Discussion

Discuss observations from simulation video. Were they what you predicted?

Physical Effects (short and long-term)

* Soil Erosion
* Stream Shading and Temperature
* Aquatic habitat complexity (substrate & large woody debris)

Biological Effects (short and long-term)

* Fish mortality and survival
* Fish population recovery mechanisms
* Changes in primary and secondary productivity
* Fish population carrying capacity compared to the pre-fire condition

Title : Understanding Effects of Wildfire on Aquatic Ecosystems: Burned Stream Model

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Materials for Water Table Simulation:

* Stream model
* Potting soil
* Burned soil
* Trays for soil
* Watering can
* Green branches
* Burned branches
* Model fish
* Flashlight
* Grass seed
* Straw

Model Overview

* Watershed 1 (treatment-Burned Soil)
* Watershed 2 (Control - Unburned Soil)
* Two first order streams (one from each soil source
* Second Order stream (where those two streams meet)
* Third order stream

Describe the Pre-Fire condition

* What is the condition of riparian vegetation?
* What is the condition of aquatic habitat? Substrate? Large Woody Debris? Stream Shading?
* What is the current carrying capacity of these streams? How many fish do they support?

Fire Scenario

1. Lightning strikes a streamside tree in the lower watershed.
2. Strong upslope winds drive the fire along the riparian area and into the upper watershed.
3. Fire intensity i shigh and consumes the forest canopy and ground cover.
4. Fire intensity and duration result in high severity effects to soil in the watershed on the left.
5. The wind direction is such that the riparian area and watershed on the right are unburned.
6. Multiple high intensity rain storms occur over the burned area in the first year after the fire.

Direct fire effects

Describe Direct Fire Effects

Direct Physical Effects

Use your fire effects knowledge to predict direct effects to the physical properties of the following stream model components

* Soil?
* Vegetation?
* Stream?

*Background music*

Direct Fire Effects: Stream Shading

*Here we are simulating stream shading on a stream channel between a burnt watershed and an unburnt watershed.*

*You’ll see that we have some good shadows from these trees, on the unburned stream channel which provides shading of the stream.*

*Now once the sun moves to the burnt side of the drainage, you can see that there’s not much shading over the stream channel. These burned trees have lost their foliage so they really don’t provide much in the way of stream shading.*

Next activity

Describe Direct Fire Effects

Direct Biological Effects

Use your fire effects knowledge to predict direct effects to the biological properties of the following stream model components:

* Soil?
* Vegetation?
* Fish Abundance?
  + Dead fish

Indirect Fire Effects

Rainstorm Over Unburned Watershed

A high intensity rainstorm falls over the unburned watershed. What do you hypothesize about the potential for surface erosion and downstream indirect fire effects to our model components?

Unburned Soil Simulated Rain Event

* *Observations, water is absorbed by the soil with a slow water output into the stream*

Burned Soil Simulated Rain Event

Rainstorm Over Burned Watershed

A high intensity rainstorm falls over the burned watershed. What do you hypothesize about the potential for surface erosion and downstream indirect fire effects to our model components?

Burned Soil Simulated Rain Event

* *Observations, water rolls off the top of the soil carrying with it a lot of topsoil - muddying the streams*

Predict Direct and Indirect Fire Effects From Burned Stream Model Scenario

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