Big Payette Lake Water Quality Council

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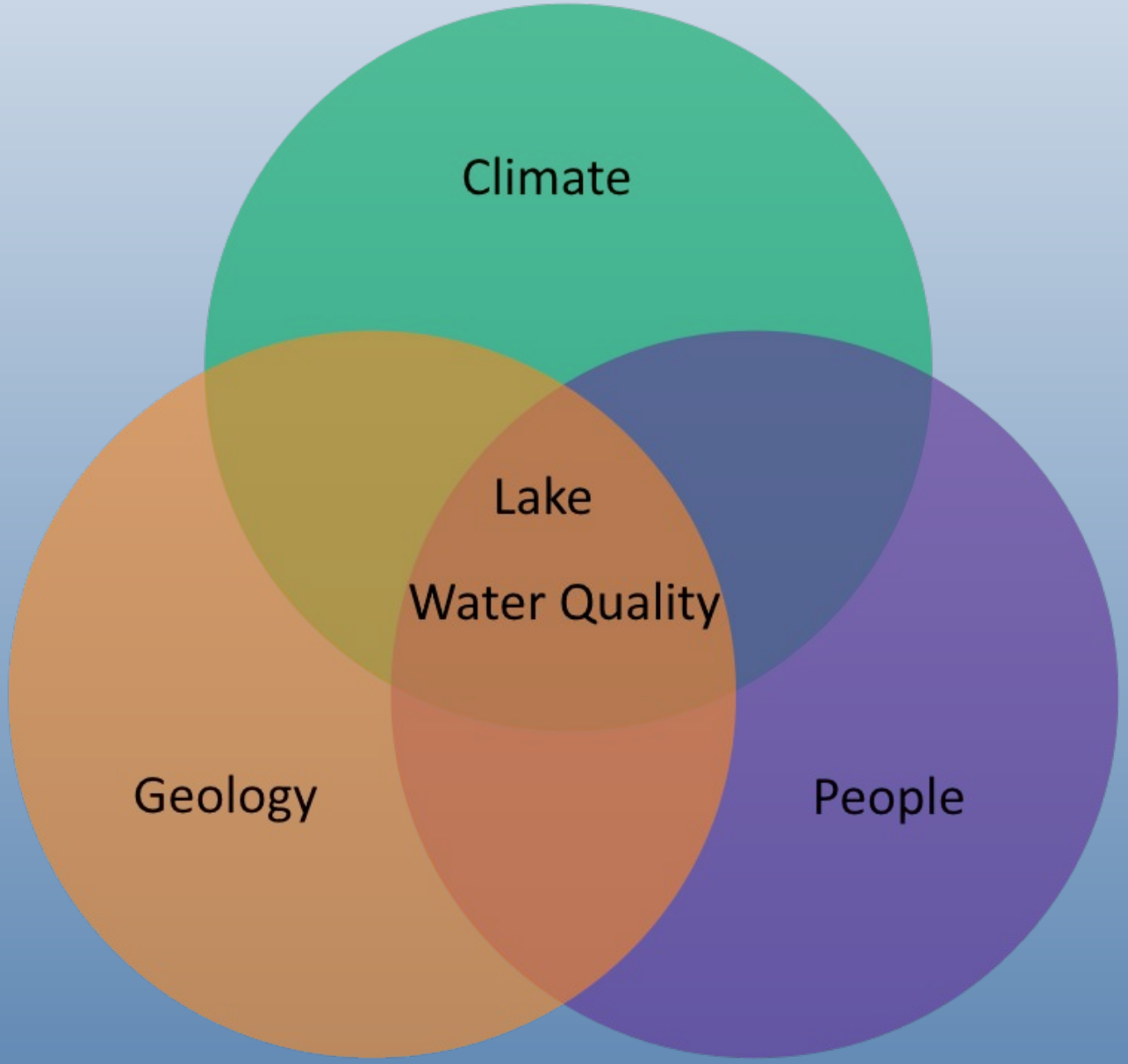
Who we are, What we do

