



Flood Control District of Maricopa County

**Pinnacle Peak West Area Drainage Master Study
Work Assignment 1
Task 9.2 - Effective Floodplain Delineation Timeline**

June, 2013

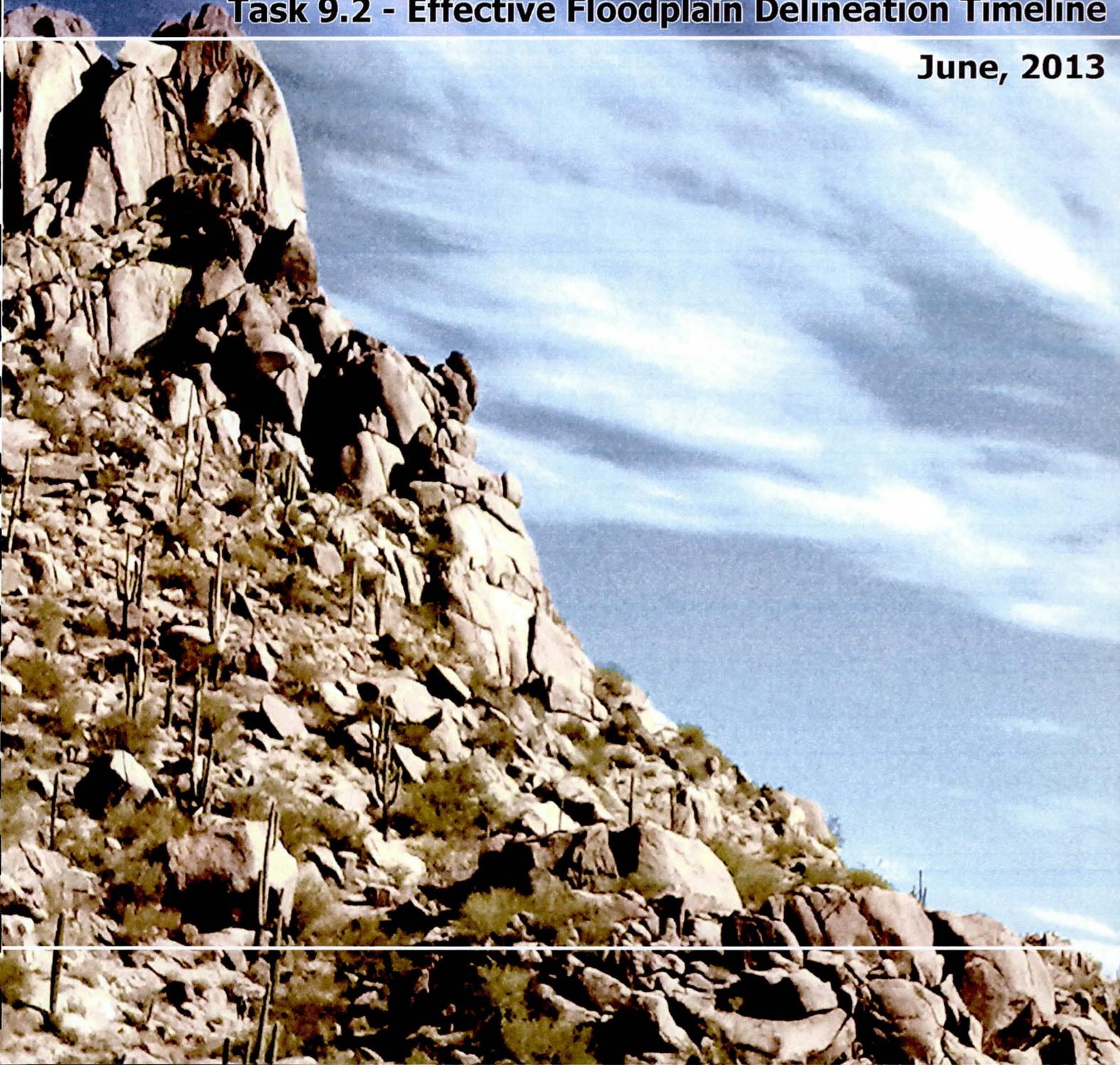
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Memorandum

DATE: June 17, 2013

TO: Theresa Pinto, FCDMC

FROM: Mike Kellogg, RG, CFM; Pat Quinn, PE, RLS, AVS

RE: Pinnacle Peak West ADMS Task 9.2 – Effective Floodplain Delineation Timeline



Purpose

Task 9.2 is a research task to identify and describe the historical timeline of the effective floodplains within the Pinnacle Peak West Area Drainage Master Study (PPW ADMS) study area. The task was completed through interviews with staff from the Flood Control District of Maricopa County (District) and the City of Scottsdale (Scottsdale). Historical documents pertinent to past and present regulatory floodplains were collected from the District and Scottsdale. This memorandum is intended for internal use within the PPW ADMS project to provide an historical context of the effective floodplain delineations. This context will be valuable if the outcome of the PPW ADMS project eventually leads to revisions of the effective floodplains within the study area.

