Origins of Lakes

Limnology

Lecture 3

Outline

- General background
- Overview of different lake origins
- Glacial lake formation
- Create kettle hole

Lakes and ponds

Mostly a pond-world (85%)

Basic requirement:

Precipitation + inflow > Evaporation + outflow

Lakes and ponds

Importance of lake origin

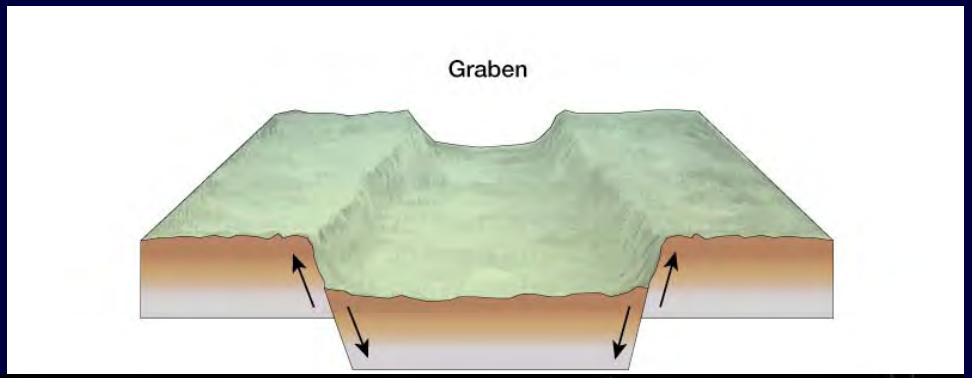
- hydrology (inputs,outputs)
- basin shape
- chemistry, inc. nutrients
- age

e.g., endemic species

Lake Baikal Seal

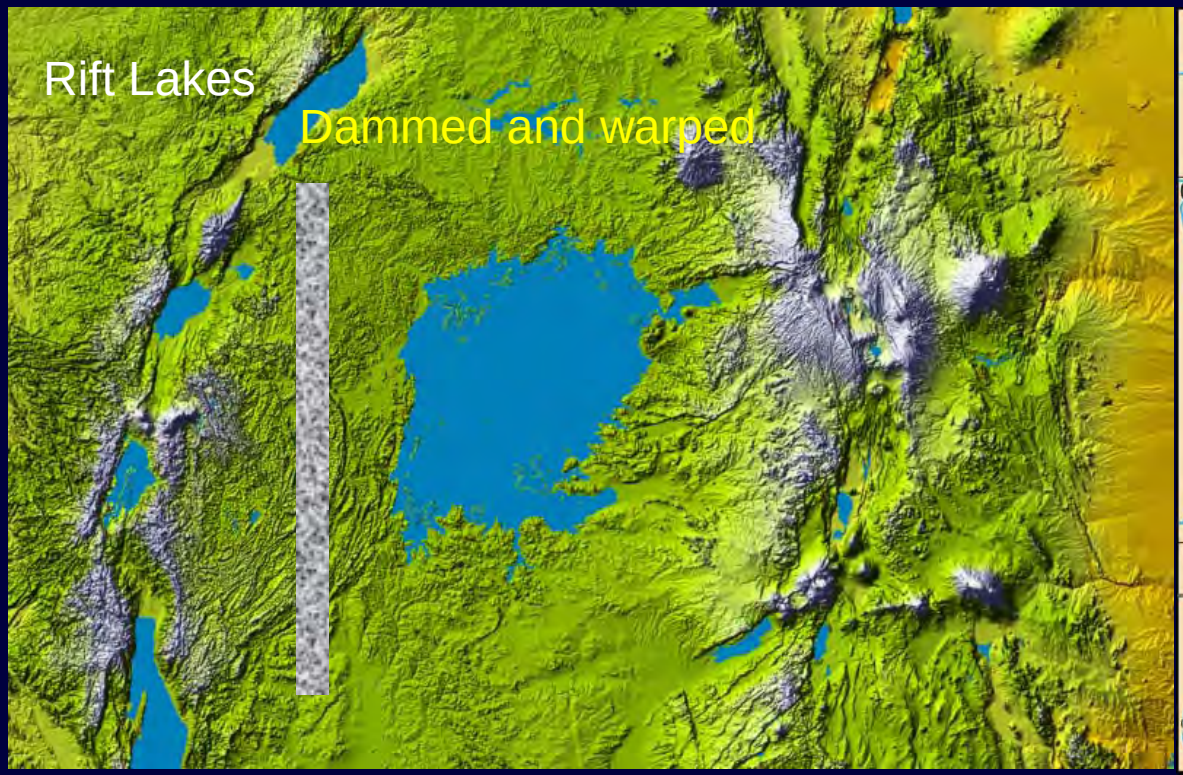
Origins of Lakes

1. Tectonic



Origins of Lakes

1. Tectonic



Origins of Lakes

2. Volcanic

Lava lakes

Caldera (Crater Lake)