- Non-profit, all-volunteer board, charitable 501.c.3 organization
- Mission to protect and sustain the water quality of Big Payette Lake
- Carry on the legacy of the first Water Quality Council
- Engage citizens, City, County and State government
- Presently supporting a University of Idaho near-shore study of the lake
- Ready to welcome a prospective new, statutory Water Quality Council

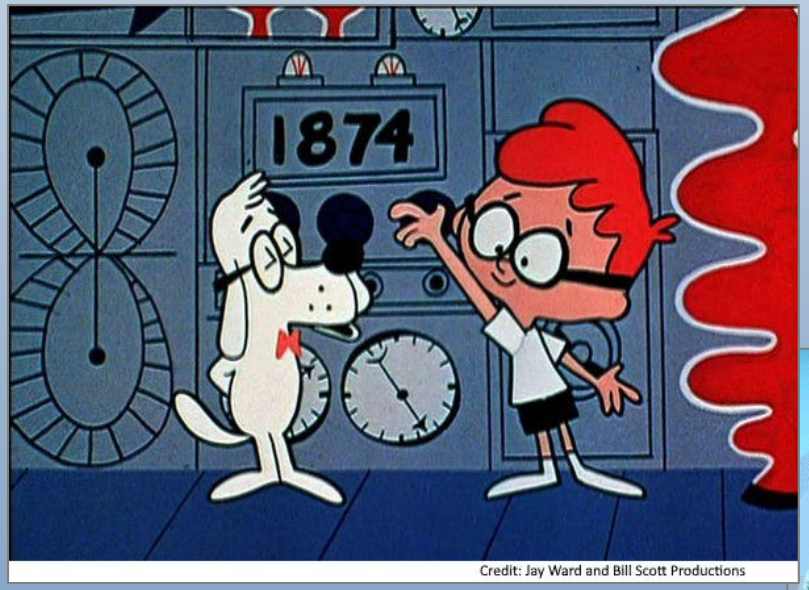
A Brief History of Two Lakes and a Watershed

Three Factors for Water Quality



Set the Stage

First, let's go Waay Back...

