Appendix F

Incremental Cost Analysis

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Incremental Cost Analysis Appendix F

1. Purpose

Corps of Engineers guidance requires a cost effectiveness analysis and an incremental cost analysis for recommended environmental restoration and mitigation plans. A cost effectiveness analysis is conducted to ensure that the least cost solution is identified for each possible level of environmental output. An incremental cost analysis of the solutions is conducted to reveal changes in costs for increasing levels of environmental outputs. In the absence of a common measurement unit for comparing the nonmonetary benefits with the monetary costs of environmental plans, cost effectiveness and incremental cost analysis are valuable tools to assist in decision making. This appendix presents the results of the cost effectiveness analysis and incremental cost analysis of the Clarence Cannon National Wildlife Refuge Habitat Rehabilitation and Enhancement Project, Pike County, Missouri.

2. Method

The project was evaluated using guidance documents and software prepared by the Corps of Engineers' Institute for Water Resources (IWR). IWR –Planning Suite Software (Version 1.0.11.0, Sept 24, 2008) was used to automate steps in the cost effectiveness and incremental cost analysis. Much of the text of this appendix was borrowed from IWR Report (IWR 94-PS-2), *Cost Effectiveness Analysis for Environmental Planning: Nine EASY Steps* (Orth, 1994). The cost effectiveness and incremental cost analysis procedures are presented in nine steps, which are grouped into four tasks listed below.

A. Formulation of Combinations

Step 1 Display outputs and costs
Step 2 Identify combinable management features
Step 3 Calculate outputs and costs of combinations

B. Cost Effectiveness Analysis

Step 4 Eliminate economically inefficient solutions
Step 5 Eliminate economically ineffective solutions

C. Development of Incremental Cost Curve

Step 6 Calculate average costs
Step 7 Recalculate average costs for additional outputs

D. Incremental Cost Analysis

Step 8 Calculate incremental costs
Step 9 Compare successive outputs and incremental costs

The results of these analyses are displayed as graphs and tables at the end of this appendix. They allow the decision makers to progressively compare alternative levels of environmental outputs and ask if the next level is "worth it" – that is, is the additional environmental output in the next level worth its additional monetary costs? It is important to note that these analyses will not usually lead, and are not intended to lead, to a single best solution as in economic cost-benefit analyses. They will improve the quality of decision making by ensuring that a rational, supportable, focused, and

traceable approach is used for considering and selecting alternative methods to produce environmental outputs.

A. Formulation of Combinations

Step 1. Display outputs and costs. Table 1 at the end of this appendix displays the outputs and costs of potential management features and combinations of management features. Outputs were determined using Habitat Evaluation Procedures and are presented as net Average Annual Habitat Units (for further detail see Appendix E, *Habitat Evaluation and Quantification*). Costs were annualized over a 50-year period of analysis at an interest rate of 3.75 % for Fiscal Year 2013. These costs include initial construction with mobilization and demobilization, contingency (25%), planning, engineering, and design (15%), and construction management (10%) above the actual estimated cost for construction. Operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs for the 50-year period of analysis were also calculated for each feature and included in the total project cost used in the ICA.

Step 2. Identify combinable management features. The management features were reviewed to determine which were dependent on other features and logically combinable (See Table 1).

Step 3. Calculate output and costs of combinations. Table 1 at the end of this appendix displays the outputs and costs of combinations.

B. Cost Effectiveness Analysis

Steps 4 and 5. Eliminate economically inefficient solutions and economically ineffective solutions. Steps 4 and 5 were carried out using the IWR-Planning Suite software. Step 4 eliminates economically inefficient solutions and identifies the least cost solution for each level of output. *Inefficient in Production* is defined as any alternative where the same output level can be generated at a lesser cost by another alternative. The alternatives are evaluated and wherever there are two or more alternatives providing the same output level, aside from any other considerations (*i.e.,* uncertainty about the reliability of cost or output estimates), the more costly alternative(s) generating that same output level is eliminated. For example, if two plans produce two AAHUs and one costs $3,000 while the other costs $4,000, the more expensive plan is eliminated.

