Read Me File for *Wall et al., “Effects of wildfire on streambed sediment in the Cascades and Klamath provinces of the Pacific Northwest”*

08/06/2025

CSV Files:

\*\*Keys for all abbreviations and units for all variables can be found in Table 1 below.

All\_site\_survey\_covars.csv

* Dataframe of all response and explanatory variables for all AREMP subwatersheds
  + Contains more sites and covariates than used in analysis. Dataframe is filtered and cleaned in scripts.

Post\_fire\_surveys\_covar.csv

* Dataframe of all response and explanatory variables for all AREMP sites that have had fire in their subwatersheds.
* Includes all covariates in “all\_site\_survey\_covars.csv” and includes wildfire metrics.

Site\_id\_linkage.csv

* Site id key to connect specific survey ids with specific sites.

R Scripts

01a\_Percent\_Fines\_Unburned\_Modeling

* Constructs Cascades and Klamath unburned percent fines models and tests the unburned models on the post-fire datasets
* Creates variable importance plots for the unburned percent fines models

\*\*\*Output data frames from this script are used in “03a\_Percent\_Fines\_Difference\_Modeling”

01b\_D50\_Unburned\_Modeling

* Constructs Cascades and Klamath unburned D50 models and tests the unburned models on the post-fire datasets
* Creates variable importance plots and partial dependence plots for the unburned D50 models

\*\*\*Output data frames from this script are used in “03b\_D50\_Difference\_Modeling”

02a\_Percent\_Fines\_Postfire\_Modeling

* Constructs Cascades and Klamath percent fines models using the post-fire dataset
* Creates variable importance plots and partial dependence plots for the post-fire percent fines models

02b\_D50\_Postfire\_Modeling

* Constructs Cascades and Klamath D50 models using the post-fire dataset
* Creates variable importance plots and partial dependence plots for the post-fire D50 models

03a\_Percent\_Fines\_Difference\_Modeling

* Uses dataframes produced in step 01a
* Constructs Cascades and Klamath Percent Fines Difference Models
* Creates Variable importance and partial dependence plots

03b\_D50\_Difference\_Modeling

* Uses dataframes produced in step 01b
* Constructs Cascades and Klamath D50 Difference Models
* Creates Variable importance and partial dependence plots

Model Tuning Folder:

Within the folder there are two subfolders: One for the Percent Fines Models and one for the D50 models. These scripts are for tuning each model in the paper to find the best model parameters.

Each script within each folder is for each individual model:

Percent\_fines\_model\_tuning Folder:

|  |  |
| --- | --- |
| Model: | Script name |
| Cascades Unburned | Cascades\_perc\_fines\_model\_tuning |
| Klamath Unburned | Klamath\_perc\_fines\_model\_tuning |
| Cascades Post-fire | Cascades\_perc\_fines\_postfire\_model\_tuning |
| Klamath Post-fire | Klamath\_postfire\_perc\_fines\_model\_tuning |
| Cascades Difference | Cascades\_difference\_model\_tuning |
| Klamath Difference | Klamath\_difference\_model\_tuning |

D50\_model\_tuning Folder:

|  |  |
| --- | --- |
| Model: | Script name |
| Cascades Unburned | Cascades\_d50\_model\_tuning |
| Klamath Unburned | Klamath\_d50\_model\_tuning |
| Cascades Post-fire | Cascades\_D50\_postfire\_model\_tuning |
| Klamath Post-fire | Klamath\_d50\_postfire\_model\_tuning |
| Cascades Difference | Cascades\_D50\_difference\_model\_tuning |
| Klamath Difference | Klamath\_D50\_difference\_model\_tuning |

Table 1. Covariates Summary Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Abbreviation** | **Unit** | **Spatial Extent** | **Category** |
| SITE ID | SITE\_ID | Categorical | Reach | Location |
| Watershed ID | CREEK\_CODE | Categorical | HUC12 Watershed | Location |
| Survey Year | Survey\_year | years | Reach | Temporal |
| Mean Bankfull Width | Bankfull\_mean | m | Reach | Stream Morphology |
| Relative bankfull | Relative\_bankfull | - | Reach | Temporal |
| Streambed Slope | Stream\_slope | degrees | Reach | Stream Morphology |
| Valley Confinement | Confinement | Categorical | Reach | Stream Morphology |
| In-Stream Large Wood | Frequency\_km | Units/km | Reach | Stream Morphology |
| High Flow Count | High\_flow\_count | - | Nearest USGS Gage | Climate |
| Subwatershed Area | Area\_sqkm.x | Km2 | Subwatershed | Topography |
| % of subwatershed with slopes  > 23 degrees | Slope23d\_perc\_greater | % | Subwatershed | Topography |
| Mean Elevation | Elev\_mean | m | Subwatershed | Topography |
| Baseflow Index | BFIWS | % | Subwatershed | Climate |
| 30-year Normal Precipitation | PRECIP8110WS | mm | Subwatershed | Climate |
| 30-year Mean Temperature | TMEAN8110WS | celsius | Subwatershed | Climate |
| Mean Rock Compressive Strength | COMPSTRGTHWS | megaPascals | Subwatershed | Lithology/Soils |
| Mean Lithological Hydraulic Conductivity | HYDRLCONDWS | micrometers/s | Subwatershed | Lithology/Soils |
| Dominant Geology | Dom\_geology | Categorical | Subwatershed | Lithology/Soils |
| Mean Soil Erodibility Factor | KFFACTWS | - | Subwatershed | Lithology/Soils |
| Soil Permeability | PERMWS | cm/hr | Subwatershed | Lithology/Soils |
| Mean Soil Depth to Bedrock | RCKDEPWS | cm | Subwatershed | Lithology/Soils |
| Soil Organic Matter Content | OMWS | % | Subwatershed | Lithology/Soils |
| Mean Tree Age | Mean\_ad | years | Subwatershed | Land Cover |
| Mean Canopy Cover | Mean\_cc | % | Subwatershed | Land Cover |
| Road Crossings | RDCRSWS | crossings/sqkm | Subwatershed | Land Cover |
| Upslope Road Density | RDDENSWS | km/sqkm | Subwatershed | Land Cover |
| Years Between Survey and Fire | YPF | Years | Subwatershed | Fire |
| Area of Subwatershed Burned | Ppc\_burned\_sqkm | Sqkm | Subwatershed | Fire |
| Area of Subwatershed Burned at Himod | Ppc\_himod\_sqkm | Sqkm | Subwatershed | Fire |
| Area of Riparian Area Burned | Rip\_burned\_sqkm | Sqkm | Riparian | Fire |
| Area of Riparian Area Burned at Himod | Rip\_himod\_sqkm | Sqkm | Riparian | Fire |
| Area of Reach Burned | Reach\_burned\_sqkm | Sqkm | Reach | Fire |
| Area of Reach Burned at Himod | Reach\_himod\_sqkm | Sqkm | Reach | Fire |
| Fire Rank | Rank.x | Count | Subwatershed | Fire |