MEMORANDUM

Date: July 22, 2020

To: The Honorable Chairman and Members
Pima County Board of Supervisors

From: C.H. Huckelberry
County Administrator

Re: **Big Horn Fire Flood Preparedness Plan**

Please see the attached July 21, 2020 memorandum from Regional Flood Control District (RFCD) Director Suzanne Shields. The memorandum and the five attachments contain materials relate to the Big Horn Fire and its hydrologic impact on the County with respect to increased flood risk.

Of importance is in Attachment 1 showing the composite burn severity related to the fire. The watershed most severely impacted by the Big Horn Fire is the upper Cañada del Oro Wash. Such was recently evident by the debris, mud and ash flow that occurred on July 15, 2020. This flow that originated in the upper Cañada del Oro watershed and discharged to the Santa Cruz River, a distance of 28 miles, was a result of a rainfall event that a Flood Control District's ALERT system rain gauge recorded as 0.83 inches in less than 1 hour. This shows the dramatic increase in stormwater and flood flows as a result of fire damage in the watershed.

Attachment 2 is a table of the impacted watersheds by the fire and percent of burned area, the pre-fire and post-fire flood discharge. The increases in estimated flood flows vary from as low as fourteen percent in the Rooney Wash North to as much as over 100 percent in the Cañada del Oro Wash watershed. The typical increase in flood discharge is approximately 30 percent to 40 percent, which is a significant increase.

The RFCD has remapped all of the major tributaries to the Santa Catalina Mountains that have been affected by the Big Horn Fire. Attachment 3 shows a preliminary hydrologic summary of flood hazards in the following areas:

- Cañada del Oro Watershed including Cañada del Oro Wash from Pinal County to Santa Cruz River along with tributaries of Sutherland Wash, Rooney Wash and Steampump Wash
- Pima Canyon Watershed including Pima and Geronimo Wash from the National forest Boundary to Rillito River
- Finger Rock Watershed including Finger Rock and Pontatoc Washes to the Rillito River
- Ventana Watershed including Ventana, Esperero and Valley View Washes
- Sabino Canyon Watershed including Sabino Creek and Bear Canyon Wash

Attachment 4 shows a number of photographs by watershed of the burned areas. In some cases, the photographs are difficult to view and in others, there is essentially complete fire destruction in the watershed. These photographs demonstrate the significant and dramatic increase the fire has had on the respective watersheds.

Finally, the additional maps in Attachment 5 show the probable areas of inundation. The data indicates there are 3,600 parcels that may be affected by flood flows from 100-year rainfall events over these burned watersheds, including 982 parcels that have improved structures. The number of structures potentially subject to inundation by jurisdiction are one in the Town of Marana, 38 in Tucson, 109 in the Town of Oro Valley, and 834 in unincorporated Pima County.

Clearly, the 120,000 acre Big Horn Fire will have significantly more adverse flood impacts on the County than any past fires in the Santa Catalina area, which includes the following fires.

- Aspen Fire, 2003 which burned 85,000 acres
- Bullock Fire, 2002 which burned 31,000 acres

CHH/lab

Attachment

c: Jan Lesher, Chief Deputy County Administrator
Carmine DeBonis, Jr., Deputy County Administrator for Public Works
Francisco García, MD, MPH, Deputy County Administrator and Chief Medical Officer, Health and Community Services
Suzanne Shields, Director, Regional Flood Control District

PIMA COUNTY
FLOOD CONTROL

MEMORANDUM

DATE: July 21, 2020

TO: C. H. Huckelberry
County Administrator

FROM: Suzanne Shields, P.E.
Director

SUBJECT: **Post Bighorn Fire Flood Preparedness Plan**

On June 5, 2020, a lightning strike started the Bighorn Fire in the Santa Catalina Mountains. The fire spread across the mountain affecting nearly 120,000 acres, and is still burning in Sabino Canyon. The Pima County Regional Flood Control District (District) began immediate actions to assess the potential impact of the Bighorn Fire on the mountainous watersheds and mitigate the potential increased flood risk to downstream areas in Catalina, Oro Valley and along the Catalina Foothills watercourses. In order to provide results quickly, the floodplain modeling assumed worst case scenarios with respect to burn severity. By using the District Qualified Consultant List (QCL), the District had preliminary flood risk information within two weeks of the start of the fire. Using this information, the District began a program of inspections and maintenance of the public watercourses at increased risk due to the fire, including drainage facilities, bridges and culverts in order increase conveyance capacity. In addition, we are working with the US Forest Service (USFS), Natural Resources Conservation Service (NRCS) and the Federal Emergency Management Agency (FEMA) to gather the necessary data to improve the accuracy of these models as well as to develop outreach to the public. The post-fire flood risk information is being used by our ALERT staff, Office of Emergency Management (OEM) and the first responders and will be used to identify areas for enhanced public outreach.

FEDERAL ASSISTANCE

The District has been meeting with NRCS to see what assistance may be available under the Emergency Watershed Protection Program or for the ranchers, through the Environmental Quality Incentives Program, which can provide assistance for erosion control and flood mitigation on private land post wildfires.

For residents and businesses, FEMA can provide immediate flood insurance coverage for structures and content after a severe fire. When a wildfire occurs on federal lands, the typical 30-day wait period for insurance policies to become effective is waived and the effective date is the date of purchase as long as the policy was acquired within 60 days after fire containment. The District has developed a public information program for information on the increased risks and flood insurance options. We are working closely with Oro Valley on notifications and the use of MyAlerts for Pima County property owners as well as the CodeRED emergency notification system in Oro Valley.

FIRE HYDROLOGIC ASSESSMENT

While the USFS's Burn Assessment Emergency Response (BAER) team is still assessing the fire severity, the District has evaluated the USFS initial burn information as well as burn area information from the previous Aspen and Bullock fires Areas that have repeated damage by fires have different post fire behaviors with respect to vegetation and soil conditions which can exacerbate and increase flood potential (see attached composite Burn Map). Using the burn information, field inspections, and watershed models, the District has mapped potential flooding scenarios.

Residents and business owners in the potential post-fire flood risk areas are receiving mailings explaining the risk of flooding after fires, emergency preparedness steps including the location of sand bags, and flood

insurance information. A total of 982 structures, including residences and businesses have been sent this information. The models of the potential flooding from a 100-year storm, shows parcels that may be impacted include one in the Town of Marana, 38 in Tucson, 109 in the Town of Oro Valley and 834 in unincorporated Pima County.