Timeline

1. 1989 – Cella Barr completes the *Scottsdale Flood Insurance Study*.

The study resulted in the delineation of six alluvial fan floodplains (Figure 1). Table 1 lists the peak discharge estimates at each fan apex as determined by the Cella Barr study. The fan designations in the study correspond to the following present-day geographic features:

- a. Fan 1 – Reata Pass Fan eastern tributaries
- b. Fan 2 – Reata Pass Fan
- c. Fan 3 – Rawhide Wash Fan eastern tributary
- d. Fan 4 – Rawhide Wash Fan
- e. Fan 5 – FEMA regulatory floodplain Fan 5
- f. Fan 6 – FEMA regulatory floodplain Fan 6



Table 1. Alluvial Fan Apex Peak Discharge Estimates (Cella Barr, 1989)

Alluvial Fan ID	Peak Discharge Estimate (cfs)
1	3,656
2	14,867
3	887
4	10,062
5	3,034
6	6,738

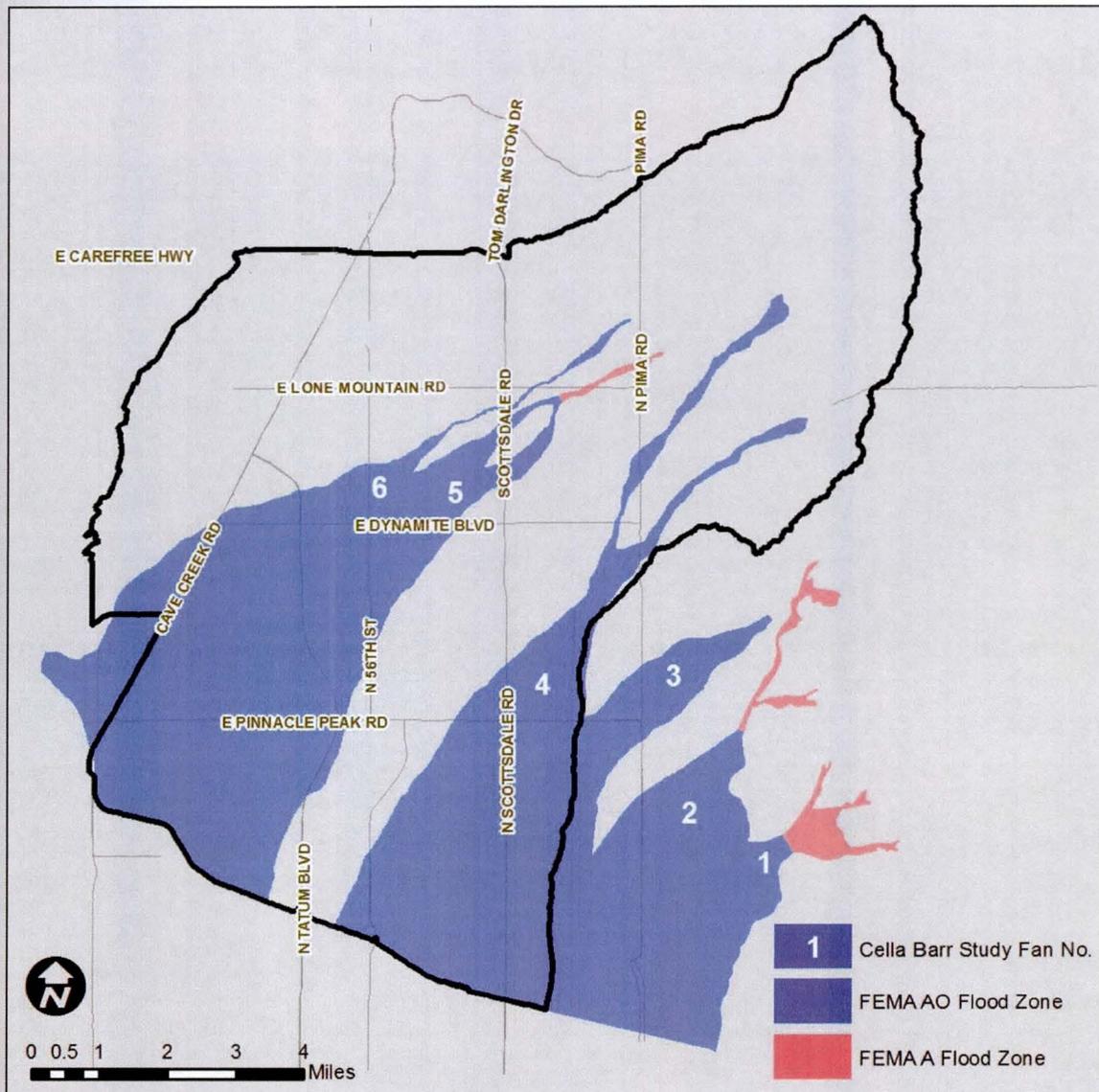


Figure 1. Approximate Scottsdale Flood Insurance Study delineations (Cella Barr, 1989)
(Note: the delineations shown in Figure 1 were derived from digitizing semi-rectified maps from the Cella Barr study.)



