FPS Topics 2021-22

Practice Problem #1

Water Supply

In many parts of the world, freshwater is in short supply. Water is often pumped for miles, streams diverted and reservoirs and dams are constructed to provide for the growing populations in dry areas. As water levels drop and aquifers decline, people become more concerned about preserving their water resources. More than 2 billion people lack access to safe drinking water services, and more than 4 billion lack safely managed sanitation services. Differing governmental and commercial demands must be balanced so that communities have enough safe water for their needs. As available water supplies deplete, adjacent areas begin to battle with water contracts and water rights. How might the right to access clean water be achieved? How will regulations shape the future of access to water? How will water scarcity shape society?

Practice Problem #2

Building Green

The world is now more urbanized than ever before, and more and more people are flocking to live in large cities. Singapore was once known as the 'Garden City,' now it is being promoted as the 'Garden in the City' as new buildings incorporate trees and other greenery in their designs. Many quickly growing population centers are more environmentally aware as they expand the living spaces for their citizens. This awareness is not just a case of saving the environment and reducing emissions; it is a matter of necessity for creating healthy cities. Buildings can be designed to conserve both energy and water while improving the indoor and outdoor environment. Advancing technology is changing how architects are incorporating sustainable living practices into buildings. Light-based modulated sunlight, improved insulation, enhanced ventilation, eco-friendly building materials – are a few of the ecologically-preferred innovations changing the face and function of buildings. Some buildings now incorporate wind turbines to provide the necessary energy to power the building. Will these developments solve the problems they have set out to address? Will these change the way cities work and the way people live in them? Will these changes improve safety during natural disasters or introduce new problems?

Qualifying Problem

Insects

Insects - human's best friends and worst enemies. We are surrounded by more than a million species of insects. Without them, humankind couldn't survive. Some insects destroy crops and carry diseases. Mosquitoes, which carry diseases such as malaria, dengue fever, Ross River, Zika, and West Nile viruses, kill and maim more people each year than any other animal. Others do essential jobs like pollinate blossoms, aerate the soil, decompose dead plant material, or eat other harmful insects, making them essential to the food web. As weather patterns and temperatures change, the distribution and habitat of many insect species are likely to change dramatically. The numbers of bees around the world have been radically reduced due to disease. How does the reduction of some species and relocation of others impact health, agriculture, and horticulture?

Over 1,900 insect species have been identified as suitable for human consumption and animal feed and could assure food security. Incorporating insects into the human food and medical supply indicates the ever-growing importance of insects in the world. Will insects and their products, such as genetically modified mosquitoes or manuka honey help to fight diseases? Will toasted grubs, fried crickets, and other edible insects become important global protein choices?

State Bowl

Mining

Mining is a long-standing means of gathering a wide range of resources vital to aspects of everyday life. The growing demands of mined materials continues to see the mining industry expand at an incredible pace. The technologies in use today and projected for the future are more minerals intensive than ever before. While technology that has made mining both safer and more environmentally sensitive than any other time in history, environmental and other risks remain. Yet without the collection of these important materials, the cornerstones of society like buildings, machines, and communication would not be possible. With environmental protections varying greatly from country-to-country, how can the world collaborate on the best way to extract and share geological materials? With mining as the foundation of countless communities, how will they be impacted by the changing landscape of mining? In the future, are there new areas that might be mined for resources?