How is a plan selected for recommendation for Ecosystem Restoration Projects?

"the plan that meets **planning objectives and constraints** and reasonably maximizes environmental benefits while passing tests of **cost effectiveness and incremental cost analyses, significance** of outputs, **acceptability, completeness, efficiency, and effectiveness**." (ER-1105-2-100 Appendix E, E-41)

"The selected plan **MUST** be shown to be cost effective and justified to achieve the desired level of output"

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How do we identify the National Ecosystem Restoration Plan?

- Screen out plans that are not cost effective from further consideration
- Incremental cost analysis reveals changes in cost for increasing levels of environmental output
- Help decision makers allocate limited resources more efficiently and avoid selection of economically irrational plans
- Incremental cost analysis reveals changes in costs as levels of environmental outputs increase, assisting in answering the question of whether selecting a more costly alternative is “worth it”

What do we use for cost effective and incremental cost analysis?

Costs

- Real estate
- Construction
- Annual maintenance, operating and monitoring

VS.

Benefits

- Ecological output (Habitat Units)
- Calculated as the difference between with and without project

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What is a cost-effective plan?

An alternative is defined as non-cost effective if:

1. *The same output level could be produced by another plan at less cost*;
2. *A larger output level could be produced at the same cost*; or
3. *A larger output level could be produced at less cost*.

Simply speaking: DON'T SPEND MORE FOR LESS!

Defining the output is the hard part

What is the incremental cost analysis?

- A common misconception is that the plan and the output level which minimizes average costs should be selected.
- Incremental cost analysis is useful in determining if the extra level of output is “worth it”.
- How do we determine if the increase in costs is worth the increase in benefits?
  - This may relate to acceptability, completeness, efficiency and significance of an alternative or scarcity of a resource.

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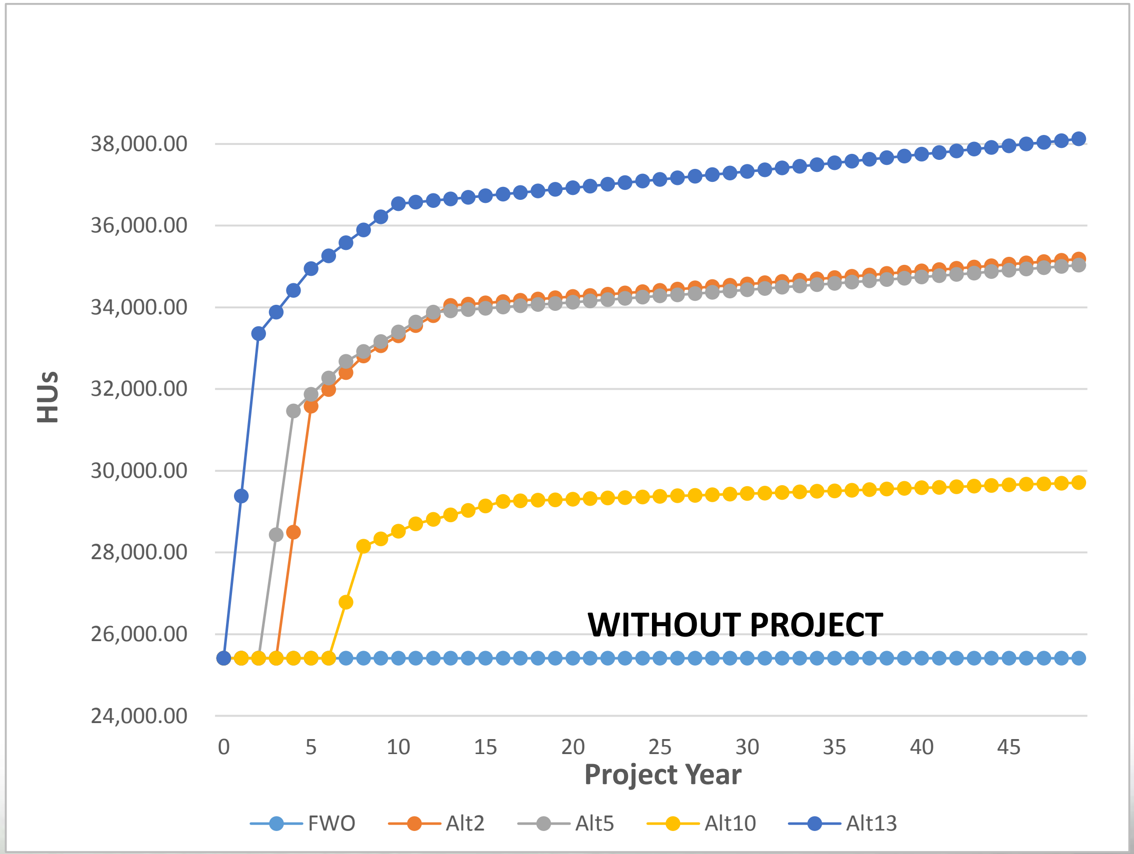
Benefits: Lift in Habitat Units WL/Connectivity