Of all the watersheds, the Cañada del Oro (CDO) Watershed was burnt the most by area and severity. Of the upper 41 square miles of the CDO Watershed, approximately 75%, or 30 square miles was burned.. The attached table provides the difference between the pre-burn 100-year flood discharge values and the post burn values, but it should be noted that the fire is not yet out in Sabino Canyon and a full assessment has not been made of Sabino and Bear canyon due to the ongoing fire and access restrictions. For the CDO above Oracle Road, the discharge value went up by 100%. Also attached is a map that shows the change in flood flow discharges, based on the worst case scenario burn severity. The Summerhaven area was spared though there are still risks because areas that were damaged during the Aspen Fire where impacted with this fire, albeit to a lesser extent.

Other areas at risk include areas west of a potential breakout of the Pima Wash at Ina Road including properties along Oracle Road from Ina Road south to the Rillito River and near the confluence of the Rillito Creek. Other newly at-risk parcels occur in the Esperero Wash and in the washes draining from Pusch Ridge toward the Town of Oro Valley. Furthermore, the risk of debris flows at the forest boundary can cause clogging and diversion of flows into properties not currently in floodplain maps. New rain gages were just installed in Pima and Ventana canyons to assist in early detection and intensity of rainfall and to provide warnings. It should be noted that these are steep watersheds with very little time, one hour or less, from rainfall events to peak flows.

In the attached two appendices, one shows photographs of the burned areas with a description of the burn severity and the second has post-fire potential flood maps for each impacted watershed.

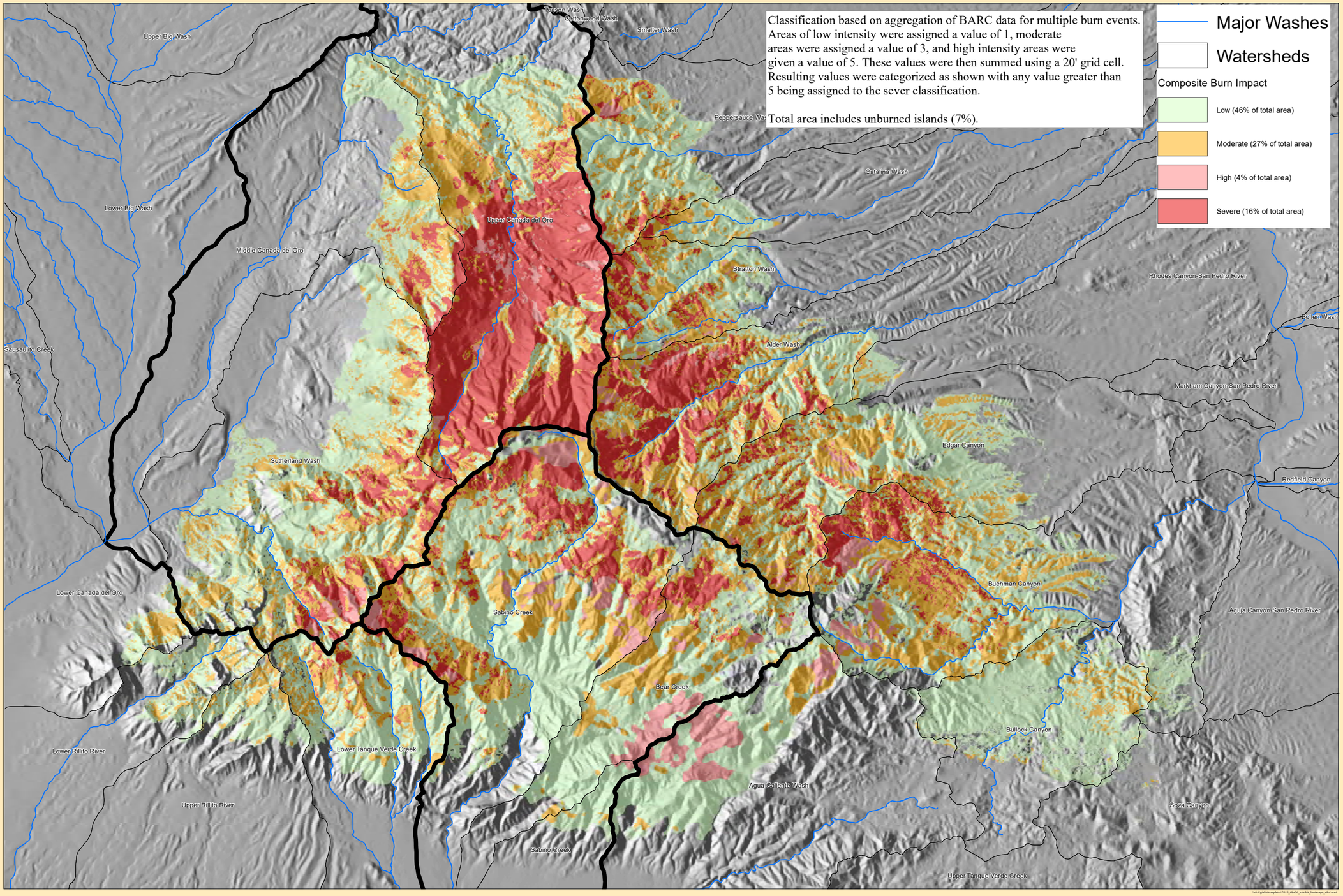
Please let me know if you have any questions. I will be providing you with information on our assessments and any federal or state assistance programs.

SS/tj

Attachments

c: Jan Lesher, Chief Deputy County Administrator
Carmine DeBonis, Jr., Deputy County Administrator – Public Works
Yves Khawam, PhD, Assistant County Administrator for Public Works
John Voorhees, Assistant County Administrator – County Administrator's Office
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