Step 5 eliminates the economically ineffective solutions by identifying and deleting those solutions that will produce less output at equal or greater cost than subsequently ranked solutions. *Ineffective in Production* is defined as any alternative where a greater output level can be generated at a lesser or equal cost by another alternative. For example, if one plan produces 2 AAHUs for $8,000 and the next plan produces 4 AAHUs for $6,000, the first plan would be eliminated because it is not economically effective.

Of the 408 generated plans, 41 plans were considered cost effective (Table 2).

C. Development of Incremental Cost Curve

Step 6. Calculate average costs. Average costs for each least-cost, cost-effective plan are determined by dividing the cost of the plan by the output (AAHUs). Average costs are expressed in cost per AAHU ($/AAHU). The plan with the lowest average cost is identified. Plans with less output at a higher average cost are eliminated.

Step 7. Recalculate average costs for additional outputs. This step asks the question: "of the remaining levels of output, which has the lowest additional cost for additional output?" Using levels of output from Step 6, the average annual costs for additional output are calculated. The previous step's lowest average cost level of output is used as the "zero level." Levels of output less than the lowest average cost level are dropped from further analysis, while levels of output greater than the lowest average cost level advance to the next recalculation. Recalculations are then made using the new lowest average cost level as the "zero level" until the highest level of output is reached. Steps 6 and 7 were carried out using the IWR-Planning Suite software. The outcome of this evaluation is displayed in Table 2 at the end of this appendix.

D. Incremental Cost Analysis

Step 8. Calculate incremental costs. Step 8 was carried out using the IWR-Planning Suite software. Incremental cost is the additional cost incurred by selecting one alternative over another, and is computed by subtracting the cost of one alternative from another. The 9 plans listed in Table 3 are the "best buys," meaning these plans produce the most AAHUs per dollar. The incremental costs shown in Table 3 are calculated by dividing the difference between the different plans output. Figure 1 is a graph of the incremental costs of alternatives as listed in Table 3. As shown in the chart, there are nine "best buy" combinations. Table 3 and Figure 1 are included at the end of this appendix.

Step 9. Compare successive outputs and incremental costs. Table 3 and Figure 1 were used as decision making tools by progressively proceeding through available levels of output and determining if the next level is worth its additional monetary costs. This step examined the additional habitat value, as featured by increased AAHU output, for an increase in monetary costs. Federal planning for water resources development is conducted in accordance with the requirements of the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (P&G). The P&G provides a decision rule for selecting a tentatively selected plan where both outputs and costs are featured in dollars. This rule states: "The alternative plan with the greatest net economic benefit consistent with protecting the Nation's environment (National Economic Development Plan, NED Plan) is to be selected… (Paragraph 1.10.2)". There is no similar rule for plan selection where the outputs are not featured in dollars, as is the case in planning for restoration and mitigation. In the absence of such a decision-making rule, cost-effectiveness and incremental cost analyses helps to better understand the consequences of the preferred plan in relation to other choices.

3. ICA Conclusions and Selection of Tentatively Selected Plan

The best buy alternatives presented provide the information necessary information to make well-informed decisions regarding desired project scale (Table 3, Figure 1). Progressing through the increasing levels of output for the alternatives in Table 3 helps determine whether the increase in Net AAHUs is worth the additional cost. As long as decision makers consider a level of output to be "worth it", subsequent levels of outputs are considered. When a level of output is determined to be "not worth it", then subsequent levels of output will also likely be "not worth it", and the final decision regarding desired project scale for environmental restoration planning will have been reached.

Typically in the evaluation of Best Buy Alternatives, 'break points' are identified in either the last column in Table 3, or in the stair-step progression from left to right in Figure 1. Break points are defined as significant increases or jumps in incremental cost per output, such that subsequent levels of output may

not be considered “worth it”. Identification of such break points can be subjective. For the Clarence Cannon NWR HREP, the break points were identified as occurring between Alternatives 3 and 4; between Alternatives 4 and 5; and between Alternatives 8 and 9 (Table 3). Even though Alternative 4 generates only 17 incremental AAHUS, deciding to continue pass this breakpoint allows for a substantial increase in incremental AAHUS in the subsequent alternatives which relatively have similar incremental costs per output (Table 3). Alternatives 5 and 6 generate substantially higher levels of output, 126 incremental AAHUs and 146 incremental AAHUs, respectively, making the decision to continue elevating and considering Best Buy alternatives beyond these first two breakpoints logical.