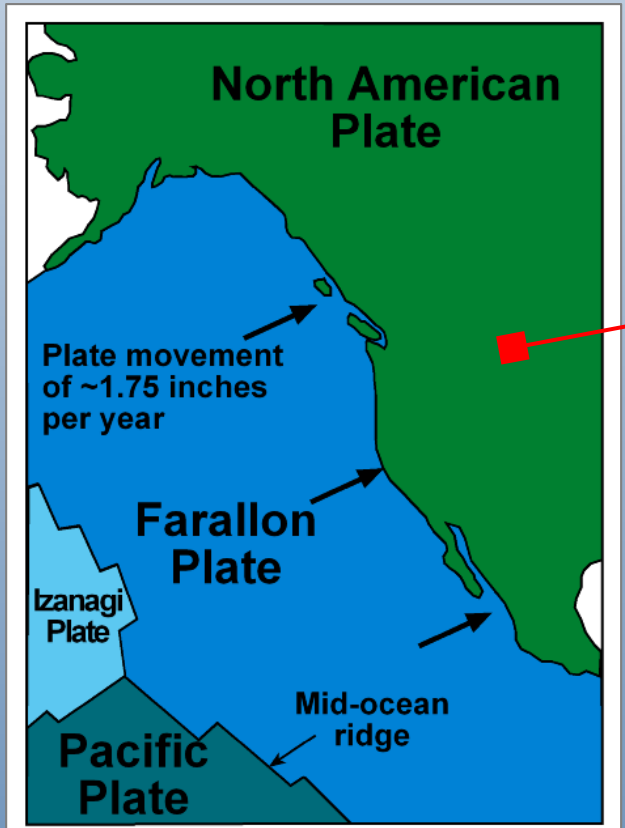


Credit: Jay Ward and Bill Scott Productions

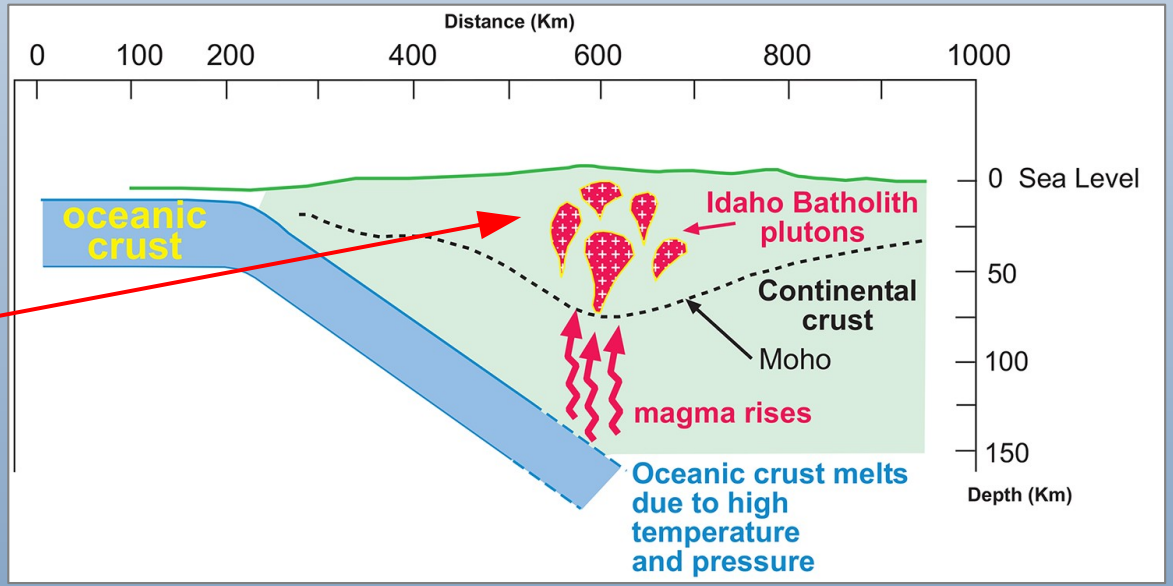
...to see how we got here...

Regional Geology

Quick and Dirty Origin of the Northern Rockies
150 to 50 Million Years Ago (Mya)



100 Ma (Middle Cretaceous) Plate tectonic configuration. Redrawn from Orr and Orr (2002).



- Farallon plate slides under the North American plate
- Rocky Mountains rise from uplift and compression
- Idaho batholith bubbles up to our east
- Pacific coast shifts from ~ Riggins to its present location

