

The background is a gradient from green at the top to blue at the bottom, with a starry or particle-like texture. On the left side, there are several concentric circular patterns. One large circle has a scale around its perimeter with numbers ranging from 140 to 260 in increments of 10. Other smaller circles and arcs are scattered around, some with arrows indicating a clockwise or counter-clockwise direction.

# FLUVIAL GEOMORPHOLOGY: SINUOSITY

ZACH HILGENDORF

# OBJECTIVES

- Understand What Sinuosity Is and What it Tells Us
- Understand How to Calculate Sinuosity

The geo-nerd currently talking...





# WHAT IS SINUOSITY?

- A ratio that tells us how “curvy” a river is
- $\text{Sinuosity} = \frac{\text{Channel Length}}{\text{Valley Length}}$





# WHAT IS SINUOSITY?

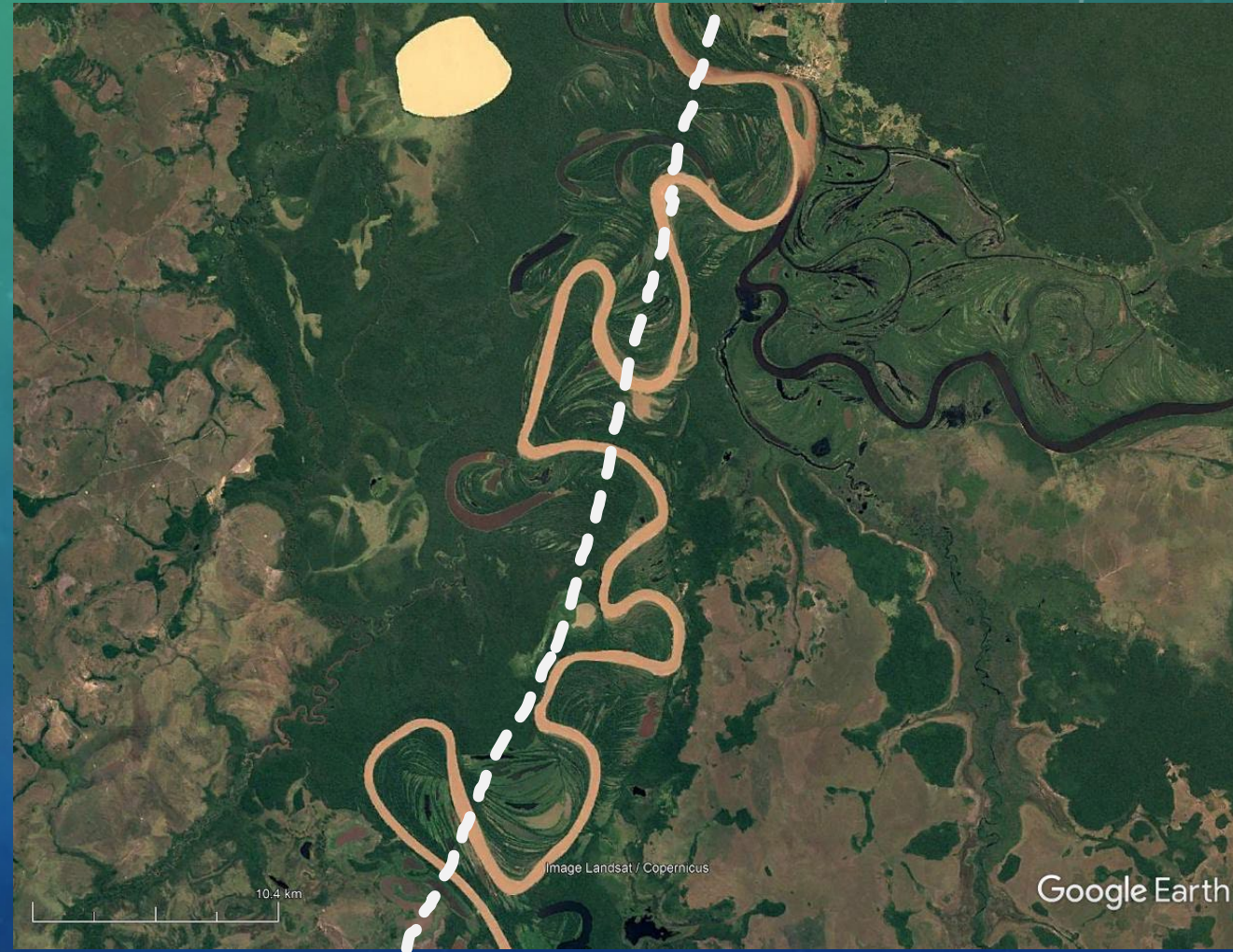
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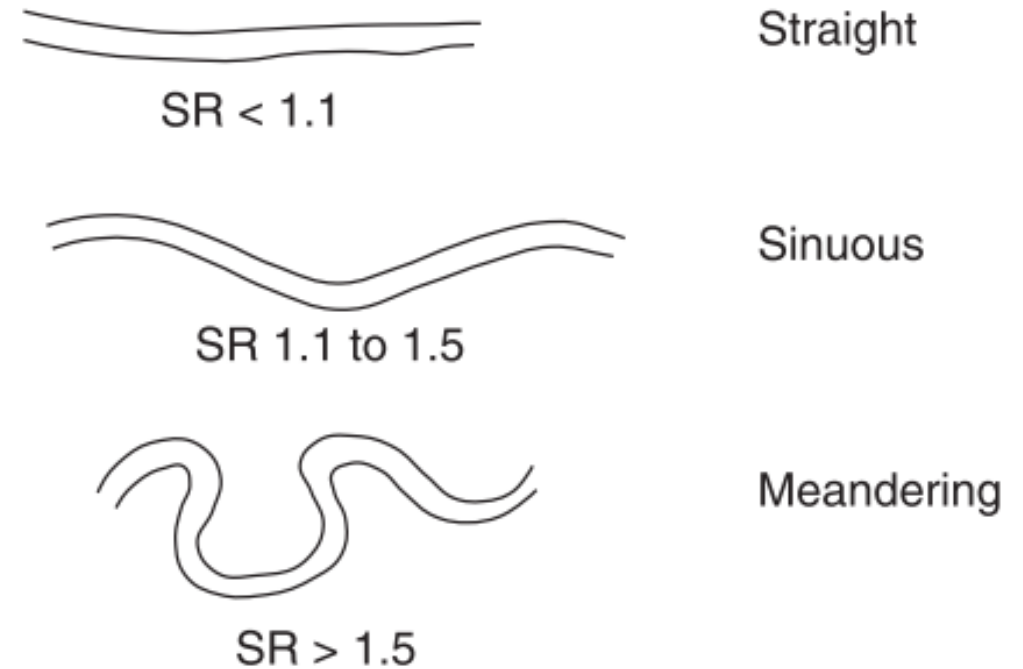
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- Higher values = Higher sinuosity
- Anabranching, Braided, and Straight Rivers = Lower Sinuosity