ATTACHMENT 1



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http://www.rfcd.pima.gov

Big Horn, Aspen and Bullock Fire
Composite Burn Severity

N
W E
S

1 inch = 3,517 feet

0 4,500 9,000 18,000 27,000 36,000 Feet

Date: 7/16/2020

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

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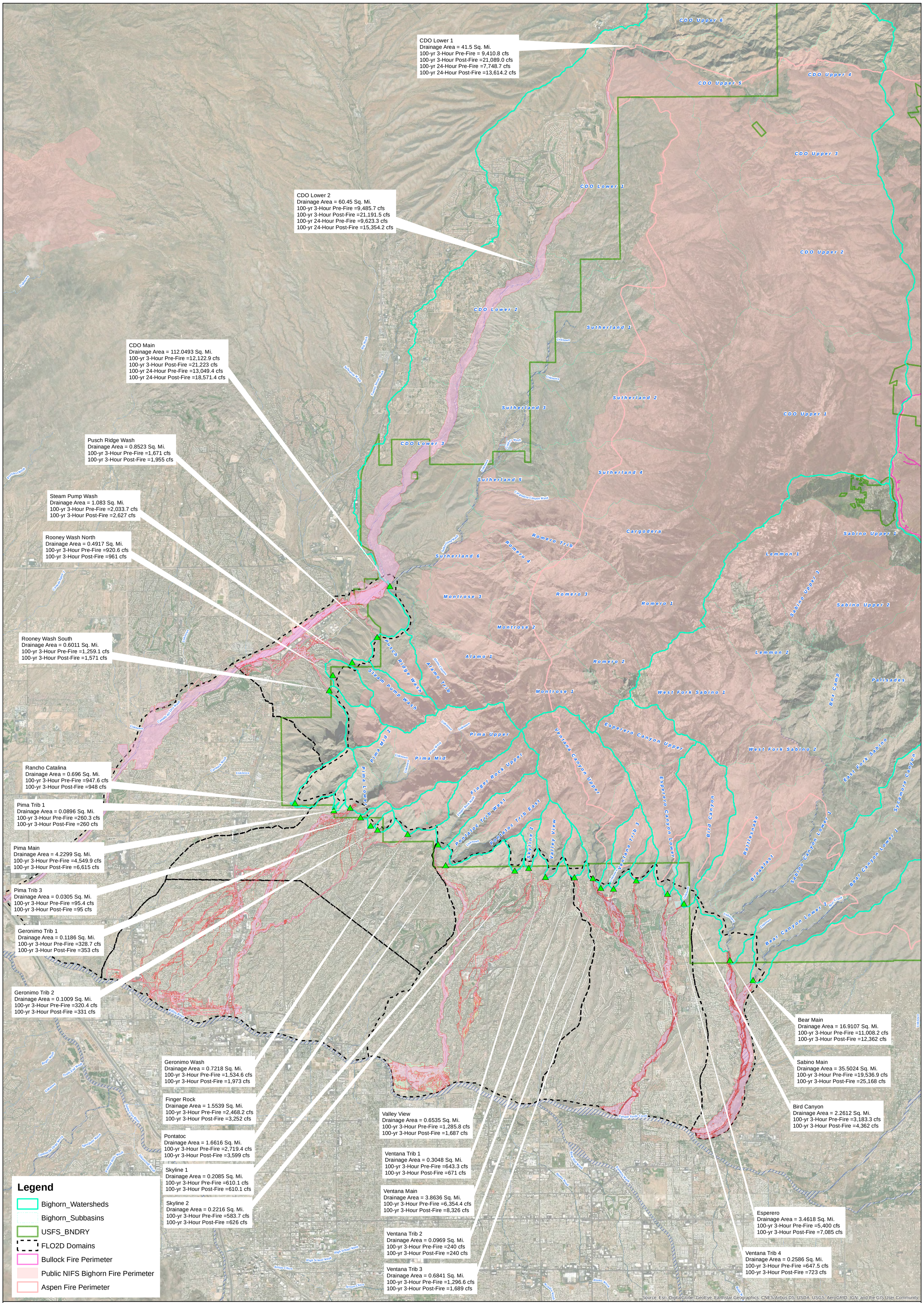
ATTACHMENT 2

Bighorn Fire 100-yr Flood Assessment

Watercoure	Drainage Area (Square Miles)	Precent Burned	Pre-Fire Discharge (in cfs)	Post-Fire Discharge (in cfs)	Percent Increase
Bear Canyon	16.9	20%	11,008	12,362	12.30%
Cañada Del Oro Wash	112	58%	10,595	21,223	100.31%
Esperero Wash	3.5	91%	5,400	7,085	31.20%
Finger Rock Wash	1.6	82%	2,468	3,252	31.77%
Pima Wash	4.2	74%	4,550	6,615	45.38%
Pontatoc Wash	1.7	65%	2,719	3,599	32.36%
Pusch Ridge Wash	0.9	47%	1,671	1,955	17.00%
Rooney Wash North	0.5	14%	921	961	4.34%
Rooney Wash South	0.6	60%	1,259	1,571	24.78%
Sabino Creek	35.5	53%	19,466	25,045	28.66%
Steam Pump Wash	1.1	81%	2,034	2,627	29.15%
Sutherland Wash (J3, 1&	9.2	44%	3,973	6,067	52.71%
Sutherland Wash (4)	3.7	76%	1,767	2,936	66.16%
Valley View Wash	0.7	53%	1,286	1,687	31.18%
Ventana Canyon Wash (Main Channel)	3.9	88%	6,354	8,326	31.04%
Ventana Canyon Wash (Trib 3)	0.7	68%	1,297	1,689	30.22%
Ventana Canyon Wash (Trib 4)	0.3	24%	648	723	11.57%

All runoff values are calculated from a 3-hour, 100-year design storm
Sabino and Bear Canyons' discharge values are preliminary and subject to change

ATTACHMENT 3



0 0.75 1.5 3 4.5 6 Miles

N

PRELIMINARY

BIGHORN FIRE
FLOOD HAZARD MAPPING
HYDROLOGY

Last Updated on *Thursday, July 2, 2020*

JE FULLER hydrology • geomorphology

PIMA COUNTY FLOOD CONTROL

ATTACHMENT 4

Upper Canada del Oro Watershed

Upper Canada del Oro Basin looking south toward Mt Lemmon. Uniform high intensity burn.

Upper CDO watershed from Oracle Ridge looking west at San Maniego Peak. Uniform high intensity burn.

Dan Saddle on Oracle Ridge. View is to northeast. High intensity burn in oak biome.

Upper CDO watershed. Oracle Ridge from Mt. Lemmon Control Road. High intensity burn.

From Ski Run Road looking north at the CDO watershed. Uniform high intensity burn.

Upper CDO watershed burn scar surrounding the town of Summerhaven. Photo Credit Stan Kartchner

Pima Canyon

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Pima Canyon looking east from below Table Mesa. Moderate/Low burn severity on rocky terrain.

