



# Changes in the buffering function of wetlands over the last century

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QRRRC Open House



# What are wetland 'functions'?

- Provide important habitat
- Mitigate flood events
- Sequester nutrients and other elements (carbon)
- Regulate the flow of sediment



A photograph of a wetland area with tall reeds and a body of water in the background.

# Wetlands in the Quesnel River Basin

Total number of wetlands = 5897

Total Area = 168 km<sup>2</sup>

% Land area = 1.6%



# Research question

How are wetland functions impacted by a land disturbance?

How is a wetland's buffering function impacted by historical forestry practices?



# Those impacted by logging?

100 m = 4709 (80%)

50 m = 4552 (77%)

0 m = 4288 (73%)



# Where I've been hanging out

## Boswell Lake

## Viewland Lake



(Quesnel River Watershed)

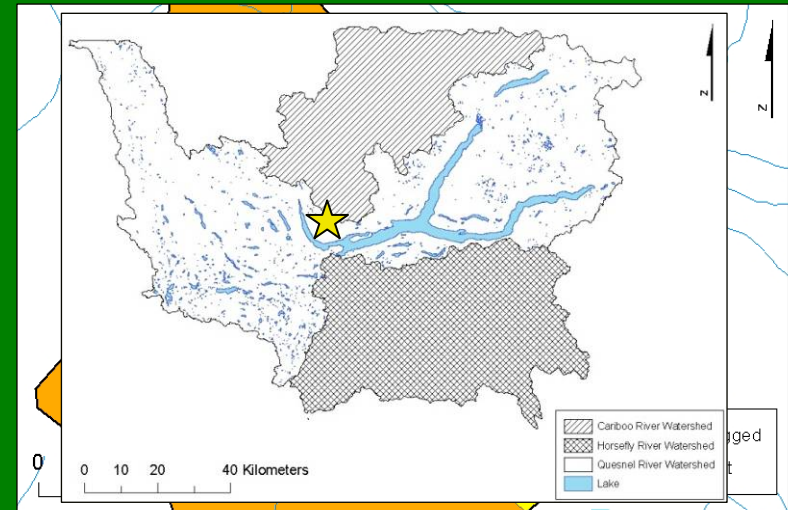


(Horsefly River Watershed)

# A few more details

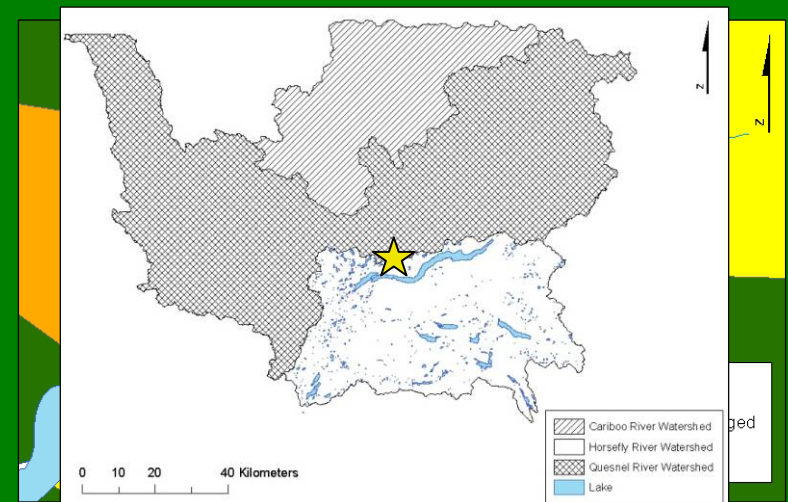
## Boswell Lake

- Logged: 1961
- % area logged: 23%
- Catchment area: 210 ha
- Lake: 11 ha
- Wetland: 1.74 ha



## Viewland Lake

- Logged: 1984
- % area logged: 58%
- Catchment area: 245 ha
- Lake: 7 ha
- Wetland: 7 ha





What was she doing what all that PVC pipe?



