ORIGINS OF LAKE OKANAGAN

By

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Information provided is primarily from a book entitled "Okanagan Geology, British Columbia" published in 2004 by the Kelowna Geology Committee.

INTRODUCTION

- **Precambrian Time**
  - **Vast granitic Continental Crust, Pangaea**
- **Paleozoic Time**
  - **Oceanic shelf environment, major mountain building**
- **Mesozoic Time**
  - **Island Arc archipelago, plate tectonic structure, Continental Drift, obduction, Interior Mountain Building, Massive Stream Erosion**
- **Cenozoic Time…the valley begins**

The Cenozoic Era (Tertiary and Quaternary Periods)

- **Initiation of the Okanagan Rift System**
- **Eocene Volcanic activity, explosive type**
  - **Knox Mountain, Mount Boucherie**
- **Development of White Lake River System**
- **Erosion of Highlands, Deposition onto Alberta Plains**
- **The rise of the Rocky Mountains**
- **Folding and Faulting in the Okanagan**
- **Mission Creek Fault**
- **Peneplanation of the Interior of BC**

Plateau Vulcanism

- **Uplift, Rifting, and Erosion, regional near-surface magma chamber.**
- **Widespread fluid basaltic flows erupt along fractures and inundate low relief valley system (200 to 300 metres local relief) including part of the Okanagan Valley (Wrinkly Faced Cliff, Oyama).**
- **Continued Uplift, Cooling of the Earth, High Precipitation, Erosion**

Preglacial Valley System

- **Massive deep erosion along fractured and fault-bounded rocky terrain in the Canadian Cordillera and Interior Plains.**
- **Development of major valleys; topography highly rugged with sharp bold profiles.**
- **Incision or dissection of the Thompson Plateau and Okanagan Highland**

THE ICE AGE

- Ice accumulation from massive snowfall
- Development of Cordilleran Ice Sheets

  -beginning with valley glaciers and ending with ice so thick, it overtopped mountains.
- Okanagan accumulation zone along Monashee Mountain Highland.
- Possibly at least six glaciations!

EFFECTS OF GLACIATION

- At least two major glaciations known for sure, including one major interglacial interval.
- Principle effects of glaciers are to:

  -deepen and widen the Okanagan Valley,

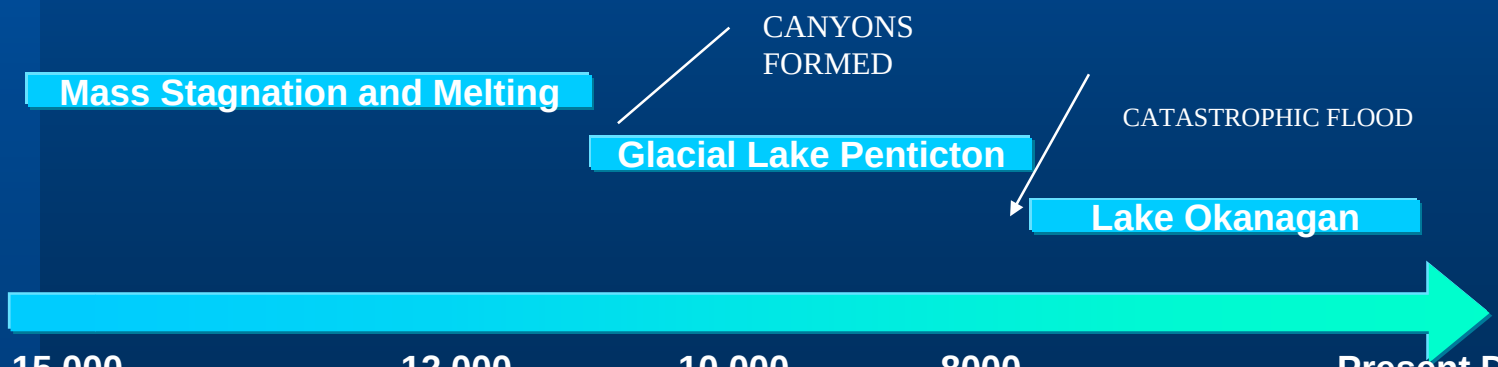
  -mantle the land with a variety of soil (glacial deposits) some of which are major landforms.
- Interglacial effect was to infill the valley.
- Seismic profiles of present day Lake Okanagan.

DEGLACIATION OF OKANAGAN

- **Plateau ice melted first; created high level canyons of Okanagan Mountain Park, for example.**
- **Ice experienced a still-stand in the valley about 300 metres above present lake. Glacial lake forms in Mission Creek Valley**
- **Massive erosion at this time created major canyons such as Bellevue, Naramata, KLO, BX, Deep Creek, Trout, Fintry. Debris dumped on ice. Glacial lake formed in Mission Creek valley.**

GLACIAL LAKE PENTICTON

- Drainage blocked at Okanagan Falls and Vaseux Lake by Remnant Stagnant Ice.
- Sediment accumulation in Glacial Lake Penticton around buried blocks of ice.
- Entry points form deltas of sand and gravel.



BIRTH OF LAKE OKANAGAN

- **Catastrophic failure of ice dam at Okanagan Falls, followed(?) by failure at Gallagher's Canyon.**
- **Erosion of lake basin, remnant silt bluffs , gullies, extensive terraces, alluvial fans.**
- **Ice-cored moraine in places such as at the "Bluffs" melted and formed kettles.**
- **Salmon migrate into Okanagan Lake.**
- **Bedrock relief is 2814 m, nearly twice as much as the Grand Canyon in Arizona.**

Present Day, Okanagan Lake

- 120 km long, 3.5 km wide, up to 232 m deep.
- Watershed area, 6187 sq km, ¼ the size of Switzerland.
- Mission Creek, largest tributary, accounts for 15% of input, 900 sq km watershed. Peak flow in June.
- Domestic, agriculture and Industrial use of annual water budget amounts to about 1 to 2%.
- 75% of annual water used in evapotranspiration, including unknown infiltration as groundwater.
- 22% of water inflows from surface drainage to the lake and to the Okanagan River, thence to the Columbia River in the State of Washington.

Geologic Processes in Recent Time

1. Erosion by streams and deposition of alluvial fans. Some fans like Bellevue, Fintry, McDougal, Bear, Mission, and Trout Creeks are “raised” indicating that they were deposited in water at a slightly higher level (2 to 6 metres guestimate) than today. Much of Rutland is located on the the “raised” Mission Creek Fan.
2. Large block landslides and sinkholes have affected the Silt Bluffs, large slumps of glacial lake clay have occurred, and debris torrents have affected all major streams.
3. The flatland of Kelowna was a vast river bottom (ancestral Okanagan River) with wide stretches of swamp in which organic material was deposited (the Mission Playing Fields and Swamp Road locality).
4. Beaches formed primarily due to reworking of glacial deposits.
5. Groundwater flows to the lake and is one of the main water supplies to sustain it.
6. Ogopogo evolved as a bottom creature; sightings are rare but peculiar “boils” and linear waves in calm conditions attest to the creatures presence…it produces a lot of gas.

Suggested Research

1. Detailed interpretation of lake bottom…bathymetry and physiography.
2. Investigation of upwelling phenomena, the “Ogopogo Effect”.
3. Quantity and influence of “Groundwater Seepage” into Lake.
4. Drift and Wind action related to shoreline development.
5. Bottom sediment types, erosional and sediment deposition history.
6. Resource portfolio elucidating vegetation and geology of major landforms along shoreline of lake.