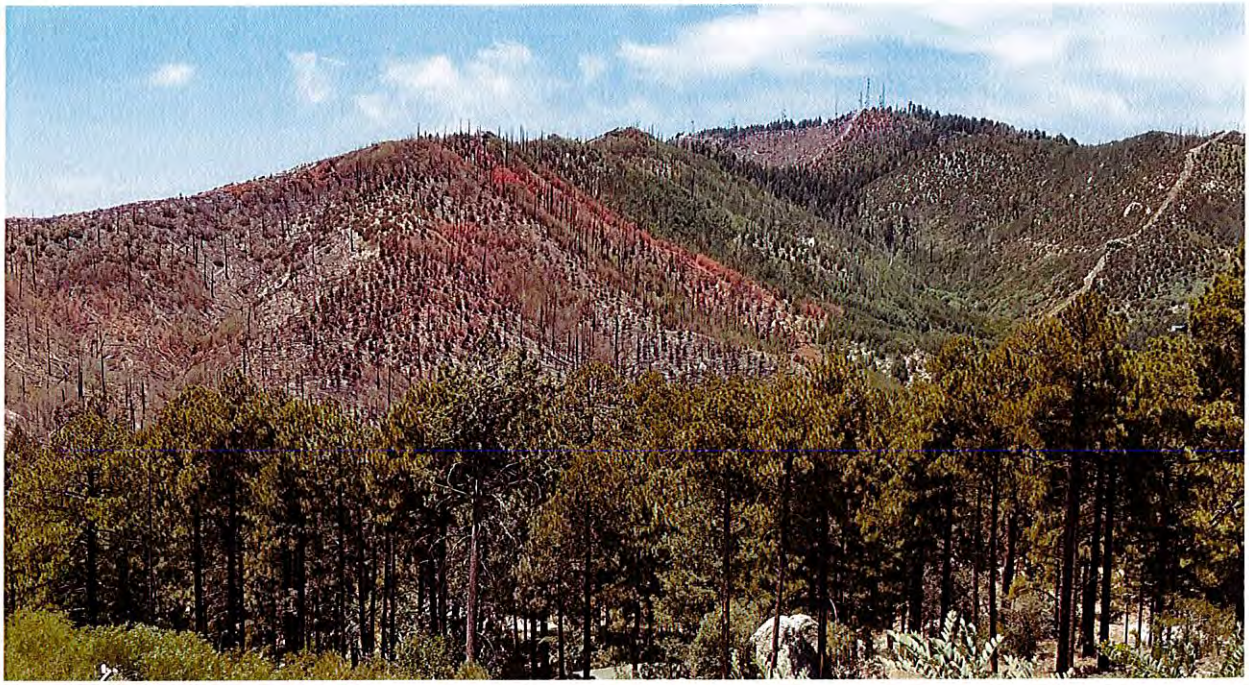
Pima Canyon

Pima Canyon looking northeast from below Table Mesa. Moderate/Low burn severity on rocky terrain.

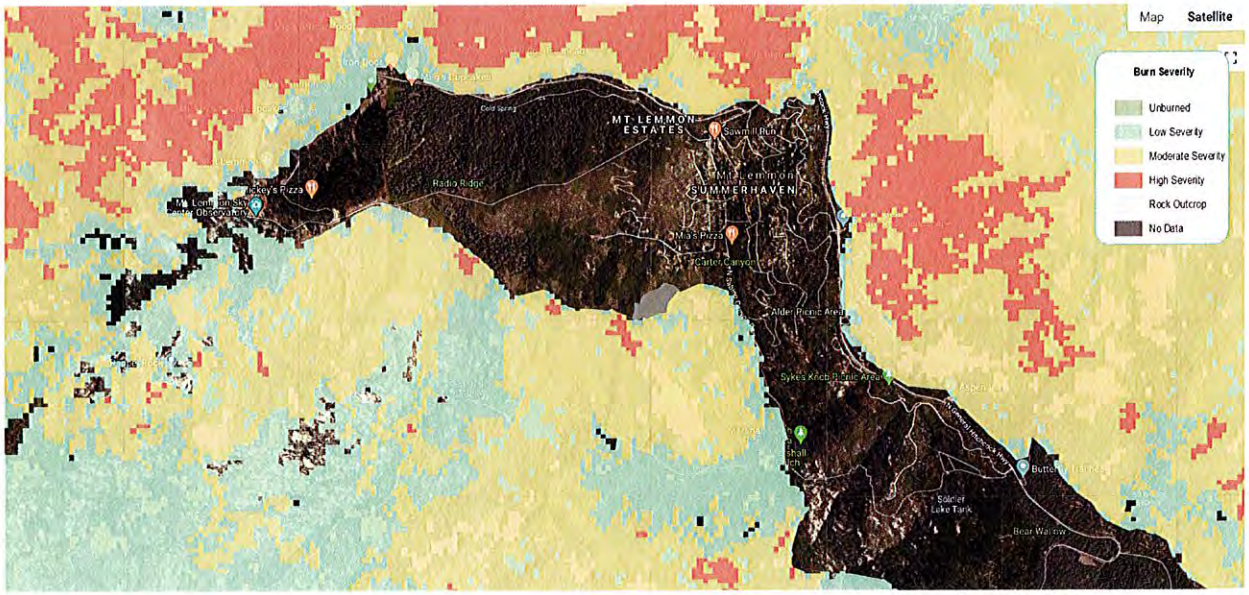
Ventana Canyon Watershed

Upper Ventana Canyon – Mosaicked Moderate/Low intensity burn.

