Pl had some damage to items that were

outside. Stated his belief that the Dollar General site created a flow diversion, increasing flooding to the existing buildings. Stated that there was a pre-existing flow path across Dollar General site, where water always flowed. Stated that he saw water “bouncing off the Dollar General pad toward the mobile home park” during the flood event. Stated that the event occurred from “8 pm all night.” Stated that Dollar General attorneys had been onsite.

Also looked at UPRR track south of Whitehouse Canyon Road. Culverts blew out and were being repaired. Boulder dam upstream in wash blew out also. Unknown who installed dam.

Field investigation conducted by Mindy Cox and Joe Cuffari on 9/5/18

Outcome of meeting between Suzanne, Eric, Brian, Andy D., Mindy, and Joe was to return to site to 1) photograph Nogales Hwy bridge over Sopori Wash to document cell condition re preexisting sandbar in south cells, 2) measure distance from top of bridge box culverts to ground level and sandbar level, 3) photograph stock pond upstream of Amado, 4) photograph greenhouse and surrounding area in Santa Cruz County, 5) advise Dollar General superintendent to stop work, and 6) try to determine flow direction within mobile home park.

Photographs were taken. Top of sandbar at south bridge cells measured 5’8” from bottom of bridge. North bridge cells were open and measured around 15 feet from channel. Northward flow on west side of Nogales Hwy eroded out much of the sandbar during the event. Flow indications on north bank of the Sopori Wash west of the bridge, including debris on chain-link fence on top of and paralleling north bank and pushed over grass and trees, seem to indicate that flow in the river was that high. However, riprap on north bank east of bridge is undisturbed. Excavator was still working on south bank.

Stock pond did not breach, and contained standing water. Unsure if flow overtopped during event.

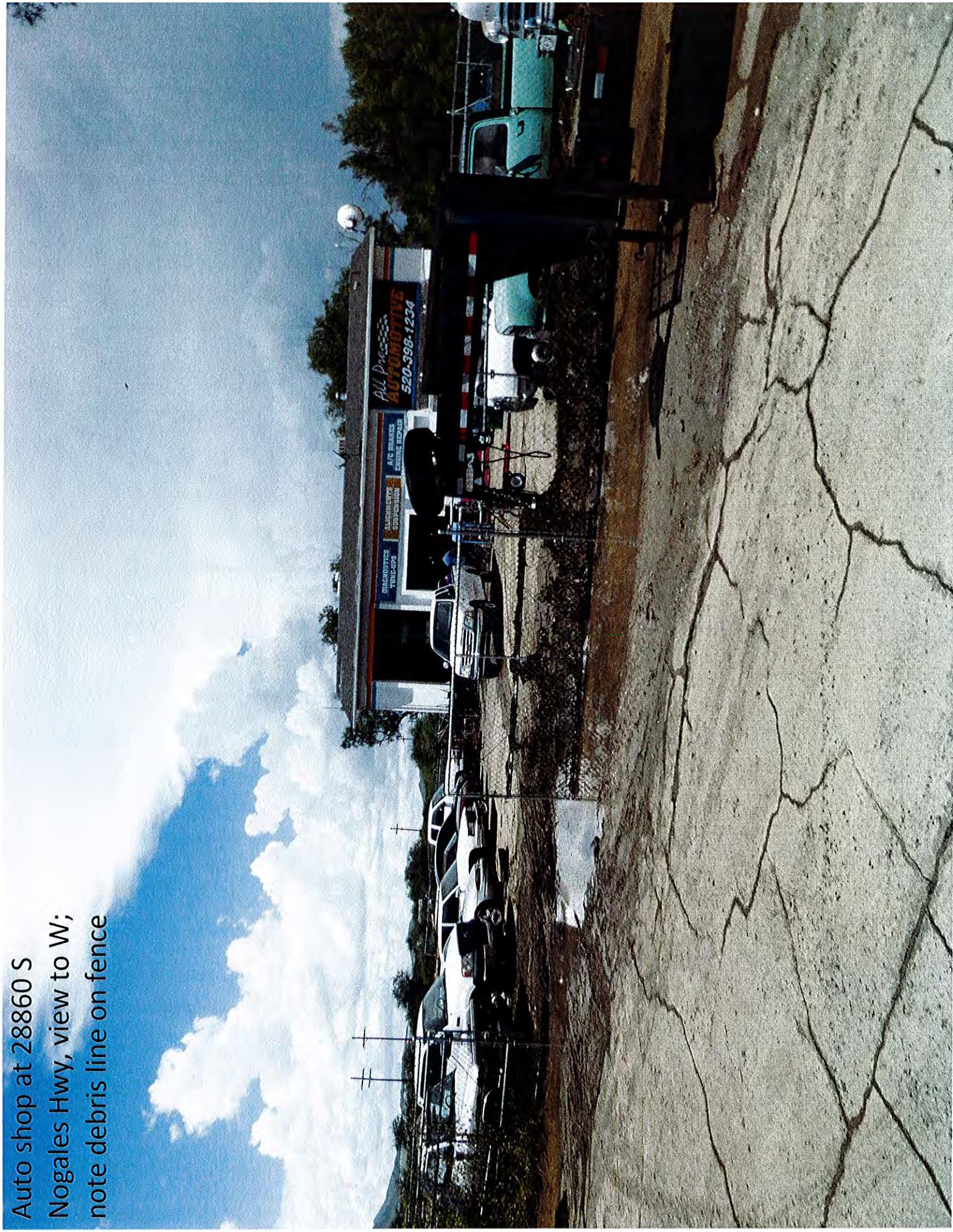
Not able to access west side of greenhouse. Open area north of greenhouse did not exhibit signs of flow.