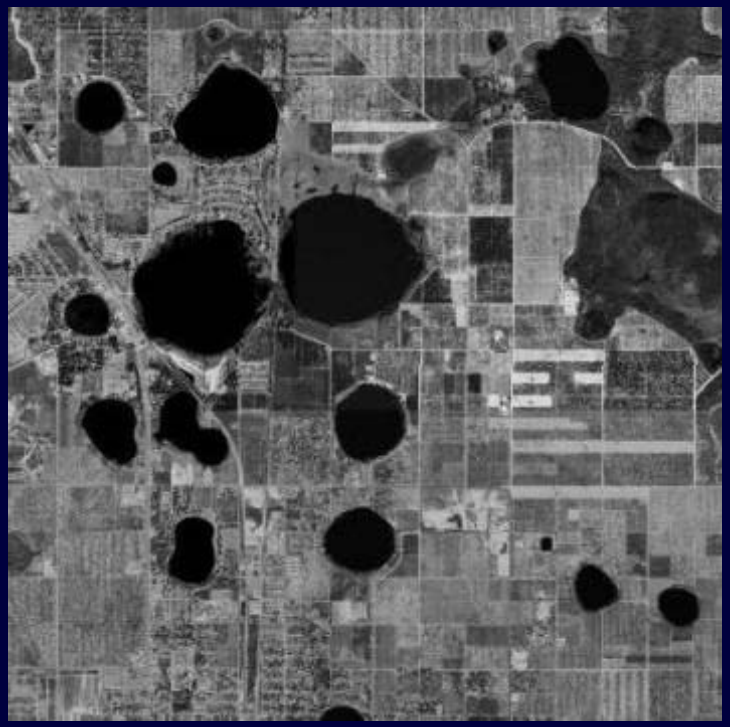
Origins of Lakes

3. Landslide

Madison Canyon (MT), 1959

Origins of Lakes

4. Solutions (Karst) Lakes



