

APPENDIX G COST ESTIMATES OF THE ALTERNATIVES

Preliminary capital cost estimates of the river management alternatives were prepared for the DEIS. Costs were developed for three separate components: improvements to the levee system, water acquisition, and implementation of environmental measures. Table G-1 summarizes calculated costs.

Table G-1 Preliminary Capital Cost Evaluation

Basis for Calculation	Flood Control Improvement Alternative	Integrated USIBWC Land Management Alt.	Targeted River Restoration Alt.
Capital Costs (millions)			
Levee system Improvements	55.9	55.9	55.9
Environmental measure Implementation	1.0	10.7	21.4
Water rights acquisition (\$3,000/ac-ft)	3.2	6.6	28.4
Total Investment	60.1	72.2	105.7
<i>Estimated water consumption (from Section 4.1) used in the water acquisition calculation</i>	<i>1,078 ac-ft/yr</i>	<i>2,203 ac-ft/yr</i>	<i>9,461 ac-ft/yr</i>

Flood Control Improvements

A preliminary cost of \$55.9 million was used for flood control improvements. This estimate was prepared for the 2001 Alternatives Formulation Report (Appendix I of this DEIS). The estimate was developed at a conceptual planning level given the need to use global construction assumptions –as site-specific conditions have not been determined– and uncertainties on rehabilitation needs for levee structural integrity.

Water Acquisition

A water acquisition cost was calculated by multiplying consumption estimates per alternative by a water right purchase cost based on financing on-farm water conservation programs. In the calculation a typical investment of \$3,000 would be used to secure 1 acre-foot of water annually over 20 years, the alternatives implementation period. The unit cost was obtained from water use data recently compiled for the Rio Grande Project area by King and Maitland (2003: Table 30). The estimate assumes a water conservation potential of 0.8 ac-ft per acre with the installation of a drip irrigation system with a cost per acre ranging from \$1,700 to \$2,800.

Environmental Measure Implementation

Capital cost estimates were prepared at a conceptual-design level for the DEIS. Unit costs per acre were derived from river restoration project data (Taylor and McDaniel 1997; South Dakota Partners for Fish and Wildlife 2001), and/or application of unit construction costs (Means 2002) to soil removal and site preparation. Unit costs per acre derived for the DEIS are as follows:

- Salt cedar control \$ 373/ac
- Site preparation \$ 2,228/ac
- Seeding native grass \$ 330/ac
- Site survey \$ 1,450/ac
- Pole planting \$ 1,205/ac
- Controlled burns \$ 160/ac
- Slash disposal \$ 184/ac
- Erosion control \$ 209/ac
- Excavation (per ft.) \$ 3,795/ac

Excavation costs were adjusted to account for depth differences as follows: 1.2 ft. for bank shavements, 1.5 ft. for meander reopening, and 4 ft. for modified arroyo dredging. An increase of 10 percent was added to each estimate for engineering and inspection, and 25 percent for contingencies.

Tables G-2, G-3, and G-4 summarize environmental measure cost estimates for each of the three action alternatives under consideration.

Table G-2 Cost Evaluation for the Flood Control Improvement Alternative

Habitat Enhancement Measures										
Subtasks	Unit Price	Unit	Grazing Regimes	Grassland Management	Native Revegetation	Stream Bank Shavements	Meander Re-Opening	Arroyo Modifications	Overbank Flows	Alternative Totals
<i>Total acreage required</i>			3552							
Erosion Control	\$ 209	acre	\$ 742,368							
Salt Cedar Control	\$ 373	acre								
Seeding Native Grass	\$ 330	acre								
Slash Disposal	\$ 160	acre								
Total Cost per Measure			\$ 742,368							

Engineering & Inspection	10%	\$ 74,237
Contingency	25%	\$ 185,592
Total		\$ 1,002,197

Table G-3 Cost Evaluation for the Integrated USIBWC Land Management Alternative

			Habitat Enhancement Measures							
Subtasks	Unit Price	Unit	Grazing Regimes	Grassland Management	Native Revegetation	Stream Bank Shavedowns	Meander Re-Opening	Arroyo Modifications	Overbank Flows	Alternative Totals
Total acreage required			3552	1641	223	127				
Site Survey	\$ 1,450	acre			\$ 323,350	\$ 184,150				
Erosion Control	\$ 209	acre	\$ 742,368			\$ 26,543				
Salt Cedar Control	\$ 373	acre		\$ 612,257	\$ 83,201	\$ 47,384				
Controlled Burns	\$ 160	acre			\$ 35,680					
Slash Disposal	\$ 184	acre			\$ 40,943	\$ 23,317				
Excavation	\$ 3,795	acre				\$ 578,330				
Soil Preparation, Grading	\$ 2,228	acre		\$ 3,656,877	\$ 496,943	\$ 283,012				
Seeding Native Grass	\$ 330	acre		\$ 541,530						
Pole Planting	\$ 1,205	acre			\$ 268,715					
Total Cost per Measure			\$ 742,368	\$ 4,810,664	\$ 1,248,832	\$ 1,142,736				\$ 7,944,601
					Engineering & Inspection	10%				\$ 794,460
					Contingency	25%				\$ 1,986,150
										Total \$ 10,725,211

Table G-4 Cost Evaluation for the River Restoration Alternative

			Habitat Enhancement Measures						Alternative Totals	
Subtasks	Unit Price	Unit	Grazing Regimes	Grassland Management	Native Revegetation	Stream Bank Shavedowns	Meander Re-Opening	Arroyo Modifications		Overbank Flows
<i>Conservation Easements Additional Acreage</i>				288	771					
<i>Total acreage required</i>			3493	1959	960		147	6.8	517	
Site Survey	\$ 1,450	acre			\$ 1,392,000		\$ 213,150	\$ 9,860		
Erosion Control	\$ 209	acre	\$ 730,037	\$ 409,431			\$ 30,723	\$ 1,421	\$ 108,053	
Salt Cedar Control	\$ 373	acre		\$ 730,903	\$ 358,176		\$ 54,846	\$ 2,537	\$ 192,893	
Controlled Burns	\$ 160	acre			\$ 153,600					
Slash Disposal	\$ 184	acre			\$ 176,256		\$ 26,989	\$ 1,248		
Excavation	\$ 3,795	acre					\$ 836,757	\$ 103,219		
Soil Preparation, Grading	\$ 2,228	acre		\$ 4,365,523	\$ 2,139,307		\$ 327,581	\$ 60,614	\$ 1,152,106	
Seeding Native Grass	\$ 330	acre		\$ 646,470	\$ 316,800					
Pole Planting	\$ 1,205	acre			\$ 1,156,800		\$ 177,135			
Total Cost per Measure			\$ 730,037	\$ 6,152,327	\$ 5,692,939		\$ 1,667,181	\$ 178,899	\$ 1,453,051	\$ 15,874,434
					Engineering & Inspection	10%			\$ 1,587,443	
					Contingency	25%			\$ 3,968,609	
					Total				\$ 21,430,486	