Alternative 8 generates a total of 1,703 AAHUs at an average cost of $725 per output. Alternative 9 only generates an additional 50 AAHUs at an incremental cost of $3,449 per output. This considerably higher incremental cost per output was deemed “not worth it”. Therefore Alternative 8 is identified as the desired project scale.

4. Summary

The results of the incremental cost analysis and habitat evaluation in this chapter were considered with other factors, including physical features on the site, management objectives of the resources agencies, critical needs of the region, and ecosystem needs of the UMRS. The Clarence Cannon NWR HREP team concluded that the alternative plan that best meets the goals and objectives of each agency and the UMRR-EMP program is alternative 8. This alternative is cost-effective and justified as a “Best Buy” plan. Alternative 8 has an overall output of 1,703 Net AAHUs, and was identified as the Tentatively Selected Plan. While the other “Best Buy” alternatives evaluated for this project would partially address the goals and objectives of the project, the consensus of the interagency team was that this alternative would reasonably maximize ecosystem restoration benefits for the greatest diversity of resident and migratory species, and that other considered alternatives would be less effective in meeting project objectives.

In addition, this alternative would maximize the rare opportunity to increase floodplain connectivity and restore a critical functional component of the floodplain ecosystem (i.e., floodplain forest) on public lands by re-establishing a large (300 acres), self -sustaining contiguous tract of this cover type within CCNWR. Implementation of the proposed project features would improve the overall quality of the ecosystem within CCNWR, as well as surrounding areas, by improving ecosystem structure and function which are expected to provide benefits extending beyond the 50-year period of analysis. For these reasons, Alternative 8 is identified as both the NER Plan as well as the project sponsor’s preferred plan.

In cooperation with USFWS, the Corps has planned and designed a cost effective project that serves the needs of the refuge managers. Alternative 8 has an overall output of 1,703 AAHUs for an estimated total construction cost of approximately $26,362,000, and included the following enhancement features:

- Setback with exterior berm degrade
- Restoration of historic meanders
- Riverside, North and South new interior management units
- Reforestation
- Diesel pump station

Table 1. Net AAHUs, Construction Cost and Average Annual Costs with contingencies, By Feature or Feature Combination. FY2013 Interest Rate of 3.75%. Features of the tentatively selected plan are in dark gray and bolded.