- 1993 – FEMA revises the *Scottsdale Flood Insurance Study* (Consultant unknown).

The revised study resulted in the removal of the Fan 1, Fan 2, and Fan 3 delineations and a truncation of the Fan 5 and Fan 6 delineations¹. The revised Fans 4, 5, and 6 were officially adopted as the regulatory floodplains by FEMA (Figure 2).

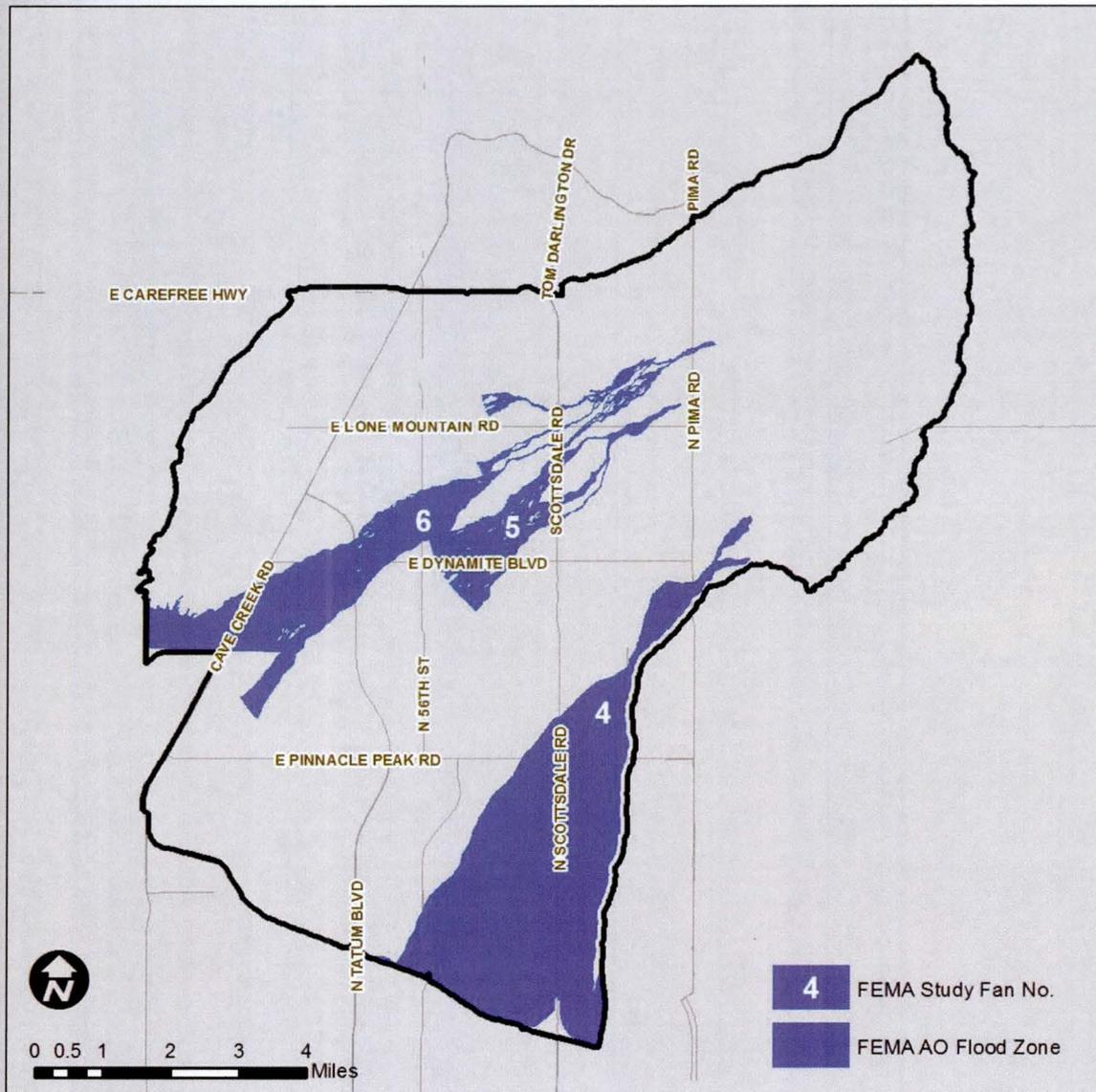


Figure 2. Scottsdale Flood Insurance Study delineations (FEMA, 1993)

¹ The purpose for removing Fans 1 through 3 and truncating Fans 5 and 6 is unknown. Flood Control District of Maricopa and City of Scottsdale staff were consulted for this study and none had knowledge as to why the modifications to the delineations were done.



