APPENDIX

A. Erosion Hazard Data Sheets for Methodology 1: 16 Physical Factors and One Economic Factor

B. Erosion Hazard Data Sheets for Methodology 2: 10 Physical Factors and no Economic Factor

C. Erosion Hazard Data Sheets for Methodology 3: 5 Physical Factors and Revised Economic Factor

D. Erosion Hazard Data Sheets for Methodology 4: 5 Physical Factors and no Economic Factor

APPENDIX A

Erosion Hazard Data Sheets for Methodology 1: 16 Physical Factors and one Economic Factor

			Sacramento River, RM 43.3R					
PD 999 HOLLANDLAND		RM 453 PR RM 453 PR ANI						
Score of 0 indicates no erosion	cation Map	ore of 112 m	Site Photograph	2004 Cross Section				
Criteria	Pre-Rock	Post-Roci	Notes					
Bank Slope (*2)	4	4	1:1 or less	1:1 or less				
Berm Width (*2) - Estimated	5	5	no berm					
Length of erosion	4	4	1060 ft					
Location of erosion	5	5	be and underwater, bank (still eroding underwater and at the toe with the rock)					
Bank Stability	4	2	ertical sections, greater than half height (still some vertical sections with rock, but not as tall)					
Radius of Curvature (R _c /w)	3	3	/w = 2.4 (Ayres calculation)					
Site Relative to Bend	5	5	utside of a less than 90 degree bend					
Geomorph	0	0	o migration expected					
Vegetation Cover	2	4	to 60 % (with rock, less vegetation, removed what was there and didn't replant, less than 20%)					
Tree Hazard	5	5	large leaning tress, visible roots (tree hazards are still present even	arge leaning tress, visible roots (tree hazards are still present even with the rock)				
Soil Type (*2)	3	3	sand					
Velocity (*2)	4	4	5.4 ft/s (UNET model)					
Wave Action (Wind/Boat)	4	4	heavy waves					
Economic Factor (*2)	2	2	farms and small town (Clarksburg)	farms and small town (Clarksburg)				
Human Usage	5	5	daily					
Seepage Potential	0	0	no known seepage history					
Tidal Fluctuation	3	3	about 3 ft of tidal flux					
Erosion Hazard	76	76	Calculate Erosion Hazard	Flow on Inspection Day:				

		Sacramento River, RM 26.9L			
Site Location Map					
Score of 0 indicates no erosion Criteria	hazard, sco Score	re of 112 maximum erosion hazard score Notes			
Bank Slope (*2)	5	near vertical to vertical			
Berm Width (*2) - Estimated	5	no berm			
Length of erosion	2	280 ft			
Location of erosion	4	all bank and toe			
Bank Stability	4	vertical sections (entire slope), no caves			
Radius of Curvature (R _c /w)	0	R/w = 5.7 (Ayres calculation)			
Site Relative to Bend	2	ust downstream of a bend			
Geomorph	0	no migration expected			
Vegetation Cover	4	less than 20% cover			
Tree Hazard	5	trees, roots exposed, and leaning			
Soil Type (*2)	3	sand			
Velocity (*2)	3	4.9 ft/s (UNET model)			
Wave Action (Wind/Boat)	4	heavy wave action			
Economic Factor (*2)	2	adjacent to Walnut Grove, population 669 (2000 US Census)			
Human Usage	5	Daily			
Seepage Potential	0	io known seepage history			
Tidal Fluctuation	4	4 ft of tidal flux			
Erosion Hazard	70	Calculate Erosion Hazard Flow on Inspection Day:			

Sacramento River, RM 78L					
Site Location Score of 0 indicates no erosion	1 Map hazard, sco	Site Photograph 2004 Cross Section			
Criteria	Score	Notes			
Bank Slope (*2)	4	1:1 or less slope			
Berm Width (*2) - Estimated	3	0 - 15 ft of berm (varies)			
Length of erosion	4	1100 ft			
Location of erosion	5	toe and underwater			
Bank Stability	5	animal burrows, vertical sections			
Radius of Curvature (R _c /w)	0	R/w = 7 (Ayres calculation)			
Site Relative to Bend	2	just downstream of a bend			
Geomorph	0	no migration expected			
Vegetation Cover	1	75-80 %			
Tree Hazard	5	exposed roots and leaning trees			
Soil Type (*2)	2	silts and clays			
Velocity (*2)	3	4.7 ft/s (UNET calculation)			
Wave Action (Wind/Boat)	3	moderate			
Economic Factor (*2)	5	adjacent to Sacramento, population 407,018 (2000 US census)			
Human Usage	4	weekly			
Seepage Potential	5	yes, known history			
Tidal Fluctuation	1	about 1 ft or less of tidal flux			
Erosion Hazard	69	Calculate Erosion Hazard Flow on Inspection Day:			

		Sacramento River, Rm 56.7L (unrepaired state)
M. SACEAMERTO M. SACEAMERTO R.		
Site Location	п Мар	Site Photograph 2004 Cross Section
Score of 0 indicates no erosion	hazard, sco	re of 112 maximum erosion hazard score
Bank Slope (*2)	4	1:1 slope
Berm Width (*2) - Estimated	5	no berm
Length of erosion	5	1675 ft
Location of erosion	4	toe and lower slope
Bank Stability	5	large beaver holes, multiple vertical sections
Radius of Curvature (R _c /w)	0	straight
Site Relative to Bend	1	straight
Geomorph	0	no migration
Vegetation Cover	1	about 60 - 70 %
Tree Hazard	5	exposed roots, large trees, some overturned, and leaning
Soil Type (*2)	3	sand
Velocity (*2)	3	4.5 ft/s (UNET)
Wave Action (Wind/Boat)	5	heavy boat use
Economic Factor (*2)	5	Sacramento
Human Usage	0	rare, against freeway and railroad.
Seepage Potential	0	no know seepage history
Tidal Fluctuation	2	about 2 ft of tidal flux
Erosion Hazard	68	Calculate Erosion Hazard Elow on Inspection Day:

Flow on Inspection Day:

		Sacramento River, RM 32.5R			
RM25 25 RM325 F RM25 25 RM325 F Stite Location Score of 0 indicates no erosion Criteria	n Map hazard, scr	Site Photograph 2004 Cross Section Site Photograph 2004 Cross Section			
Bank Slope (*2)	Score 4	Notes			
Berm Width (*2) - Estimated	5	no berm			
Length of erosion	5	1850 ft			
Location of erosion	5	bank, toe, and underwater			
Bank Stability	5	vertical sections, not more than half bank height, some caves, erosion is threatening the road			
Radius of Curvature (R _c /w)	0	straight			
Site Relative to Bend	1	straight			
Geomorph	0	no migration expected			
Vegetation Cover	1	about 70 - 80 % cover			
Tree Hazard	5	large trees, lots of roots showing, leaning			
Soil Type (*2)	3	sand			
Velocity (*2)	4	5.6 ft/s (UNET model)			
Wave Action (Wind/Boat)	4	heavy waves			
Economic Factor (*2)	1	Farms			
Human Usage	4	weekly			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	3	about 3 ft of tidal flux			
Erosion Hazard	67	Calculate Erosion Hazard Flow on Inspection Day:			

		Sacramento River, RM 55.8R			
Site Location Score of 0 indicates no erosion Criteria	Map hazard, sco	Image: Stephotograph Stephotographotograph Stephotographotograph Stephotograph Stephotograph Step			
Bank Slope (*2)	4	close to 1:1			
Berm Width (*2) - Estimated	5	no berm			
Length of erosion	3	850 ft			
Location of erosion	2	into the lower bank			
Bank Stability	4	vertical slope sections, more than half bank height			
Radius of Curvature (R _c /w)	2	R/w = 3.3 (Ayres calculation)			
Site Relative to Bend	0	inside of a bend			
Geomorph	0	no migration expected			
Vegetation Cover	2	about 40 to 60% cover			
Tree Hazard	3	Large trees			
Soil Type (*2)	3	sand			
Velocity (*2)	3	4.5 ft/s (UNET model)			
Wave Action (Wind/Boat)	5	heavy boats			
Economic Factor (*2)	4	adjacent to West Sacramento, population 31, 615 (2000 US Census)			
Human Usage	4	weekly			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	2	about 2 ft of tidal flux			
Erosion Hazard	65	Calculate Erosion Hazard Flow on Inspection Day:			

