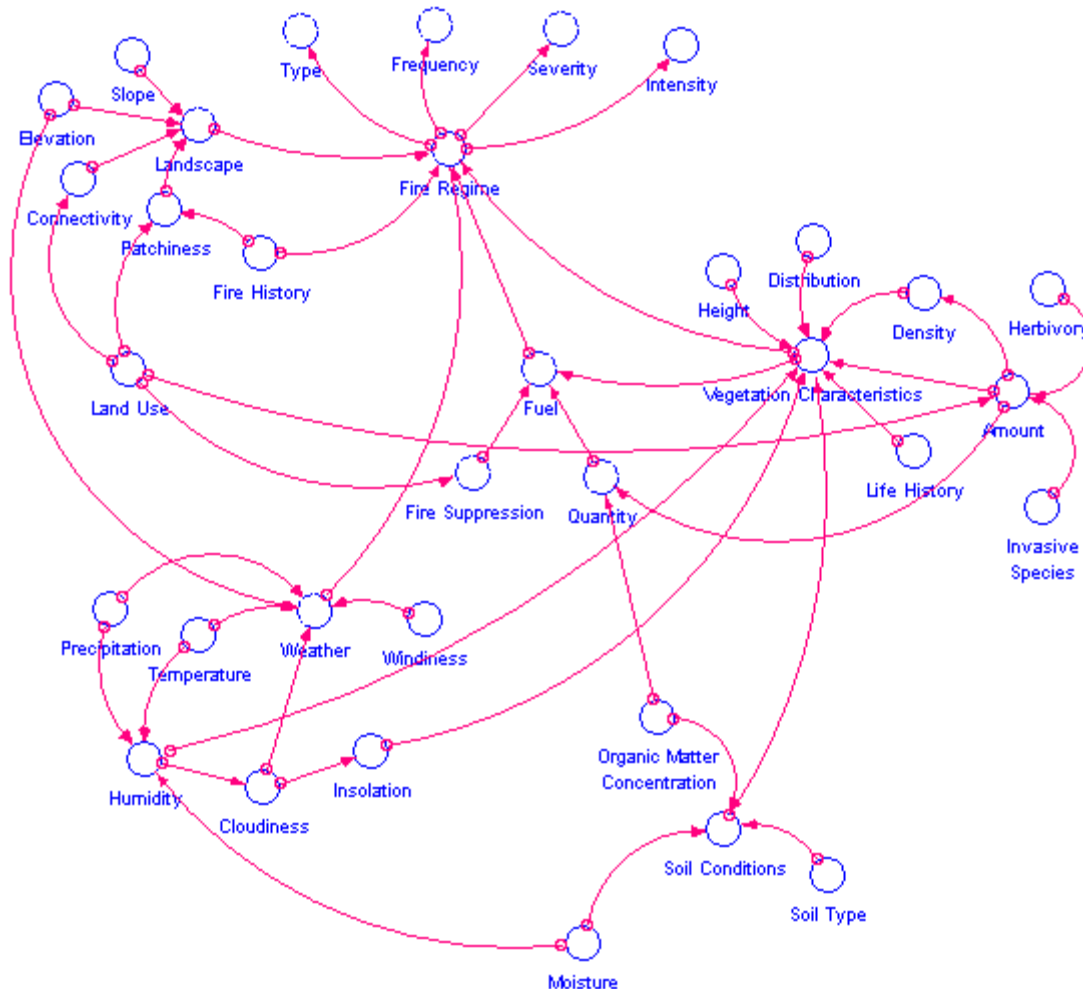


Ecol 190 Article Review #3
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A fire regime is affected by landscape, weather, fuel, and vegetation characteristics (among others). These characteristics are in turn affected by fine-scale features such as slope, landform (ridge or valley), or precipitation and temperature... In sum, the attributes of the fire regime (type, intensity, severity, frequency) are determined by this suite of factors.

A. Draw a box and arrow diagram linking the fine-scale features of fuel, weather, landscape to a fire regime.



B. Now pick two inputs (e.g. weather and vegetation) and explain how variation in these will affect two of the fire regime qualities (you pick): Keep it to 1/2 to 1 page long.

Vegetation Characteristics vs. Fire Type and Frequency

Plants are the primary fuel for fires, so their characteristics help determine fire type and frequency.

- Composition – Every species has a different chemical and moisture content that determines its pyrogenicity. If a patch of vegetation is moist, it won't burn until it dries out. A patch of grass is more likely to dry within x number of days than a stand of trees, due to the difference in biomass.

Thus, grass fires should be more frequent than crown fires, but less severe because of the low biomass (fuel) compared to forests.

- Height—the higher the understory in a forest, the greater the likelihood they will serve as a fire ladder during a dry season, creating crown fires instead of surface fires and thus enhancing fire severity.
- Amount, Density, and Distribution – If there is little vegetation on a plot of land (an arid desert, for example), a fire might not ignite at all. If it did, it would have limited ground spread and severity would be low. If there are many plants, there is more fuel. The plant density would also increase. The closer plants are to each other, the greater the likelihood of fire spread if one plant is ignited. Denser fuel can create higher fire temperatures, enhancing fire intensity and severity. Herbivores (deer browsing, for example) and invasive species can lower the density and amount of available fuel. Distribution is very much linked to density—if fuel patches are close together, there will be a greater likelihood of fire spreading between them.
- Life History – this can directly affect both fire frequency and severity. If it takes 100 years for trees to get large enough to succumb to lethal bark beetle infestations, then there would be roughly a 100-year frequency of severe fires due to the abundance of dead trees every century. If it only took 50 years for a tree species to reach this stage, then the frequency of severe fires would double.

Landscape Patterns vs. Fire Frequency and Severity

Patterns in the landscape control fire frequency and severity.

- Land use: When land is put to human use, fire is often suppressed, causing a buildup of fuels on the ground. Over time, this fuel can create fire ladders up to the crowns of trees and create severe crown fires. Even small ground fires might cover a wider extent than they would if fire had not been suppressed throughout that region. Fire suppression also changes the frequency of fires from more frequent to more infrequent. Therefore, when there is a fire, it is likely to be more severe, leaving larger burn scars and fewer surviving plants.
- Elevation—the higher in elevation a place is, the windier and drier it tends to be, so that fires at high elevation may tend to be more severe than at lower elevations. (Temperature is generally cooler at higher elevations, so this would tend to counteract the fire-promoting effect of wind and dryness.)
- Slope—given uniform fuel cover, fires will travel more quickly up a slope because rising flames downhill will naturally ignite the uphill fuel it contacts. Since southern-facing slopes receive more solar radiation than northern-facing ones, vegetation there might also be drier, increasing the chance and thus the frequency of fire.
- Patchiness—overall fire severity would be reduced if the fire is confined to a dry patch of vegetation surrounded by moist patches, and if this patch is small. If the landscape has many such small patches, the frequency of severe fires would be much lower than if the landscape had several large dry patches, any one of which would burn severely.
- Connectivity—the more connected fuel sources are, the faster a fire can propagate through the landscape, and the greater the fire extent will be.