Summerhaven

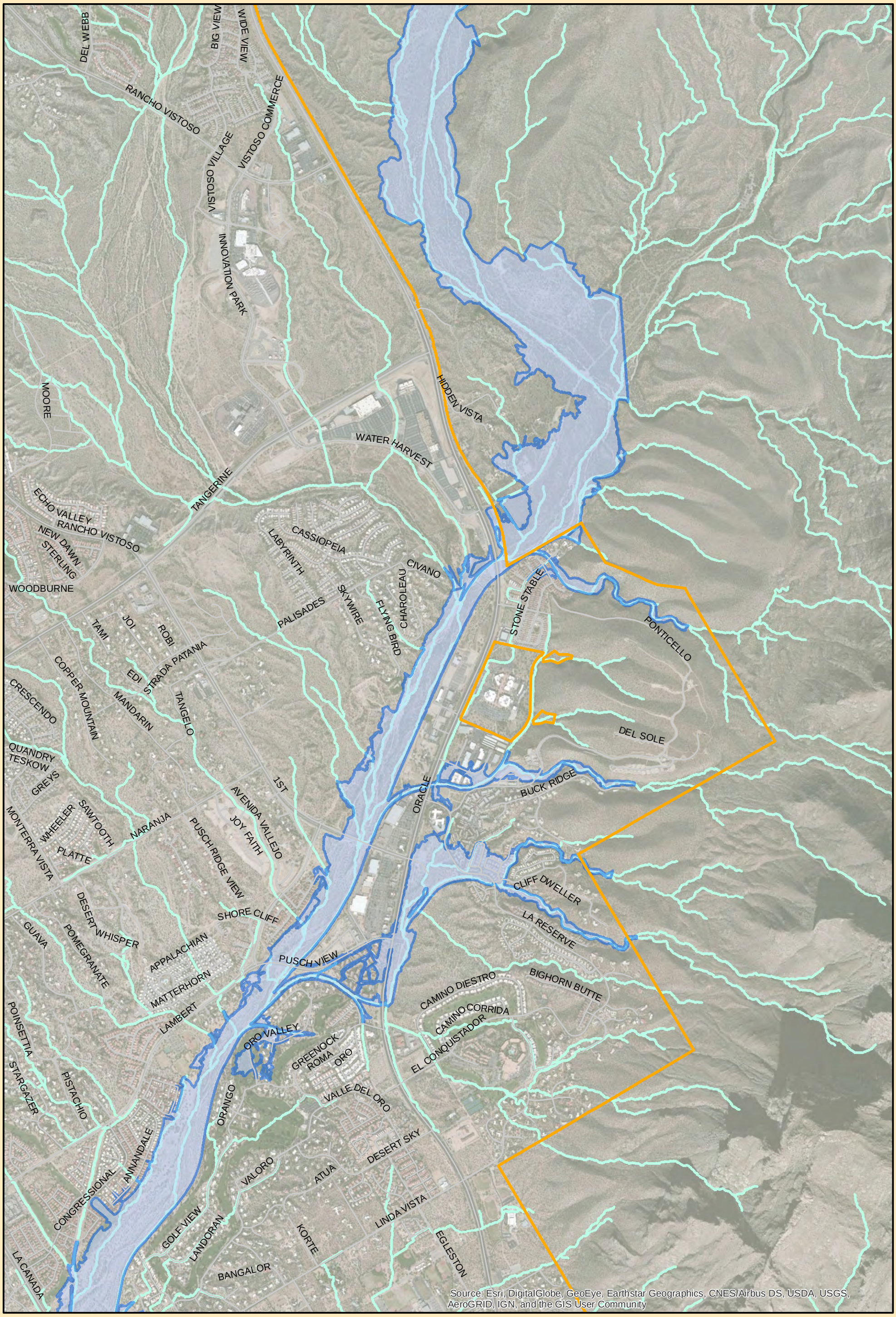


Looking west from General Hitchcock Highway towards the Carter Canyon watershed and Radio Ridge. Summerhaven is obscured by the trees in the foreground. Moderate/Low intensity burn in the Marshal Gulch watershed is visible on the left of frame.



Burn intensity map showing Summerhaven and the Carter Canyon watershed were mostly un-burned. Watersheds that burned adjacent to Summerhaven do not flow into the town. High severity burn on the north flows to the CDO, the moderate/low burn area to the south flows to Sabino Creek downstream of the town.

ATTACHMENT 5



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Streets
Jurisdictional Boundaries
Post-Fire Innundation Areas
Washes

1 inch = 2,000 feet

0 495 990 1,980 2,970 3,960 Feet

Date: 10/23/2017

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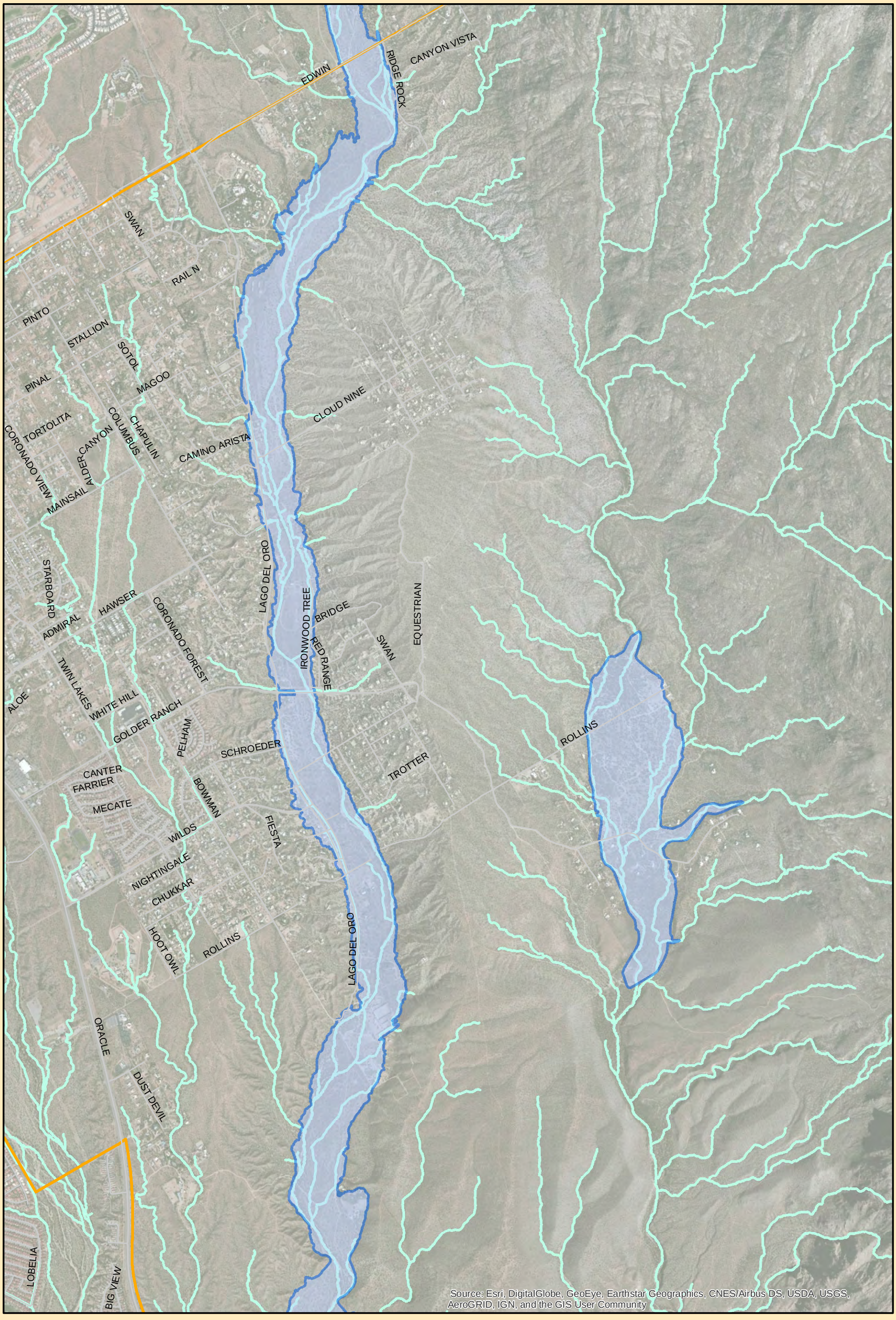

