# Erosion Risks in Selected Watersheds for the 2005 School Fire Located Near Pomeroy, Washington on Predominately Ash-Cap Soils

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## Geo-WEPP Spatial Analysis

A limited erosion potential analysis was carried out on the 50,000 acre School Fire. Three WEPP interfaces were used for the analysis, a GIS wizard, an online interface and a windows interface. Ten watersheds within the fire area were modeled with the GeoWEPP tool (a geo-spatial interface for WEPP, Water Erosion Predication Project). The watersheds covered 18,823 acres, or about 38 percent of the total burned area. Hillslopes were specified high, moderate or low burn severity by examining the BAER (Burned Area Emergency Response) severity map.

By consulting with the BAER specialists, watersheds of greatest interest were identified. One set included four watersheds discharging into the Tucannon River from the western side, including School Creek, which flowed into the Tucannon River at the Tucannon Guard Station. A second set included three watersheds flowing into the Tucannon River from the east side, south of the Tucannon Guard Station. The third set of watersheds were larger and incorporated Dry Creek (a tributary to Cummings Creek), Cummings Creek and Pataha Creek.

## ERMiT Hillslope Analysis – Online Interface

The ERMiT (Erosion Rehabilitation Management Tool; August, 2005 version) results for a single storm erosion prediction are given in table 1 below. Table 2 provides an overall average of all ERMiT runs. Hillslopes were specified high, moderate or low severity from the BAER severity map. An average of about 12 randomly selected hillslopes or 5 percent of the hillslopes on larger watersheds, were run with ERMiT for each watershed, with the exception of upper Pataha. In the upper Pataha watershed, only 10 hillslopes were identified as moderate or severely burned. The mulching treatment assumed an application role of 0.9 tons/acre following the fire. On average, there is a 20 percent chance that the erosion rate in the watershed will be greater than 7 tons per acre if left untreated, and only a 10 percent probability that erosion will exceed 10 tons/ac if left untreated.

**Table 1**—ERMiT single storm erosion predictions – August-2005 version.

| | | | Untreated | | Seeded | | Mulched | |
|---|---|---|---|---|---|---|---|---|
| | | | Year | | Year | | Year | |
| Drainage | Exceedance | | 1 | 2 | 1 | 2 | 1 | 2 |
| | | | (tons/ac) | | | | | |
| Tucannon West 3 | 10% | Mean | 12.98 | 9.00 | 12.98 | 4.98 | 1.34 | 3.11 |
| | | Std Dev | 8.00 | 5.97 | 8.00 | 3.32 | 0.85 | 2.16 |
| | 20% | Mean | 8.57 | 5.78 | 8.57 | 2.27 | 0.00 | 0.92 |
| | | Std Dev | 5.56 | 3.93 | 5.56 | 1.76 | 0.00 | 0.79 |
| Tucannon West 2 | 10% | Mean | 10.05 | 7.24 | 10.05 | 3.95 | 0.99 | 2.43 |
| | | Std Dev | 8.40 | 6.30 | 8.4 | 4.08 | 1.02 | 2.50 |
| | 20% | Mean | 6.56 | 4.67 | 6.56 | 1.73 | 0.00 | 0.70 |
| | | Std Dev | 6.22 | 4.71 | 6.22 | 2.09 | 0.00 | 0.86 |
| Tucannon West 1 | 10% | Mean | 14.14 | 9.61 | 14.14 | 5.27 | 1.36 | 3.16 |
| | | Std Dev | 8.11 | 5.95 | 8.11 | 3.79 | 1.33 | 2.51 |
| | 20% | Mean | 9.23 | 6.25 | 9.23 | 2.21 | 0.00 | 0.90 |
| | | Std Dev | 5.79 | 4.44 | 5.79 | 1.99 | 0.00 | 0.87 |
| School Canyon | 10% | Mean | 6.00 | 4.15 | 6.00 | 2.21 | 0.53 | 1.34 |
| | | Std Dev | 7.00 | 5.24 | 7.00 | 3.33 | 0.74 | 2.04 |
| | 20% | Mean | 3.77 | 2.51 | 3.77 | 0.92 | 0.00 | 0.37 |
| | | Std Dev | 5.13 | 3.84 | 5.13 | 1.64 | 0.00 | 0.67 |
| Grub Creek | 10% | Mean | 10.71 | 7.70 | 10.71 | 4.38 | 1.10 | 2.67 |
| | | Std Dev | 8.31 | 6.23 | 8.31 | 3.87 | 0.93 | 2.37 |
| | 20% | Mean | 7.31 | 5.18 | 7.31 | 1.93 | 0.00 | 0.78 |
| | | Std Dev | 6.02 | 4.65 | 6.02 | 1.95 | 0.00 | 0.84 |
| Hixon Creek | 10% | Mean | 6.71 | 4.49 | 6.71 | 2.06 | 0.65 | 1.39 |
| | | Std Dev | 8.31 | 5.78 | 8.31 | 3.41 | 1.34 | 2.41 |
| | 20% | Mean | 4.10 | 2.48 | 4.10 | 0.95 | 0.00 | 0.37 |
| | | Std Dev | 5.78 | 4.08 | 5.78 | 2.00 | 0.00 | 0.75 |