ICA Code	Feature	50-year Output (Total Net AAHU)	Construction Cost ($)	Average Annual Construction Cost	Average Annual OMRR&R Cost[1]	Total Average Annual Cost
NO ACTION		0	$0	$0	$0	$0
NEW SUBUNITS ONLY (cannot be combined with anything else)						
A1	South Unit (SU)	315.41	$4,258,000.00	$189,797.02	$4,351.00	$194,148.02
A2	North Unit (NU)	335.73	$3,145,000.00	$140,185.92	$4,180.00	$144,365.92
A3	Riverside Unit (RU)	47.66	$182,000.00	$8,112.51	$460.00	$8,572.51
A4	SU+NU	651.14	$7,403,000.00	$329,982.94	$8,531.00	$338,513.94
A5	SU+RU	363.07	$4,440,000.00	$197,909.53	$4,811.00	$202,720.53
A6	NU+RU	383.39	$3,327,000.00	$148,298.42	$4,640.00	$152,938.42
A7	SU+NU+RU	698.80	$7,585,000.00	$338,095.45	$8,991.00	$347,086.45
DIESEL PUMP STATION OPTIONS (cannot be combined with A or C-H)						
B1	Diesel Pump Station Only	474.89	$8,515,000.00	$379,549.47	$41,969.00	$421,518.47
B2	Diesel Pump Station + SU	621.34	$12,773,000.00	$569,346.49	$46,320.00	$615,666.49
B3	Diesel Pump Station + NU	603.85	$11,660,000.00	$519,735.39	$46,149.00	$565,884.39
B4	Diesel Pump Station + RU	503.27	$8,697,000.00	$387,661.98	$50,081.51	$437,743.49
B5	Diesel Pump Station + SU+NU	750.30	$15,918,000.00	$709,532.41	$50,500.00	$760,032.41
B6	Diesel Pump Station + SU+RU	649.72	$12,955,000.00	$577,459.00	$46,780.00	$624,239.00
B7	Diesel Pump Station + NU+RU	632.23	$11,842,000.00	$527,847.90	$46,609.00	$574,456.90
B8	Diesel Pump Station + SU+NU+RU	778.68	$16,100,000.00	$717,644.92	$50,960.00	$768,604.92
ELECTRIC PUMP STATION OPTIONS (cannot be combined with A-B, or D-H)						
C1	Electric Pump Station Only	474.89	$10,302,000.00	$459,203.60	$47,483.00	$506,686.60
C2	Electric Pump Station + SU	621.34	$14,560,000.00	$649,000.62	$51,834.00	$700,834.62
C3	Electric Pump Station + NU	603.85	$13,447,000.00	$599,389.52	$51,663.00	$651,052.52
C4	Electric Pump Station + RU	503.27	$10,484,000.00	$467,316.11	$47,943.00	$515,259.11
C5	Electric Pump Station + SU+NU	750.30	$17,705,000.00	$789,186.54	$56,014.00	$845,200.54
C6	Electric Pump Station + SU+RU	649.72	$14,742,000.00	$657,113.13	$52,294.00	$709,407.13
C7	Electric Pump Station + NU+RU	632.23	$13,629,000.00	$607,502.02	$52,123.00	$659,625.02
C8	Electric Pump Station + SU+NU+RU	778.68	$17,887,000.00	$797,299.05	$56,474.00	$853,773.05
SETBACK WITH WATER CONTROL STRUCTURE OPTIONS (cannot be combined with A-C; E)						
D1	Setback with WCS only	1065.57	$11,552,000.00	$514,921.37	$4,828.00	$519,749.37
D2	Setback + reforestation	1110.37	$12,959,000.00	$577,637.30	$8,735.00	$586,372.30
D3	Setback + excavating	1115.85	$15,027,000.00	$669,816.78	$23,381.00	$693,197.78
D4	Setback + meanders	1082.68	$12,125,000.00	$540,462.40	$7,977.00	$548,439.40
D5	Setback + reforestation + excavating	1160.65	$16,434,000.00	$732,532.71	$27,288.00	$759,820.71
D6	Setback + reforestation + meanders	1127.48	$13,532,000.00	$603,178.32	$11,884.00	$615,062.32
D7	Setback + excavating + meanders	1132.97	$15,600,000.00	$695,357.81	$26,530.00	$721,887.81
D8	Setback + reforestation + excavating + meanders	1177.77	$17,007,000.00	$758,073.73	$30,437.00	$788,510.73
