Appendix D

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Project Name: Upper Amargosa Creek Flood Control, Recharge, and Habitat Restoration Project

Cost of Project: $ 14,600,257

Description: Construct soilcrete berms for flood protection, eight basins to recharge underlying aquifer, and restore native habitat/vegetation

Number of Events Modeled: 3

	Without Project						With Project					
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
Average Return Interval (ARI)	1	5	100				1	5	100			
Annual Probability of Exceedance	1.000	0.200	0.010	#DIV/0!	#DIV/0!	#DIV/0!	1.000	0.200	0.010	#DIV/0!	#DIV/0!	#DIV/0!
Probability of Levee Failure	1.00	1.00	1.00				1.00	1.00	1.00			
Water Surface Elevation - channel (f)												
Flood Warning Time (hours)	0	0	0	0	0		0	0	0	0	0	
Flood Experience	N	N	N	N	N		N	N	N	N	N	
Period of Inundation (days)												
HEC-FIA DATA INPUTS	Y											
Residential Structural Damages ($)												
Residential Contents Damages ($)												
Residential Debris & Cleanup ($)												
Commercial Structural Damages ($)												
Commercial Contents Damages ($)												
Commercial Debris & Cleanup ($)												
Industrial Structural Damages ($)												
Industrial Contents Damages ($)												
Industrial Debris & Cleanup ($)												
Agricultural Structural Damages ($)												
Agricultural Contents Damages ($)												
Agricultural Debris & Cleanup ($)												
Residential Properties												
Ratio Depreciated Value to Replacement Value												
Average Flood depth above ground level (f)												
Rural - Res: Homesteads												
Rural - Other: Barns, sheds												
Urban Res: Single story (no base)												
Urban Res: Single story (basement)												
Urban Res: Two plus story (no base)												
Urban Res: Two plus story (basement)												
Mobile home												
Commercial Properties												
Ratio Depreciated Value to Replacement Value												
Average Flood depth above ground level (f)												
low value — building area inundated (sq.f.)												
medium value — building area inundated (sq.f.)												
high value — building area inundated (sq.f.)												
Industrial Properties												
Ratio Depreciated Value to Replacement Value												
Average Flood depth above ground level (f)												
low value — building area inundated (sq.f.)												
medium value — building area inundated (sq.f.)												
high value — building area inundated (sq.f.)												
Agricultural Production												
Corn — ac.												
Rice — ac.												
Walnuts — ac.												
Almonds — ac.												
Cotton — ac.												
Tomatoes — ac.												
Wine Grapes — ac.												
Alfalfa — ac.												
Pasture — ac.												
Safflower — ac.												
Sugar Beets — ac.												
Beans — ac.												
Other — ac.												
Roads												
length of arterial roads inundated (miles)												
length of major roads inundated (miles)	0.0	0.1	0.5									
length of minor roads inundated (miles)	0.1	0.2	0.1									
length of unsealed roads inundated (miles)	0.1	0.2	0.1									

Extrapolate Y-intercept: N

Summary of Cost-Benefit Analysis

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Project Name: **Upper Amargosa Creek Flood Control, Recharge, and Habitat Restoration Project**

Description: Construct soilcrete berms for flood protection, eight basins to recharge underlying aquifer, and restore native habitat/vegetation

Proposed project capital cost:	$ 14,600,257	[Note: construction costs which are assumed to occur in one year.]
Change in annual O&M costs:	$ -	[Note: the change in annual O&M costs compared to without project conditions.]
PV of future O&M costs:	$ -	(at 6% discount rate over 50 years)
PV of future costs	$ 14,600,257	[Note: the sum of capital costs plus the PV of O&M costs.]

