Stream Flow Analysis of a Great Smoky Mountains National Park

Name of Student

Course Code

Instructor's Name

Institutional Affiliation

Stream Flow Analysis of a Great Smoky Mountains National Park

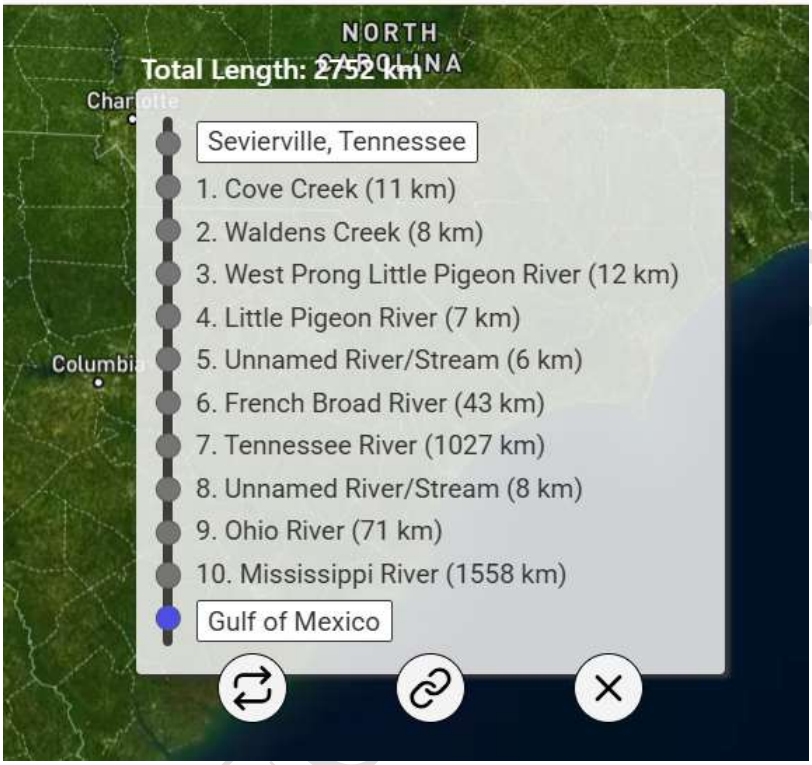
Part 1: Stream Drainage and your National Park

1. Take a screenshot of your completed drainage network and insert the image below. Size the image appropriately and align the image Top and Bottom so it will not cover any text. (SUGGESTION: Use this image in your final presentation to support your description of water flow within your park).

The above screenshot shows the completed drainage network. It is a clear display of the path of uninterrupted downstream flow starting as close to Great Smoky Mountains National Park and draining through many states to the Gulf of Mexico.

2. How many bodies of water overall are included in this drainage path? Take a screenshot of the list of water bodies in your drainage network and insert it below. Size the image and appropriately and align the image Top and Bottom so it will not

cover any text. How do the stream lengths change between the first water body to the last within your drainage network? Why would stream lengths change in this manner?



There are 10 significant water bodies that comprise the drainage path, which ends at the ultimate outlet in the Gulf of Mexico. These are evident in the screenshot above, beginning with smaller streams like Cove Creek (11 km), Waldens Creek (8 km), and then larger rivers like the French Broad River (43 km), the Tennessee River (1027 km), the Ohio River (71 km), and finally the Mississippi River (1558 km).

The length of streams is distinctly greater at the start and the end of the drainage system. The initial streams are brief and localized and the last rivers are very long. It is due to the fact that small headwater streams combine to make bigger rivers. When tributaries join together, there is an increase in the volume of water and thus rivers are able to flow over larger distances (Bărbulescu & Mohammed, 2024). This process is indicative of the way

in which drainage systems are naturally formed, with smaller streams becoming larger and more intricate river systems.

3. Describe the compass direction of movement of this drainage network (north, south, east, or west). Explain why the drainage network moves in this manner. What major body of water does the last stream in this drainage system drain into?

The general pattern of flow within this drainage system is southwest. Water originates in the highlands of the Smoky Mountains and flows off under the force of gravity. It initially flows into the Little Pigeon River system, then the French Broad River and finally, it flows into the Tennessee River. At this point, the water flows west down into the Ohio River and south down into the Mississippi River, which eventually empties into the Gulf of Mexico.

This directional movement is governed by the topography of the regions. The Appalachian Mountains form the higher part that leads to reduction of elevation to the central lowlands and coast plains, which directs the water on a southwest and southward direction.

4. As you let the downstream path play, describe how the topography of the landscape changes. Additionally, describe how the stream channels in the drainage system change. How does one relate to the other?

The topography alters greatly as the river passes downstream. The mountainous region of the system is the upper part which is steep and elevated. The streams in this area are fine, rapid and heavily eroding. The landscape is becoming flatter as the river flows towards the south.

Simultaneously, the stream channels are also altered. They are enlarged and increased in depth, and the stream is slower. The erosion that is carried upstream starts to depose in these downstream regions. It indicates that there is direct correlation between stream behavior and topography (Li et al., 2024). Steep slopes enhance erosion and rapid flow whereas flat slopes result in slower flow and deposition of sediments.

5. National parks are protected areas; however, the stream system extends beyond the boundaries of the national park. Any activity upstream may affect the water flowing through the park, and any activity downstream may affect the water after it leaves the park. Explain how different environmental practices in one area versus the other may affect people living along the river downstream and usage of this resource.

Great Smoky Mountains National Park is a preserved region, but its river system goes past its border. Such upstream activities as agriculture, deforestation, or urban development may bring in some contaminants and augment sediments in the water. These effects are passed downstream and impact ecosystems and human populations. Downstream activities are also significant. The river may be altered by water extraction, dam construction, and industrial usage, which will lower the availability of water. It may affect communities who rely on the river as a source of drinking water, agriculture, etc (Wei et al., 2023). It demonstrates that river systems are interrelated, and the management of the environment should think about the whole drainage basin, not only one point.

Part 2: Finding Research Resources

1. Bărbulescu, A., & Mohammed, N. (2024). Study of the River Discharge Alteration. *Water*, *16*(6), 808.

2. Li, L., Knapp, J. L. A., Lintern, A., Ng, G.-H. C., Perdrial, J., Sullivan, P. L., & Zhi, W. (2024). River water quality shaped by land–river connectivity in a changing climate. *Nature Climate Change*, *14*(3), 225–237.
3. Wei, D., Liu, S., Wu, Y., Feng, S., Gao, H., Qin, C., Ren, D., Tang, W., & Zhang, Y. (2023). Impacts of human activities and climate change on water and sediment evolution in four large subtropical river basins in China. *Ecological Indicators*, *155*, 110958.