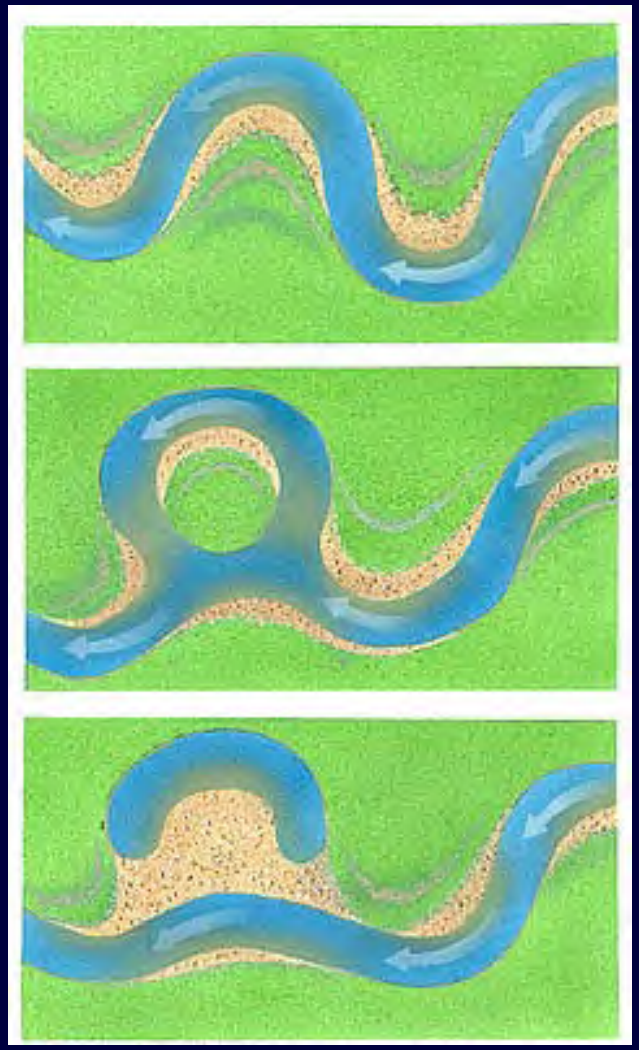
Origins of Lakes

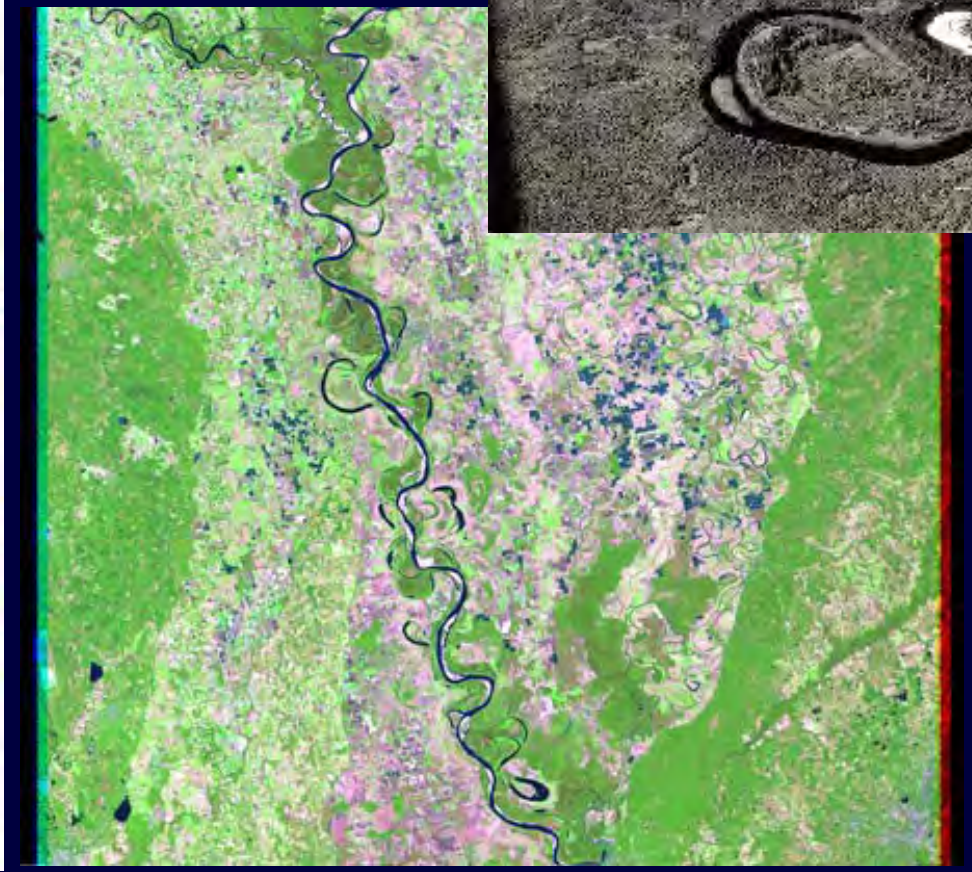
5. Aeolian or dune

Moses Lake (WA)

