

ACTIVITY 4.1

WORKSHEET—STREAM INTEGRITY AND AQUATIC COMMUNITIES

Name _____ Date _____

1. Review the WHEBIP scoring method summarized in Table 2.8 (Protocol 4). Now consider hypothetical Streams 1 and 2. Stream 1 has a WHEBIP score of 248, and Stream 2 has a score of 175. Which is likely to be a healthier habitat for stream plants and animals? Why?
2. List three things you might find in a stream segment's watershed that would tend to *increase* the area's WHEBIP score.
3. Next, consider the term *diversity*. In the box below, draw ten small circles, eight small triangles, two small squares, and seven small lines. Imagine that each of the shapes represents a different organism living in a small area on the bottom of "Stream 3." For example, the triangles might represent mayfly nymphs.

Stream 3 Community:

4. For "Stream 4," draw 30 small circles and 3 small triangles.

Stream 4 Community:

5. Without using any actual numbers, describe the differences between the communities in these two streams. Which community do you think has greater diversity?

6. In any given region, greater diversity is generally indicative of a healthier system. In your own words, describe what you think *diversity* and *abundance* mean.

7. Look back to your diagram for Stream 4. Would it make a difference ecologically if the triangles represented stonefly nymphs—which require high levels of dissolved oxygen—instead of aquatic worms, which require very little dissolved oxygen? In your own words, describe differences between the terms *biotic integrity* and *diversity*.

8. After studying your graph of WHEBIP by RCE, does it appear that both methods rate the same stream similarly? For example, if the WHEBIP method rates one stream as excellent, does the RCE method rate it the same way, or very differently? Explain.

SECTION 2. PROTOCOLS

9. Describe what happens to InvertBI as WHEBIP scores *increase*. Explain why you think this is happening.

10. Describe what happens to InvertPI as WHEBIP scores *increase*. Explain why you think this is happening.

11. Describe what happens to the number of fish species in streams as the WHEBIP score *increases*. Explain why you think this is happening.

12. Describe what happens to FishBI in streams as the WHEBIP score *increases*.

13. If you completed Step 8 in the Procedure section, compare the trend lines you drew. One of these lines estimates the relationship between WHEBIP and RCE scores, and the other the relationship between WHEBIP scores and number of fish species. For which graph was it easier to draw a trend line? In other words, which graph seemed to show a stronger relationship between the two variables, and how can you tell?
14. Using these two graphs as examples, explain how useful you think linear trend lines can be in describing patterns in data series.
15. Finally, imagine that you are a member of a citizens' advisory group, charged with advising a watershed management task force. The task force plans to identify and protect sensitive regions of the local watershed. To do this, they are considering using either remote sensing (WHEBIP) or ground-based (RCE) stream integrity assessment, and they have determined that it would be cheaper and faster to use remote sensing. Based on the analysis you did today, which approach would you recommend, and why? Is it better to use remote sensing or ground-based stream assessment?