SETBACK WITH EXTERIOR BERM DEGRADE OPTIONS (cannot be combined with A-D)						
E1	Setback with EBD only	1065.57	$8,639,000.00	$385,076.67	$3,335.00	$388,411.67
E2	Setback + reforestation	1110.37	$10,046,000.00	$447,792.60	$7,242.00	$455,034.60
E3	Setback + excavating	1115.85	$12,114,000.00	$539,972.08	$21,888.00	$561,860.08
E4	Setback + meanders	1082.68	$8,855,000.00	$394,704.70	$6,602.00	$401,306.70
E5	Setback + reforestation + excavating	1160.65	$13,521,000.00	$602,688.01	$25,795.00	$628,483.01
E6	**Setback + reforestation + meanders**	**1127.48**	**$10,262,000.00**	**$457,420.63**	**$10,509.00**	**$467,929.63**
E7	Setback + excavating + meanders	1132.97	$12,330,000.00	$549,600.11	$25,155.00	$574,755.11
E8	Setback + reforestation + excavating + meanders	1177.77	$13,737,000.00	$612,316.04	$29,062.00	$641,378.04
SETBACK + NEW SUBUNITS (Depends on D or E; cannot be combined with A-C; G-H)						
F1	+SU	146.05	$4,258,000.00	$189,797.02	$4,351.00	$194,148.02
F2	+NU	126.20	$3,145,000.00	$140,185.92	$4,180.00	$144,365.92
F3	+RU	27.99	$182,000.00	$8,112.51	$460.00	$8,572.51
F4	+SU+NU	272.25	$7,403,000.00	$329,982.94	$8,531.00	$338,513.94
F5	+SU+RU	174.04	$4,440,000.00	$197,909.53	$4,811.00	$202,720.53
F6	+NU+RU	154.19	$3,327,000.00	$148,298.42	$4,640.00	$152,938.42
F7	+SU+NU+RU	300.24	$7,585,000.00	$338,095.45	$8,991.00	$347,086.45
SETBACK + DIESEL PUMP STATION and/pr NEW SUBUNITS OPTIONS NET BENEFIT (Depends on D or E; cannot be combined with A-C; F; H)						
G1	+ Diesel Pump Station	162.50	$8,515,000.00	$379,549.47	$41,969.00	$421,518.47
G2	+Diesel Pump Station + SU	357.58	$12,773,000.00	$569,346.49	$46,320.00	$615,666.49
G3	+Diesel Pump Station + NU	345.18	$11,660,000.00	$519,735.39	$46,149.00	$565,884.39
G4	+Diesel Pump Station + RU	198.15	$8,697,000.00	$387,661.98	$50,081.51	$437,743.49
G5	+Diesel Pump Station + SU+NU	540.26	$15,918,000.00	$709,532.41	$50,500.00	$760,032.41
G6	+Diesel Pump Station + SU+RU	393.23	$12,955,000.00	$577,459.00	$46,780.00	$624,239.00
G7	+Diesel Pump Station + NU+RU	380.83	$11,842,000.00	$527,847.90	$46,609.00	$574,456.90
G8	**+Diesel Pump Station + SU+NU+RU**	**575.91**	**$16,100,000.00**	**$717,644.92**	**$50,960.00**	**$768,604.92**
SETBACK + ELECTRIC PUMP STATION and/or NEW SUBUNIT OPTIONS NET BENEFIT (Depends on D or E; cannot be combined with A-C, F-G)						
H1	+ Electric Pump Station	162.50	$10,302,000.00	$459,203.60	$47,483.00	$506,686.60
H2	+Electric Pump Station + SU	357.58	$14,560,000.00	$649,000.62	$51,834.00	$700,834.62
H3	+Electric Pump Station + NU	345.18	$13,447,000.00	$599,389.52	$51,663.00	$651,052.52
H4	+Electric Pump Station + RU	198.15	$10,484,000.00	$467,316.11	$47,943.00	$515,259.11
H5	+Electric Pump Station + SU+NU	540.26	$17,705,000.00	$789,186.54	$56,014.00	$845,200.54
H6	+Electric Pump Station + SU+RU	393.23	$14,742,000.00	$657,113.13	$52,294.00	$709,407.13
H7	+Electric Pump Station + NU+RU	380.83	$13,629,000.00	$607,502.02	$52,123.00	$659,625.02
H8	+Electric Pump Station + SU+NU+RU	575.91	$17,887,000.00	$797,299.05	$56,474.00	$853,773.05