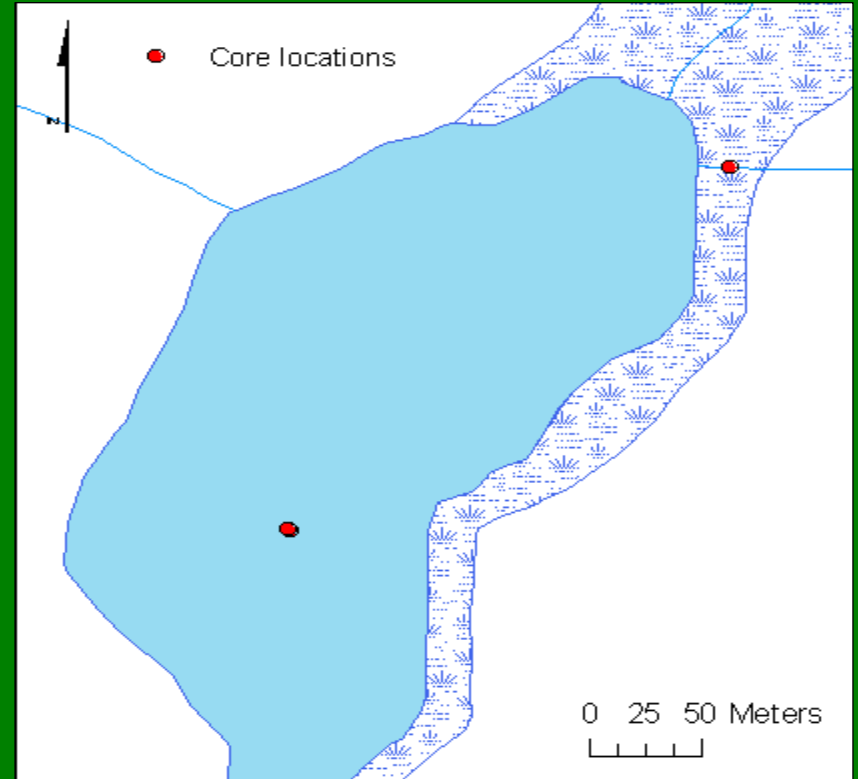
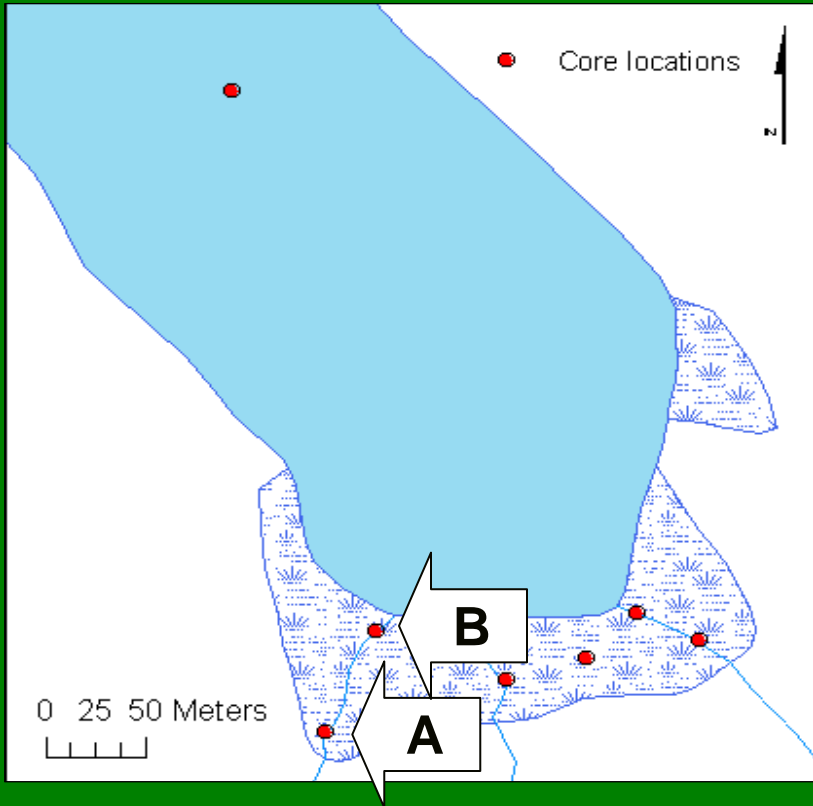
Rob Little