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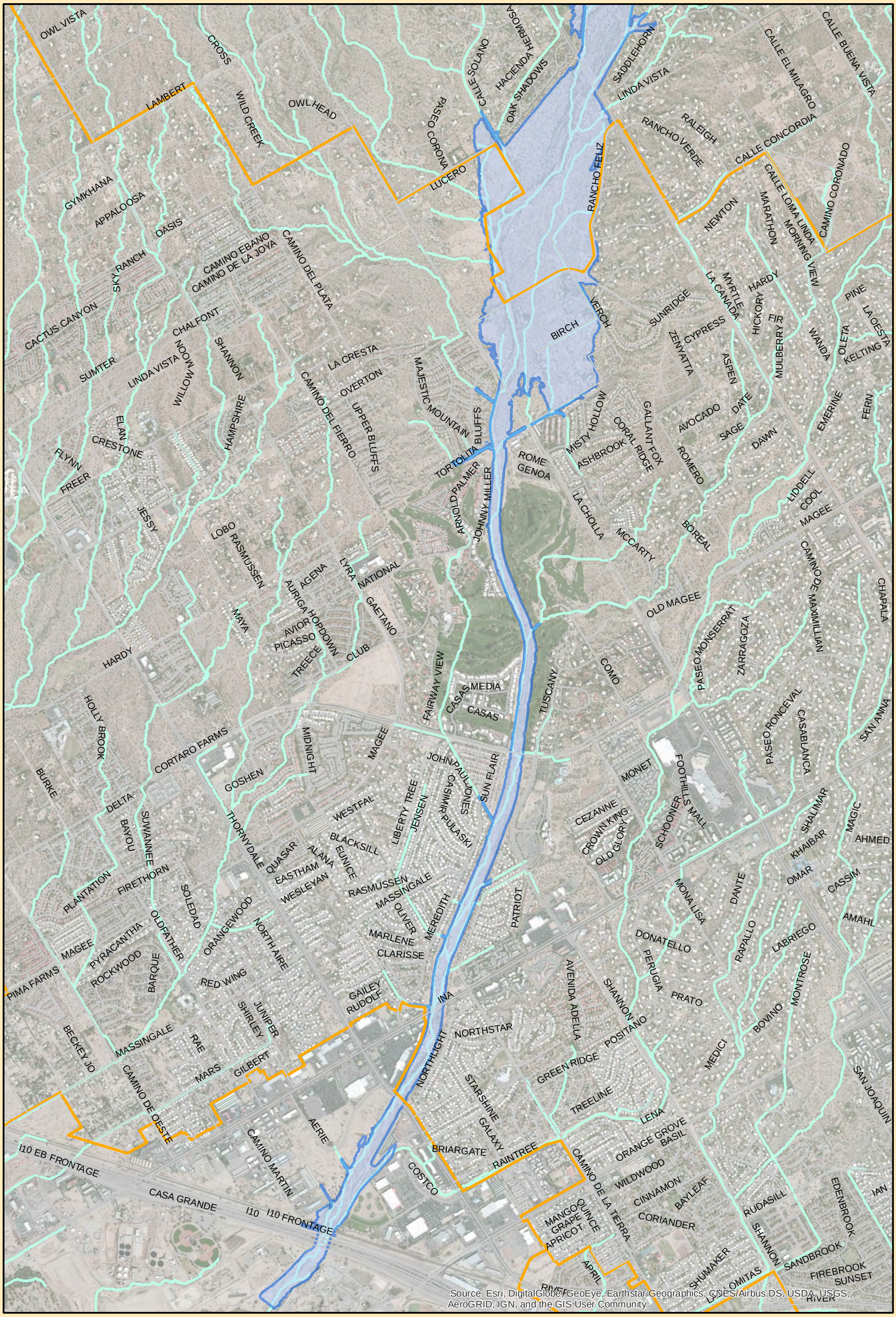

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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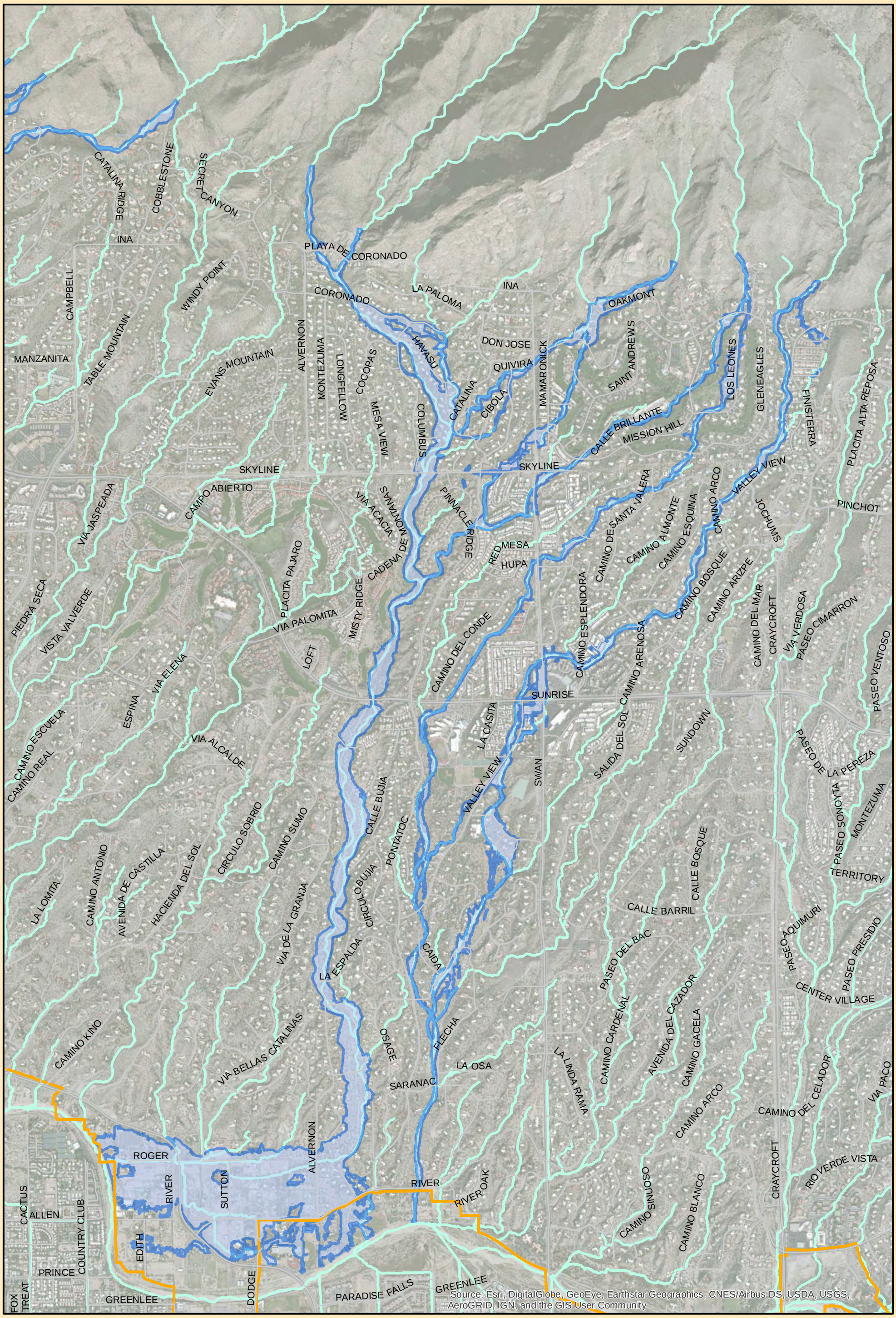