		Sacramento River, RM 26.5L					
RM 26 L							
26 RM 26,1 R							
	14						
12 RM26.4L	And /						
RD 363	家會和						
	Sector Sector	STATE OF THE OWNER					
KM 2091	California and	the second s					
	WALNUT GROVE						
Site Location	Мар	Site Photograph 2004 Cross Section					
Score of 0 indicates no erosion Criteria	hazard, sco	ore of 112 maximum erosion hazard score Notes					
Bank Slope (*2)	3	1.5:1 slope					
Berm Width (*2) - Estimated	5	no berm					
Length of erosion	2	460 ft					
Location of erosion	2	lower bank					
Bank Stability	4	vertical sections, more than half the height					
Radius of Curvature (R _c /w)	1	R/w = 4.4 (Ayres calculation)					
Site Relative to Bend	1	straight					
Geomorph	0	no migration expected					
Vegetation Cover	3	about 40% cover					
Tree Hazard	5	trees with exposed roots and leaning					
Soil Type (*2)	3	sand					
Velocity (*2)	3	4.9 ft/s (UNET model)					
Wave Action (Wind/Boat)	4	Heavy waves					
Economic Factor (*2)	2	Walnut Grove, population 669 (2000 US Census)					
Human Usage	5	Daily					
Seepage Potential	0	no known seepage history					
Tidal Fluctuation	4	4 ft of tidal fux					
Erosion Hazard	63	Calculate Erosion Hazard Flow on Inspection Day:					

Sacramento River, RM 26.0L



Site Location Map

Site Photograph

Score of 0 indicates no erosion Criteria	hazard, sco Score	bre of 112 maximum erosion hazard score		
Bank Slope (*2)	5	Vertical slope		
Berm Width (*2) - Estimated	3	0 - 20 ft		
Length of erosion	4	1400 ft		
Location of erosion	5	Bank, toe nad underwater		
Bank Stability	5	lots of cave, and vertical sections		
Radius of Curvature (R _c /w)	0	R/w = 5.1 (Ayres calculation)		
Site Relative to Bend	1	straight		
Geomorph	0	no migration expected		
Vegetation Cover	3	nost veg is growing on the tree roots, not in the ground, about 30 %		
Tree Hazard	5	_arge trees, exposed roots, and leaning		
Soil Type (*2)	3	sand		
Velocity (*2)	4	5.0 (UNET model)		
Wave Action (Wind/Boat)	3	Moderate waves		
Economic Factor (*2)	1	Farms		
Human Usage	0	are, no access		
Seepage Potential	0	no known history		
Tidal Fluctuation	4	4 ft of tidal flux		
Erosion Hazard	62	Calculate Erosion Hazard Flow on Inspection Day:		

		Sacramento River, RM 85.6R				
Sacramento River, RM 85.6R						
Site Location	Мар	Site Photograph 2004 Cross Section				
Score of 0 indicates no erosion Criteria	hazard, sco Score	ore of 112 maximum erosion hazard score				
Bank Slope (*2)	4	1:1 slope				
Berm Width (*2) - Estimated	4	1 to 4 ft of berm (0 ft in some spots)				
Length of erosion	2	430 ft				
Location of erosion	4	ower bank and toe				
Bank Stability	5	small animal burrows, caves from fallen trees, vertical sections				
Radius of Curvature (R _c /w)	4	ג/w = 1.6 (Ayres calculation)				
Site Relative to Bend	4	butside of a 90 degree bend				
Geomorph	0	no migration expected				
Vegetation Cover	1	50-80% cover				
Tree Hazard	5	Huge trees, all roots exposed, many leaning				
Soil Type (*2)	2	silts and clay				
Velocity (*2)	3	4.5 ft/s (UNET model)				
Wave Action (Wind/Boat)	1	occassional boats				
Economic Factor (*2)	2	near Knight's Landing				
Human Usage	1	occassional usage, road nearby, so accessible, but no signs				
Seepage Potential	5	yes, history of seepage				
Tidal Fluctuation	0	not tidal				
Erosion Hazard	62	Calculate Erosion Hazard Flow on Inspection Day:				

		Sacramento River, RM 10.8L		
Site Location	Map	Image: State of the control of the		
Score of 0 indicates no erosion Criteria	hazard, sco Score	vre of 112 maximum erosion hazard score Notes		
Bank Slope (*2)	4	1:1 slope		
Berm Width (*2) - Estimated	5	no berm		
Length of erosion	5	1600 ft		
Location of erosion	2	All bank		
Bank Stability	4	vertical sections more than half bank height		
Radius of Curvature (R _c /w)	1	₹/w = 4.4 (Ayres calculation)		
Site Relative to Bend	1	ust about straight		
Geomorph	0	no migration expected		
Vegetation Cover	2	about 50 - 60 % cover		
Tree Hazard	0	no trees		
Soil Type (*2)	1	clays and rock at toe		
Velocity (*2)	5	6.8 ft/s (UNET model)		
Wave Action (Wind/Boat)	5	Heavy winds, large ships		
Economic Factor (*2)	1	Farms		
Human Usage	5	Daily, trash, and shelter set up		
Seepage Potential	0	no known history		
Tidal Fluctuation	5	5 ft of flux		
Erosion Hazard	62	Calculate Erosion Hazard Flow on Inspection Day:		

Sacramento River, RM 8L





Site Location Map

Site Photograph

- -1

Criteria	Score	Notes			
Bank Slope (*2)	5	Vertical Bank			
Berm Width (*2) - Estimated	3	8-10 ft (about at levee height)			
Length of erosion	1	98 ft			
Location of erosion	2	All Bank			
Bank Stability	4	Vertical sections, greater than half the slope height			
Radius of Curvature (R _c /w)	2	R/w = 3 (Ayres calculation)			
Site Relative to Bend	3	outside of gentle bend			
Geomorph	0	io migration expected			
Vegetation Cover	3	about 20 - 30 % cover			
Tree Hazard	0	lo trees			
Soil Type (*2)	1	Clays			
Velocity (*2)	3	1.9 ft/s (UNET model)			
Wave Action (Wind/Boat)	5	Heavy Wind, large ships pass by			
Economic Factor (*2)	1	Farms			
Human Usage	4	veekly, path down, but steep			
Seepage Potential	0	to know seepage problems			
Tidal Fluctuation	5	about 5 ft of tidal flux			
Erosion Hazard	55	Calculate Erosion Hazard Inspection Date: 9/8/2005 Flow on Inspection Day:			

		Georgia	ana Slough, RM 10.3L		
SLOUGH SLOUGH SCore of 0 indicates no erosion	Mal Ressort hazard, sco	vere of 112 maximum erosion hazard	Site Photograph Score	2004 Cross Section	
Criteria	Score	Notes			
Barry Width (*2) Estimated	3	1.5.1 Slope			
Berm Width ("2) - Estimated	2	10 - 20 IL OI DEITI			
Length of erosion	2	250 ft			
	5	toe and underwater			
Bank Stability	5	Ventical sections and caves			
Radius of Curvature (R _c /w)	5	R/W = 0.7 (Ayres calculation)			
Site Relative to Bend	0	Inside of a bend			
Geomorph	0	no migration expected			
Vegetation Cover	1	70 - 80 %			
Tree Hazard	5	exposed roots, trees appear to be growing sideways in some places			
Soil Type (*2)	3	sand			
Velocity (*2)	1	2 - 4 ft/s			
Wave Action (Wind/Boat)	2	low			
Economic Factor (*2)	2	adjacent to Walnut Grove, population 669 (2000 US Census)			
Human Usage	4	weekly, houses, old rock, rope swing			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	4	about 4 ft of tidal flux			
Erosion Hazard	55	Calculate Erosion Hazard		Flow on Inspection Day:	

		Sacramento River, RM 34.5R		
Sacial Hento Kivel, KM 34.5K				
Site Location Score of 0 indicates no erosion	Map hazard. sco	Site Photograph 2004 Cross Section		
Criteria	Score	Notes		
Bank Slope (*2)	4	1:1 slope		
Berm Width (*2) - Estimated	5	no berm		
Length of erosion	2	430 ft		
Location of erosion	2	iower bank		
Bank Stability	2	vertical section less than half height, no caves, more rock was placed to fill in large holes from previous year. (photo from 2004)		
Radius of Curvature (R _c /w)	0	straight		
Site Relative to Bend	1	straight		
Geomorph	0	no migration expected		
Vegetation Cover	4	less than 20%		
Tree Hazard	0	no trees		
Soil Type (*2)	3	sands		
Velocity (*2)	4	5.6 ft/s (UNET model)		
Wave Action (Wind/Boat)	3	Moderate waves		
Economic Factor (*2)	1	Farms		
Human Usage	3	Monthly		
Seepage Potential	0	no know seepage history		
Tidal Fluctuation	3	3 ft of tidal flux		
Erosion Hazard	54	Calculate Erosion Hazard Flow on Inspection Day:		