3. 1994 – Anecdotal information from the District and the Scottsdale indicate the City of Scottsdale initiated a series of Letter of Map Amendment (LOMA) submittals to FEMA for parcels located within Fans 5 and 6 regulatory floodplains. Research for this task indicated neither Scottsdale nor the District has any records of the LOMA submittals. The primary evidence of the LOMA submittals is a comparison of historical FEMA Firm panel 04013C0820E for Fans 5 and 6 within Sections 13 and 14. The original FIRM panel dated 7/9/1991 shows the Fans 5 and 6 delineations without Zone X “islands”. The FIRM panel dated 12/3/1993 shows Fans 5 and 6 with numerous Zone X “islands” that have been removed from the AO Zone floodplain. Figure 3 and Figure 4 show the comparison.



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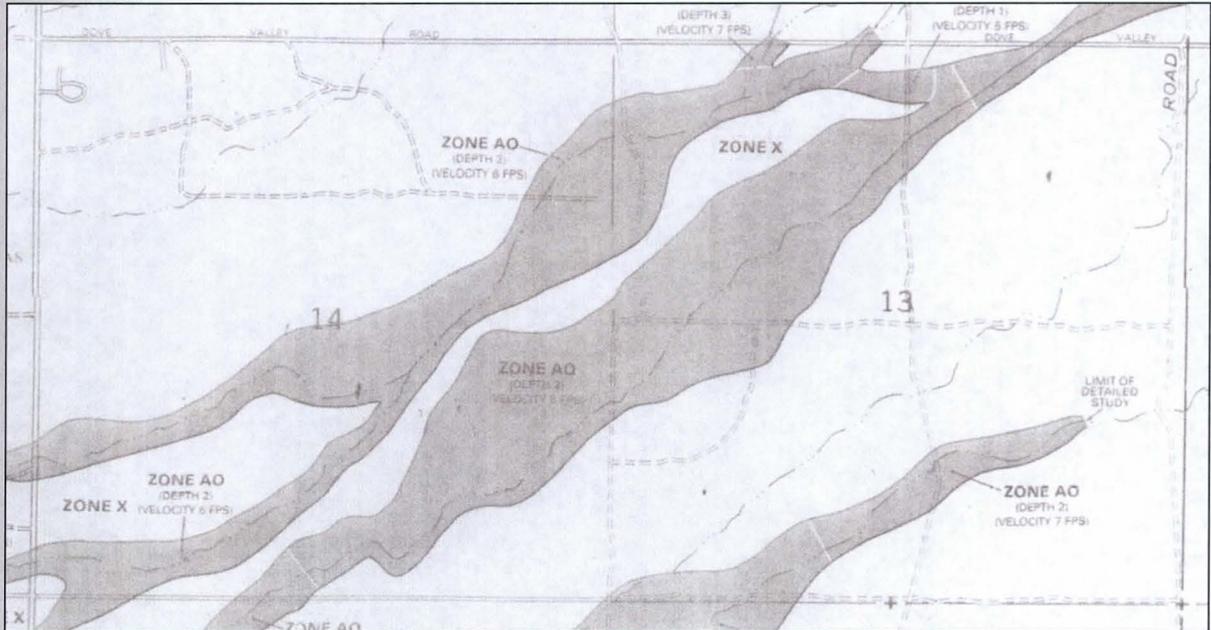


Figure 3. FIRM Panel 04013C0820E dated 7/9/1991 showing no "islands" removed from the AO Zone.

