

# An Ecosystem Services Approach to Water Resources

Unit 1.1: Mapping Ecosystem Services

# Learning objectives

- Define ecosystems and ecosystem services
- Identify ecosystem services provided by an ecosystem
- Classify ecosystem services according to one of the four categories as described in the Millennium Ecosystem Assessment (MA)
- Use the basic features of Google Earth
- Evaluate how the production of ecosystem services varies over time

# Landscape #1 – Missouri River in South Dakota





# Linking Google Earth to photographs

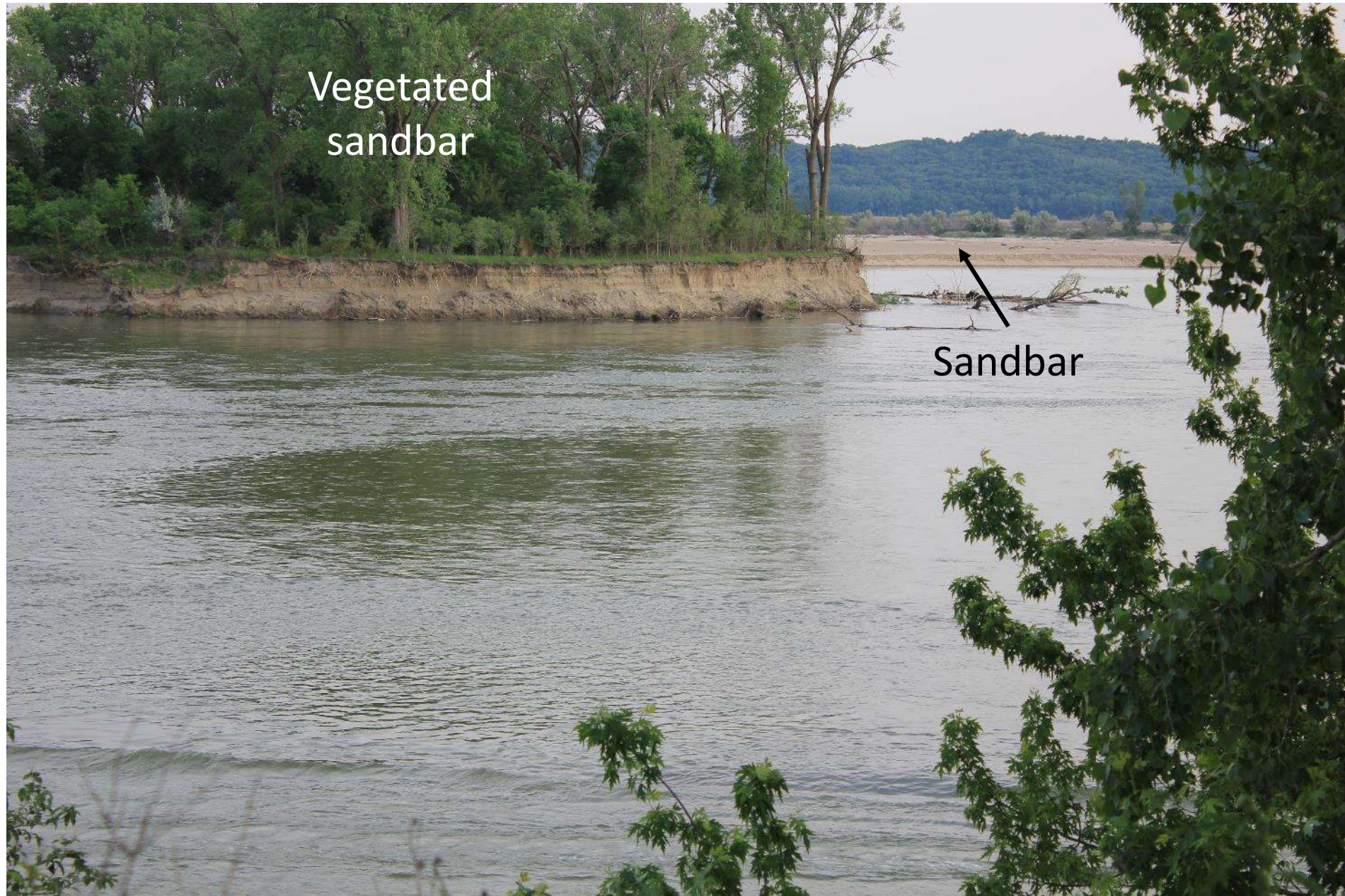


# Linking Google Earth to photographs





# Missouri River sandbars



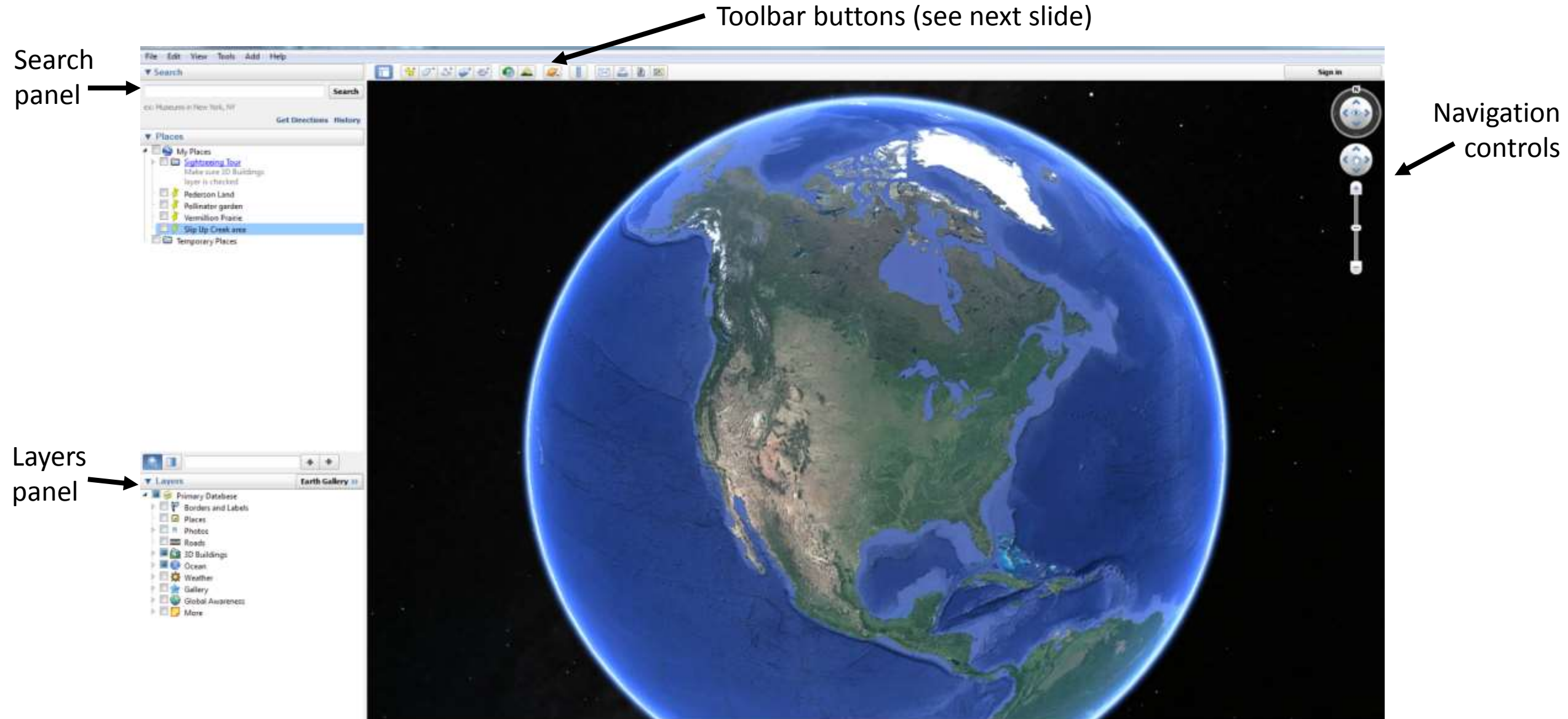


# Landscape #1

- List and categorize at least two ecosystem services from each MA category that are likely provided by this landscape.
















# Google Earth – basic features





# Google Earth – Toolbar Buttons



- |   |  |
|---|--|
|  Conceal or the display the side bar |  Display sunlight across the landscape  |
|  Add a placemark for a location      |  View the sky, moon and planets         |
|  Add a polygon                       |  Measure a distance or area size        |
|  Add a path (line or lines)         |  Email a view or image.                |
|  Add an image overlay on the Earth |  Print the current view of the Earth  |
|  Record a tour                     |  Show the current view in Google Maps |
|  Display historical imagery        |  |

# Using Google Earth

- Navigate to this location: 40°59'0.43"N 87° 7'33.35"W
  - Enter into the search bar as 40 59 0.43N 87 7 33.5W
  - Zoom out until you can see the pond/lake to the northwest
- Use the features of Google Earth to answer the following questions:
  - What state is this location in?
  - When is the first aerial image of this location available?
  - How many different aerial images are available for this location?
  - What different seasons are captured in the aerial imagery for this location?
  - What is the length of the pond/lake in this image in 2013?



# Temporal changes in ecosystem services

- List and categorize five ecosystem services that are especially important in this landscape
- Evaluate if and how the production of these ecosystem services has changed over time

# Presenting back to the class

- Each group should give a short (~1 min) presentation back to the class
  - 1) List one ecosystem service provided by this landscape that has changed over time.
  - 2) Describe how the production of that ecosystem service has changed including the timescale of that change.



# Additional practice (1)

- Navigate to this location: N 40 37 25.5, W 111 54 59.25
- For this location, answer the following questions:
  - What state is this location in?
  - How has the land use to the east of this river changed since June 2005?
  - What impacts might these land-use changes have on the ecosystem services provided by the river?

# Additional practice (2)

- In Google Earth, navigate to a water body near your campus.
  - How has that water body changed over time?
  - List and describe five ecosystem services provided by the water body.
- Find a similar type of water body in another country.
  - How might the ecosystem services provided by this water body differ from the one near your campus? How might the ecosystem services provided be the same?



Google Earth image that students should navigate to for slide 10