[1]Detailed breakdown of OMRR&R costs for the Tentatively Selected Plan are provided in Table 21 of the Main Report.

Table 2. Clarence Cannon National Wildlife Refuge Cost Effective Plans

Total and Average Cost 6/26/2013 7:42:56AM

Cost Effective Plan Alternatives **Planning Set:** CEICA Analysis 27

Counter	Name	Output HU	Cost $1000	Average Cost
1	No Action Plan	0.00	0.00	
2	A3F0B0C0D0E0G0H0	47.66	8,600.00	180.44
3	A2F0B0C0D0E0G0H0	335.13	144,400.00	430.11
4	A6F0B0C0D0E0G0H0	383.39	152,900.00	398.81
5	A4F0B0C0D0E0G0H0	651.14	338,500.00	519.86
6	A7F0B0C0D0E0G0H0	698.80	347,100.00	496.71
7	A0F0B0C0D0E1G0H0	1,065.57	388,400.00	364.50
8	A0F3B0C0D0E1G0H0	1,093.56	397,000.00	363.03
9	A0F3B0C0D0E4G0H0	1,110.67	409,900.00	369.06
10	A0F3B0C0D0E2G0H0	1,138.36	463,600.00	407.25
11	A0F3B0C0D0E6G0H0	1,155.47	476,500.00	412.39
12	A0F2B0C0D0E1G0H0	1,191.77	532,800.00	447.07
13	A0F6B0C0D0E1G0H0	1,219.76	541,300.00	443.78
14	A0F6B0C0D0E4G0H0	1,236.87	554,200.00	448.07
15	A0F5B0C0D0E1G0H0	1,239.61	591,100.00	476.84
16	A0F5B0C0D0E4G0H0	1,256.72	604,000.00	480.62
17	A0F6B0C0D0E2G0H0	1,264.56	607,900.00	480.72
18	A0F6B0C0D0E6G0H0	1,281.67	620,800.00	484.37
19	A0F5B0C0D0E2G0H0	1,284.41	657,700.00	512.06
20	A0F5B0C0D0E6G0H0	1,301.52	670,600.00	515.24
21	A0F4B0C0D0E1G0H0	1,337.82	726,900.00	543.35
22	A0F7B0C0D0E1G0H0	1,365.81	735,500.00	538.51
23	A0F7B0C0D0E4G0H0	1,382.92	748,400.00	541.17
24	A0F7B0C0D0E2G0H0	1,410.61	802,100.00	568.62
25	A0F7B0C0D0E6G0H0	1,427.72	815,000.00	570.84
26	A0F7B0C0D0E7G0H0	1,433.21	921,900.00	643.24
27	A0F0B0C0D0E1G7H0	1,446.40	962,900.00	665.72
28	A0F7B0C0D0E5G0H0	1,460.89	975,600.00	667.81
29	A0F0B0C0D0E4G7H0	1,463.51	975,800.00	666.75
30	A0F7B0C0D0E8G0H0	1,478.01	988,500.00	668.80
31	A0F0B0C0D0E2G7H0	1,491.20	1,029,500.00	690.38
32	A0F0B0C0D0E6G7H0	1,508.31	1,042,400.00	691.10
33	A0F0B0C0D0E6G6H0	1,520.71	1,092,100.00	718.15
34	A0F0B0C0D0E1G5H0	1,605.83	1,148,400.00	715.14
35	A0F0B0C0D0E1G8H0	1,641.48	1,157,000.00	704.85
36	A0F0B0C0D0E4G8H0	1,658.59	1,169,900.00	705.36
37	A0F0B0C0D0E2G8H0	1,686.28	1,223,600.00	725.62
38	A0F0B0C0D0E6G8H0	1,703.39	1,236,500.00	725.91
39	A0F0B0C0D0E7G8H0	1,708.88	1,343,400.00	786.13
40	A0F0B0C0D0E5G8H0	1,736.56	1,397,100.00	804.52
41	A0F0B0C0D0E8G8H0	1,753.68	1,410,000.00	804.02

IWR-PLAN * Plan Of Interest Page 1 of 1

Table 3. Incremental Costs of Best Buy Plans. Price Level May 2013

Best Buy Alt. #	ICA Plan Code	Alternative Description - Additional feature added	Output (AAHU)	Annualized Cost[1]	Average Cost ($/AAHU)	Incremental Cost	Incremental Output	Incremental Cost/Output ($/Output)
1	A0B0C0D0E0F0G0H0	No Action	0.00	$0				
2	A3B0C0D0E0F0G0H0	+ Riverside Unit	47.66	$8,600	$180.44	$8,600	47.66	$180.44
3	A0B0C0D0E1F3G0H0	+ Setback with exterior berm degrade	1,093.56	$397,000	$363.03	$388,400	1,045.9	$371.35
4	A0B0C0D0E4F3G0H0	+ Restoration of historic meanders	1,110.67	$409,900	$369.06	$12,900	17.11	$753.95
5	A0B0C0D0E4F6G0H0	+ North Unit	1,236.87	$554,200	$448.07	$144,300	126.20	$1,143.42
6	A0B0C0D0E4F7G0H0	+ South Unit	1,382.92	$748,400	$541.17	$194,200	146.05	$1,329.68
7	A0B0C0D0E6F7G0H0	+ Reforestation	1,427.72	$815,000	$570.84	$66,600	44.80	$1,486.94
8	**A0B0C0D0E6F0G8H0**	**+ Diesel Pump Station**	**1,703.39**	**$1,236,500**	**$725.91**	**$421,500**	**275.67**	**$1,529.00**
9	A0B0C0D0E8F0G8H0	+ Excavation of existing water bodies	1,753.68	$1,410,000	$804.02	$173,500	50.29	$3,449.99