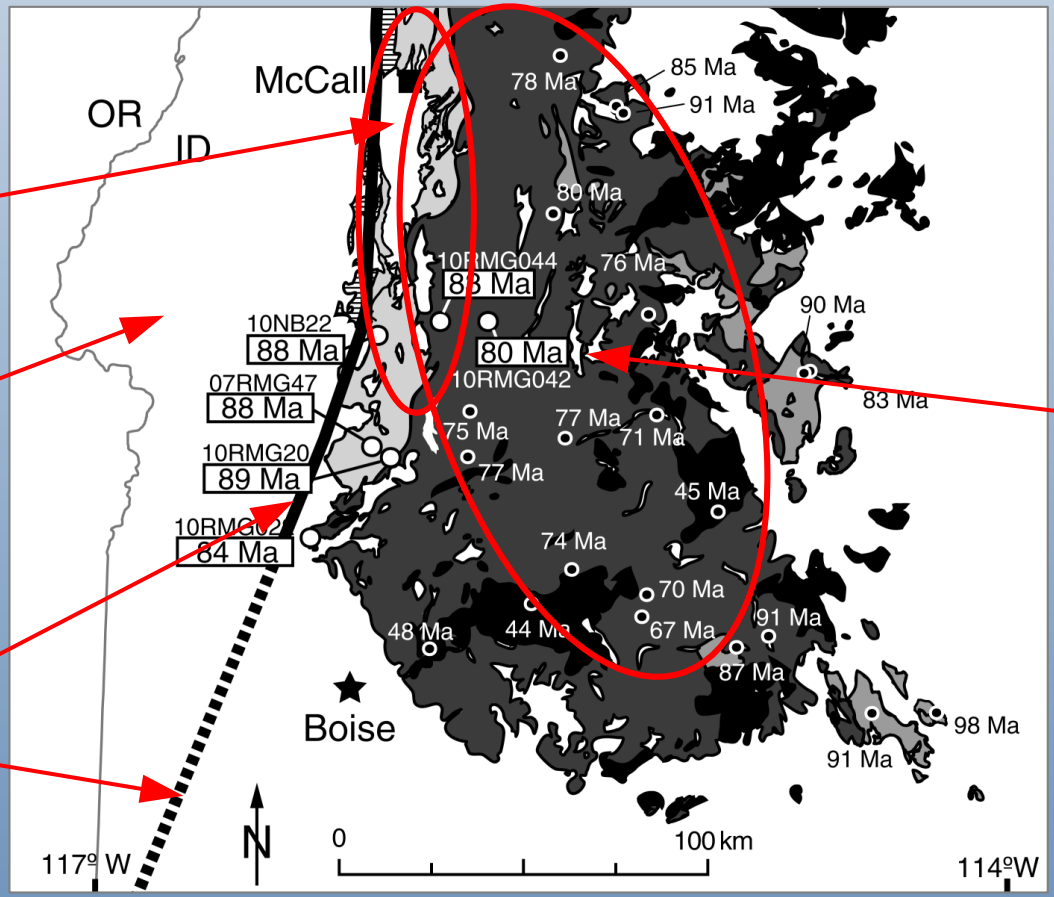
Local Geology

Quick and Dirty Origin of Long Valley
~80 Million – 25 Thousand Years Ago

Long Valley

Pacific Terranes

Western Idaho Shear Zone



Idaho Batholith

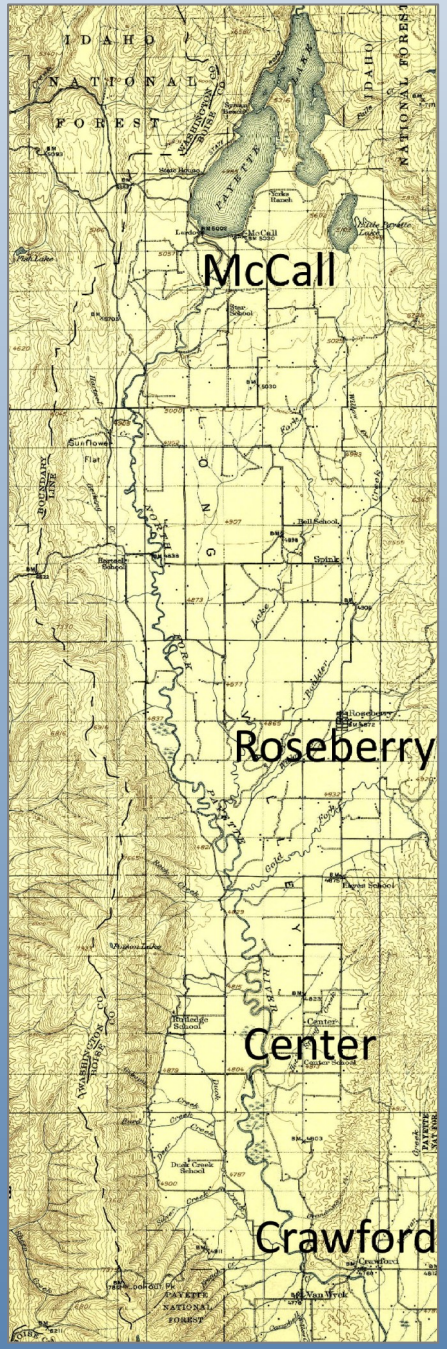
- Shear zone escarpment (West Mountain) rises to the west
- Idaho batholith rises to the east
- Block faulting spreads the valley floor
- Erosion and glaciers level and fill it in