Origins of Lakes

6. Fluviatile





Oxbows

Origins of Lakes

7. Coastal

Barrier lakes

Cats' eye lakes

Origins of Lakes

8. Biological

Origins of Lakes

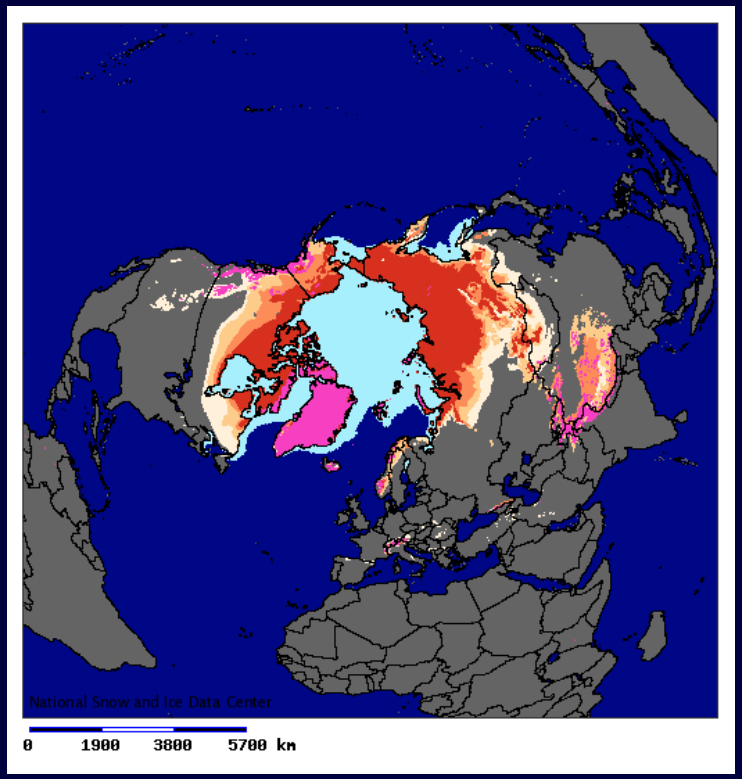
9. Extraterrestrial

Origins of Lakes

10. Thaw pond or thermokarst pond

Permafrost – Permanently frozen soil

- Insulated during summer by vegetation



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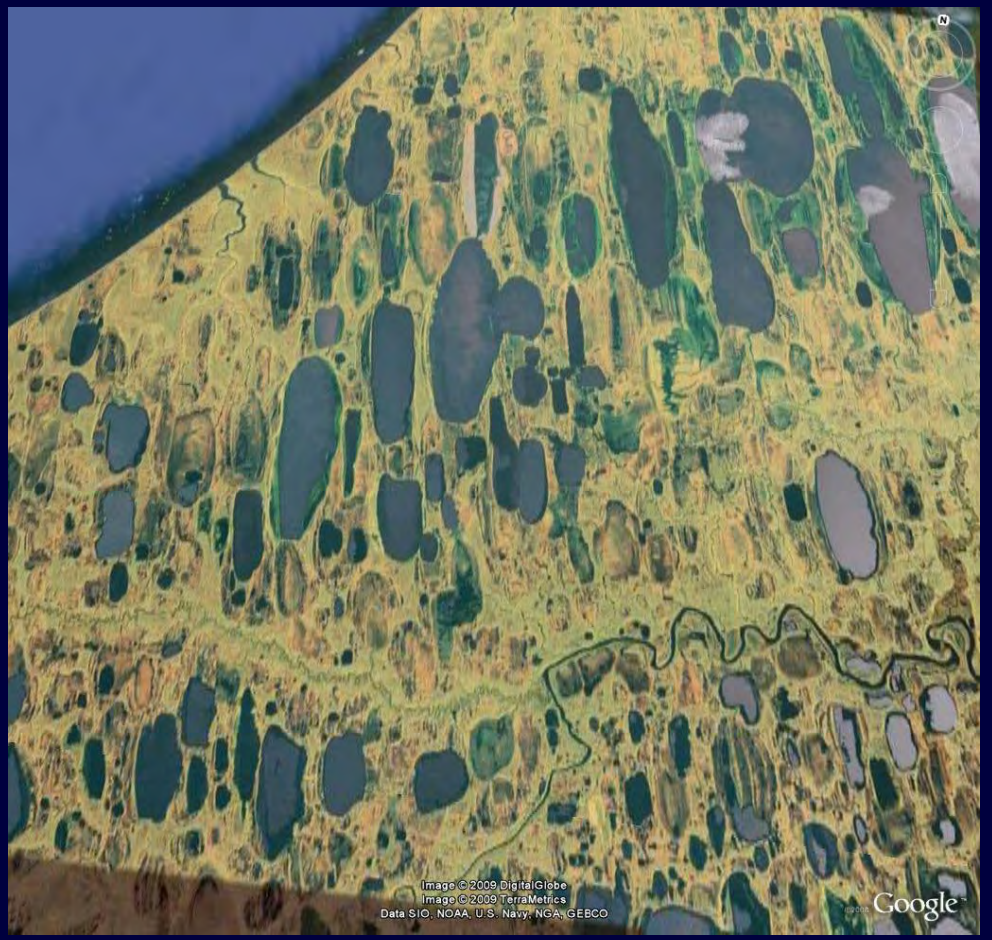
10. Thaw pond or thermokarst pond