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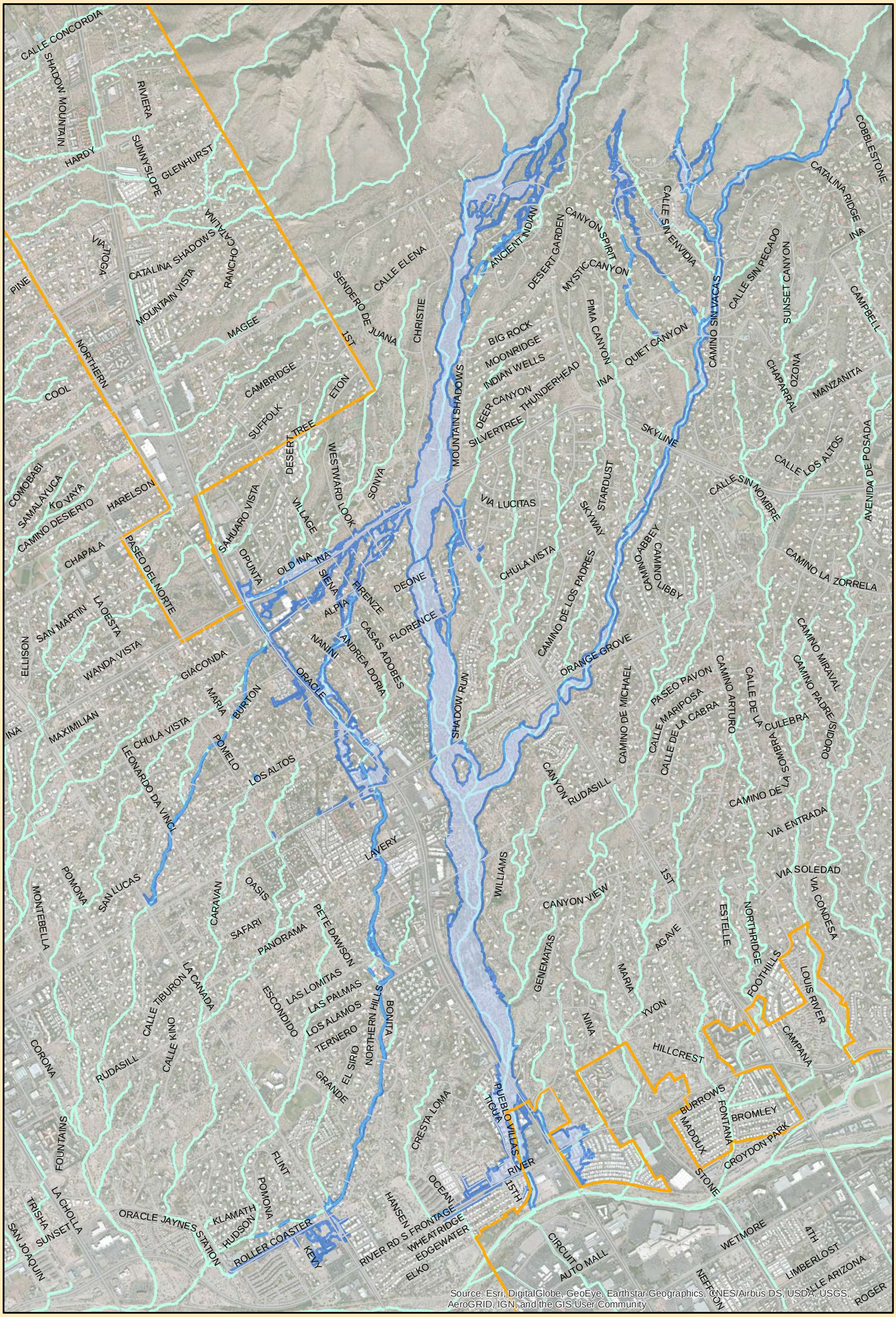