Credit: Adapted from Lithosphere. 2017;9(2):157-183

Climate and People in Long Valley

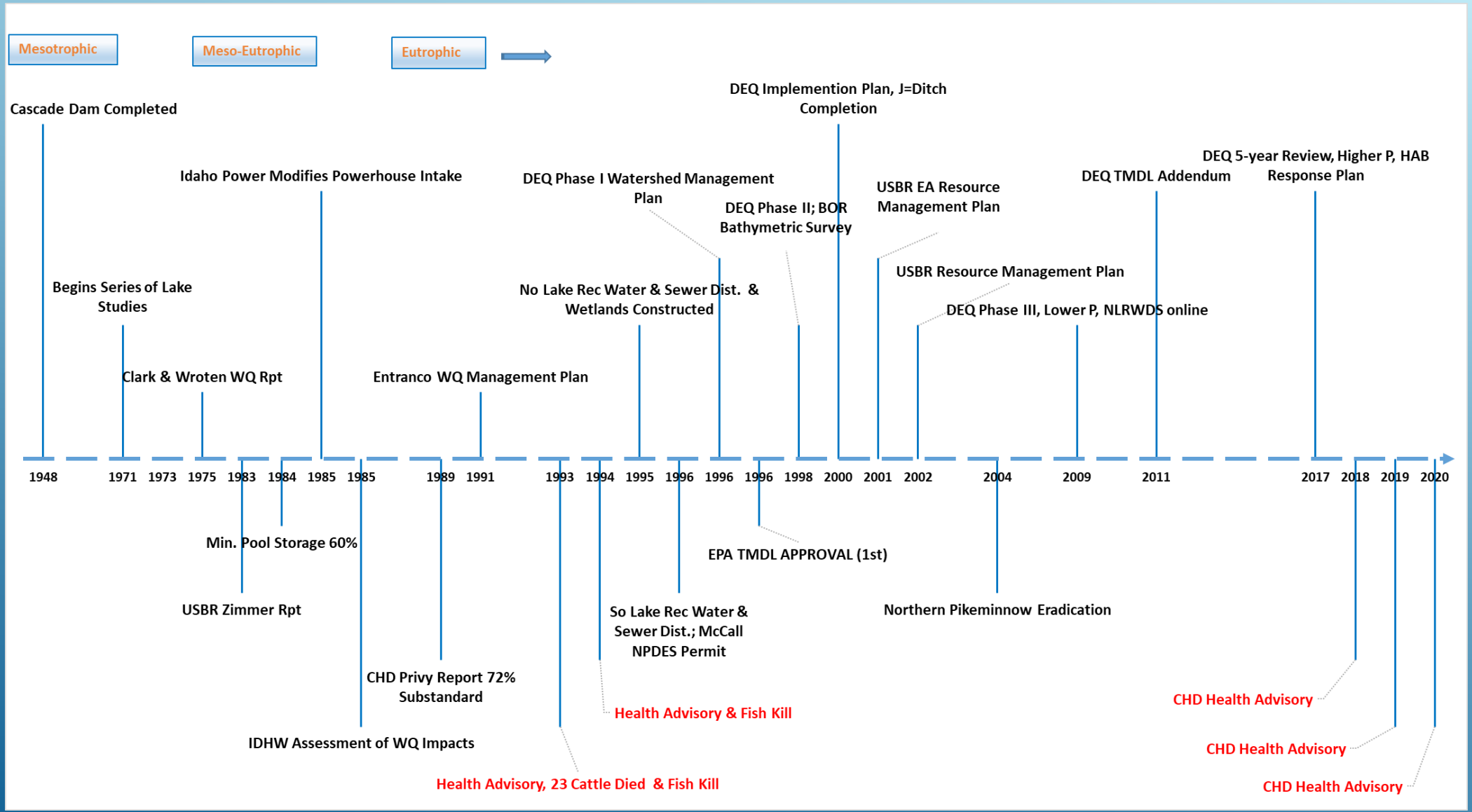
20,000 years ago - 1948

- Last ice age ends with Pinedale glaciation ~20,000 years ago
- Big and Little Payette Lakes fill behind terminal Pinedale moraines
- Mammoths roam, interglacial climate warms, then people ~12,000 years ago
- European immigrants displace Sheepeater and Nez Perce people ~1850
- Valley is settled, farmed and grazed, towns started by ~1870
- Sockeye salmon commercial fishery and cannery at Lardo ~1900
- First major sawmill at McCall built 1910
- Railroad from Emmett to McCall begins service 1914
- Influx of vacationers, exports of lumber by rail accelerate growth
- Payette Lake designated as a resort, first irrigation dam on the lake 1920
- Little Payette Lake and Black Canyon dams built 1924
- Cascade dam begun 1942, finished after WWII 1948
- Progressively warmer conditions affect fire, water and biology