Advised John Cambra, construction superintendent of Dollar General, to stop work on building pad. He called his supervisor, Russ Salmon, to advise. Stated that they were not planning any work on the building for the rest of the week anyway. Advised him we’d update him by the end of the week.

Dollar General building pad,
28890 S Nogales Hwy, view
to NE



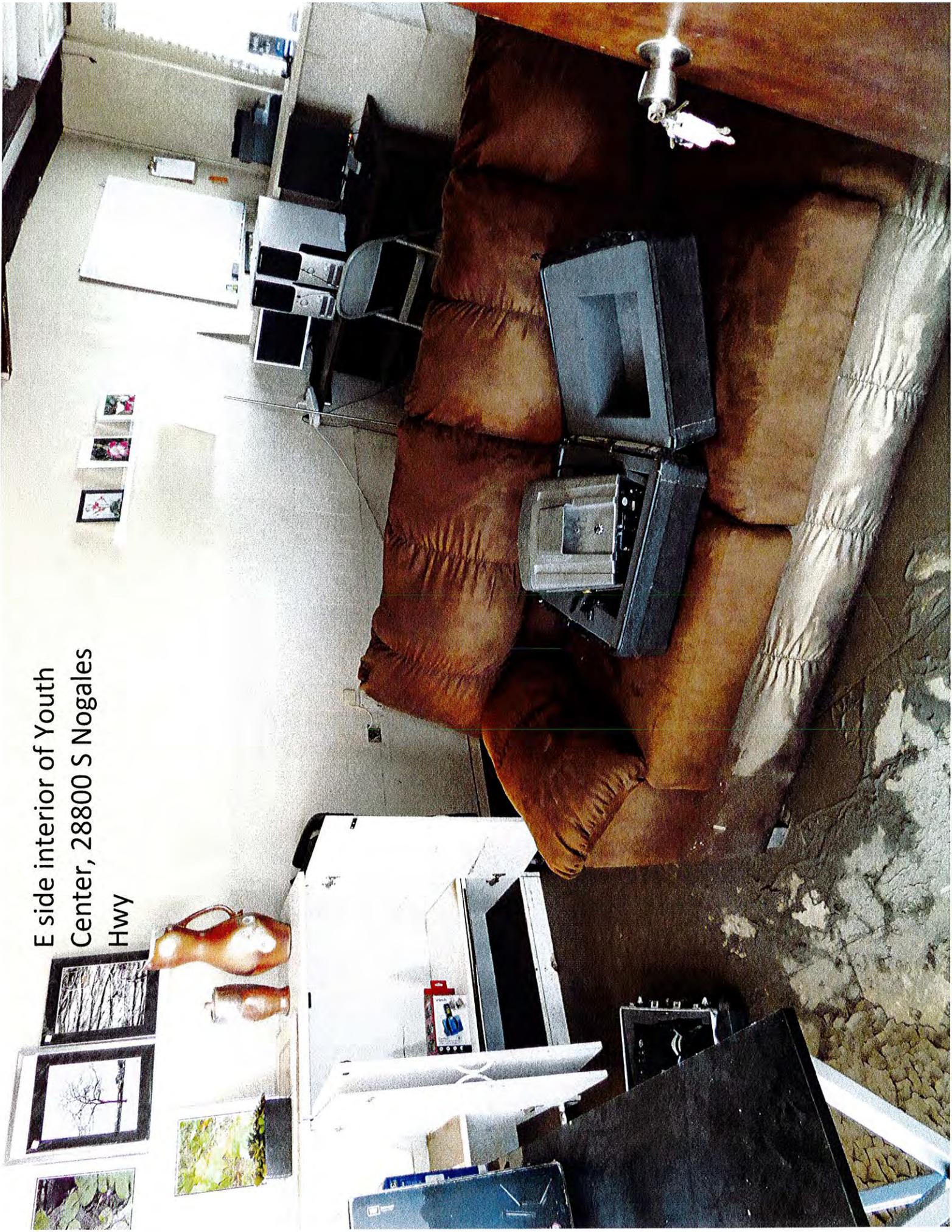
Auto shop at 28860 S
Nogales Hwy, view to W;
note debris line on fence



W side of Cow Palace, view to N



E side interior of Youth
Center, 28800 S Nogales
Hwy



1.5
mi
west of Cow Palace,
trailer park at 4635 W
Arivaca Rd



5'8" from top of sand bar to bottom
of bridge over Sopori Wash on
Nogales Hwy (south cells)



Bridge over Sopori Wash on
Nogales Hwy, view to E