	Sacramento River, RM 72.2R				
BITER BITER	Map hazard, sco	The Protograph Water and The Protograph The Protogr			
Bank Slope (*2)	5	near vertical, won't support vegitation			
Berm Width (*2) - Estimated	2	12 - 15 ft			
Length of erosion	4	360 ft			
Location of erosion	5	be and underwater			
Bank Stability	5	rge holes, multiple vertical sections			
Radius of Curvature (R _c /w)	0	R/w = 6.3			
Site Relative to Bend	3	outside of a slight bend			
Geomorph	0	o migration expected			
Vegetation Cover	1	60 - 70 %			
Tree Hazard	5	arge trees, exposed roots, leaning			
Soil Type (*2)	2	silty clay			
Velocity (*2)	3	4.7 ft/s (UNET model)			
Wave Action (Wind/Boat)	3	moderate			
Economic Factor (*2)	1	none			
Human Usage	0	Farms			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	1	about 1 ft of tidal flux			
Erosion Hazard	53	Calculate Erosion Hazard Flow on Inspection Day:			

Sutter Slough, RM 25.1R



Site Location Map

Site Photograph

Score of 0 indicates no erosion Criteria	nazard, sco Score	e of 112 maximum erosion hazard score Notes	
Bank Slope (*2)	3	1.5:1 slope	
Berm Width (*2) - Estimated	5	no berm	
Length of erosion	3	600 ft	
Location of erosion	5	toe and underwater	
Bank Stability	5	vertical sections, greater than half bank height, holes from fallen trees	
Radius of Curvature (R _c /w)	1	R/w = 4 (Ayres calculation)	
Site Relative to Bend	3	outside of a gentle bend	
Geomorph	0	no migration expected	
Vegetation Cover	1	70 - 80 %	
Tree Hazard	5	exposed roots, leaning and fallen trees	
Soil Type (*2)	1	zlays	
Velocity (*2)	0	packwater, less than 2 ft/s	
Wave Action (Wind/Boat)	4	ieavy	
Economic Factor (*2)	1	arms	
Human Usage	1	pccassional	
Seepage Potential	0	no known seepage history	
Tidal Fluctuation	4	about 4 ft of tidal flux	
Erosion Hazard	52	Calculate Erosion Hazard Flow on Inspection Day:	

	Sacramento River, RM 22.7L			
Score of 0 indicates no erosion	hazard, sco	ore of 112 maximum erosion hazard score		
Criteria Bonk Slong (*2)	Score	Notes		
Barm Width (*2) Estimated	5			
Berni Width ("2) - Estimated	5			
	2	.10 R		
Location of erosion	3			
Bank Stability	2	ertical sections, less than hair slope height		
Radius of Curvature (R _c /w)	0	traight		
Site Relative to Bend	1	traight		
Geomorph	0	no migration expected		
Vegetation Cover	2	about 60 %		
Tree Hazard	5	big tree recently fell, trees leaning away from river, likely to slide in		
Soil Type (*2)	3	Sand		
Velocity (*2)	2	1.4 ft/s (UNET model)		
Wave Action (Wind/Boat)	4	Heavy wind and boat		
Economic Factor (*2)	1	Farms		
Human Usage	1	Occassional		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	4	4 ft of tidal flux		
Erosion Hazard	52	Calculate Erosion Hazard Flow on Inspection Day:		



Site Location Map

Site Photograph

Score of 0 indicates no erosion Criteria	hazard, so	pre of 112 maximum erosion hazard score			
Bank Slope (*2)	3	1.5:1 slope	1.5:1 slope		
Berm Width (*2) - Estimated	5	no berm			
Length of erosion	2	310 ft			
Location of erosion	1	middle bank			
Bank Stability	0	no vertical sections or caves			
Radius of Curvature (R _c /w)	0	R/w = 5.1 (Ayres calculation)			
Site Relative to Bend	1	straight			
Geomorph	0	no migration expected	o migration expected		
Vegetation Cover	2	about 50%	bout 50%		
Tree Hazard	0	small trees	mall trees		
Soil Type (*2)	3	sand	and		
Velocity (*2)	4	.0 ft/s (UNET model)			
Wave Action (Wind/Boat)	3	Moderate wave action	Aoderate wave action		
Economic Factor (*2)	2	adjacent to part of Walnut Grove, po	adjacent to part of Walnut Grove, population 669 (2000 US Census)		
Human Usage	4	weekly	weekly		
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	4	4 ft of tidal flux	4 ft of tidal flux		
Erosion Hazard	51	Calculate Erosion Hazard		Flow on Inspection Day:	

		Sacramento River, RM 69.9R			
PU 527 ELGRORN RUTO 7 R RUTO 7 R	N. 74 R				
Site Location	Мар	Site Photograph	2004 Cross Section		
Score of 0 indicates no erosion	hazard, sco	ore of 112 maximum erosion hazard score			
Bank Slope (*2)	4	1:1 or less			
Berm Width (*2) - Estimated	4	little berm			
Length of erosion	5	2000 ft			
Location of erosion	5	toe and underwater			
Bank Stability	2	/ertical slopes, less than half bank height			
Radius of Curvature (R _c /w)	0	straight	traight		
Site Relative to Bend	1	itraight			
Geomorph	0	no migration expected			
Vegetation Cover	0	80-90% cover			
Tree Hazard	5	large trees, leaning, visible roots			
Soil Type (*2)	2	silts and clays			
Velocity (*2)	3	4.7 ft/s (UNET model)			
Wave Action (Wind/Boat)	3	Moderate			
Economic Factor (*2)	1	Farms			
Human Usage	0	none			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	1	about 1 ft of tidal flux			
Erosion Hazard	50	Calculate Erosion Hazard	Flow on Inspection Day:		

		Sacramento River, RM 130.8R		
	RM 150-8 R			
Site Location	Мар	Site Photograph 2004 Cross Section		
Score of 0 indicates no erosion Criteria	hazard, sco	ore of 112 maximum erosion hazard score		
Bank Slope (*2)	4	1:1 or less		
Berm Width (*2) - Estimated	2	10 - 19 ft		
Length of erosion	2	200 ft		
Location of erosion	5	pank, toe, and underwater		
Bank Stability	2	mall vertical section		
Radius of Curvature (R _c /w)	4	/w = 1.1 (Ayres calculation)		
Site Relative to Bend	3	utside of a less than 90 degree bend		
Geomorph	0	opposite bank will likely pass this site		
Vegetation Cover	2	40 - 50%		
Tree Hazard	5	arge trees, roots visible, leaning		
Soil Type (*2)	1	clay		
Velocity (*2)	3	4.5 ft/s (UNET model)		
Wave Action (Wind/Boat)	2	low		
Economic Factor (*2)	2	Upstream if the small town fo Grimes		
Human Usage	1	occassional, private property adjacent, but a pump that needs checking		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	0	not tidal		
Erosion Hazard	50	Calculate Erosion Hazard Flow on Inspection Day:		





Erosion Hazard	49	Calculate Erosion Hazard	Flow on Inspection Day:
Tidal Fluctuation	1	about 1 ft of tidal flux	
Seepage Potential	0	no known seepage history	

Sacramento River, RM 141.4R				
Site Location Score of 0 indicates no erosion Criteria	Map hazard, sco Score	142 Site Photograph 2004 Cross Section ore of 112 maximum erosion hazard score Notes		
Bank Slope (*2)	3	1.5:1 slope		
Berm Width (*2) - Estimated	2	10 - 12 ft, appears the levee has been re-built		
Length of erosion	5	2000 ft		
Location of erosion	5	Bank and toe, underwater		
Bank Stability	2	ome vertical sections		
Radius of Curvature (R _c /w)	1	/w = 4.5 (Ayres calculation)		
Site Relative to Bend	3	utside of a less than 90 degree bend		
Geomorph	0	iot expected		
Vegetation Cover	3	10%		
Tree Hazard	5	arge trees with exposed roots and leaning		
Soil Type (*2)	1	clays		
Velocity (*2)	2	4.4 ft/s (UNET model)		
Wave Action (Wind/Boat)	2	low		
Economic Factor (*2)	3	Next to Colusa, population 5,402 (2000 US Census)		
Human Usage	1	occassional		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	0	not tidal		
Erosion Hazard	49	Calculate Erosion Hazard Flow on Inspection Day:		

	Sacramento River, RM 99.5R			
Sacramento River, RM 99.5R				
Site Location	Мар	Site Photograph 2004 Cross Section		
Score of 0 indicates no erosion Criteria	hazard, sco Score	ore of 112 maximum erosion hazard score Notes		
Bank Slope (*2)	3	1.5:1 slope		
Berm Width (*2) - Estimated	5	no berm		
Length of erosion	4	1020 ft		
Location of erosion	5	coe and underwater		
Bank Stability	2	/ertical section		
Radius of Curvature (R _c /w)	4	X/w = 1.0 (Ayres calculation)		
Site Relative to Bend	4	outside of a 90 degree bend		
Geomorph	0	no migration expected		
Vegetation Cover	2	50-60 %		
Tree Hazard	0	small trees		
Soil Type (*2)	2	clays and silts		
Velocity (*2)	2	4.2 ft/s (UNET model)		
Wave Action (Wind/Boat)	2	low		
Economic Factor (*2)	1	Farms		
Human Usage	0	not easily acessable, rare		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	lal Fluctuation 0 not tidal			
Erosion Hazard	49	Calculate Erosion Hazard Flow on Inspection Day:		