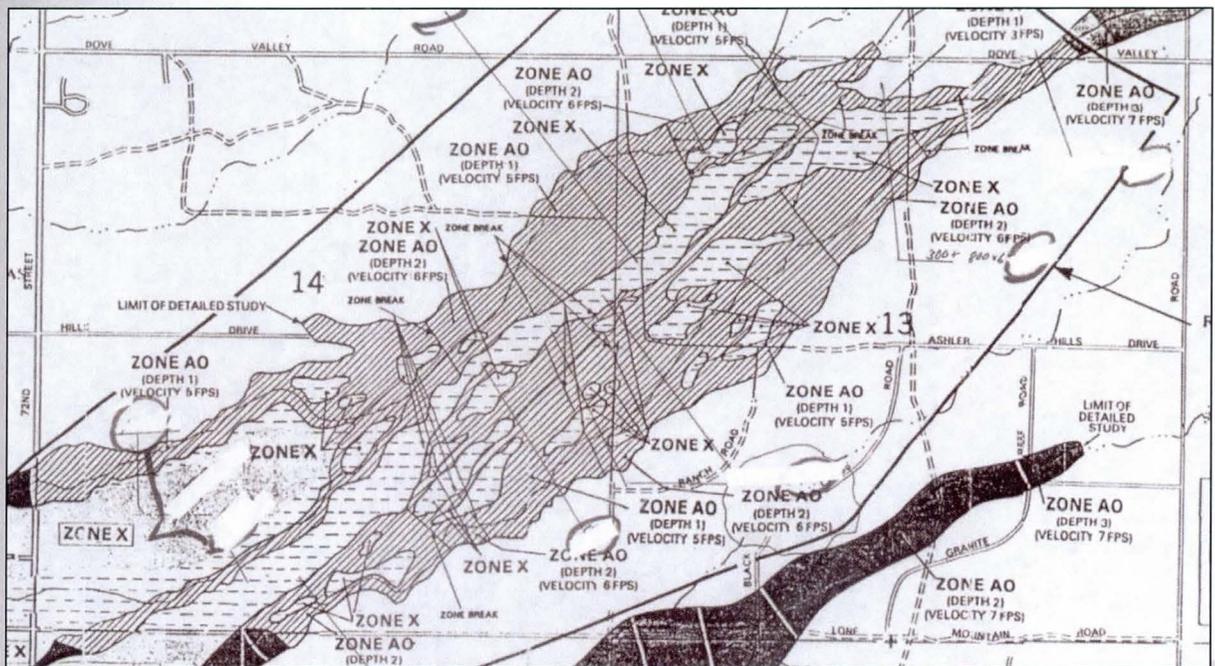


Figure 4. FIRM Panel 04013C0820E dated 12/3/1993 showing multiple "islands" removed from the AO Zone.



4. 2002 – The *Upper Rawhide Wash Floodplain Delineation Study* completed by Kimley-Horn and Associates (KHA).

This study comprised 12 miles of detailed Zone AE floodplain delineation of Upper Rawhide Wash and tributaries (Figure 5).

