Appendix L

Screening Procedure for Estimating the Wildlife-Habitat Types for each Alternative.

A screening procedure was developed to estimate the acres of wildlife-habitat types resulting from seven alternatives considered by the Multi-Species Framework Project. This procedure estimated the degree that current wildlife-habitat types would shift back towards the historic wildlife-habitat types for a specific alternative. Each alternative was composed of a set of strategies. The effectiveness and intensity of each strategy, as defined in the section on Methods-Fish, were considered in combination with the land use and land ownership for each 6-HUC. Changes in the aquatic habitat were estimated in a similar but independent procedure.

The Multi-Species Framework Alternatives working group specified the intensity (expressed in fuzzy terms as low, medium, high) of a specific strategy (e.g. remove logging roads) for a specific land use and land ownership (e.g. Federal forest lands). Intensities were allowed to vary between provinces. This resulted in 11,536 rules combined.

The Northwest Habitat Institute provided the fraction of wildlife-habitat types in each 6-HUC composed of each of 27 (non-marine) different wildlife-habitat types for current and historic (circa 1850) conditions (see Methods-Wildlife). Each of the wildlife-habitat types was associated with one of six land use groupings (forest, range, wetland, water, agricultural, or urban). StreamNet provided, for each 6-HUC, the fraction of area in each land use/land ownership (federal, state, city/county, tribal, or private) group.

Spatial information was not considered at a spatial scale finer than the 6-HUC . This approach was consistent with other elements of the Multi-Species Framework Project. It implies that no information about adjacency of habitat types and land ownership is known. For instance, we don't know if forest represents riparian or non-riparian regions. Such information was beyond the initial basin and province levels of assessment of the Multi-Species Framework Project.

Each of the strategies considered was assumed to result in some shift of the current wildlife-habitat type back to the historic wildlife-habitat type. Continued shifting of habitat away from historical conditions was not considered. Each of the 98 strategies available results in either no or some positive shift in habitat towards historic conditions. The shift from various strategies within an alternative was assumed to superimpose. The shifts associated with each strategy are estimated independently for each alternative, each 6-HUC, and each land use group. The impacts of the three largest shifts were considered to superimpose onto the residual fraction only. Therefore, if the largest three shifts were 50%, 40%, and 30% the combined shift would be $0.5 + (1-0.5)*0.4 + \{1 - (0.5 + (1-$

0.5)*0.4)}*0.3 = 79%. This procedure ensures that the shift will never exceed 100% and is consistent with a diminishing return on similar strategies.

The magnitude of an individual shift, before superimposing it into an aggregate shift for an alternative, is estimated from the effectiveness and intensity specified for the strategy. The intensity values were specified by the Multi-Species Framework Alternatives working group for each land ownership and land use group for each strategy and each alternative and each province using values of 0, 1, 2, and 3. The effectiveness values were also developed by Multi-Species Framework Alternatives working group and were expressed using values of 0, 1, 2, 3, and 4. In both cases, the larger values signified a greater impact. Effectiveness and intensity values were combined into shift values as shown in Table 1. The intensity values for various land use and land ownership groups were area weighted for each 6-HUC by the fraction of the total acreage in the respective land use group. The resulting area-weighted aggregate intensity values were combined with the effectiveness values designated for the strategy and the result shift for each land use group was interpolated from Table 1 using a 2-dimensional linear interpolation scheme.

The resultant shifts were applied to remap the current wildlife-habitat type towards the historic habitat-wildlife type. A shift value of 1 would reproduce the historic pattern of wildlife-habitat type and a shift value of 0 would maintain the pattern of current wildlife-habitat type.

The procedure was implemented in Microsoft™Excel™ using macros, and this model can be obtained from the senior author of this Appendix. The procedure was implemented in Excel™ because the initial rule database was implemented in Excel™ and it was a common method for communicating information within the Multi-Species Framework Project team. Several macros were used to automate the computational process. The file is 30 MB in size and requires Microsoft™ Excel™ 2000 to run. Microsoft™ Excel™ while common to many users is not a very efficient way to perform the computations, so the computations can take several hours to complete.

The acres of wildlife-habitat types estimated using the screening procedure are used to assess wildlife species-specific performance and terrestrial ecosystem function. The results of this screening procedure are contained in a very large spreadsheet (30 megabytes) that is available from the Power Planning Council upon request. Data in this spreadsheet are summarized and analyzed in the wildlife sections of the report for the Multi-Species Framework Project. Analyses include changes of selected wildlife-habitat types, habitat condition for selected species, and ecosystem function. The screen procedure presented in this report may be useful for subbasin managers to assess the consequences of proposed management actions on fish and wildlife.

Effectiveness	Intensity			
	0	1	2	3
0	0	0	0	0
1	0	0.56	0.63	0.7
2	0	0.64	0.72	0.8
3	0	0.72	0.81	0.9
4	0	0.8	0.9	1

Table 1. Tabular Function of Shifts. Intensity and effectiveness were integrated for each strategy (i.e., cell).