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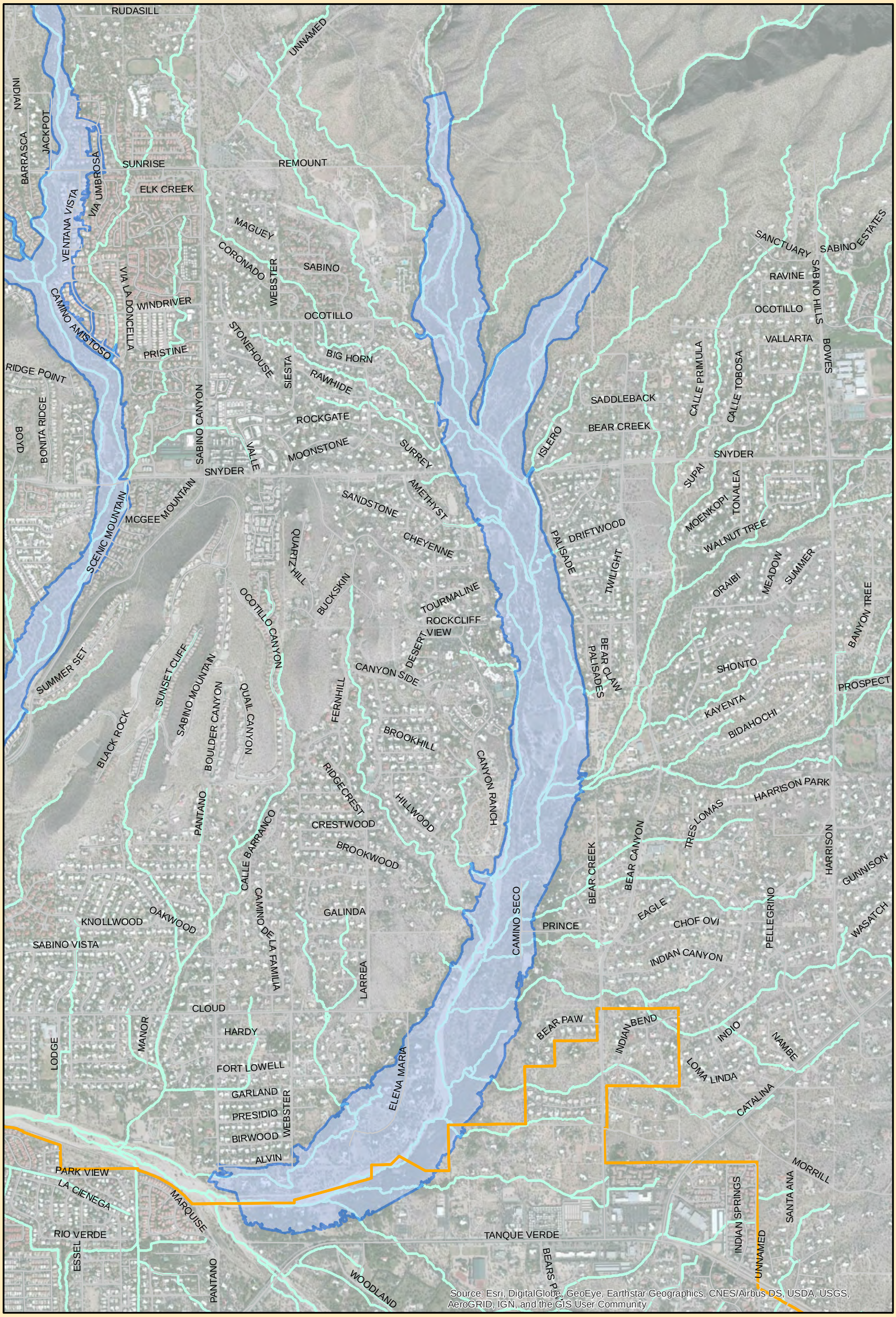

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0 370 740 1,480 2,220 2,960 Feet

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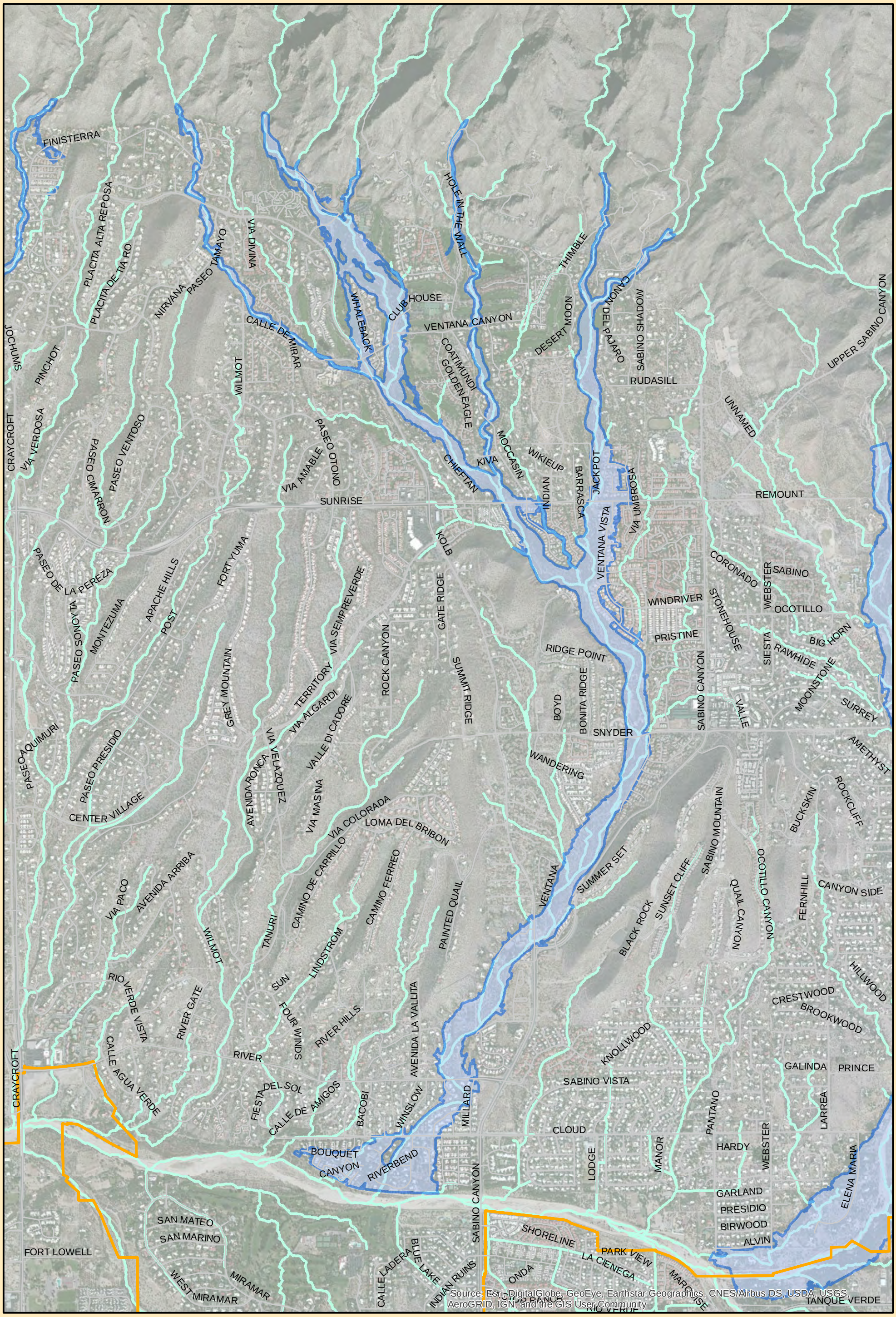

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