Natural topography/geology/fire or human

Origins of Lakes

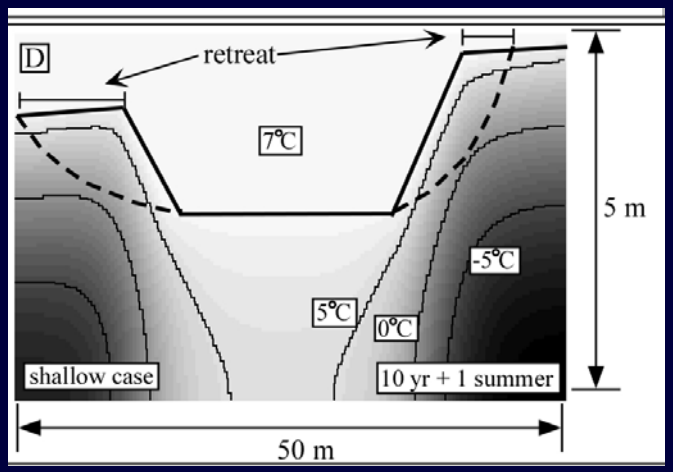
10. Thaw pond or thermokarst pond



On Alaska North slope:

Fastest growing lakes in world

15 ft. per year



Origins of Lakes

11. Glacial


EIS
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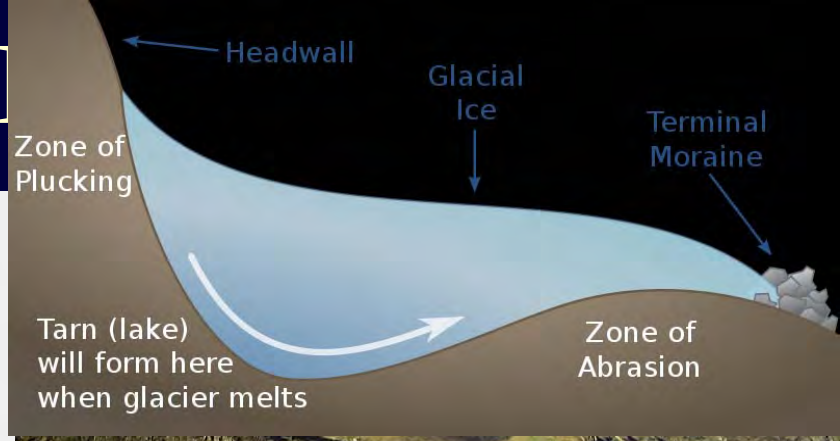
Origins of Lakes

