Preliminary Response of Fish Habitat to Post-Fire Salvage Logging in Riparian Areas [AFS]

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Fish habitat in Hand Creek, a third-order trout stream in northwestern Montana, was monitored before and after post-fire timber salvage along the stream. Approximately 89 percent of Hand Creek's watershed was burned in a 1994 wildfire but most of the riparian area was only lightly burned. In subsequent years, fire-stressed spruce have become vulnerable to a spruce beetle infestation, and begun to fall across the stream. In 1996 the Flathead National Forest used helicopter logging to remove infested riparian spruce trees. Some portions of Hand Creek did not require salvage harvesting and served as control reaches for fish habitat monitoring. Fish habitat data was collected immediately following the fire in 1994, then monitored prior to salvage activities in 1996, and then again in 2000. Both the treated and control reaches changed over time, presumably due to the wildfire effects. However, no substantial difference was noted between the treated and control reaches. All stream reaches, both treated and untreated, gradually became wider and shallower. Stream banks correspondingly became slightly less stable over time in all reaches. These channel changes are likely due to increased peak flows resulting from the wildfire. Habitat complexity, as measured by the number of pools, riffles and glides, increased in the low gradient, meandering channels but not in higher gradient reaches. Large woody debris gradually increased in all units, but no difference in treated verses control reaches was detected. Fine sediments appear to be decreasing in all units, presumably due to scouring from increased flows. These changes were quantified, but due to survey design limitations, no statistical analyses were performed. It appears that fish habitat in Hand Creek has not yet been affected by riparian salvage. Helicopter logging likely prevented any short-term adverse impacts to channel conditions; however, it may be several years or decades before the full effect of the riparian salvage treatment is manifested. Untreated stream reaches have many trees still suspended over the stream channel that have not yet fallen into the stream whereas the harvested areas have little wood available for future recruitment into the stream.