Score of 0 indicates no erosion	hazard, s	score of 112 maximum erosion hazard score
Criteria	Score	Notes

Criteria	Score	Notes	
Bank Slope (*2)	5	lear Vertical	
Berm Width (*2) - Estimated	1	20 - 30 ft	
Length of erosion	2	210 ft	
Location of erosion	3	bank and toe	
Bank Stability	4	vartical sections, more than half height	
Radius of Curvature (R _c /w)	2	R/w = 3.9 (ayres calculation)	
Site Relative to Bend	3	outside of a greater than 90 degree bend	
Geomorph	2	has room to migrate on the left bank	
Vegetation Cover	3	0 - 30 %	
Tree Hazard	0	o trees	
Soil Type (*2)	1	ays and rock	
Velocity (*2)	2	.2 ft/s (UNET model)	
Wave Action (Wind/Boat)	2	low	
Economic Factor (*2)	3	upstream of Colusa, population 5,402 (2000 US Census)	
Human Usage	3	monthly, adjacent to road, easy access, but steep	
Seepage Potential	0	io known seepage history	
Tidal Fluctuation	0	not tidal	
Erosion Hazard	48	Calculate Erosion Hazard Flow on Inspection Day:	

		Sacram	nento River, RM 130L		
	RM 100.8 R		Image: Antipage		
Site Location	Man		Site Photograph	2004 Cross Section	
Score of 0 indicates no erosion	hazard, sc	ore of 112 maximum erosion hazard	score		
Criteria	Score	Notes			
Bank Slope (*2)	3	1.5 : 1 slope			
Berm Width (*2) - Estimated	2	10 - 20 ft			
Length of erosion	3	560 ft			
Location of erosion	1	upper and middle bank			
Bank Stability	2	small vertical section			
Radius of Curvature (R _c /w)	4	R/w = 1.3 (Ayres calculation)	۲/w = 1.3 (Ayres calculation)		
Site Relative to Bend	4	outside of 90 degree bend			
Geomorph	0	no immediate effect			
Vegetation Cover	3	burnt vegetation, 30 %	burnt vegetation, 30 %		
Tree Hazard	4	exposed roots			
Soil Type (*2)	1	clays			
Velocity (*2)	3	4.5 ft/s (UNET model)			
Wave Action (Wind/Boat)	2	low			
Economic Factor (*2)	2	small town of Meridian			
Human Usage	1	occassional, no evidence of people	e however near the highway		
Seepage Potential	0	no known history			
Tidal Fluctuation	0	not tidal			
Erosion Hazard	46	Calculate Erosion Hazard		Flow on Inspection Day:	

	Sacramento River, RM 96.2L				
RD 787 FAIR RANCH	RD_1500 SUTTER BAS				
Site Location	Мар	Site Photograph 2004 Cross Section			
Criteria	nazard, sco Score	Notes			
Bank Slope (*2)	4	1:1 slope			
Berm Width (*2) - Estimated	1	about 25 ft			
Length of erosion	3	900 ft			
Location of erosion	4	bank and toe, sand has deposited on the downstream end			
Bank Stability	5	small vertical sections, multiple small animal holes			
Radius of Curvature (R _c /w)	4	۲/w = 1.2 (Ayres calculation)			
Site Relative to Bend	2	ust downstream of a bend			
Geomorph	0	no migration expected			
Vegetation Cover	3	about 30%			
Tree Hazard	0	no trees			
Soil Type (*2)	2	clays and silts, sand has deposited on the downstream end			
Velocity (*2)	2	4.2 ft/s (UNET model)			
Wave Action (Wind/Boat)	2	low waves			
Economic Factor (*2)	1	Farms			
Human Usage	2	seasonal usage			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	0	not tidal			
Erosion Hazard	45	Calculate Erosion Hazard Flow on Inspection Day:			

		Cache Slough, RM 21.8R		
21 RM 21.2 R Site Location Score of 0 indicates no erosion Criteria	Map hazard, sco	CACHE SLO		
Bank Slope (*2)	2	2:1 slope		
Berm Width (*2) - Estimated	5	lo berm		
Length of erosion	5	590 ft		
Location of erosion	4	ower bank and toe		
Bank Stability	4	ertical sections, greater than half the bank height		
Radius of Curvature (R _c /w)	0	raight		
Site Relative to Bend	1	straight		
Geomorph	0	o, backwater slough		
Vegetation Cover	4	urned, less than 20 %		
Tree Hazard	0	one tree, not a problem		
Soil Type (*2)	1	clays		
Velocity (*2)	0	backwater, less than 2 ft/s		
Wave Action (Wind/Boat)	4	Heavy wind		
Economic Factor (*2)	1	Farms		
Human Usage	0	none, private land		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	4	about 4 ft of tidal flux		
Erosion Hazard	44	Calculate Erosion Hazard Flow on Inspection Day:		

		Sacramento River, RM 164R		
EM 154 R 154		RILR		
Site Location	Мар	Site Photograph 2004 Cross Section		
Score of 0 indicates no erosion Criteria	hazard, sco Score	ore of 112 maximum erosion hazard score		
Bank Slope (*2)	4	1:1 or less slope		
Berm Width (*2) - Estimated	2	15 ft		
ength of erosion	2	490 ft		
_ocation of erosion	4	Bank and toe		
Bank Stability	2	vertical sections, less than half slope, there appears to be fresh rock on bank		
Radius of Curvature (R _c /w)	0	straight		
Site Relative to Bend	1	straight		
Geomorph	2	room to migrate on left bank		
/egetation Cover	2	40 - 50%		
Free Hazard	0	no trees		
Soil Type (*2)	2	clays and silts		
/elocity (*2)	2	4.2 ft/s (UNET model)		
Wave Action (Wind/Boat)	2	low		
Economic Factor (*2)	2	adjacent to small town of Princeton		
luman Usage	4	weekly, road adjacent, paths down to water		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	0	not tidal		

Calculate Erosion Hazard

Flow on Inspection Day:

43

Erosion Hazard

	Elk Slough, RM 0.7					
R SLOUGH 23 RMOR RMOR 34 Normality Land RM 34 RM 34 RM 34 Stie Location Score of 0 indicates no erosion Criteria	RO_150 MERRITT ISLA	Str S				
Criteria Bank Slone (*2)		Notes 1:1 slope				
Berm Width (*2) - Estimated	5	n. herm				
Length of erosion	2	300 ft				
Location of erosion	4	toe and bank				
Bank Stability	2	/ertical sections, less than half bank height				
Radius of Curvature (R _c /w)	0	traight				
Site Relative to Bend	1	traight				
Geomorph	0	no migration expected				
Vegetation Cover	0	80-90%				
Tree Hazard	4	large trees with exposed roots				
Soil Type (*2)	1	slays				
Velocity (*2)	0	backwater, less than 2 ft/s				
Wave Action (Wind/Boat)	2	low (only boatable durign high water				
Economic Factor (*2)	1	Farms				
Human Usage	2	Seasonal usage				
Seepage Potential	0	no known seepage history				
Tidal Fluctuation	3	about 3 ft of tidal flux				
Erosion Hazard	42	Calculate Erosion Hazard Flow on Inspection Day:				

		Sacramento River, RM 99.3R		
RM 90 1 RM 90 1 RM 90 2 RM 90 2 Site Location Score of 0 indicates no erosion	Map hazard, sco	The of 112 maximum erosion hazard score		
Criteria Bank Slone (*2)	Score	Notes		
Berm Width (*2) - Estimated	3	5 - 9 ft		
Length of erosion	1	98 ft		
Location of erosion	5	bank, toe, and below water		
Bank Stability	2	ertical sections		
Radius of Curvature (R _c /w)	4	//w = 1.1		
Site Relative to Bend	0	nside of a bend		
Geomorph	0	no migration expected		
Vegetation Cover	2	about 50 - 60 %		
Tree Hazard	0	no trees		
Soil Type (*2)	2	silty clay		
Velocity (*2)	3	4.2 ft/s and eddy currents		
Wave Action (Wind/Boat)	1	occassional		
Economic Factor (*2)	1	Farms		
Human Usage	0	none, too steep, not near public land		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	0	Not tidal		
Erosion Hazard	41	Calculate Erosion Hazard Flow on Inspection Day:		

	Sacramento River, RM 73R
R117222B R117222B R117222B R117252B R117252B R117252B R117252B R117252B R117252B R117252B R117252B R117252B R117252B R117252B R117252B R117252B	
Site Location Map	Site Photograph
Score of 0 indicates no erosion hazard, score of 112 ma	aximum erosion hazard score

