

**KEY**

**Student Instructions and Data Sheet for Mud Creek Case Study:  
Physical Measurement of Stream Health**

1. Number of habitat transitions:

*Upper Mud Creek: 6*

*Lower Mud Creek: 9*

*Mud Tributary: 11*

2. Incision ratio:

*Upper Mud Creek: 0.20*

*Lower Mud Creek: 0.14*

*Mud Tributary: 0.14*

3. Range of substrate sizes (mm):

*Upper Mud Creek: 1 - 22*

*Lower Mud Creek: 1 - 1000*

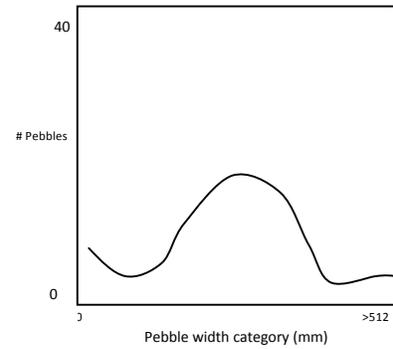
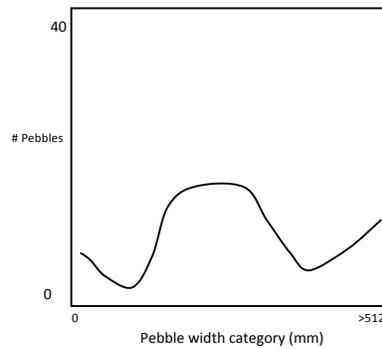
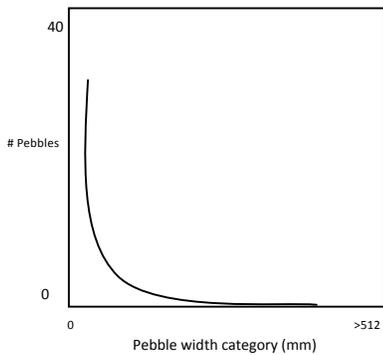
*Mud Tributary: 1-1000*

4. Rough sketch of number of pebbles in each pebble width category:

*Upper Mud Creek:*

*Lower Mud Creek:*

*Mud Tributary:*



1. Why does measuring the number of habitat transitions provide information about stream health?

*A great diversity of habitats will support a greater diversity of organisms since different organisms have different requirements.*

2. Why does measuring the incision ratio of the stream channel provide information about stream health?

***A stream with a more incised channel will have more erosion, resulting in faster storm flow rates, greater turbidity, higher temperatures, and greater diurnal variation in temperature. These conditions are less favorable for most species because they result in lower oxygen saturation levels and more intense disturbance after rain events.***

3. Why does examining variation in substrate sizes provide information about stream health?

*Streams with a greater diversity of substrate size have greater habitat diversity, so they can support a greater variety of organisms. These streams also tend to include a reasonable number of riffles, which help increase dissolved oxygen levels.*

4. Based on these physical measurements, how does stream health compare between the three Mud Creek sites?

*Based on incision ratios and variation in substrate size, Lower Mud Creek and Mud Tributary appear similar to one another in stream health and healthier than Upper Mud Creek. Based on the number of habitat transitions, Mud Tributary appears the healthiest, Lower Mud Creek appears to have intermediate stream health, and Upper Mud Creek appears to have the lowest stream health.*

5. What do these results tell us about the ability of Mud Creek to recover from urbanization? Explain your answer.

*Based on the data on channel incision and substrate size variation, Lower Mud Creek appears to have greater stream health than Upper Mud Creek and comparable stream health to Mud Tributary. These data suggest that Mud Creek does recover from urbanization as it travels 1 km into a protected forest. Based on the data on the number of habitat transitions, Lower Mud Creek appears to have greater stream health than Upper Mud Creek but lower stream health than Mud Tributary. These data suggest that, although Mud Creek recovers to some extent it does not fully recover from urbanization along the 1 km between the Upper Mud Creek and Lower Mud Creek study sites.*