11. Glacial

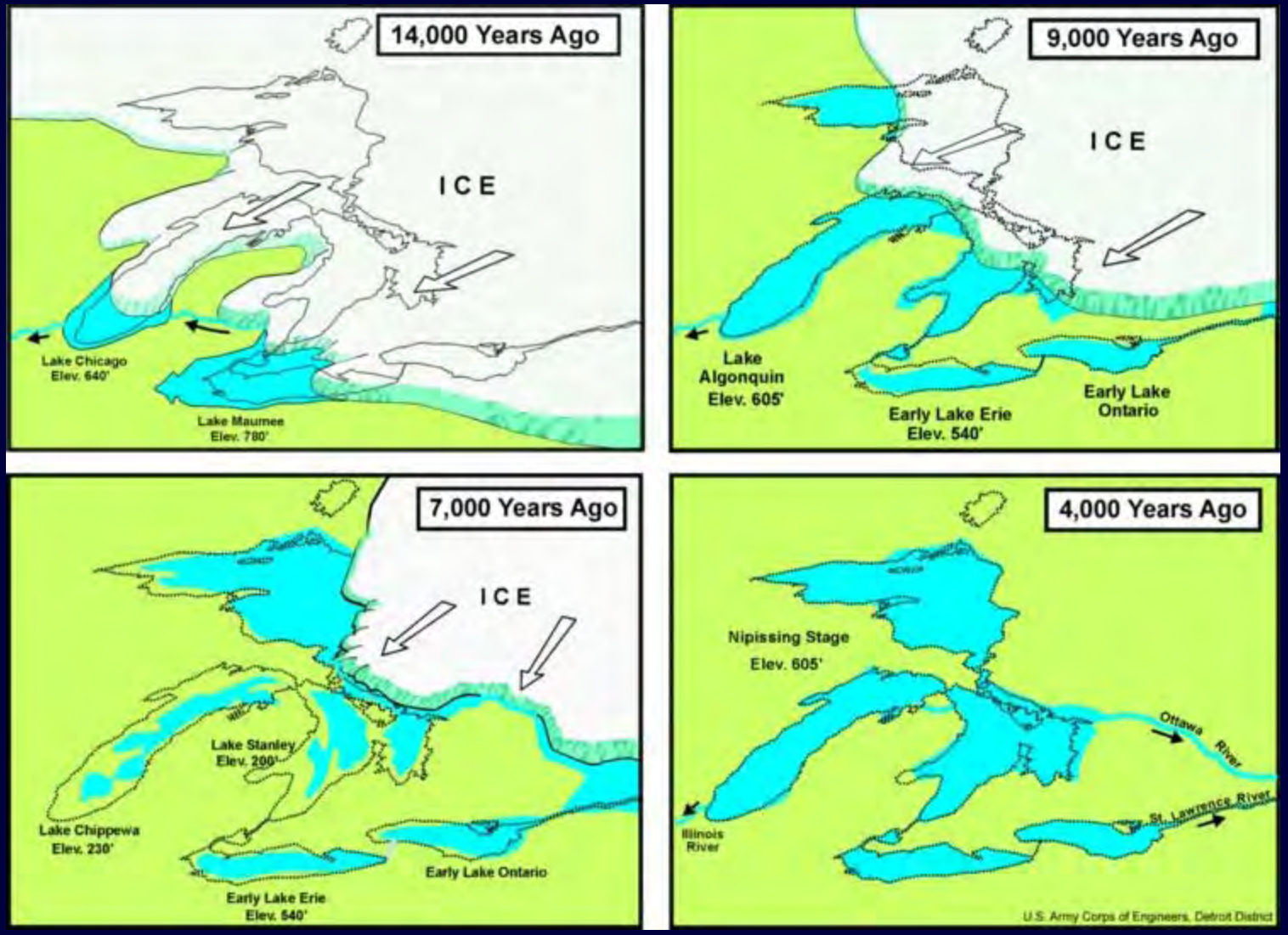
Glacial max. 18,000 ya

Last ice age ended 12,500 ya

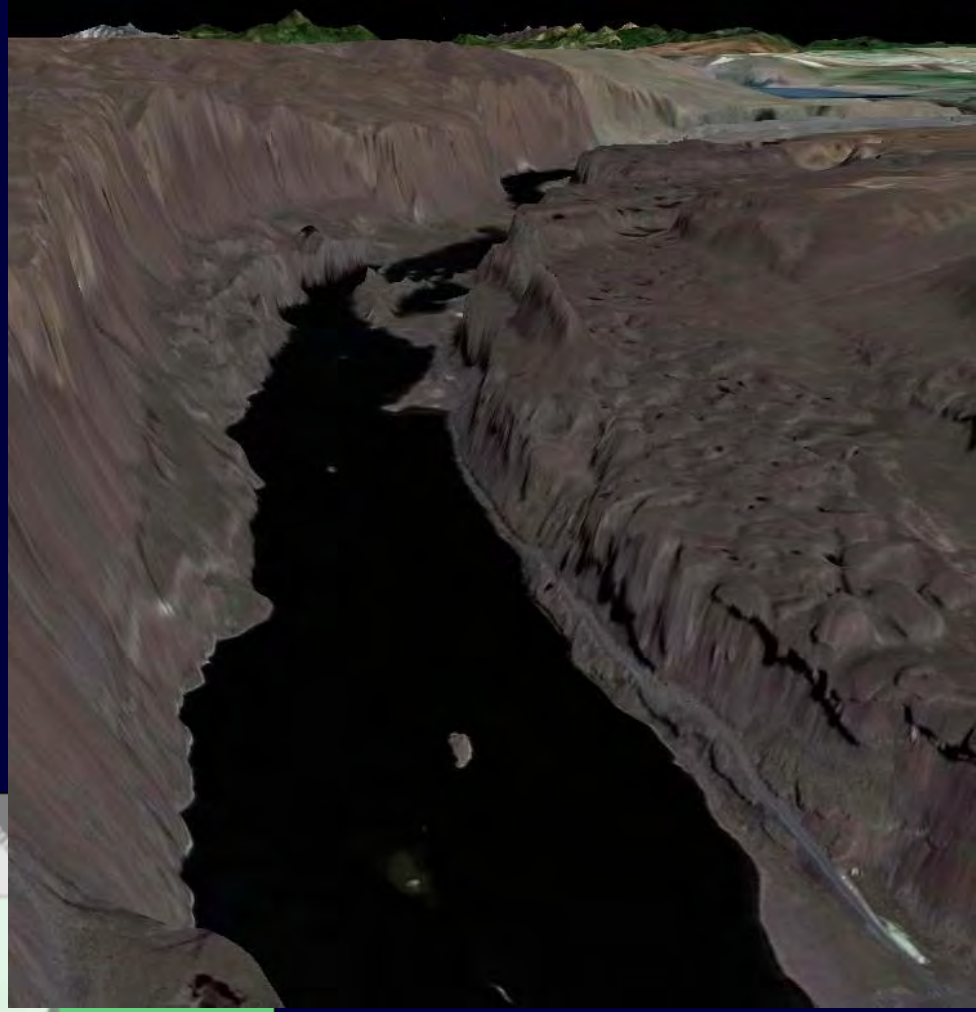
11. Glacial Origins of L



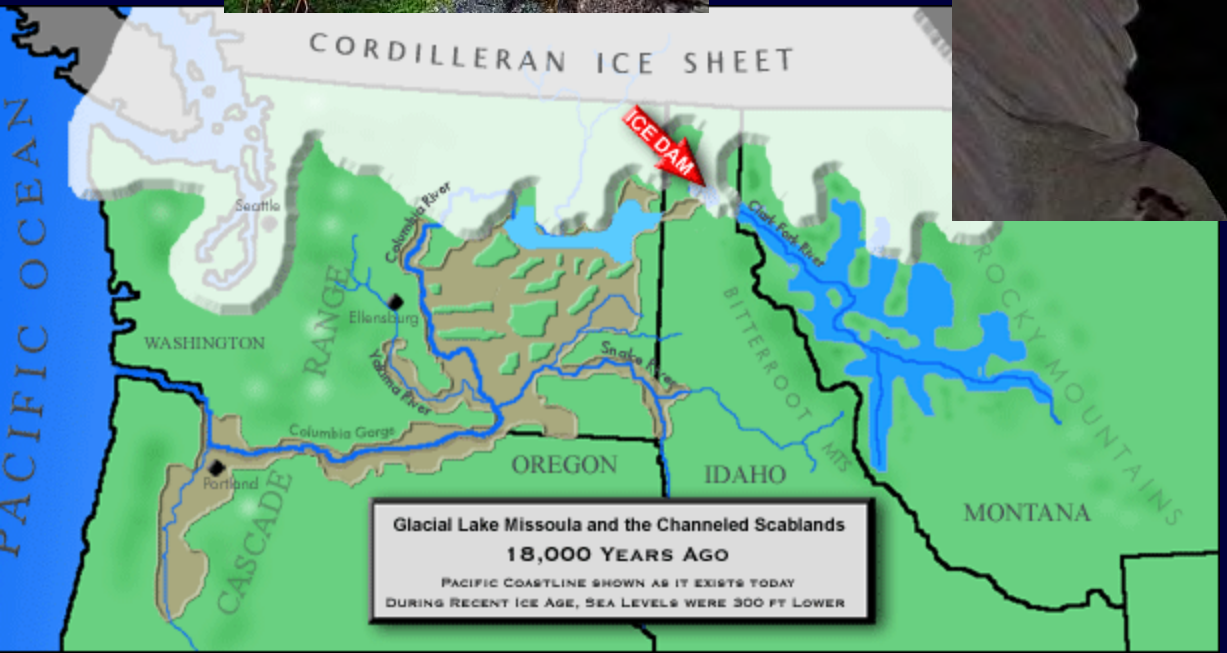
Glacial scour lakes



Plunge basin

