

## 2019 Tarleton State University State ENR CDE Waste Management Scenario

As urbanization increases, these concentrated areas of people and industry need to obtain resources used and dispose of their wastes outside the city limits. Until the implementation of the Clean Air and Clean Water Acts in the 1970's, many municipalities and industries operated on the premise that "the solution to pollution is dilution" and that air and water resources were sufficiently vast to dilute any pollutants dumped into the air and water via smokestacks and wastewater pipes. Smog build-up in large cities, such as Los Angeles and Chicago, combined lake and river contamination resulted in regulations on the amount of contamination allowed to enter the atmosphere or "waters of the US" from smokestacks and pipes.

While air and water contamination in rural areas continue to be less than that in urban areas, much of the pollution affecting rural communities emanates from urban areas. Air quality impacts may occur due to contaminant and particulate drift from urban-located factories as well as the increasing tendency to locate factories in "peri-urban" areas, or locations outside of the municipal boundaries that have both farms and homes of urban commuters. Similarly, factories and food processing facilities, with the potential for releasing nutrients and other contaminants into the water, are increasingly located in rural areas. This choice of location is primarily economic: lower taxes, less stringent environmental regulations, and potential lower wage levels. Additionally, legal structures and organizations for advocating against potential environmental impacts of these facilities generally are less in rural than in urban areas.

For people living and working in rural areas, protecting air and water quality is not "just an environmental issue". These factors affect the health and economy of people in these areas. Degraded air quality is associated with pulmonary diseases such as asthma, COPD, emphysema, and bronchitis as well as headaches, fatigue, and reduced resistance to infections. Pollutants released into the water system range from nutrients and pathogens, to heavy metals, such as lead and cadmium, to various organics or petroleum-based products. These contaminants can cause health impacts such as intestinal ailments, cancers, cognitive and mental health impairments, and kidney diseases. These health impacts not only affect humans; contaminated ground water can also affect livestock dependent on well water. For example, high levels of nitrate, from manure or fertilizer applications, can leach into the groundwater resulting in methemoglobinemia, more commonly known as "blue baby syndrome." This condition can debilitate or kill young stock by reducing their ability to transport oxygen from the lungs throughout the body.

Improperly managed factories, dumps, food processing facilities, and mines can have detrimental economic impacts on rural communities. These communities, interested in obtaining jobs, welcome new businesses. However, if these facilities are not managed to environmental standards, the economy of the community can suffer. Water treatment costs can increase, employee illness can reduce work productivity, and employment based on natural resources, such as fishing, can decrease. Community health can also impact water quality and environmental health. Recent research indicates that pharmaceuticals, including antidepressants, antibiotics, pain killers, and hormones are being detected in rivers, streams, and even in drinking water taps. While the levels are not currently sufficient to cause human health impacts, wildlife, particularly fish and amphibians are showing deformations and sexual abnormalities.

# 2019 Tarleton State University State ENR CDE Waste Management Scenario Questions

Answer these questions on the Waste Management section of your scan sheet.

1. In this paper, what does the term “organics” refer to?
  - a. Manure runoff
  - b. Petroleum products
  - c. Produce from organic farms
  - d. Certified inputs for organic food production.
  
2. What health impact can high levels of manure or fertilizer applications have on animals?
  - a. Diarrhea
  - b. Kidney problems
  - c. Reduced resistance to infections
  - d. Suffocation by young animals
  
3. What are the reasons provided in the paper for some factories moving out of urban areas and into rural areas?
  - a. Insufficient land in rural areas
  - b. Lack of access to workers
  - c. Fewer environmental regulations
  - d. Cleaner water
  
4. In the 1960’s and before, many people believed that “the solution to pollution is dilution.” Why is this concept not considered to be valid anymore?
  - a. Cities developed high levels of smog
  - b. Rivers became polluted such that cities had to buy expensive equipment to treat drinking water
  - c. Fish and amphibians became deformed
  - d. All of the above
  
5. Based on information in the paper, why might rural people not be concerned about the environmental impacts of factories or other industries that come to their towns?
  - a. These factories and industries provide needed jobs
  - b. The amount of environmental pollution produced by these entities is never very much
  - c. These businesses are always owned by people living in the community
  - d. These factories and industries provide environmental restoration jobs as well as manufacturing jobs.
  
6. Based on information in the paper, which list of diseases and ailments associated with poor air quality is correct?
  - a. Emphysema, epilepsy, and headaches
  - b. Depression, COPD, and bronchitis
  - c. Fatigue, Alzheimer’s, and asthma
  - d. Reduced resistance to infections, headaches, and fatigue

7. Which of the following potential water contaminants are heavy metals?
  - a. Pathogens and nutrients
  - b. Mercury and hormones
  - c. Lead and cadmium
  - d. Petroleum and nitrate
  
8. Based on information in the paper, what are human illnesses associated with contaminated drinking water?
  - a. Cancer and kidney diseases
  - b. Limb deformities
  - c. COPD and asthma
  - d. Respiratory failure
  
9. According to the paper, how can environmental impacts affect a community economically?
  - a. Cost of increased sick leave
  - b. Fewer fishing licenses and fishing poles sold
  - c. High cost of water treatment
  - d. All of the above
  
10. Which of the following water contaminants probably cause fish deformities?
  - a. Nutrients
  - b. Hormones
  - c. Antibiotics
  - d. Pain killers