*Figure 8.11 Sinuosity ratio definition.*

Charlton (2008): *Fundamentals of Fluvial Geomorphology*



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S. A. SCHUMM *U. S. Geological Survey, Denver, Colo.*

**Sinuosity of Alluvial Rivers on the Great Plains**

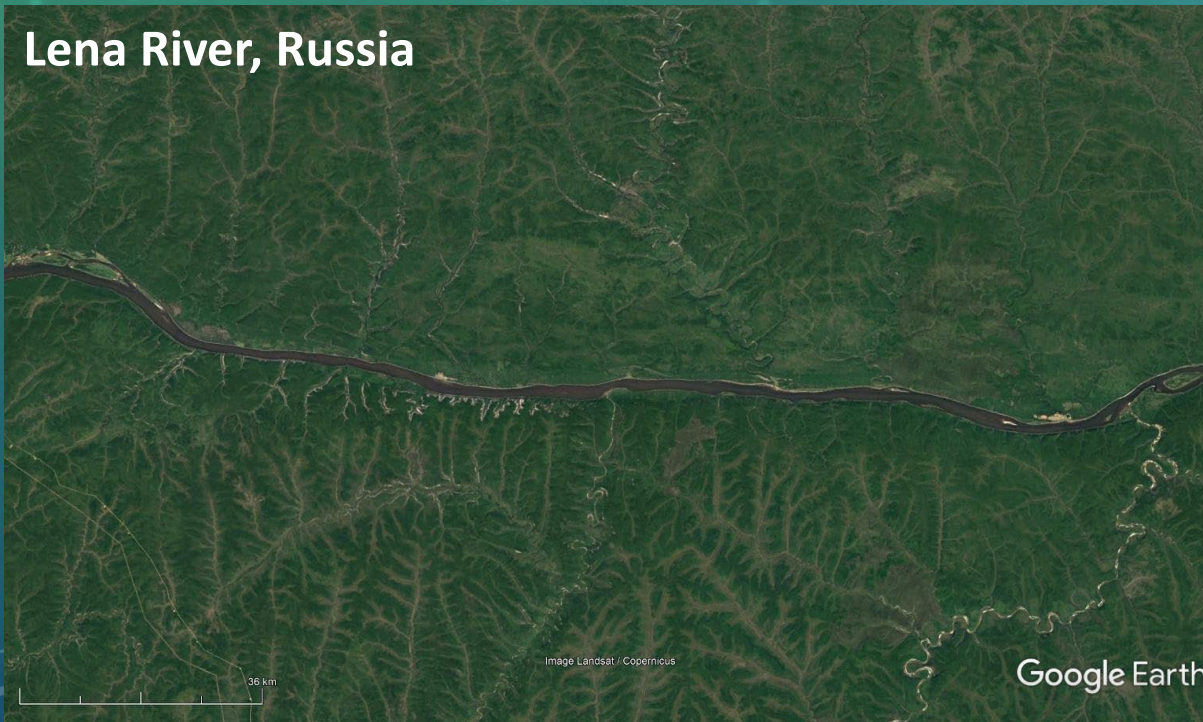
# EXAMPLE CALCULATIONS



# WHAT IS SINUOSITY?

- Sinuosity = Channel Length / Valley Length

