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## ALTERNATIVE COMPOSITE ECOLOGICAL INTEGRITY TRENDS

### Methods

In order to identify expected trends in ecological integrity under each of the alternatives, we generated a set of indices based on expected changes in vegetation structure and composition, changes in road densities, and riparian protection afforded by each alternative. We started by generating an intermediate score for vegetation, based on potential vegetation type (forest or range) and the prescription models applied within each alternative (Table 1). Intermediate scores were generated for each 1 square kilometer pixel within the Basin, using the rule set in Table 1 and the potential vegetation maps and prescription allocations developed by the landscape team. Mean scores were calculated for each subbasin, based on an aggregation of only those lands under FS or BLM management. The mean intermediate scores were used in combination with the current rating of composite integrity to derive an index of expected change (Table 2). This index (*vegidx*) assumed values of -1, 0, or +1, where the sign of the index refers to expected direction of change in ecological integrity (i.e., -1 indicates that ecological integrity as reflected in vegetation is expected to decline; +1 suggests improvement, and 0 suggests no change). No attempt was made to quantify the magnitude of the expected change.

A similar index (*rdidx*) was constructed based on the landscape team's projections of future road densities and our interpretation of the potential ecological ramifications of changing road densities. We calculated two measures for each subbasin. One was the combined change in the proportion of FS- and BLM-administered lands within each subbasin with less than 0.1 miles of road per square mile (as projected by the landscape team). This was referred to as the change in low road density. The second measure, change in high road density, measured an equivalent change in the FS- and BLM-administered lands with greater than 1.7 road miles per square mile. These measures of road changes were used along with the current composite integrity rating to assign *rdidx* values (Table 3).

Our third index of expected change (*sgidx*), was based on the level of riparian protection that would be provided on FS- and BLM-administered lands under each alternative. A simple rule set assigned values to each subbasin, based on the alternative and whether the subbasin fell within one of several categories (Table 4). This assignment was consistent with the evaluation of alternatives brought forward by the aquatics and terrestrial teams.

For each alternative and subbasin, we calculated a final index of change based simply on the sum of *vegidx*, *rdidx*, and *sgidx*. This composite index of change thus assumed values ranging from -3 to +3, where +3 indicates a strong improvement in ecological integrity; 0 is no change; and -3 is a strong decline in ecological integrity.

Table 1. Intermediate scores used in the calculation of directional changes in integrity for each combination of prescription model and major vegetation group (forest or range). Scores range from -5 (traditional production emphasis), to 0 (conserve existing structure and composition), to +5 (maximum restoration consistent with biophysical template).

Prescription Model	Forest score	Range score
A1	+ 5	+ 1
A2	+ 4	+ 5
A3	+ 2	+ 3
C1	0	0
C2	- 3	- 3
C3	- 4	- 4
P1	- 2	- 2
P2	- 3	- 1
P3	- 5	- 5
N1	+ 1	+ 3
N2	- 3	- 2
N3	- 4	- 3
N4	- 1	0
N5	- 2	- 1
N6	- 4	- 3
N7	- 3	- 2
N8	- 4	- 3

Table 2. Rule set for determining the expected directional change (*vegidx*) in ecological integrity, based on current composite integrity rating and mean intermediate vegetation score for each subbasin.

Potential Vegetation	Current Composite Integrity Rating	Mean Intermediate Score	<i>Vegidx</i>
Forest	Low	-5 to 3	-1
		3 to 5	0
	Medium	-5 to 1	-1
		1 to 3	0
	High	3 to 5	+1
		-5 to 0	-1
		0 to 1	0
		1 to 5	+1
Range	Low	-5 to 4	-1
		4 to 5	0
	Medium	-5 to 1	-1
		1 to 3	0
	High	3 to 5	+1
		-5 to 0	-1
		0 to 1	0
		1 to 5	+1

Table 3. Rule set for determining directional change in integrity (*rdidx*) due to changes in area of low road density or high road density within each subbasin, and current composite integrity rating.

Change in low road densities	Change in high road densities	Current Composite Integrity Rating	<i>Rdidx</i>
any decrease	all	all	-1
0 to 5% increase	any increase	all	-1
	0 to 10% decrease	all	0
	> 10% decrease	low	0
		medium or high	+1
> 5% increase	any increase	low or medium	0
		high	-1
	0 to 10% decrease	low or medium	+1
		high	0
	> 10% decrease	all	+1

Table 4. Rule set for assigning expected change (*sgidx*) in composite integrity due to implementation of riparian standards and guidelines under each of the proposed alternatives.

Alternative	Conditions	<i>Sgidx</i>
1	Protected under FEMAT	+1
	Greater than 50% in wilderness	0
	Otherwise	-1
2, 3, 4, 6, 7	Protected under FEMAT, PACFISH, or INFISH	+1
	Greater than 50% in wilderness	0
5	Livestock or timber emphasis areas	-1
	Otherwise, and protected under FEMAT, PACFISH, or INFISH	+1
	Greater than 50% in wilderness	0