Benefits

	Actual	Potential	
EAD without project	$ 20,225	$ 20,225	[Note: for stormwater projects use "Potential" damage which ignores storm warning effects.]
EAD with project	$ -	$ -	
Annual Benefit:	$ 20,225	$ 20,225	
PV of Future Benefits:	$ 318,784	$ 318,784	(at 6% discount rate over 50 years)

Cost-Benefit Analysis

	Actual	Potential	
Net Present Value (NPV)	-$ 14,281,473	-$ 14,281,473	(at 6% discount rate over 50 years)
Benefit:Cost Ratio	0.022	0.022	

NPV Sensitivity to Discount Rate:

	Actual	Potential
4%	-$ 14,165,780	-$ 14,165,780
5%	-$ 14,231,031	-$ 14,231,031
6%	-$ 14,281,473	-$ 14,281,473
7%	-$ 14,321,137	-$ 14,321,137
8%	-$ 14,352,835	-$ 14,352,835

Roads

Cost per mile of highway road inundated	$	250,000
Cost per mile of major road inundated	$	100,000
Cost per mile of minor road inundated	$	30,000
Cost per mile of unsealed road inundated	$	10,000

Roads

	Without Project						With Project					
	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6
ARI	1	5	100	0	0	0	1	5	100	0	0	0
Probability of Levee failure	1.00	1.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00
Roads Inundated												
length of arterial roads inundated (miles)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
length of major roads inundated (miles)	0.00	0.10	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
length of minor roads inundated (miles)	0.10	0.20	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
length of unsealed roads inundated (miles)	0.10	0.20	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potential Damages												
length of arterial roads inundated (miles)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
length of major roads inundated (miles)	$ -	$ 10,000	$ 50,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
length of minor roads inundated (miles)	$ 3,000	$ 6,000	$ 3,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
length of unsealed roads inundated (miles)	$ 1,000	$ 2,000	$ 1,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Damages:	*$ 4,000*	*$ 18,000*	*$ 54,000*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*
Total Damage with levee failure ($):	$ 4,000	$ 18,000	$ 54,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Calculation of Without Project EAD

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	Y Intercept
Average Recurrence Interval (ARI)	1	5	100	0	0	0	
AEP	1.000	0.200	0.010	#DIV/0!	#DIV/0!	#DIV/0!	0
Actual Damage to Residential Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Potential Damage to Residential Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Actual Damage to Commercial/Industrial Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Potential Damage to Commercial/Industrial Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Damage to Agriculture ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Damage to Roads ($)	$ 4,000	$ 18,000	$ 54,000	$ -	$ -	$ -	
Actual Indirect Costs	$ 1,000	$ 4,500	$ 13,500	$ -	$ -	$ -	
Potential Indirect Costs	$ 1,000	$ 4,500	$ 13,500	$ -	$ -	$ -	
Special Cases	$ -	$ -	$ -	$ -	$ -	$ -	
Total Actual Damages	$ 5,000	$ 22,500	$ 67,500	$ -	$ -	$ -	$ 67,500
Total Potential Damages	$ 5,000	$ 22,500	$ 67,500	$ -	$ -	$ -	$ 67,500
EAD (Actual)	$ 20,225						
EAD (Potential)	$ 20,225						

Calculation of With Project EAD

	Event 1	Event 2	Event 3	Event 4	Event 5	Event 6	
Average Recurrence Interval (ARI)	1	5	100	0	0	0	
AEP	1.000	0.200	0.010	#DIV/0!	#DIV/0!	#DIV/0!	0
Actual Damage to Residential Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Potential Damage to Residential Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Actual Damage to Commercial/Industrial Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Potential Damage to Commercial/Industrial Buildings ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Damage to Agriculture ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Damage to Roads ($)	$ -	$ -	$ -	$ -	$ -	$ -	
Actual Indirect Costs	$ -	$ -	$ -	$ -	$ -	$ -	
Potential Indirect Costs	$ -	$ -	$ -	$ -	$ -	$ -	
Special Cases	$ -	$ -	$ -	$ -	$ -	$ -	
Total Actual Damages	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Potential Damages	$ -	$ -	$ -	$ -	$ -	$ -	$ -

EAD (Actual)	$ -
EAD (Potential)	$ -