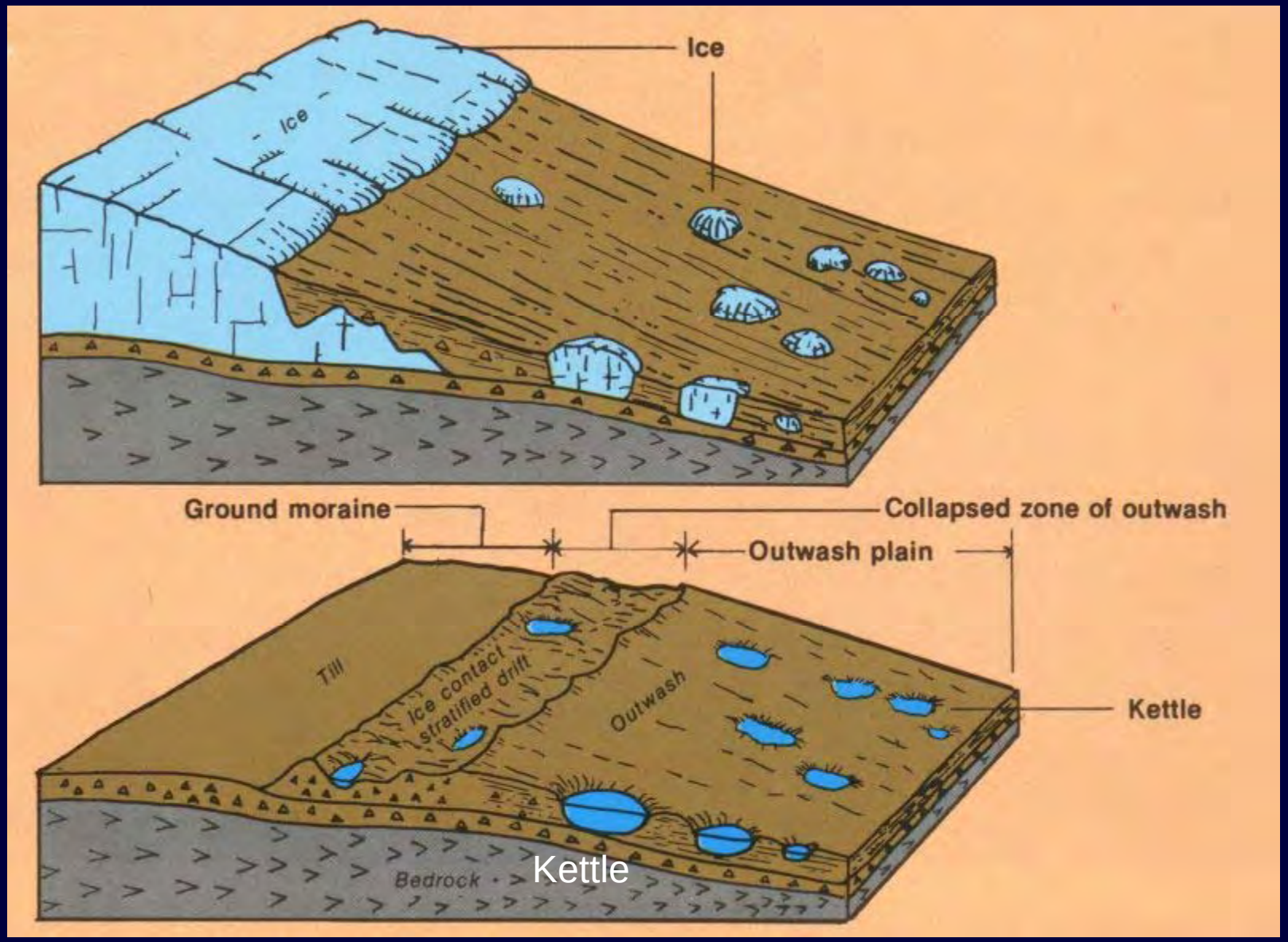


Lake Lenore, WA



e.g., Finger Lakes

Rick Allmendinger, Cornell


Ice
Ice
Ground moraine
Collapsed zone of outwash
Outwash plain
Till
Ice contact stratified drift
Outwash
Kettle
Bedrock

Kettle

Bering Glacier, after Jökulhlaup

Kettle lakes

Death of a lake

Catastrophic release

BCNostetoku lake after moraine dam failure

Wet meadow

Today:

Lake origins
Many different ways to make a lake or pond
Affects important characteristics of lakes

Thursday:

Hydrology

Lab – Dunham Pond zooplankton