Score of 0 indicates no erosion	on hazard, score of 112 maximum erosion hazard score			
Criteria	Score	Notes		
Bank Slope (*2)	3	1.5:1		
Berm Width (*2) - Estimated	3	5 - 10 ft of berm		
Length of erosion	1	50 ft, rock protection on the upstream and downstream sides.		
Location of erosion	4	toe and bank		
Bank Stability	0	no visible vertical sections or caves		
Radius of Curvature (R _c /w)	0	straight		
Site Relative to Bend	1	straight		
Geomorph	0	no migration expected		
Vegetation Cover	1	75-80 %		
Tree Hazard	1	one tree, young		
Soil Type (*2)	2	ilts and clays		
Velocity (*2)	5	1.7 ft/s (UNET model) and eddy currents		
Wave Action (Wind/Boat)	3	noderate		
Economic Factor (*2)	1	Farms		
Human Usage	0	not likely, private land		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	1	about 1 ft of tidal flux		
Erosion Hazard	40	Calculate Erosion Hazard Flow on Inspection Day:		

		Cache Slough, RM 21.2R		
21 RN 21.2 R Site Location Score of 0 indicates no erosion	RM 21: Map hazard, sco	CACHE SLO 22 22 22 22 22 22 3 3 22 22		
Criteria	Score	Notes		
Bank Slope (*2)	1	2.5:1 slopw		
Berm Width (^2) - Estimated	5	10 berm		
Length of erosion	1	19 ft		
Location of erosion	4	bank and toe		
Bank Stability	2	ertical section, less than half bank height		
Radius of Curvature (R _c /w)	0	traight		
Site Relative to Bend	1	traight		
Geomorph	0	o migration expected		
Vegetation Cover	3	0%		
Tree Hazard	1	young trees		
Soil Type (*2)	1	clay		
Velocity (*2)	0	backwater, less than 2 ft/s		
Wave Action (Wind/Boat)	4	Heavy		
Economic Factor (*2)	1	Farms		
Human Usage	4	weekly, little campsite setup		
Seepage Potential	0	no known seepage history		
Tidal Fluctuation	4	about 4 ft of tidal flux		
Erosion Hazard	40	Calculate Erosion Hazard Flow on Inspection Day:		

		Sacramento River, RM 123.5L			
RD 70 MERIDIAN FARMS	78 124 1000	Site Photograph 2004 Cross Section			
Site Location Score of 0 indicates no erosion	hazard, sco	bre of 112 maximum erosion hazard score			
Criteria	Score	Notes			
Bank Slope (*2)	4	1:1 or less slope			
Berm Width (*2) - Estimated	3	5 - 9 ft			
Length of erosion	2	330 ft			
Location of erosion	5	bank, toe, and underwater			
Bank Stability	2	/ertical section, less than half bank height			
Radius of Curvature (R _c /w)	0	straight			
Site Relative to Bend	1	straight			
Geomorph	0	no migration expected			
Vegetation Cover	2	about 60%			
Tree Hazard	0	no trees			
Soil Type (*2)	1	clay			
Velocity (*2)	3	4.6 ft/s			
Wave Action (Wind/Boat)	2	low			
Economic Factor (*2)	1	Farms			
Human Usage	0	none			
Seepage Potential	0	no known seepage history			
Tidal Fluctuation	0	not tidal			
Erosion Hazard	38	Calculate Erosion Hazard Flow on Inspection Day:			

		Sacra	mento River. RM 125.8L	
SC RM 225.8	25			New rock on this site, it does not appear to be an erosion site anymore. The rock appears to be falling into place and healing itself.
Site Location Score of 0 indicates no erosion Criteria	Map hazard, scc	pre of 112 maximum erosion haz	Site Photograph zard score	2004 Cross Section
Bank Slope (*2)				
Berm Width (*2) - Estimated				
Length of erosion				
Location of erosion				
Bank Stability				
Radius of Curvature (R _c /w)				
Site Relative to Bend				
Geomorph				
Vegetation Cover				
Tree Hazard				
Soil Type (*2)				
Velocity (*2)				
Wave Action (Wind/Boat)				
Economic Factor (*2)				
Human Usage				
Seepage Potential				
Tidal Fluctuation				
Erosion Hazard	0	Calculate Erosion Haz	ard	Flow on Inspection Day:
APPENDIX B

Erosion Hazard Data Sheets for Methodology 2: 10 Physical Factors and no Economic Factor

			Sacramento River, RM 43.3R	
HOLLAND LAND HOLLAND LAND BUT ALO R BUT ALO R BUT ALO R LAND LAND HOLLAND LAND		RM 153 PR		
Site Loc	ation Map	(70	Site Photograph	2004 Cross Section
Score of 0 indicates no erosion Criteria	hazard, sco Pre-Rock	Post-Rock	Notes	
Bank Slope (*2)	4	4	1:1 or less	
Berm Width (*2) - Estimated	5	5	no berm	
Location of erosion	5	5	toe and underwater, bank (still eroding underwater and at the toe with	the rock)
Bank Stability	4	2	vertical sections, greater than half height (still some vertical sections w	<i>v</i> ith rock, but not as tall)
Site Relative to Bend	5	5	outside of a less than 90 degree bend	
Vegetation Cover	2	4	40 to 60 % (with rock, less vegetation, removed what was there and d	idn't replant, less than 20%)
Tree Hazard	5	5	large leaning tress, visible roots (tree hazards are still present even wi	th the rock)
Soil Type (*2)	3	3	sand	
Velocity (*2)	4	4	5.4 ft/s (UNET model)	
Human Usage	5	5	daily	
Erosion Hazard	58	58	Calculate Erosion Hazard	Flow on Inspection Day:

		Sacramento River, RM 26.9L	
RM 261 F 25 RM 261 F RM 261 F 12 70 70 70 70 70 70 70 70 70 70 70 70 70			
Site Location	n Map	Site Photograph	2004 Cross Section
Score of 0 indicates no erosion	hazard, sco	ore of 72 maximum erosion hazard score	
Bank Slope (*2)	5	near vertical to vertical	
Berm Width (*2) - Estimated	5	no berm	
Location of erosion	4	all bank and toe	
Bank Stability	4	vertical sections (entire slope), no caves	
Site Relative to Bend	2	just downstream of a bend	
Vegetation Cover	4	less than 20% cover	
Tree Hazard	5	trees, roots exposed, and leaning	
Soil Type (*2)	3	sand	
Velocity (*2)	3	4.9 ft/s (UNET model)	
Human Usage	5	Daily	

		Sacramento River, RM 32.5R	
RN 26% 25 RN 26% 25 RN 25% RN 25% RM 25\% RM	35 R 33 30		
Site Location	n Map	Site Photograph	2004 Cross Section
Score of 0 indicates no erosion	hazard, sco	ore of 72 maximum erosion hazard score	
Criteria Bank Slone (*2)	Score	Notes	
Barm Width (*2) Estimated	5		
Berni width ("2) - Estimated	5		
Location of erosion	5	bank, toe, and underwater	
Bank Stability	5	vertical sections, not more than half bank height, some caves, erosion is threaten	ning the road
Site Relative to Bend	1	straight	
Vegetation Cover	1	about 70 - 80 % cover	
Tree Hazard	5	large trees, lots of roots showing, leaning	
Soil Type (*2)	3	sand	
Velocity (*2)	4	5.6 ft/s (UNET model)	
Human Usage	4	weekly	
Erosion Hazard	53	Calculate Erosion Hazard	Flow on Inspection Day:

		Sacram	ento River, RM 26.0L	
RM 26 L 26 RM 26 L R 12 RM 26 4 L 12 RM 26 4 L 12 RM 26 5 L RM 26 5 L RM 26 D L RM 26				
Site Location	Мар		Site Photograph	2004 Cross Section
Score of 0 indicates no erosion	hazard, sco	ore of 72 maximum erosion hazard so	core	
Bank Slope (*2)	5	Vertical slope		
Berm Width (*2) - Estimated	3	0 - 20 ft		
Location of erosion	5	Bank, toe nad underwater		
Bank Stability	5	lots of cave, and vertical sections		
Site Relative to Bend	1	straight		
Vegetation Cover	3	most veg is growing on the tree roo	ts, not in the ground, about 30 %	
Tree Hazard	5	Large trees, exposed roots, and lea	aning	
Soil Type (*2)	3	sand		
Velocity (*2)	4	5.0 (UNET model)		
Human Usage	0	rare, no access		
Erosion Hazard	49	Calculate Erosion Hazard		Flow on Inspection Day:

		Sacramo	ento River, RM 26.5L	
RM 26 L 25 RM 26 L R 12 RM 26 4 L 12 RM 26 4 L 12 RM 26 S L RM 26 S L RM 26 S L RM 26 S L				
Site Location	мар		Site Photograph	2004 Cross Section
Score of 0 indicates no erosion Criteria	hazard, sco	re of 72 maximum erosion hazard so Notes	core	
Bank Slope (*2)	3	1.5:1 slope		
Berm Width (*2) - Estimated	5	no berm		
Location of erosion	2	lower bank		
Bank Stability	4	vertical sections, more than half the	height	
Site Relative to Bend	1	straight		
Vegetation Cover	3	about 40% cover		
Tree Hazard	5	trees with exposed roots and leanin	g	
Soil Type (*2)	3	sand		
Velocity (*2)	3	4.9 ft/s (UNET model)		
Human Usage	5	Daily		
Erosion Hazard	48	Calculate Erosion Hazard		Flow on Inspection Day:

		Sacrar	nento River, RM 78L	
73 RW 78.31	Premost Lod	RD 1001 MICOLAUS		
Site Location	мар		Site Photograph	2004 Cross Section
Score of 0 indicates no erosion	hazard, sco	ore of 72 maximum erosion hazard s	score	
Bank Slope (*2)	4	1:1 or less slope		
Berm Width (*2) - Estimated	3	0 - 15 ft of berm (varies)		
Location of erosion	5	toe and underwater		
Bank Stability	5	animal burrows, vertical sections		
Site Relative to Bend	2	just downstream of a bend		
Vegetation Cover	1	75-80 %		
Tree Hazard	5	exposed roots and leaning trees		
Soil Type (*2)	2	silts and clays		
Velocity (*2)	3	4.7 ft/s (UNET calculation)		
Human Usage	4	wekly		
Erosion Hazard	46	Calculate Erosion Hazard		Flow on Inspection Day:

		Sacramento River, Rm 56.7L (unre	paired state)
RM 50 R RM 50			
Site Location	Мар	Site Photograph	2004 Cross Section
Score of 0 indicates no erosion Criteria	hazard, sco Score	re of 72 maximum erosion hazard score Notes	
Bank Slope (*2)	4	1:1 slope	
Berm Width (*2) - Estimated	5	no berm	
Location of erosion	4	toe and lower slope	
Bank Stability	5	large beaver holes, multiple vertical sections	
Site Relative to Bend	1	straight	
Vegetation Cover	1	about 60 - 70 %	
Tree Hazard	5	exposed roots, large trees, some overturned, and leaning	
Soil Type (*2)	3	sand	
Velocity (*2)	3	4.5 ft/s (UNET)	
Human Usage	0	rare, against freeway and railroad.	
Erosion Hazard	46	Calculate Erosion Hazard	Flow on Inspection Day:



2004 Cross Section

Score of 0 indicates no erosion	hazard, sco	pre of 72 maximum erosion hazard score		
Criteria	Score	Notes		
Bank Slope (*2)	4	1:1 slope		
Berm Width (*2) - Estimated	4	1 to 4 ft of berm (0 ft in some spots)		
Location of erosion	4	lower bank and toe		
Bank Stability	5	small animal burrows, caves from fallen trees, vertical sections	all animal burrows, caves from fallen trees, vertical sections	
Site Relative to Bend	4	outside of a 90 degree bend		
Vegetation Cover	1	60-80% cover		
Tree Hazard	5	Huge trees, all roots exposed, many leaning		
Soil Type (*2)	2	silts and clay		
Velocity (*2)	3	4.5 ft/s (UNET model)		
Human Usage	1	occassional usage, road nearby, so accessible, but no signs		
Erosion Hazard	46	Calculate Erosion Hazard Flow on Inspection Day:		

		Sacramento	River, RM 55.8R	
RD 900 W. SACEAMENTO RM 50 ST R RM 56 ST R				
Site Location	Мар	Site	Photograph	2004 Cross Section
Score of 0 indicates no erosion	hazard, sco Score	ore of 72 maximum erosion hazard score		
Bank Slope (*2)	4	close to 1:1		
Berm Width (*2) - Estimated	5	no berm		
Location of erosion	2	into the lower bank		
Bank Stability	4	vertical slope sections, more than half bar	ik height	
Site Relative to Bend	0	inside of a bend		
Vegetation Cover	2	about 40 to 60% cover		
Tree Hazard	3	Large trees		
Soil Type (*2)	3	sand		
Velocity (*2)	3	4.5 ft/s (UNET model)		
Human Usage	4	weekly		
Erosion Hazard	45	Calculate Erosion Hazard		Flow on Inspection Day:

		Sacramento River, RM 10.8L	
Site Location	Мар	Site Photograph	2004 Cross Section
Score of 0 indicates no erosion Criteria	hazard, sco	re of 72 maximum erosion hazard score	
Bank Slope (*2)	4	1:1 slope	
Berm Width (*2) - Estimated	5	no berm	
Location of erosion	2	All bank	
Bank Stability	4	vertical sections more than half bank height	
Site Relative to Bend	1	just about straight	
Vegetation Cover	2	about 50 - 60 % cover	
Tree Hazard	0	no trees	
Soil Type (*2)	1	clays and rock at toe	
Velocity (*2)	5	6.8 ft/s (UNET model)	
Human Usage	5	Daily, trash, and shelter set up	
Erosion Hazard	44	Calculate Erosion Hazard Inspection Date: 9/8/2005	Flow on Inspection Day:





Site Location	мар	Site Photograph	2004 Cross Section
Score of 0 indicates no erosion	hazard, sco	pre of 72 maximum erosion hazard score	
Criteria	Score	Notes	
Bank Slope (*2)	5	near vertical, won't support vegitation	
Berm Width (*2) - Estimated	2	12 - 15 ft	
Location of erosion	5	toe and underwater	
Bank Stability	5	large holes, multiple vertical sections	
Site Relative to Bend	3	outside of a slight bend	
Vegetation Cover	1	60 - 70 %	
Tree Hazard	5	large trees, exposed roots, leaning	
Soil Type (*2)	2	silty clay	
Velocity (*2)	3	4.7 ft/s (UNET model)	
Human Usage	0	Farms	
Erosion Hazard	43	Calculate Erosion Hazard	Flow on Inspection Day:



		Sacramento River, RM 8L
HORSESHOE BEND 2 Site Location Score of 0 indicates no erosion Criteria	Map hazard, score	Statute of 72 maximum erosion hazard score
Bank Slope (*2)	5	Vertical Bank
Berm Width (*2) - Estimated	3	8-10 ft (about at levee height)
Location of erosion	2	All Bank
Bank Stability	4	Vertical sections, greater than half the slope height
Site Relative to Bend	3	outside of gentle bend
Vegetation Cover	3	about 20 - 30 % cover
Tree Hazard	0	No trees
	Ľ Č	
Soil Type (*2)	1	Clays
Soil Type (*2) Velocity (*2)	1	Clays 4.9 ft/s (UNET model)
Soil Type (*2) Velocity (*2) Human Usage	1 3 4	Clays 4.9 ft/s (UNET model) weekly, path down, but steep

		Sacrame	ento River, RM 22.7L		
GEORGIANNA SLOU	SH RN 2321				
Site Location	Мар		Site Photograph	2004 Cross Section	
Score of 0 indicates no erosion Criteria	hazard, sco	ore of 72 maximum erosion hazard so	core		
Bank Slope (*2)	3	1.5:1 slope			
Berm Width (*2) - Estimated	5	no berm			
Location of erosion	3	Тое	Ĩoe		
Bank Stability	2	vertical sections, less than half slop	e height		
Site Relative to Bend	1	straight			
Vegetation Cover	2	about 60 %			
Tree Hazard	5	big tree recently fell, trees leaning away from river, likely to slide in			
Soil Type (*2)	3	Sand			
Velocity (*2)	2	I.4 ft/s (UNET model)			
Human Usage	1	Occassional			
Erosion Hazard	40	Calculate Erosion Hazard		Flow on Inspection Day:	

		Sacramento River, RM 6	9.9R		
RU 1927 ELKHORN RM 70.7 R 71 RM 193.8 R					
Site Location	Мар	Site Photograph	2004 Cross Section		
Score of 0 indicates no erosion	hazard, sco Score	ore of 72 maximum erosion hazard score			
Bank Slope (*2)	4	1:1 or less			
Berm Width (*2) - Estimated	4	little berm			
Location of erosion	5	toe and underwater			
Bank Stability	2	vertical slopes, less than half bank height			
Site Relative to Bend	1	straight			
Vegetation Cover	0	i0-90% cover			
Tree Hazard	5	large trees, leaning, visible roots			
Soil Type (*2)	2	silts and clays			
Velocity (*2)	3	4.7 ft/s (UNET model)			
Human Usage	0	none			
Erosion Hazard	39	Calculate Erosion Hazard	Flow on Inspection Day:		





