

## **EEB 4609W/5609**

### **Workshop on Synthesis and Working with Sources: Writing Samples**

#### Paragraph #1

Fire significantly increases soil ammonium and nitrate pools, and reduces fuel nitrogen amount (Wan et al. 2001). Increases in ammonium and nitrate, after a fire, are caused by pyrolysis of organic matter, an increase of N mineralization, and the leaching of N from the forest floor into the soil. The increased rates of N mineralization post-fire are due to a decrease in the carbon to nitrogen ratio. Nitrification also increases initially post-fire. After a while both ammonium and nitrate decrease as N-fixation increases. N-fixation is the main pathway by which new nitrogen enters terrestrial ecosystems (Chapin III et al. 2002). Ammonium adsorbs on negative charges of mineral and organic surfaces, but with time is destined to be biogeochemically transformed to nitrate, which is leached soon if not taken up (Certini, 2005). The soil ammonium pool increased approximately twofold immediately after fire, but gradually decreased to the pre-fire level after just one year (Wan et al. 2001). In contrast, nitrate saw a small initial increase initially, then reached a maximum level of roughly threefold of the pre-fire level within the first six months to a year after the fire, and then declined (Wan et al. 2001). Fire effects on ammonium and nitrate availability, the changes by fire that affect the plant communities and the direct effects of fire on plant communities are three factors that illustrate the effect of forest fires on nitrogen availability of nitrogen to plants in boreal forests.

#### Paragraph #2

The issue of potential impact on species richness under potential climate change conditions has largely been examined in alpine regions (Moen et al. 2008). Furthermore, a paper examined potential outcomes of species richness in Europe (Thuiller et al. 2006). However, the boreal forest of North America is also receiving attention in modeling distribution of tree species (McKenney et al. 2007). In addition, vegetation changes were modeled for northern Alaska in relation to climate change conditions (Euskirchen et al. 2009).

#### Paragraph #3

The potential damage to photosynthetic capacity by ultraviolet radiation (UVR) can happen in a variety of ways. UVR can damage proteins and nucleic acids by denaturing the bonds within the structures. It also has the capacity to affect chlorophyll, which is essential to photosynthesis, and even the cell walls of an organism (Hazzard et al. 1997). Chlorophyll production can be disrupted through indirect harm to the membrane of the chloroplast (Sobrinho et al. 2008). Photosystem II (PSII) can be damaged by creating imbalances in energy throughout the photosynthetic apparatus because the organism cannot as effectively “assimilate energy absorbed through photochemical processes” (Sobrinho and Neale 2007). Because the light reaction of photosynthesis, the step involving PSI and PSII, is essentially a series of electron transport mechanisms, if PSII is unable to use, or assimilate the energy absorbed into it, the reduction state of PSII compared to the rest of the photosynthetic apparatus is affected as charge builds up. Additionally, when UVR reacts with oxygen it can produce various radicals such as OH<sup>-</sup> which are harmful and can cause damage to cellular structures (Hazzard et al. 1997). The mechanisms by which UVR can inhibit photosynthesis are numerous and this makes it particularly harmful.

## **Instructor Notes**

### **Workshop on Synthesis and Working with Sources**

#### **Objective:**

Illustrate using student writing samples how to synthesize information in a paragraph, i.e., bring information together from multiple sources to draw conclusions.

#### **Workshop:**

- 1) Discuss the question “what is synthesis?” and what are the important attributes of “synthetic writing”.
- 2) Have students read each of the three paragraphs individually.
- 3) After reading, have students pair up to comment on the ways that the author succeeded and/or failed to achieve synthesis.
- 4) Have pairs share with the larger group.

#### **Sarah’s comments on paragraphs:**

Paragraph #1: This paragraph starts out with a pretty clear topic sentence that promises to be synthetic. However, the paragraph has some problems after that. First, it summarizes a lot of points about how fire can affect the N cycle but most of these aren’t supported by cited evidence. Mostly, the paragraph is just citing a single study and the textbook, rather than synthesizing multiple sources of information. Second, not all of the points made in the body of the paragraph clearly relate to the topic of fire effects on N cycling. Third, the concluding sentence raises new issues that weren’t even discussed in the body of the paragraph – for example, how changes in the plant community composition caused by fire might change N cycling. This is a poor example of synthesis.

Paragraph #2: This paragraph doesn’t synthesize at all. It has no topic sentence and no concluding sentence. It basically lists a number of different studies, but doesn’t say anything about what those studies actually found, nor does it use the information from the different studies to draw conclusions about how climate change will alter species distributions. This is a poor example of synthesis.

Paragraph #3: This paragraph does a good job of stating a topic sentence, supporting that topic sentence with evidence from a variety of sources throughout the body of the paragraph, and drawing a conclusion based on the synthesis of the evidence. This is a good example of synthesis.