[1]Outputs are calculated as Average Annual Habitat Units (AAHUs)

[2]Annualized costs includes initial construction and OMRR&R costs including contingencies based on a 50-year period of analysis, 3.75% interest rate (FY13)

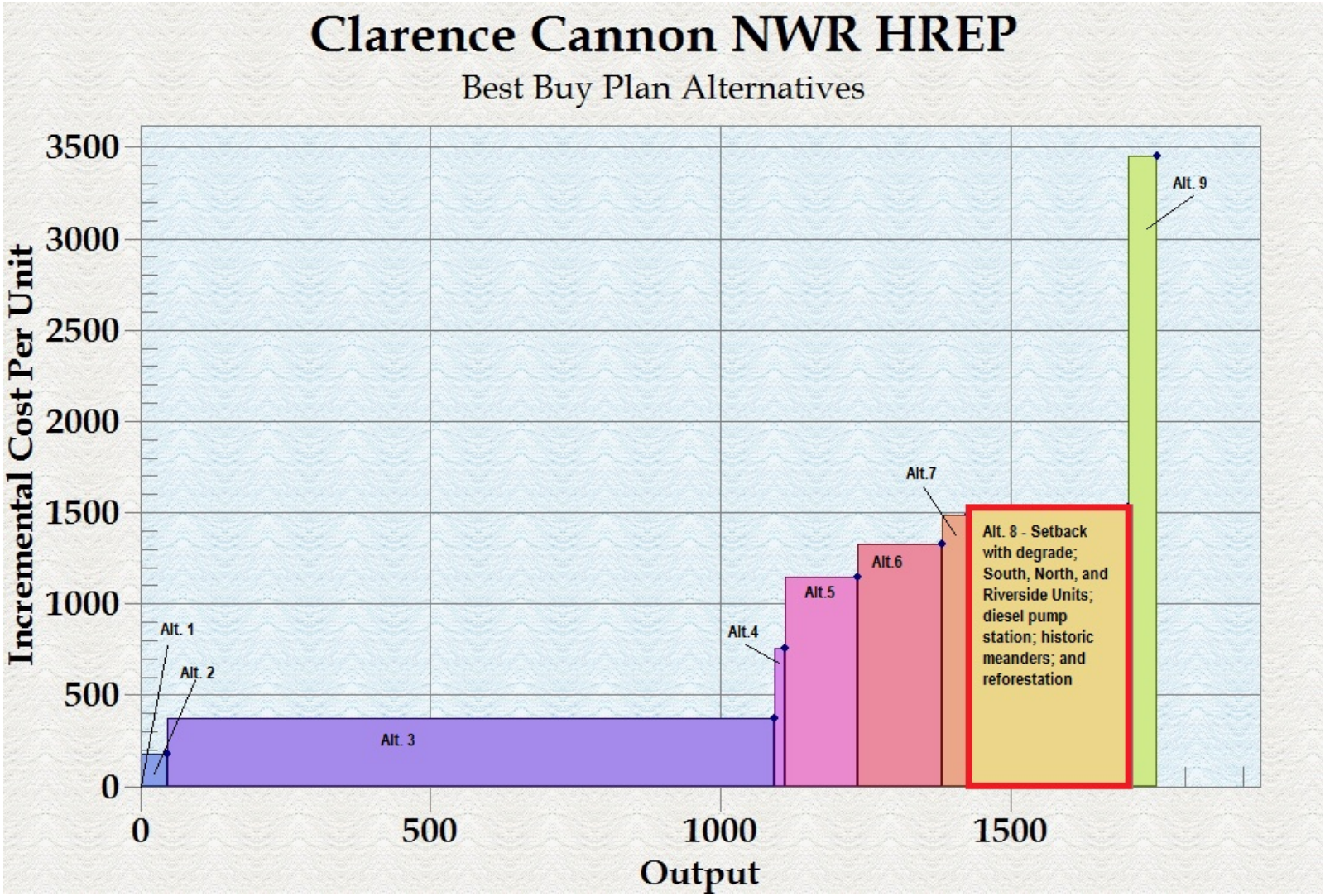

Figure 1. Best Buy Alternatives for Clarence Cannon National Wildlife Refuge. The tentatively selected plan (Alternative 8) is highlighted in red.