

ENVIRONMENTAL SCIENCE

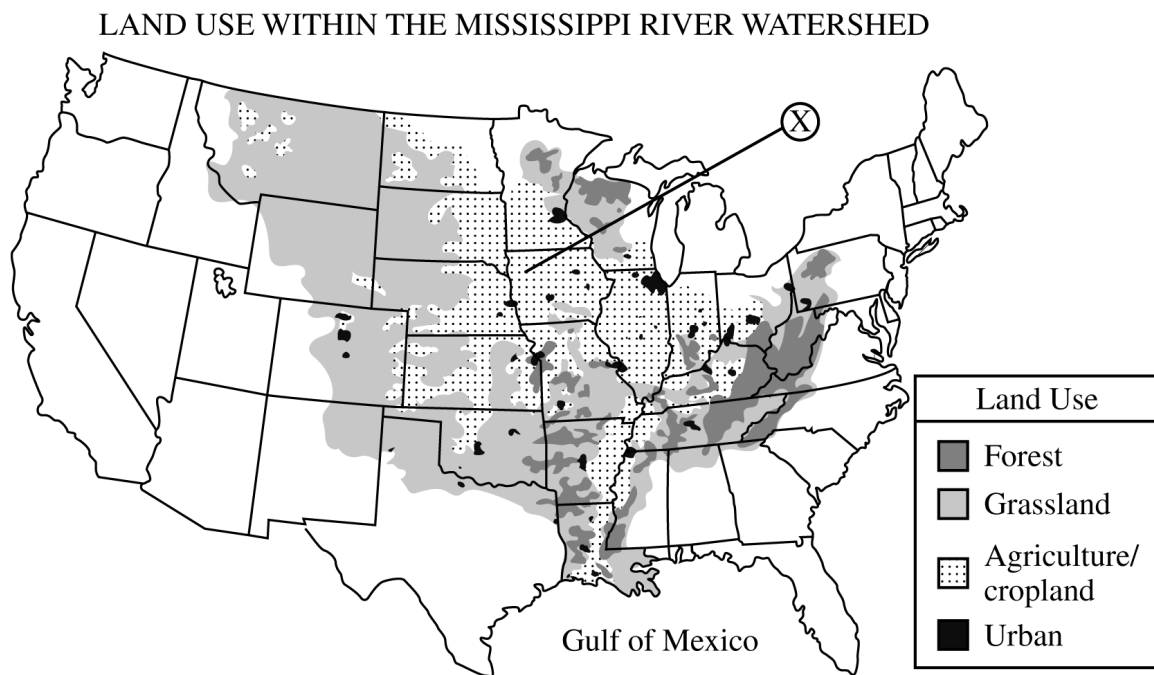
SECTION II

Time—1 hour and 10 minutes

3 Questions

Directions: Answer all three questions, which are weighted equally; the suggested time is about 22 minutes for answering each question. Write all your answers in the Free Response booklet. Where calculations are required, clearly show how you arrived at your answer. Where explanation or discussion is required, support your answers with relevant information and/or specific examples. You may plan your answers in this orange booklet, but no credit will be given for anything written in this booklet. **You will only earn credit for what you write in the separate Free Response booklet.**

1. The dead zone in the Gulf of Mexico occurs every summer when winter snow melts and spring rain flows into the Mississippi River. Recent studies have shown that both the total area covered by algae and the depth of the algal mass in the dead zone are increasing.



- (a) Various land use practices can have different effects on the waters that surround a dead zone.
- Identify** the land use that covers the least amount of area in the Mississippi River watershed, based on the diagram.
 - Describe** one way that the land use practice at location X in the diagram could contribute to the dead zone in the Gulf of Mexico.
 - Describe** one way that urban areas in the Mississippi River watershed could contribute to the dead zone in the Gulf of Mexico.
- (b) The dead zone in the Gulf of Mexico has both economic and environmental effects for coastal communities.
- Describe** how a dead zone affects marine organisms living in the Gulf of Mexico.
 - Describe** one economic effect on communities along the Gulf of Mexico that can result from the presence of the dead zone.
 - Describe** one factor that causes the area of the dead zone in the Gulf of Mexico to increase in the summer months.
- (c) Researchers want to examine the effect of riparian vegetation buffers on water quality in streams in agricultural areas. Researchers will measure the water nutrient concentrations over the course of one year. The study sites are located 100 meters downstream from areas either with or without riparian vegetation buffers.
- Identify** a testable hypothesis for the study.
 - Describe** a control that the researchers could use in the study.
 - Identify** one water quality test, other than measuring nitrates or phosphates, that the researchers could use to evaluate how riparian vegetation buffers affect water quality.
 - During the investigation, researchers discovered that some of the land next to one of the streams with a riparian vegetation buffer is going to be converted from cornfields into a large-scale concentrated animal feeding operation. **Explain** one way that this change in land use could alter the results of the study.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.