Site Location Map		Site Photograph	2004 Cross Section	
Score of 0 indicates no erosion Criteria	hazard, sco Score	pre of 72 maximum erosion hazard score Notes		
Bank Slope (*2)	3	1.5:1 slope		
Berm Width (*2) - Estimated	2	10 - 20 ft of berm		
Location of erosion	5	toe and underwater		
Bank Stability	5	vertical sections and caves		
Site Relative to Bend	0	inside of a bend		
Vegetation Cover	1	70 - 80 %		
Tree Hazard	5	exposed roots, trees appear to be growing sideways in some places		
Soil Type (*2)	3	sand		
Velocity (*2)	1	- 4 ft/s		
Human Usage	4	weekly, houses, old rock, rope swing		
Erosion Hazard	38	Calculate Erosion Hazard	Flow on Inspection Day:	

			Sutter Slough, RM 25.1R				
RM 24.8 L RM 24.8 L RM 24.7 R	RM 25.1	RSUTTER					
Site Location	Мар		Site Photograph	2004 Cross Section			
Score of 0 indicates no erosion	hazard, sco Score	ore of 72 maximum er Notes	osion hazard score				
Bank Slope (*2)	3	1.5:1 slope					
Berm Width (*2) - Estimated	5	no berm					
Location of erosion	5	toe and underwater					
Bank Stability	5	vertical sections, gre	/ertical sections, greater than half bank height, holes from fallen trees				
Site Relative to Bend	3	outside of a gentle b	outside of a gentle bend				
Vegetation Cover	1	70 - 80 %	70 - 80 %				
Tree Hazard	5	exposed roots, leaning and fallen trees					
Soil Type (*2)	1	clays					
Velocity (*2)	0	backwater, less than	backwater, less than 2 ft/s				
Human Usage	1	occassional	ccassional				
Erosion Hazard	38	Calculate Er	osion Hazard	Flow on Inspection Day:			





		Sacram	nento River, RM 99.5R		
93 RM99 L 93 RM99 L 93 RM 99.3	NR RM DI	RD_108			
Site Location	Мар		Site Photograph	2004 Cross Section	
Score of 0 indicates no erosion Criteria	hazard, sco Score	ore of 72 maximum erosion hazard	score		
Bank Slope (*2)	3	1.5:1 slope			
Berm Width (*2) - Estimated	5	no berm			
Location of erosion	5	toe and underwater	be and underwater		
Bank Stability	2	vertical section			
Site Relative to Bend	4	outside of a 90 degree bend	outside of a 90 degree bend		
Vegetation Cover	2	50-60 %			
Tree Hazard	0	small trees			
Soil Type (*2)	2	clays and silts			
Velocity (*2)	2	4.2 ft/s	1.2 ft/s		
Human Usage	0	not easily acessable, rare			
Erosion Hazard	37	Calculate Erosion Hazard		low on Inspection Day:	

		Sacramento River, RM 141.4R			
	141	RM TALLA R			
Site Location	Мар	Site Photograph	2004 Cross Section		
Score of 0 indicates no erosion Criteria	hazard, sco Score	re of 72 maximum erosion hazard score Notes			
Bank Slope (*2)	3	1.5:1 slope			
Berm Width (*2) - Estimated	2	10 - 12 ft, appears the levee has been re-built			
Location of erosion	5	Bank and toe, underwater			
Bank Stability	2	some vertical sections			
Site Relative to Bend	3	outside of a less than 90 degree bend	outside of a less than 90 degree bend		
Vegetation Cover	3	.0%			
Tree Hazard	5	large trees with exposed roots and leaning			
Tree Hazard Soil Type (*2)	5	large trees with exposed roots and leaning clays			
Tree Hazard Soil Type (*2) Velocity (*2)	5 1 2	large trees with exposed roots and leaning clays 4.4 ft/s (UNET model)			
Tree Hazard Soil Type (*2) Velocity (*2) Human Usage	5 1 2 1	large trees with exposed roots and leaning clays 4.4 ft/s (UNET model) occassional			



		Sacramento River, RM 96.2L			
RU 787 FAIR RANCH	RD_1500 SUTTER BAS	RM 90 L 9R 9R			
Site Location	Мар	Site Photograph	2004 Cross Section		
Score of 0 indicates no erosion Criteria	hazard, sco Score	re of 72 maximum erosion hazard score Notes			
Bank Slope (*2)	4	1:1 slope			
Berm Width (*2) - Estimated	1	about 25 ft			
Location of erosion	4	bank and toe, sand has deposited on the downstream end	ank and toe, sand has deposited on the downstream end		
Bank Stability	5	small vertical sections, multiple small animal holes			
Site Relative to Bend	2	just downstream of a bend			
Vegetation Cover	3	bout 30%			
Tree Hazard	0	io trees			
Soil Type (*2)	2	lays and silts, sand has deposited on the downstream end			
Velocity (*2)	2	2 ft/s (UNET model)			
Human Usage	2	seasonal usage			
Erosion Hazard	34	Calculate Erosion Hazard	Flow on Inspection Day:		



2004 Cross Section

Criteria	Score	Notes	
Bank Slope (*2)	3	1.5 : 1 slope	
Berm Width (*2) - Estimated	2	10 - 20 ft	
Location of erosion	1	upper and middle bank	
Bank Stability	2	small vertical section	
Site Relative to Bend	4	outside of 90 degree bend	
Vegetation Cover	3	burnt vegetation, 30 %	
Tree Hazard	4	posed roots	
Soil Type (*2)	1	iys	
Velocity (*2)	3	5 ft/s (UNET model)	
Human Usage	1	cassional, no evidence of people however near the highway	
Erosion Hazard	33	Calculate Erosion Hazard Flow on Inspection Day:	

		Sacramento River, RM 164R				
RNIBAR 104 RNIBAR 104 Ster Location Score of 0 indicates no erosion Criteria	A REAL A Map hazard, sco	For the construction of the constru	2004 Cross Section			
Bank Slope (*2)	4	1:1 or less slope				
Berm Width (*2) - Estimated	2	15 ft	5 ft			
Location of erosion	4	Bank and toe				
Bank Stability	2	/ertical sections, less than half slope, there appears to be fresh rock on bank				
Site Relative to Bend	1	straight	straight			
Vegetation Cover	2	40 - 50%				
Tree Hazard	0	no trees				
Soil Type (*2)	2	clays and silts				
Velocity (*2)	2	I.2 ft/s (UNET model)				
Human Usage	4	eekly, road adjacent, paths down to water				
Erosion Hazard	33	Calculate Erosion Hazard	Flow on Inspection Day:			



		Sacram	nento River, RM 99.3R			
93 RM99 L 93 RM99 L 93 RM99 .3	R RM D	RD_108				
Site Location	Мар		Site Photograph	2004 Cross Section		
Score of 0 indicates no erosion	hazard, sco	ore of 72 maximum erosion hazard	score			
Bank Slope (*2)	4	1:1 or less				
Berm Width (*2) - Estimated	3	5 - 9 ft				
Location of erosion	5	bank, toe, and below water	ank, toe, and below water			
Bank Stability	2	vertical sections	rertical sections			
Site Relative to Bend	0	inside of a bend	nside of a bend			
Vegetation Cover	2	bout 50 - 60 %				
Tree Hazard	0	no trees				
Soil Type (*2)	2	silty clay				
Velocity (*2)	3	1.2 ft/s and eddy currents				
Human Usage	0	none, too steep, not near public la	one, too steep, not near public land			
Erosion Hazard	33	Calculate Erosion Hazard		Flow on Inspection Day:		

		Sacran	nento River, RM 73R		
RNL3R RNL3R RNL3R	FED 1990 MULL DISTRICT	al Photography taken Apr			
Site Location	Мар		Site Photograph	2004 Cross Section	
Score of 0 indicates no erosion	hazard, sco	re of 72 maximum erosion hazard s	core		
Bank Slope (*2)	3	1.5:1			
Berm Width (*2) - Estimated	3	5 - 10 ft of berm			
Location of erosion	4	toe and bank			
Bank Stability	0	no visible vertical sections or caves			
Site Relative to Bend	1	straight			
Vegetation Cover	1	75-80 %			
Tree Hazard	1	one tree, young			
Soil Type (*2)	2	silts and clays			
Velocity (*2)	5	4.7 ft/s (UNET model) and eddy cu	rrents		
Human Usage	0	not likely, private land			
Erosion Hazard	33	Calculate Erosion Hazard		Flow on Inspection Day:	



Berm Width (*2) - Estimated	3	- 9 ft		
Location of erosion	5	bank, toe, and underwater		
Bank Stability	2	vertical section, less than half bank height		
Site Relative to Bend	1	straight		
Vegetation Cover	2	oout 60%		
Tree Hazard	0	o trees		
Soil Type (*2)	1	ay		
Velocity (*2)	3	δ ft/s		
Human Usage	0	DNe		
Erosion Hazard	32	Calculate Erosion Hazard Flow on Inspection Day:		

