Fall Chinook Salmon Spawning Activity in Relation to Day/Night and Dam Operations [AFS]

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The operations of hydropower projects on the main stem Columbia River may affect the spawning or incubation success of fall chinook salmon (*Oncorhynchus tshawytscha*) that spawn in the tailraces of these projects. In addition, the timing of redd construction may be linked to environmental cues, e.g., daylight. Understanding the relationship between environmental cues and hydropower project operations and spawning activity would provide managers with information that might allow for determination of a better balance between protection for spawning salmon and their gametes/progeny, and hydropower operations flexibility. To determine the effects of daylight and hydropower operations on fall chinook salmon spawning activity, we developed a method of detecting the sounds created when female fall chinook salmon moves substrate particles while constructing a redd. Spawning activity was recorded on digital media using hydrophone systems and associated acoustical recording systems. A hydrophone system was deployed from a boat during stratified random 24-h time blocks over a 10-day period near the peak of spawning activity in 2001. The sound files are scored and the spawning activity data (digs/minute) will be compared to time of day (day and night) as well as project operations, e.g., stable, increasing, decreasing discharge. Data will be analyzed by creating multi-way contingency tables across all model factors, then assessing these factors using a log-linear model taking the cell counts from the contingency tables as the response variable.