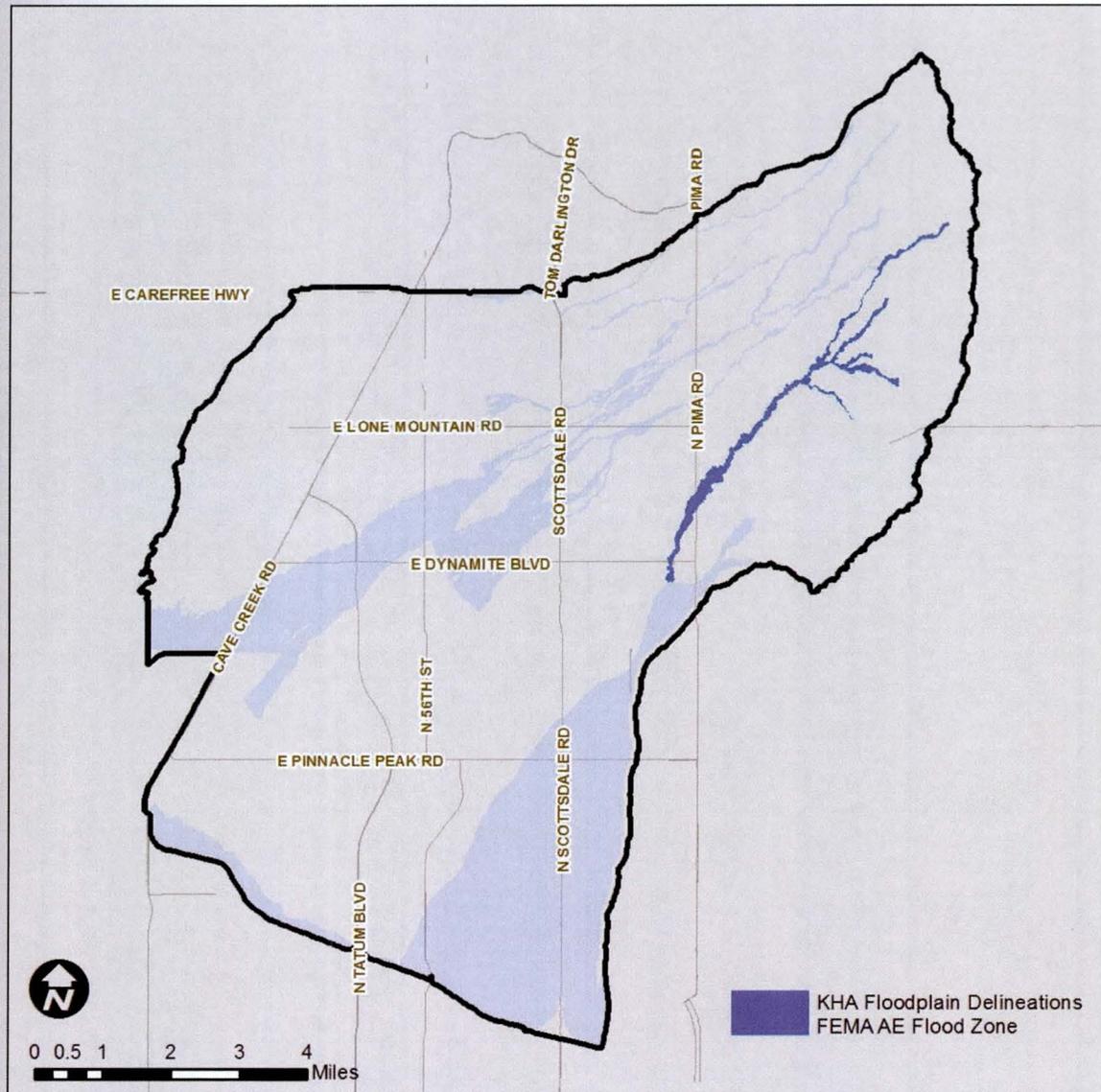


Figure 5. Upper Rawhide Wash Floodplain Delineation Study (KHA, 2002)



5. 2005 – The North Scottsdale Floodplain Delineation Study by DEI.

This study comprised 24.1 miles of detailed AE Zone floodplain delineation of the washes upstream of Fans 5 and 6 (Figure 6).