Cache Slough, RM 21.8R						
21 RM 212R CACHE SLO RM 218R 22 D						
Score of 0 indicates no erosion hazard, score of 72 maximum erosion hazard score						
Bank Slope (*2)	2	2:1 slope				
Berm Width (*2) - Estimated	5	no berm				
Location of erosion	4	lower bank and toe				
Bank Stability	4	vertical sections, greater than half the bank height				
Site Relative to Bend	1	straight				
Vegetation Cover	4	burned, less than 20 %				
Tree Hazard	0	one tree, not a problem				
Soil Type (*2)	1	clays				
Velocity (*2)	0	backwater, less than 2 ft/s				
Human Usage	0	none, private land				
Erosion Hazard	29	Calculate Erosion Hazard	Flow on Inspection Day:			

Cache Slough, RM 21.2R						
21 RM 21.2.R	RM 21.5					
Site Location Map Site Photograph 2004 Cross Section						
Score of 0 indicates no erosion Criteria	hazard, sco Score	re of 72 maximum erosion hazard score Notes				
Bank Slope (*2)	1	2.5:1 slopw				
Berm Width (*2) - Estimated	5	no berm				
Location of erosion	4	bank and toe				
Bank Stability	2	vertical section, less than half bank height				
Site Relative to Bend	1	straight				
Vegetation Cover	3	30%				
Tree Hazard	1	young trees				
Soil Type (*2)	1	clay				
Velocity (*2)	0	backwater, less than 2 ft/s				
Human Usage	4	weekly, little campsite setup				
Erosion Hazard	29	Calculate Erosion Hazard	Flow on Inspection Day:			



APPENDIX C

Erosion Hazard Data Sheets for Methodology 3: 5 Physical Factors and Revised Economic Factor








Sacramento River, RM 55.8R				
PD 502 PM 502 PM 502 P				
Site Location	n Map	Site Photograph	2004 Cross Section	
(Score of 0 indicates no hazard, score of 48 maximum potential for levee failure)				
Criteria	Score	Notes		
Bank Slope	4	1:1 slope		
Berm Width - Estimated	5	no berm		
Soil Type	3	sand		
Velocity	3	4.5 ft/s (UNET model)		
Economic Factor	11	South West Sacramento		
Bank Stability	7	slumping, caves, and tree hazards		
Erosion Hazard	33		Flow on Inspection Day:	

Sacramento River, RM 141.4R					
Site Location	Мар		Site Photograph	2004 Cross Section	
(Score of 0 indicates no hazard,	, score of 48	maximum potential for levee fa	ailure)		
Criteria	Score	Notes			
Bank Slope	3	1.5:1 slope			
Berm Width - Estimated	2	10 to 12 ft			
Soil Type	1	clays			
Velocity	2	4.4 ft/s (UNET model)			
Economic Factor	19	Colusa Basin			
Bank Stability	6	tree hazards, slumping			
Erosion Hazard	33			Flow on Inspection Day:	









Sacramento River, RM 96.2L					
FRE FARCE					
Site Location Map Site Photograph			2004 Cross Section		
(Score of 0 indicates no hazard, score of 48 maximum potential for levee failure)					
Criteria	Score	Notes			
Bank Slope	4	1:1 slope			
Berm Width - Estimated	1	-5 ft			
Soil Type	2	ays and silts			
Velocity	2	1.2 ft/s (UNET model)			
Economic Factor	14	Sutter Basin			
Bank Stability	6	animal holes and slumping			
Erosion Hazard	29		Flow on Inspection Day:		









Sacramento River, RM 22.7L					
RIL227L BIL227L BIL227L BIL227L BIL227L	20 RH 23 21	at ho hanat smutat Rinutat			
Site Location	Мар		Site Photograph	2004 Cross Section	
(Score of 0 indicates no hazard, score of 48 maximum potential for levee failure)					
Criteria	Score	Notes			
Bank Slope	3	1.5:1 slope			
Berm Width - Estimated	5	o berm			
Soil Type	3	sand			
Velocity	2	4.4 ft/s (UNET model)			
Economic Factor	7	sleton			
Bank Stability	6	rees, slumping			
Erosion Hazard	26			Flow on Inspection Day:	





Sacramento River, RM 10.8L				
Fite Location	n Map	<image/>	2004 Cross Section	
(Score of 0 indicates no hazard, score of 48 maximum potential for levee failure)				
Criteria	Score	Notes		
Bank Slope	4	1:1 slope		
Berm Width - Estimated	5	no berm		
Soil Type	1	clays and toe rock		
Velocity	5	6.8 ft/s (UNET model)		
Economic Factor	7	Isleton		
Bank Stability	3	tension cracks		
Erosion Hazard	25		Flow on Inspection Day:	





























			Sacramento River, RM 125.8L		
RM T25.8	28			New rock on this site, it does not appear to be an erosion site anymore. The rock appears to be falling into place and healing itself.	
Site Location Map			Site Photograph	2004 Cross Section	
(Score of 0 indicates no hazard, score of 48 maximum potential for levee failure)					
Criteria	Score	Notes			
Bank Slope					
Berm Width - Estimated					
Soil Type					
Velocity					
Economic Factor					
Bank Stability					
Erosion Hazard	0			Flow on Inspection Day:	

APPENDIX D

Erosion Hazard Data Sheets for Methodology 4: 5 Physical Factors and no Economic Factor




















Sacramento River, RM 22.7L					
Site Location	Мар	Site Photograph	2004 Cross Section		
(Score of 0 indicates no hazard, score of 28 maximum potential for levee failure)					
Bank Slope	3	1.5:1 slope			
Berm Width - Estimated	5	no berm			
Soil Type	3	Sand			
Velocity	2	4.4 ft/s (UNET model)			
Bank Stability	6	trees, slumping			
Erosion Hazard	19		Flow on Inspection Day:		



Sacramento River, RM 10.8L					
Sacramento River, RM 10.8L					
Stal action	Man		Site Photograph	2004 Cross Section	
Site Location Map			Site Photograph	2004 Cross Section	
(Score of 0 indicates no hazard, score of 28 maximum potential for levee failure)					
Criteria	Score	Notes			
Bank Slope	4	1:1 slope			
Berm Width - Estimated	5	o berm			
Soil Type	1	clays and toe rock			
Velocity	5	6.8 ft/s (UNET model)			
Bank Stability	3	tension cracks			
Erosion Hazard	18			Flow on Inspection Day:	























Sacramento River, RM 96.2L					
Sacramento River, RM 96.2L					
Site Location	мар	Site Photograph	2004 Cross Section		
(Score of 0 indicates no hazard, score of 28 maximum potential for levee failure)					
Criteria	Score	Notes			
Bank Slope	4				
Berm Width - Estimated	1	5 ft			
Soil Type	2	clays and silts			
Velocity	2	4.2 ft/s (UNET model)			
Bank Stability	6	animal holes and slumping			
Erosion Hazard	15		Flow on Inspection Day:		



Sacramento River, RM 141.4R					
Sacramento River, Rivi 141.4R					
Site Location	n Map	Site Photograph	2004 Cross Section		
(Score of 0 indicates no hazard	(Score of 0 indicates no hazard, score of 28 maximum potential for levee failure)				
Criteria	Score	Notes			
Bank Slope	3	1.5:1 slope			
Berm Width - Estimated	2	10 to 12 ft			
Soil Type	1	clays			
Velocity	2	4.4 ft/s (UNET model)			
Bank Stability	6	tree hazards, slumping			
Erosion Hazard	14		Flow on Inspection Day:		



Sacramento River, RM 154.5R				
RH 1545 R 151 100 100 100 100 100 100 100 100 100		Bite Photograph	2004 Cross Section	
(Score of 0 indicates no hazard, score of 28 maximum potential for levee failure)				
Criteria	Score	Notes		
Bank Slope	5	near vertical		
Berm Width - Estimated	1	20 to 30 ft		
Soil Type	1	clays		
Velocity	2	4.2 ft/s (UNET calculation)		
Bank Stability	4	slumping		
Erosion Hazard	13		Flow on Inspection Day:	

Sacramento River, RM 73R				
Site Location Map		Site Photograph	2004 Cross Section	
(Score of 0 indicates no hazard, score of 28 maximum potential for levee failure)				
Criteria	Score	Notes		
Bank Slope	3	.5:1 slope		
Berm Width - Estimated	3	5 to 10 ft		
Soil Type	2	silts and clays		
Velocity	5	4.7 ft/s (UNET model) plus eddy currents		
Bank Stability	0	no stability issues		
Erosion Hazard	13	Flow on Inspection Day:		