**Lena River, Russia**



**Minnesota River, Minnesota, USA**

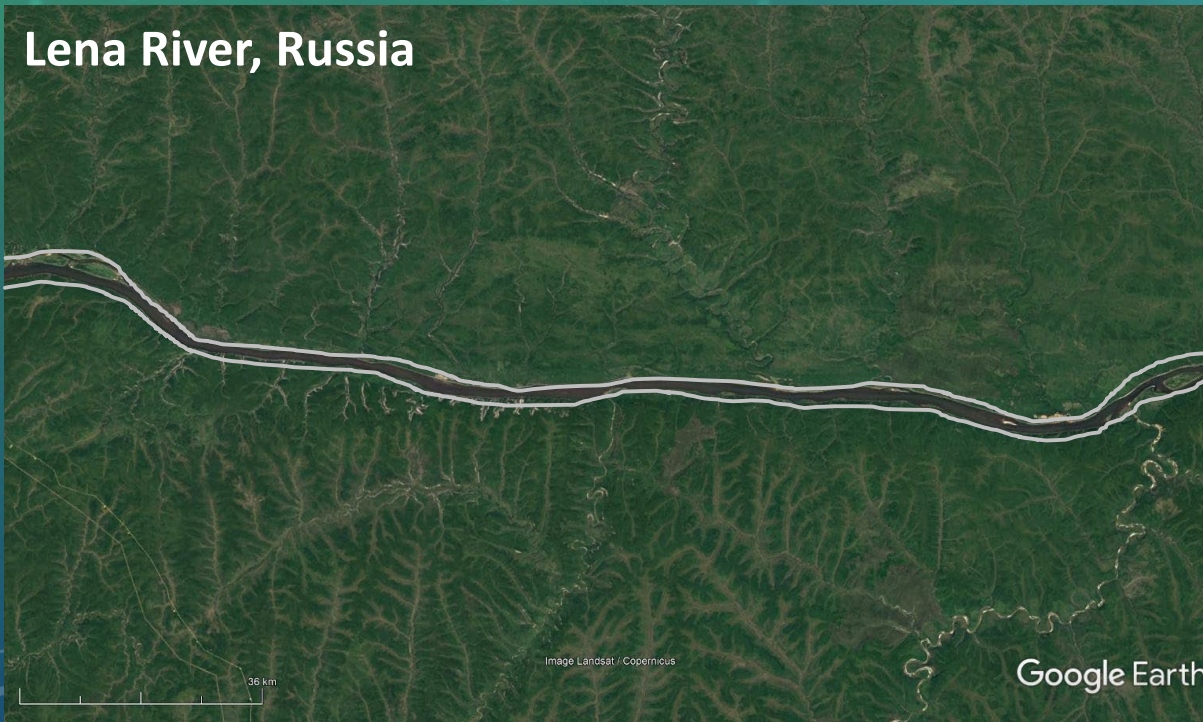




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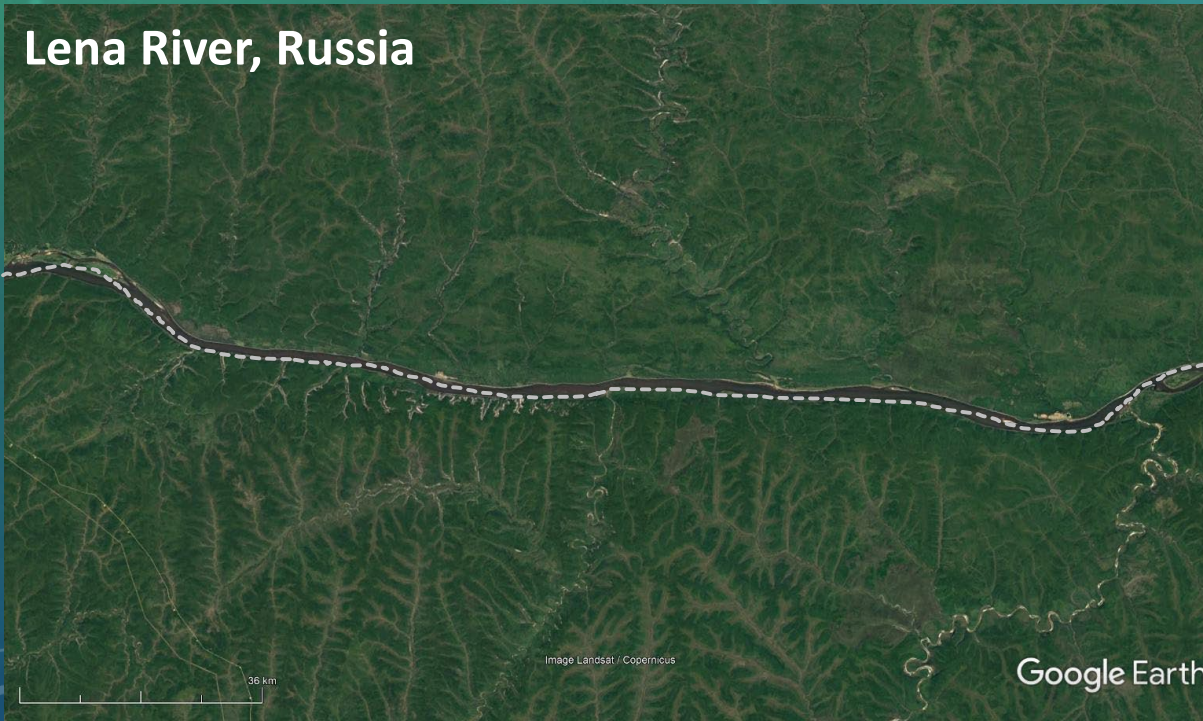




# WHAT IS SINUOSITY?

- Sinuosity = Channel Length / Valley Length

Lena River, Russia



Valley Length: 187 km  
Channel Length:

Minnesota River, Minnesota, USA



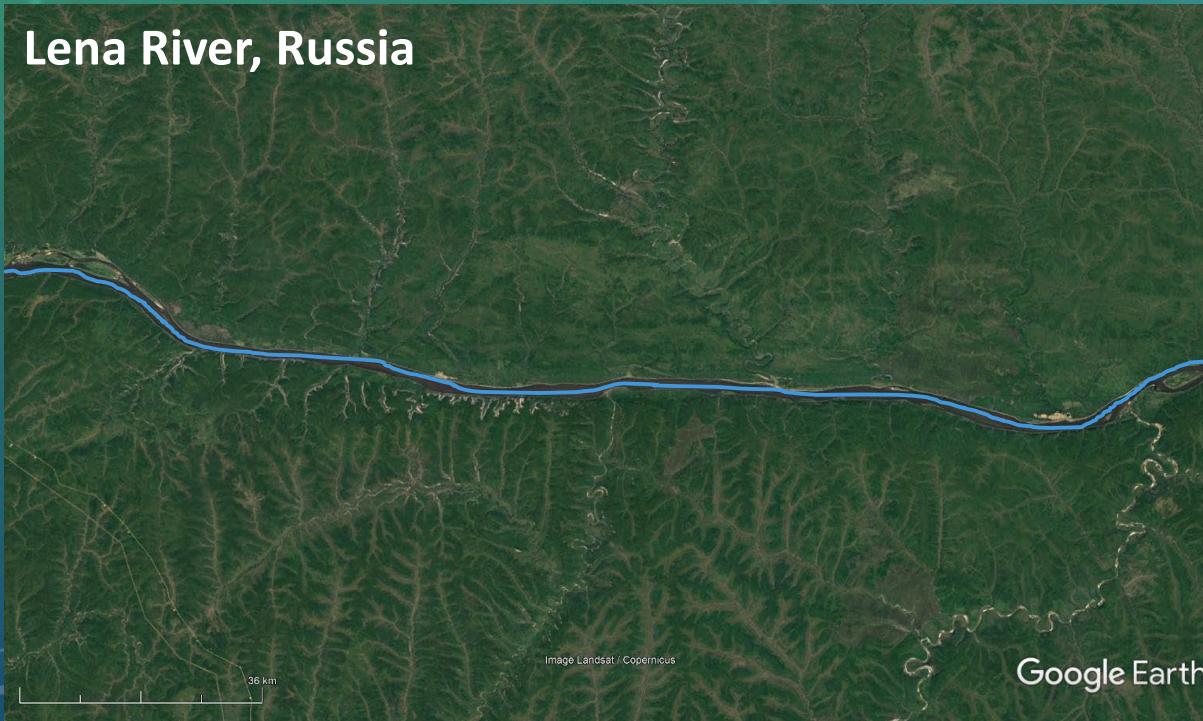
Valley Length: 12.3 km  
Channel Length:



# WHAT IS SINUOSITY?

- Sinuosity = Channel Length / Valley Length

**Lena River, Russia**



Valley Length: 187 km  
Channel Length: 188 km

**Minnesota River, Minnesota, USA**



Valley Length: 12.3 km  
Channel Length: 18.2 km

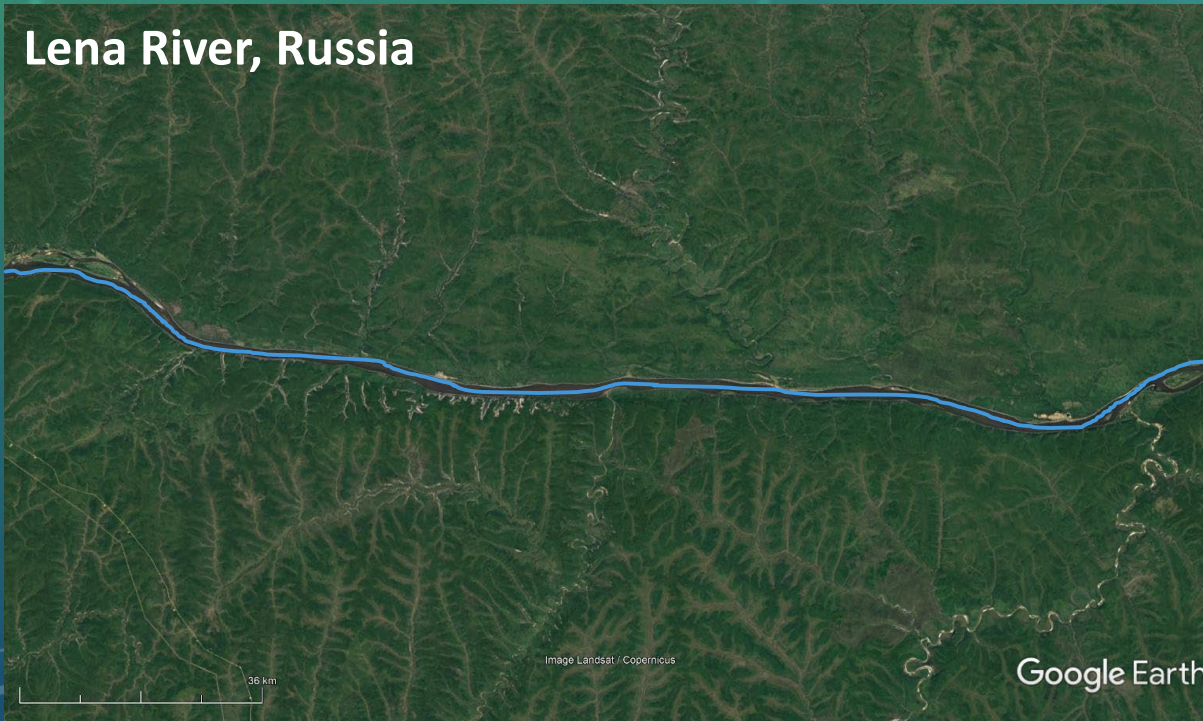


# PAUSE

## WHAT IS SINUOSITY?

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Valley Length: 187 km  
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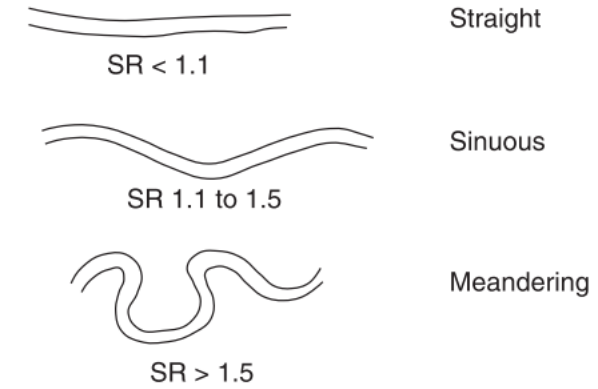