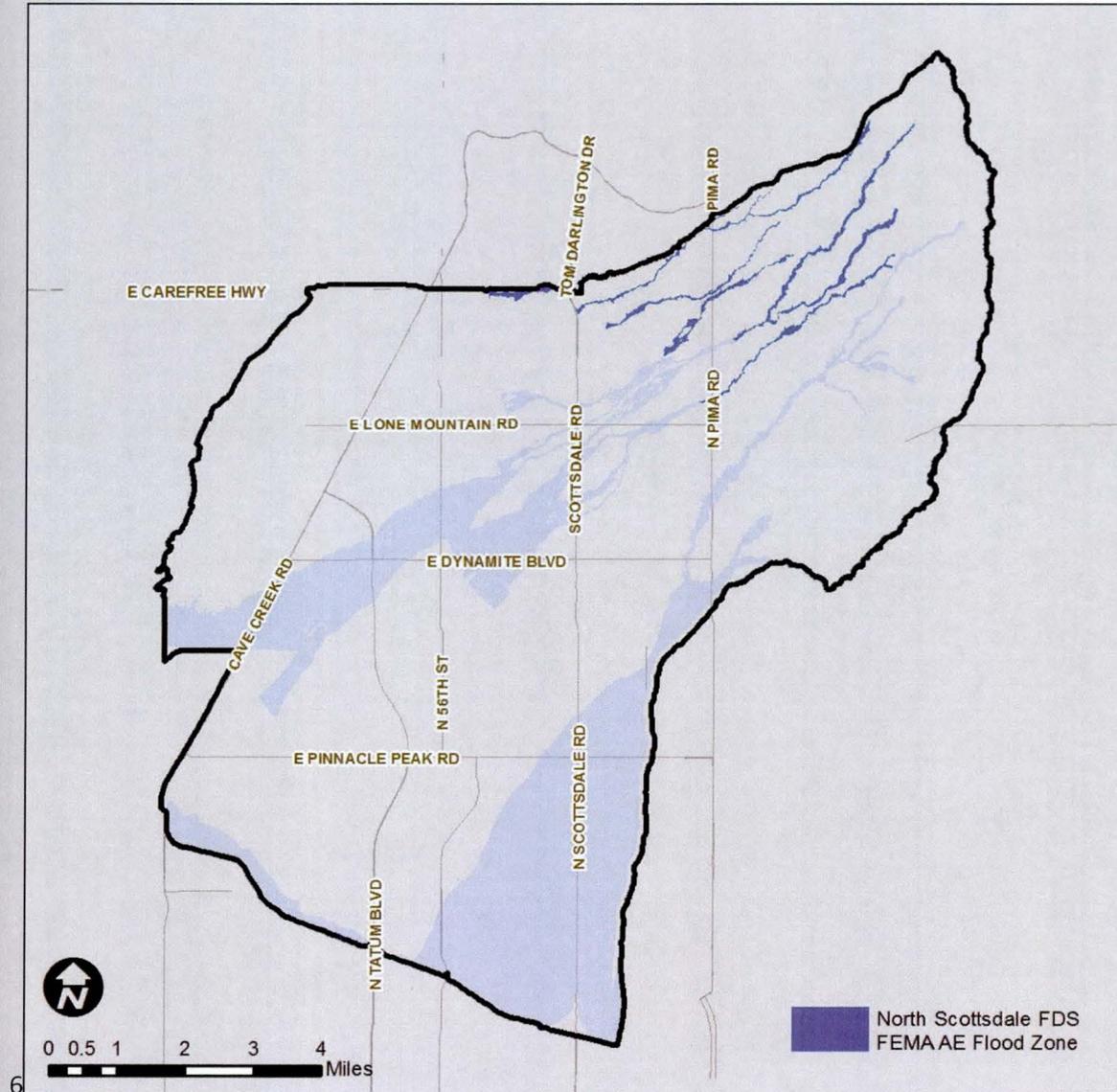


Figure 6. North Scottsdale Floodplain Delineation Study (DEI, 2005)



Alluvial Fan Apex Discharge Estimates

A 2005 FEMA Flood Insurance Study (FIS) Report for Maricopa County and Incorporated Areas includes a discharge summary table for alluvial fans within the PPW ADMS study; specifically for the alluvial fans identified in a Water Resource Associates (WRA) 1991 study. The alluvial fans were subdivided by WRA and identified as fans 1A, 1B, 2A, 2B, 3, 4A, 4B, 4C, 4D, 5, 6A, 6B, and 6C. Fans 1 through 6 correspond to the numbered alluvial fans from the Cella Barr study. The discharge estimates from the 1991 WRA report are listed in Table 2.

Table 2. Discharge estimates from WRA, 1991

Sub-Basin ID	Drainage Area (mi ²)	10-year Peak Discharge (cfs)	50-year Peak Discharge (cfs)	100-year Peak Discharge (cfs)	500-year Peak Discharge (cfs)
1A	1.46	348	2,148	4,083	14,981
1B	1.79	234	1,787	3,661	15,663
2A	0.80	169	1,063	2,036	7,572
2B	7.87	1,243	5,782	9,949	29,836
3	0.45	86	485	887	3,021
4A	0.63	222	848	1,360	3,554
4B	0.78	153	706	1,210	3,620
4C	1.78	452	2,108	3,629	10,918
4D	9.70	901	4,062	6,912	20,276
5	3.09	358	1,659	2,849	8,535
6A	3.32	322	1,831	3,382	11,709
6B	0.43	100	358	562	1,400
6C	1.49	182	854	1,475	4,451



References

Cella-Barr Associates. 1989. *Scottsdale Flood Insurance Study*.

