Spawning Abundance Of Bull Trout In Relation To Geomorphology, Temperature And Roads In Tributaries Of Rock Creek Basin (Missoula And Granite Counties), Montana

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Land management is a pervasive influence on imperiled native aquatic species, but its effects are often difficult to tease from those of natural environmental variation To discriminate these effects, we first indexed bull trout (*Salvelinus confluentus*) spawner abundance from redd survey counts made in 19 tributaries of Rock Creek—Upper Clark Fork Basin, Montana (Missoula and Granite Counties). We compared response metrics of pawner abundance against a large suite of environmental variables, including measures of geomorphology, summer stream temperature and land management. We iterated multivariate analyses to compare effects of alternate aggregation and stratification methods for both response and environmental variables. Significance tests revealed several robust results: spawner abundance increased with channel or sub-basin slope, declined with maximum stream temperature, increased with proportion of sub-basin in wilderness and roadless area, and increased with extent of bounded alluvial valley geomorphology. Catchment road density did not correlate with bull trout spawning, but the range of road density among Rock Creek sites was one order of magnitude lower than in a previously published analysis for Swan River tributaries (Baxter et al. 1999). The two studies showed highly consistent associations with catchment and stream hydrogeomorphic features. We hypothesize that proportional roadless area, a variable that reflects

the dispersion of road disturbance within the catchment, is an important factor at low road density, but at moderate and higher road densities prevailing across the bull trout's range, total road density tends to saturate or override the effect of spatial distribution of roads within the catchment.