Alternative	Average Annual Lift in WL/Connectivity HUs
ALT2	**8,054**
ALT5	**8,095**
ALT10	**3,320**
ALT13	**11,133**



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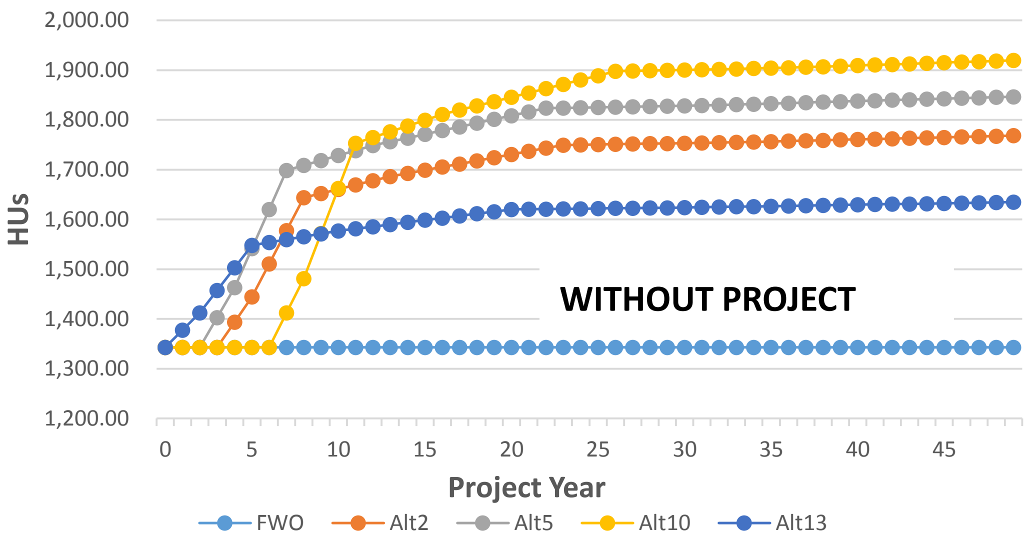
Benefits: Lift in Habitat Units River/Estuary

Alternative	Average Annual Lift in River/Estuary HUs
ALT2	**341**
ALT5	**414**
ALT10	**431**
ALT13	**250**



Cost Effectiveness Results

WL/CONNECTIVITY

Alternative	Average Annual Cost CRF (i=2.75%, n=50)	Average Annual NER Benefits	Cost Effective (Yes/No)
No Action Plan	$ -	0	N/A
Alt5	$ 20,547,000	8,095	Yes ★
Alt13	$ 20,832,000	11,133	Yes ★
Alt2	$ 24,527,000	8,054	No
Alt10	$ 27,373,000	3,320	No

RIVER/ESTUARY

Alternative	Average Annual Cost CRF (i=2.75%, n=50)	Average Annual NER Benefits	Cost Effective (Yes/No)
No Action Plan	$ -	0	N/A
Alt5	$ 20,547,000	414	Yes ★
Alt13	$ 20,832,000	250	No
Alt2	$ 24,527,000	341	No
Alt10	$ 27,373,000	431	Yes ★

COST EFFECTIVE ALTERNATIVES ONLY ARE CARRIED FORWARD FOR CONSIDERATION IN THE INCREMENTAL COST ANALYSIS.

*Alternatives shown in order from decreasing to increasing average annual cost.

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Incremental Cost Analysis

WL/CONNECTIVITY

Alternative	Average Annual Plan Cost	Average Annual Plan Outputs (Habitat Units)	Average Annual Incremental Cost per Habitat Unit
No Action Plan	$ -	-	$ -
Alt5	$ 20,547,000	8,095	$ 2,538
Alt13	$ 20,832,000	11,133	$ 1,871

RIVER/ESTUARY

Alternative	Average Annual Plan Cost	Average Annual Plan Outputs (Habitat Units)	Average Annual Incremental Cost per Habitat Unit
No Action Plan	$ -	-	$ -
Alt5	$ 20,547,000	414	$ 50,000
Alt10	$ 27,373,000	431	$ 64,000

For WL/connectivity benefits, Alternative 13 is the alternative that costs the least per unit of output. This is also the largest cost effective plan in terms of average annual habitat units.

For river/estuary benefits, Alternative 5 is the alternative that costs the least per unit of output. What do we get when we go to Alt10, a larger plan in terms of average annual habitat units?

Alt5 to Alt10	
Increase in Average Annual Cost	$ 6,826,000
Incremental Increase in Average Annual Benefit (HUs)	17.3
Average Annual Incremental Cost per Habitat Unit	$ 395,000

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