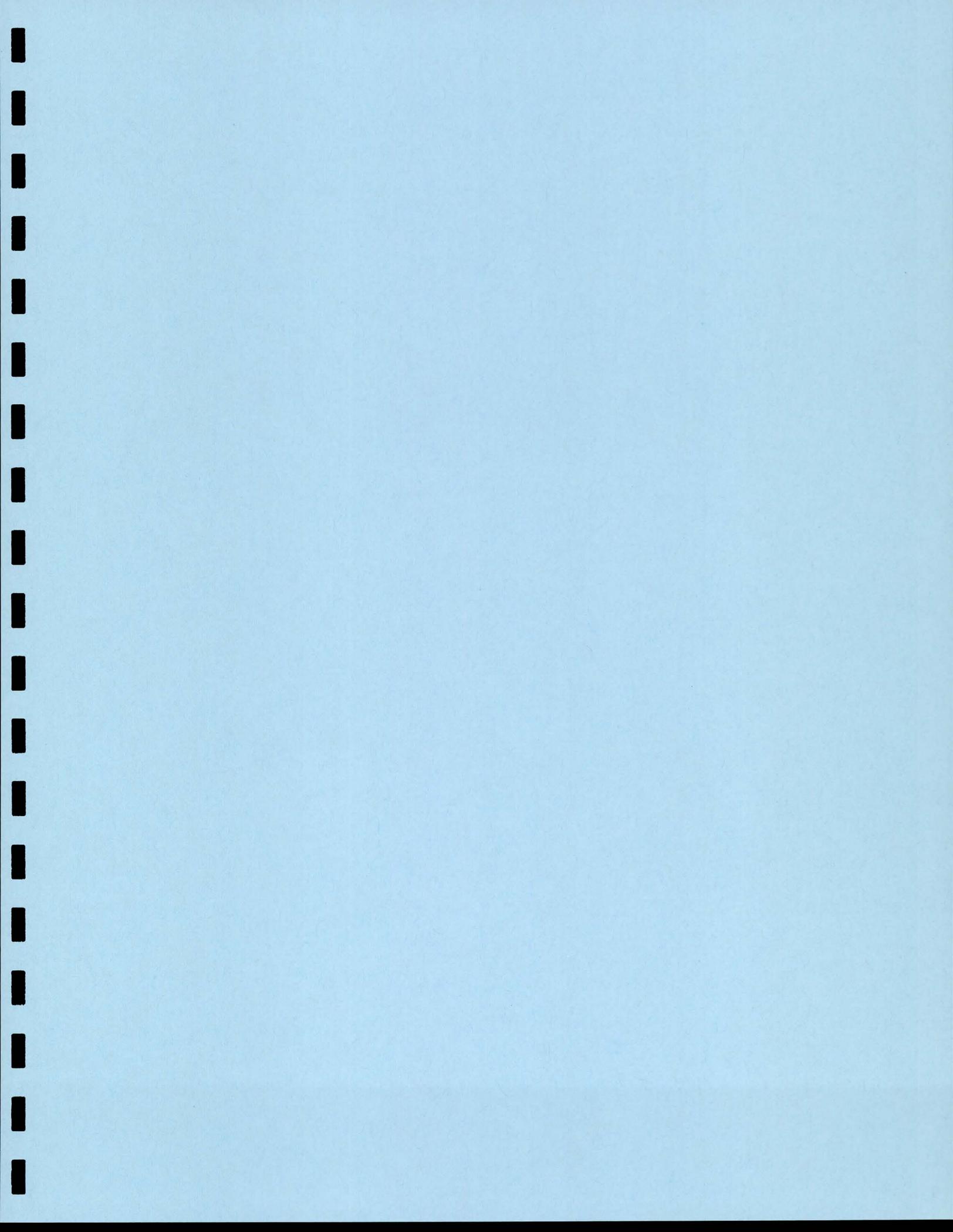
DEI Professional Services. 2005. *North Scottsdale Floodplain Delineation Study*.

Federal Emergency Management Agency. 1993. *Scottsdale Flood Insurance Study*.

Federal Emergency Management Agency. 2005. *Flood Insurance Study for Maricopa County and Incorporated Areas*. Volume 1 of 17. pp. 43-44.

Kimley-Horn Associates. 2002. *Upper Rawhide Wash Floodplain Delineation Study*.

Water Resource Associates. 1991. Letter Report.



APPENDIX A
TEMPORAL CHRONOLOGY

	1980s	1990s		2000s	
Study Name	<p><i>Scottsdale Flood Insurance Study</i> (Cella-Barr, 1989). The study resulted in the delineation of six alluvial fan floodplains. The fan designations in the Cella Barr study correspond to the following present-day geographic features:</p> <ul style="list-style-type: none"> Fan 1 – Reata Pass Fan eastern tributaries Fan 2 – Reata Pass Fan Fan 3 – Rawhide Wash Fan eastern tributary Fan 4 – Rawhide Wash Fan Fan 5 – FEMA regulatory floodplain Fan 6 – FEMA regulatory floodplain 	<p>Flood Control District of Maricopa County, City of Scottsdale, and City of Phoenix file an appeal for revision of the flood zone for designated alluvial fans 5 and 6. FEMA ultimately rejects the appeal and the AO Zone designations are adopted as the regulatory zones. (Fans 6 and 6)</p> <p>Water Resource Associates (WRA) published a letter report in September that included revisions to the discharge estimates for the Scottsdale alluvial fans. (Fans 1 through 6)</p>	<p><i>Scottsdale Flood Insurance Study</i> (FEMA, 1993) was a revision to the 1989 Cella Barr study. The study resulted in the removal of the Fan 1 AO Zone delineation, revisions to Fan 2 and Fan 3 delineations, and modifications (including a truncation) of the Fan 5 and Fan 6 delineations. The final delineations were officially adopted as the regulatory floodplains by FEMA and remain effective as of the date of this memo.</p>	<p><i>Upper Rawhide Wash Floodplain Delineation Study</i> (KHA, 2002). This study comprised 12 miles of detailed Zone AE floodplain delineation of Upper Rawhide Wash and tributaries.</p>	<p><i>North Scottsdale Floodplain Delineation Study</i> (DEI, 2005). This study comprised 24.1 miles of detailed AE Zone floodplain delineation of the washes upstream of Fans 5 and 6.</p>
Study Date	1989	1991	1993	March-2002	April-2005
Study Extent	Fans 1 through 6	Fans 1 through 6	Rawhide Fan, Fan 5, Fan 6	12 miles of Upper Rawhide Wash and Tributaries	24.1 miles of washes