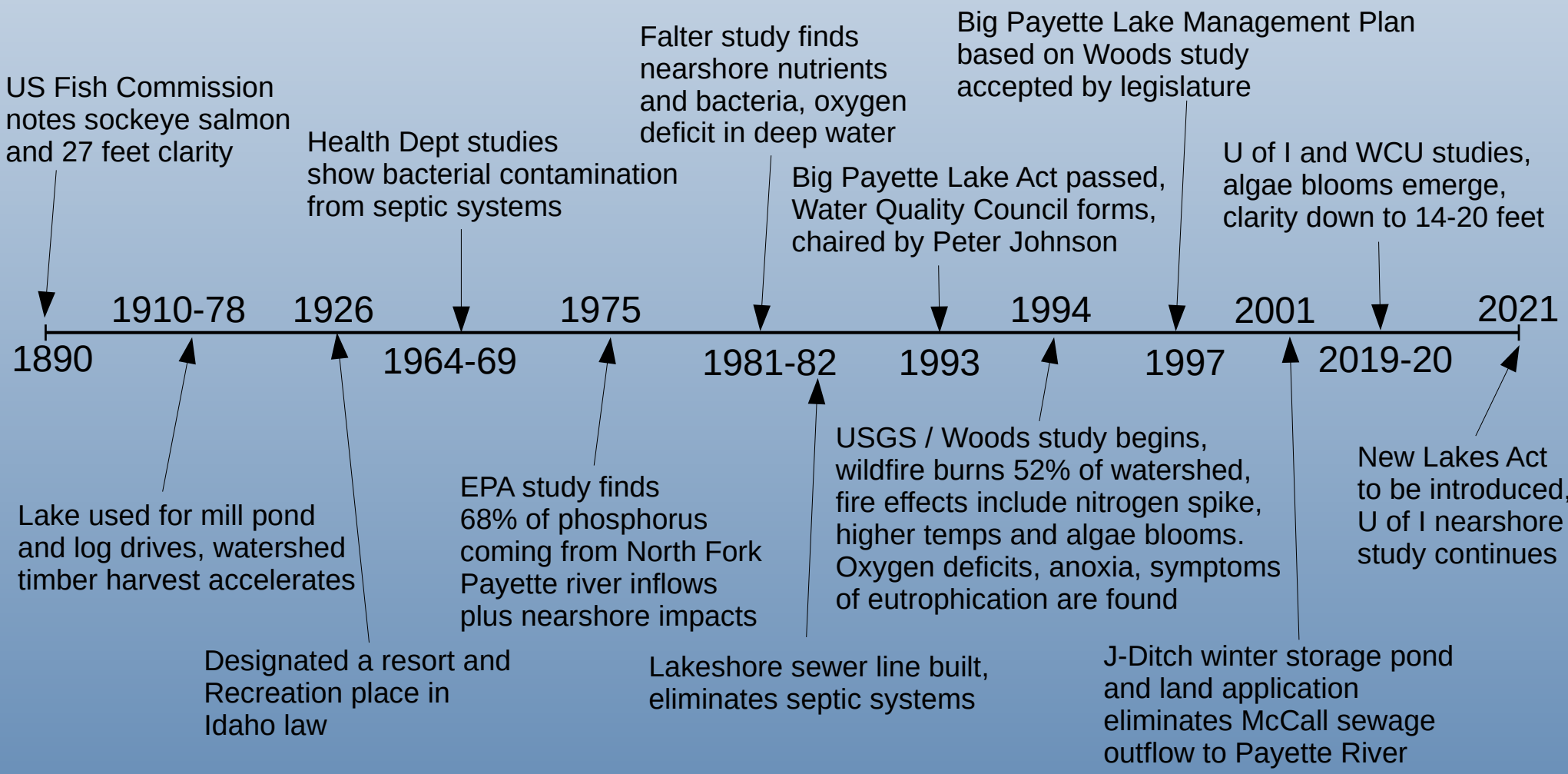
From 1911 USGS Topo

Lake Cascade
Water Quality Timeline



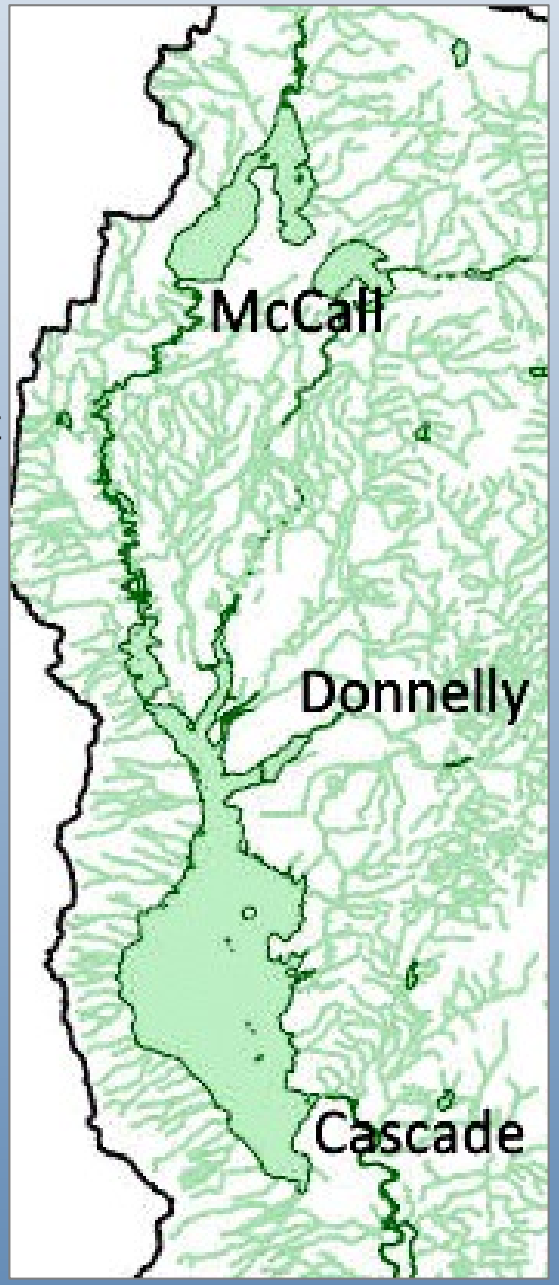
Courtesy: Lenard Long

Big Payette Lake
Water Quality Timeline



Factors Shared by Both Lakes

- Increased population, shoreline development and urban runoff
- Lake recreation intensity and effects increasing
- Shared watershed - Granite soils erode, yield phosphorus and sediment
- Cumulative effects of 100 years forest cover loss from fire and logging
- A warming climate contributes to warmer, more productive water
- Algae blooms degrade water quality and impede beneficial uses
- Invasive aquatic species displace natives and add to productivity
- Low funding levels for water quality monitoring and studies
- Voluntary water quality measures have had limited success
- Leadership and education on freshwater ecosystems is needed
- Dated lake management plans



