



Memo

To **Ebey Island Advisory Committee**
From **Cliff Strong, AMEC Earth & Environmental**
Date **10 August 2010**

Subject: Ebey Island Restoration Feasibility Study – Revised Draft SCRE Criteria, Scoring Scheme, Pairwise Comparison Results, and Alternatives Ratings

Please find attached the revised draft social, cultural, recreation, and economic criteria, scoring scheme, pairwise comparison results, and alternatives rating.

At your last meeting draft criteria were presented to you and you were invited to comment on them. We received many helpful comments both at the meeting and via written correspondence afterwards. We have reviewed all these comments and incorporated them as were able (realize that some of them contradicted others', and thus we had to balance interests as best we could).

The biggest change you'll notice is the reduction of the number of criteria. Some were eliminated as non-determinative (i.e., didn't make a difference in the overall scores). But the majority was combined into three overall criteria based on the specific topic (fish, ag, and recreation). This was done by creating a formula that incorporated measurable aspects of the topic. These are discussed in further detail below.

Alternatives Rating Process

The rating team consisted of eight members of the client/consulting team with disparate expertise and backgrounds (biology, agriculture, planning/public outreach, engineering, management, etc). The criteria, as they left the Advisory Committee at the last meeting, were reviewed against the comments received and amended to incorporate these comments. Additionally, we wanted to make sure each team member thoroughly understood what the criteria meant in terms of importance to each of their proponents. Three new alternatives were also created to incorporate some of the ideas generated through the Advisory Committee. Metrics were then created for each of the criteria, normalized to a 4-point rating, and multiplied by its weighting factor as developed through the pairwise comparison (see below).

Draft Final Criteria

Value to Fish – Score based on a formula accounting for area of restored areas, tidal processes, connectivity to the riverine processes, fish access, and connectivity to the mainstem.

The below formula incorporates the following four basic components of conceptual level restoration design:

Area	The area (acres) of each proposed “parcel” (i.e., different “restoration land uses,” e.g., full tidal inundation, muted tidal inundation, managed drained, managed wet, or enhanced wet) within each alternative, as measured using the GIS system.
T = Tidal Processes	The degree to which the full tidal amplitude is restored, where full = 1; muted = 0.5
R = River Connectivity	Connectivity to natural riverine processes and the ease of access for fish (size and location of dike breach).
M = Mainstem	Access to the site from the mainstem or from Ebey Slough, where access to/from the mainstem = 1 and from Ebey Slough = 0.8.
Fish Score = $\sum(A_i T_i R_i M_i)$ Where i = the number of different “parcels” that comprise each alternative	

Scores were calculated (ranging from 4.6 – 1,213) and then normalized to a 1 – 4 score so as to be comparable to other criteria.

Agricultural Productivity – Score based on a formula accounting for agricultural acreage, function, contiguity, and impacts to DD1

Step 1	Total ag acreage in alternative	Sum of forage and fallow acreage encompassed by each alternative, excluding managed drained
Step 2	Unaffected ag acreage (relative to 617 acres)	617 - Step 1
Step 3	Fraction of Enhanced Wet, Managed Wet, and Walking Wet acreage usable for ag annually	$\sum_i F_i Area_i$ i=sector of enhanced wet, managed wet, or walking wet; Values of F: 0.35=Enhanced Wet, 0.45=Managed Wet, 0.6=Walking Wet
Step 4	Total ag acreage available including usable Enhanced Wet and Walking Wet	Step 2 + Step 3
Step 5	Impact to DD1 drainage within alternative	D x Step 4; Values of D: 1=unaffected, 0.75=pump station relocated and draining to muted tidal, 0.5=pump station relocated and draining to full tidal
Step 6 (Final Score)	Contiguity of remaining ag parcels within WDFW property	C x Step 5; Values of C: 1=unaffected, 1/(remaining ag sectors)=large portions, 0.25=isolated parcels

Scores were calculated (ranging from 0 – 393) and then normalized to a 1 – 4 score so as to be comparable to other criteria.

Economic Effects on Diking District – Score based on a measurement of a change in the ratio of length of dikes to area of land protected from flooding.

Scores were calculated (ranging from 0 – 16.1) and then normalized to a 1 – 4 score so as to be comparable to other criteria.

Impacts on Utilities – Score based on reviewing the utilities maps to determine whether utilities would be impacted, and if so, whether they are major (e.g., pipelines) or minor (e.g., standard utility poles) and the relative ease/difficulty of relocating, maintaining, or flood-proofing.

- 1 = Major utilities are present that would be extremely difficult to relocate, maintain, or flood-proof
- 2 = Major utilities are present that would be moderately difficult to relocate, maintain, or flood-proof
- 3 = Minor utility infrastructure present, which can easily be relocated, maintained, and/or flood-proofed
- 4 = No utility infrastructure present

Scores were calculated (ranging from 1 – 2).

Impacts on Road System – Score based on a comparison of the relative effects on public roads and adjacent bike trails, based on classification of the road and length affected.

Scores ranged from 1 – 4.

Effects on Recreational Opportunities – Score based on an analysis of potential effects the project will have on fishing, hunting, boating, hiking/walking, or bird watching opportunities. In essence, making a judgment as to any existing recreational opportunities would be lost, gained, or unaffected.

At this point, of all the criteria this is the least meaningful one in differentiating between alternatives, not because of what's trying to be measured, but due to the lack of discernable, measurable metrics. The reason is that there are no formal recreation facilities affected, only informal ones created by actual use, not by design. Traditionally, recreation Levels of Service are measured by number of fields, acres of area, miles of recognized trails, number of parking stalls, bathroom facilities, boat ramps, etc. None of these exist here.

Furthermore, each of the alternatives has the potential to add more—either formal or informal—recreational opportunities. More bird habitat will be created (increasing bird watching opportunities), more fish habitat (increasing fishing opportunities), more dikes on which to walk or bike; and any of the alternatives could include parking spaces or restroom facilities. Each alternative has the potential to have a positive effect on recreation, depending on what is planned and designed into the project. A meaningful, differentiating rating can only be assigned once these plans are created.

Pairwise Comparison

To account for varying values as to which criteria are more important, each of the team members was provided a pairwise comparison chart and asked to judge, for each of the criterion, which was more important compared to the others. These were tabulated and divided by the sum of the ranking to provide relative weights of each of the criterion. The results were as follows:

Criteria	Value to Fish	Agricultural Productivity	Economic Effects on Diking District	Impacts on Utilities	Impacts on Roads	Affects on Recreational Opportunities	Sum of Ranking
Value to Fish	0	1	2	2	1	1	
Agricultural Productivity	8	0	5	4	3	5	
Economic Effects on Diking District	6	3	0	4	1	3	
Impacts on Utilities	6	4	5	0	2	6	
Impacts on Roads	7	5	8	6	0	6	
Effects on Recreational Opportunities	7	3	6	3	4	0	
Total number of times factor checked	34	16	26	19	11	21	
Rank (highest number checked = #1 rank)	1	5	2	4	6	3	21
Weighted Decision Factor (sum of all ranks divided by the rank of the specific criterion)	21.00	4.20	10.50	5.25	3.50	7.00	

Alternatives Scores

The final scores for each of the 14 draft alternatives are presented in the following chart.

Ebey Island Restoration Feasibility Study Comparison of Alternatives' Weighted Scores

