6. Stream Channel Patterns

LEARNING OUTCOMES

By the end of this assignment you should be able to:

• Describe the characteristics of straight, meandering, braided and anastomosing stream channels;
• Identify straight, meandering, braided and anastomosing stream channels in photos or on topographic maps; and,
• Describe and identify landforms and channel changes associated with meandering stream channels.

Note: When asked to identify a stream channel pattern, be aware that some streams may exhibit characteristics of more than one of the four basic patterns (straight, meandering, braided, anastomosing). In those cases, you should identify all the patterns you see evidence of, or if the stream exhibits more characteristics of one pattern than another, then list the pattern that dominates. Remember that these four channel patterns are “end” types and there are many variations in between these end types.

QUESTIONS

1. What type of channel pattern does the stream in Photo 1 have? ________________________________ [1.5]
   List specific characteristics or features that caused you to identify the channel pattern in this way.

2. What type of channel pattern does the stream in Photo 2 have? ________________________________ [1.5]
   List specific characteristics or features that caused you to identify the channel pattern in this way.

3. What type of channel pattern does the stream in Photo 3 have? ________________________________ [1.5]
   List specific characteristics or features that caused you to identify the channel pattern in this way.

4. What type of channel pattern does the stream in Photo 4 have? ________________________________ [1.5]
   List specific characteristics or features that caused you to identify the channel pattern in this way.
5. What type of channel pattern does the stream in Photo 5 have? 
List specific characteristics or features that caused you to identify the channel pattern in this way.

6. What type of channel pattern does the stream in Photo 6 have? 
List specific characteristics or features that caused you to identify the channel pattern in this way.

7. What type of channel pattern does the stream in Photo 7 have? 
List specific characteristics or features that caused you to identify the channel pattern in this way.

8. What type of channel pattern does the stream in Photo 8 have? 
List specific characteristics or features that caused you to identify the channel pattern in this way.

9. What type of channel pattern does the stream in Photo 9 have? 
List specific characteristics or features that caused you to identify the channel pattern in this way.

10. What type of channel pattern does the stream in Photo 10 have? 
List specific characteristics or features that caused you to identify the channel pattern in this way.
11. Are the meanders in Photo 11 in the process of being cut off, or are these new meanders that are forming? 
   Justification:

12. Photo 12 shows excellent examples of several features characteristic of meandering rivers. List them.

13. What type of channel pattern does the stream in Photo 13 have? List specific characteristics or features that caused you to identify the channel pattern in this way.

14. In class we discussed the fact that geomorphologists treat stream bank erosion separate from stream bed erosion because other processes in addition to fluvial entrainment are at work on the stream bank. What feature in Photo 14 illustrates processes that impact stream bank erosion but not stream bed erosion? Explain.

15. Draw a line along the edge of each of the fluvial terraces visible in Photo 15. Based on the number and position of the terraces, is this river undergoing primarily downcutting, lateral migration, or both? Explain.
16. Photo 16 shows a stretch of the Red River in Arkansas. Identify at least three examples of each of the following landforms:

- Cut banks
- Meander scars
- Point bar deposits
- Bar and swale topography
- Oxbow lakes
17. Figures 17 – 22 show the Red River near Boyce, Louisiana at six different time periods. All the images are approximately the same scale. Document the changes that have occurred along the Red River at each time stop compared to the previous time stop.

1971 compared to 1949:

1979 compared to 1971:

1992 compared to 1979:

2004 compared to 1992:

2013 compared to 2004:

18. Over this 64-year period has the length of the Red River increased or decreased? ________________

Do you think this change in length has occurred due primarily to excess erosion carving a new channel or excess deposition filling in the old channel? Why?

How do you think this change in length has impacted the gradient of the river?
19. Calculate the sinuosity of the river in 1949 and in 2004. Use a piece of string or a map measurer to measure the river length in inches and the length of the meander belt axis in inches in 1949 and again in 2004.

1949 sinuosity:

2004 sinuosity:

20. Examine Figure 17, the 1971 map, on a computer monitor so you can zoom in and see more detail. How are point bar deposits symbolized on topographic maps?

Examine the contour lines on the inside (west side) of the last meander bend (east of Boyce) in the bottom right corner of the map. If you drew a topographic profile perpendicular to these contour lines, what landform would your profile show?

Note the contour line spacing on the south side of the meander bend immediately north of Boyce. What landform do these contour lines represent?

Examine the deposition occurring along the meander bend due west of Raven Camp Church. What is odd about the deposition along this meander bend?