Differences Between the Lakes

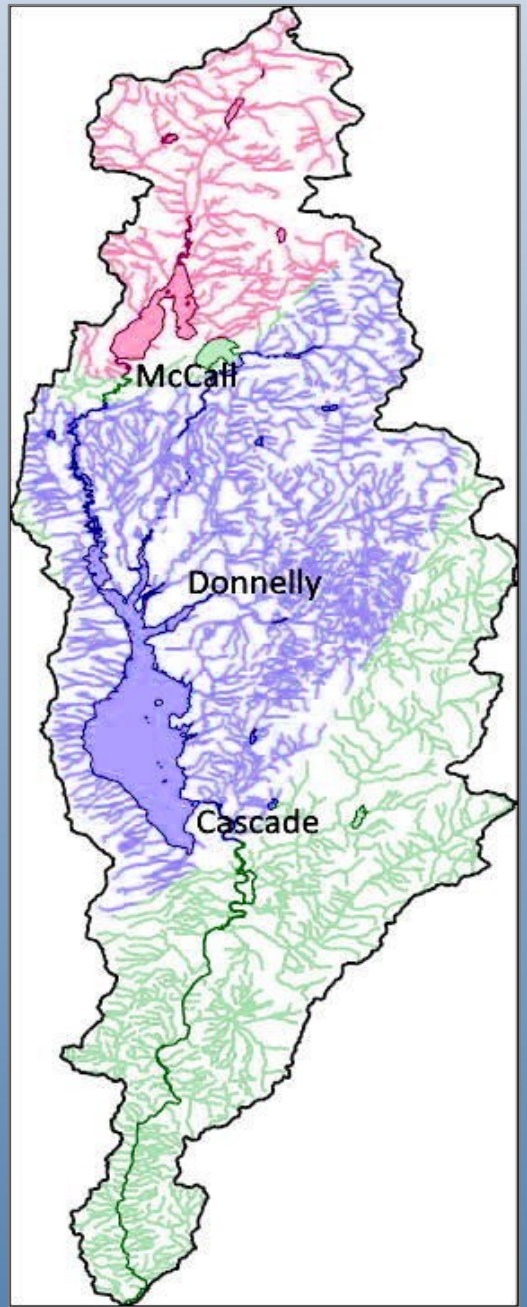
…History, Characteristics and Impacts

Big Payette Lake

- Deep glacial lake, about 5 miles long and 20,000 years old
- Seen as “special” - Designated health resort and recreation place in 1926
- Public drinking water supply for 3,000 – 20,000 residents and visitors
- Algae blooms observed, but not well understood
- Fires burned 52% of watershed in 1994

Lake Cascade

- Shallow reservoir, about 20 miles long and 73 years old
- Incidents and health advisories with toxic blue-green algae blooms
- Major seasonal and irrigation storage lake level changes
- Designated as water quality limited with TMDL (pollution budget) by EPA
- Significant impact from agriculture



So, Where does that leave us?

...Mammoths may be gone, but there are still ***elephants in the room***

Geology

- Watersheds are mostly erosive granite
- Sediment and nutrients go downhill
- The lakes are at the bottom of the hill

Climate

- Effects of a warming climate:
  - Water temperature, quantity and timing changes affect lakes
  - Wildfires - more and bigger - changing vegetation

People

- We build dams, change the landscape, put the watershed to work, and play on the lakes
- We may use history and science to understand the facts
- We can choose to solve even very large water quality problems, or choose to give up