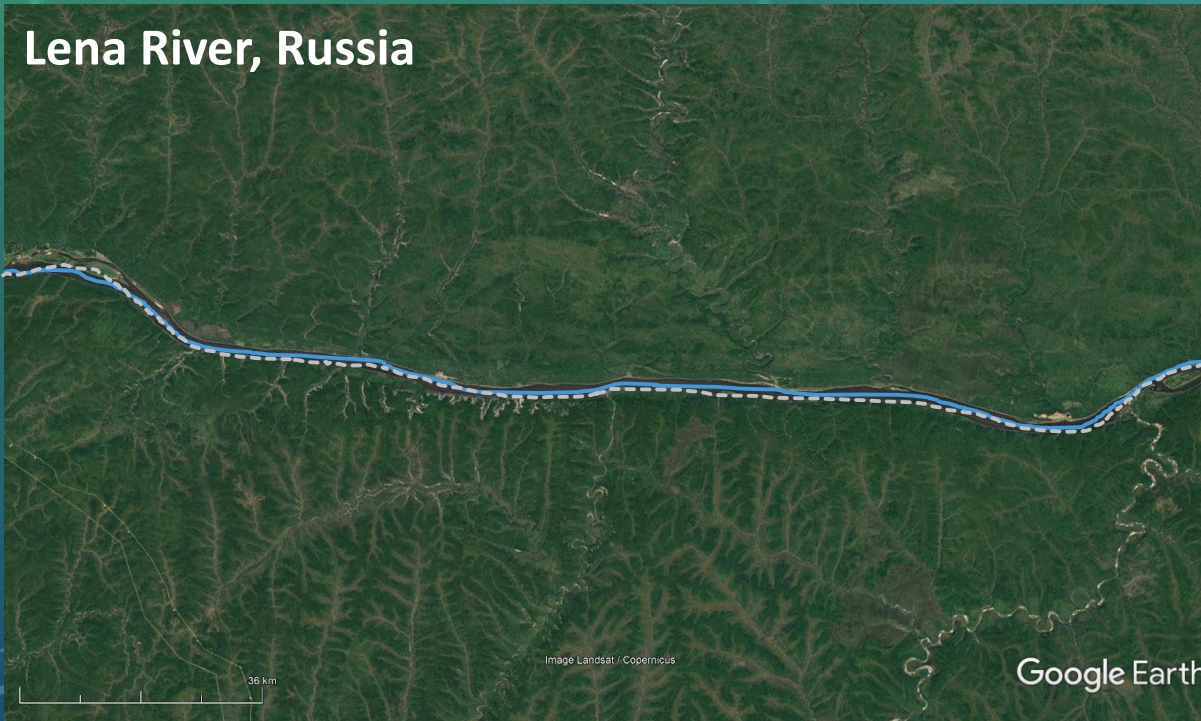


Figure 8.11 Sinuosity ratio definition.

Lena River, Russia



Low Sinuosity: 1.01

Sinuosity Ratio < 1.1 = Straight Channel

Minnesota River, Minnesota, USA



High Sinuosity: 1.48

Sinuosity Ratio near 1.1-1.5 (Sinuous) and > 1.5 (Meandering)



# RECAP

- What sinuosity is.
- How to calculate sinuosity.

S. A. SCHUMM *U. S. Geological Survey, Denver, Colo.*

## Sinuosity of Alluvial Rivers on the Great Plains