(continued)

**Table 1** (Continued).

| Drainage | Exceedance | | Untreated Year 1 | Untreated Year 2 | Seeded Year 1 | Seeded Year 2 | Mulched Year 1 | Mulched Year 2 |
|---|---|---|---|---|---|---|---|---|
| | | | (tons/ac) | | | | | |
| Tucannon East unnamed | 10% | Mean | 8.22 | 5.72 | 8.22 | 2.90 | 0.72 | 1.82 |
| | | Std Dev | 8.44 | 6.24 | 8.44 | 3.93 | 0.89 | 2.35 |
| | 20% | Mean | 5.28 | 3.44 | 5.28 | 1.22 | 0.00 | 0.51 |
| | | Std Dev | 5.94 | 4.49 | 5.94 | 1.97 | 0.00 | 0.83 |
| Upper Cummings Creek | 10% | Mean | 10.23 | 6.94 | 10.23 | 3.99 | 1.04 | 2.34 |
| | | Std Dev | 6.08 | 4.42 | 6.08 | 2.62 | 1.03 | 1.71 |
| | 20% | Mean | 6.70 | 4.73 | 6.70 | 1.56 | 0.00 | 0.51 |
| | | Std Dev | 4.16 | 3.07 | 4.16 | 1.25 | 0.00 | 0.56 |
| Dry Creek | 10% | Mean | 11.32 | 7.77 | 11.33 | 5.25 | 3.08 | 4.38 |
| | | Std Dev | 8.59 | 6.05 | 8.58 | 4.28 | 2.75 | 3.59 |
| | 20% | Mean | 6.87 | 4.61 | 7.30 | 2.70 | 0.73 | 1.51 |
| | | Std Dev | 5.78 | 4.07 | 5.77 | 2.71 | 1.05 | 1.67 |
| Upper Pataha | 10% | Mean | 13.88 | 9.48 | 13.88 | 6.54 | 3.89 | 5.59 |
| | | Std Dev | 6.17 | 4.15 | 6.17 | 3.10 | 1.93 | 2.75 |
| | 20% | Mean | 9.02 | 5.60 | 9.02 | 3.40 | 0.76 | 1.55 |
| | | Std Dev | 3.90 | 2.65 | 3.90 | 1.70 | 0.54 | 0.81 |

**Table 2**—Average of ERMiT runs.

| Drainage | Exceedance | | Untreated Year 1 | Untreated Year 2 | Seeded Year 1 | Seeded Year 2 | Mulched Year 1 | Mulched Year 2 |
|---|---|---|---|---|---|---|---|---|
| | | | (tons/ac) | | | | | |
| Means of ten sets of ERMiT runs | 10% | Mean | 10.82 | 7.53 | 10.82 | 4.38 | 1.51 | 2.95 |
| | | Std Dev | 2.50 | 1.68 | 2.50 | 1.24 | 1.08 | 1.24 |
| | 20% | Mean | 7.06 | 4.80 | 7.10 | 1.99 | 0.15 | 0.85 |
| | | Std Dev | 1.68 | 1.11 | 1.68 | 0.72 | 0.31 | 0.40 |

## WEPP Windows Analysis

The WEPP windows interface was run for each watershed to estimate return periods for peak runoff rates. These results were combined with other methods to make final runoff predictions.

## Conclusions

The GeoWEPP tool allows the user to quickly estimate hillslope parameters for use in the ERMiT program. The results from the ERMiT program show that mulching will have major benefits in reducing erosion, especially on the high severity areas. On the other hand, erosion risks on low severity burned slopes were projected as being minimal.

# References


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