Ty Smith

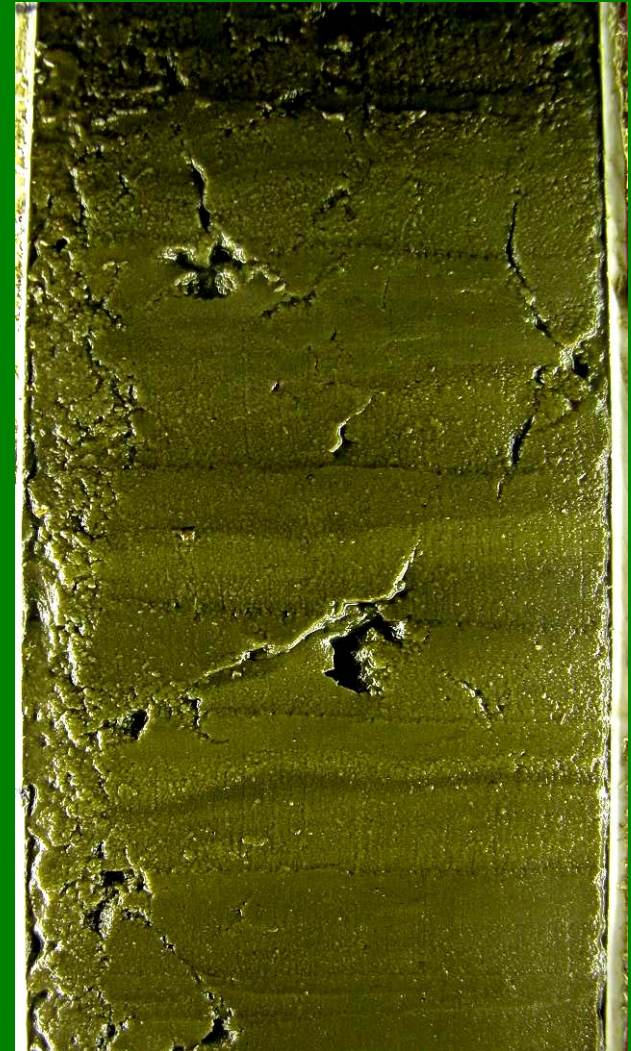


# Sampling locations



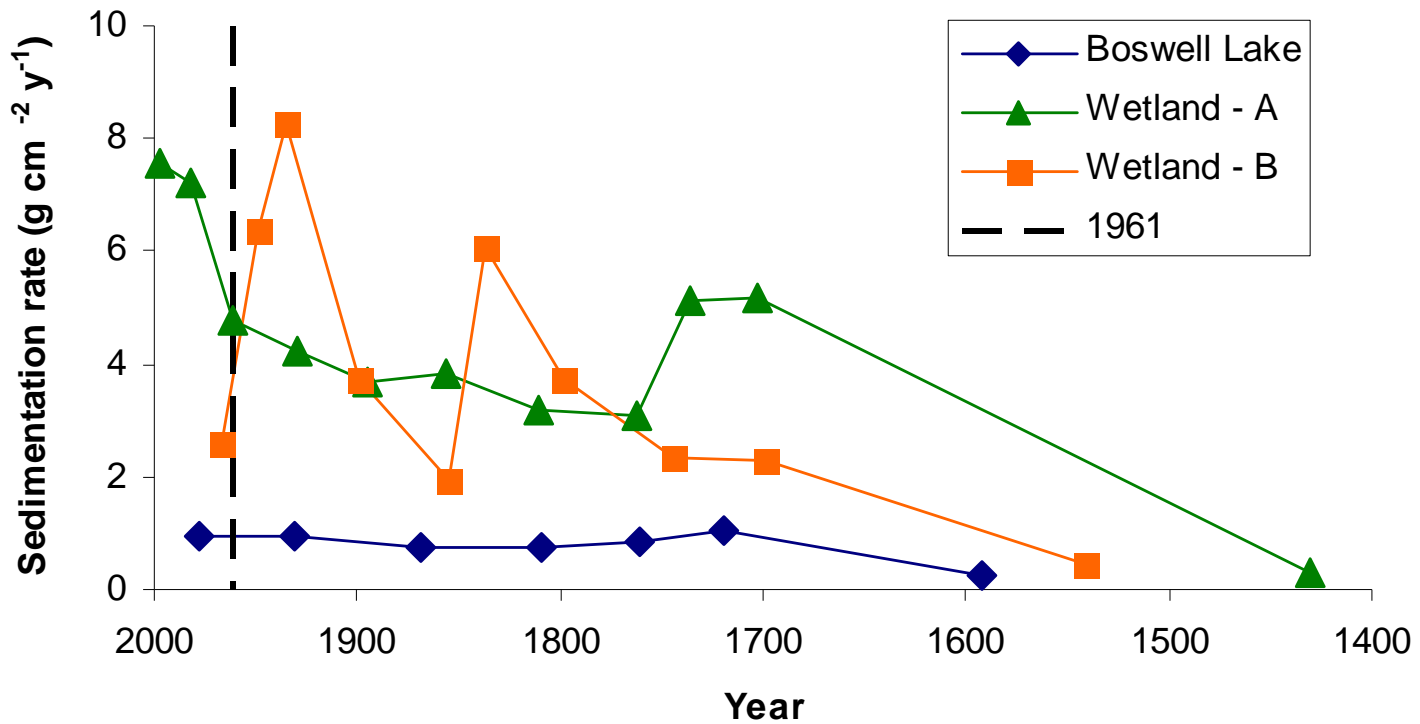
# Proxy indicators

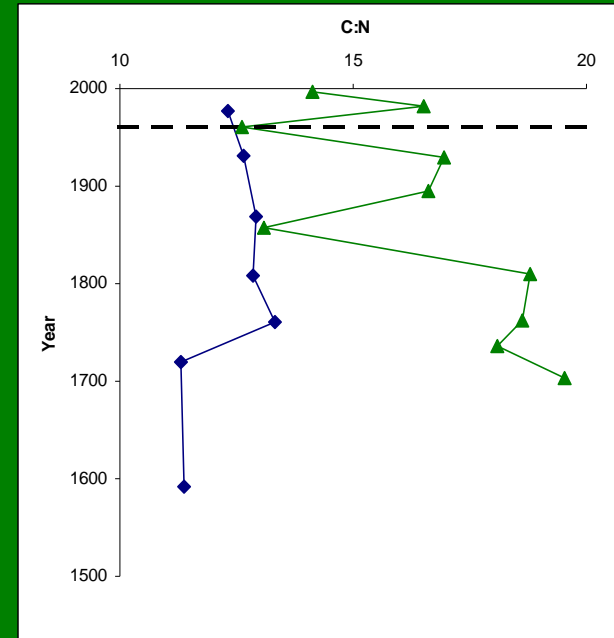
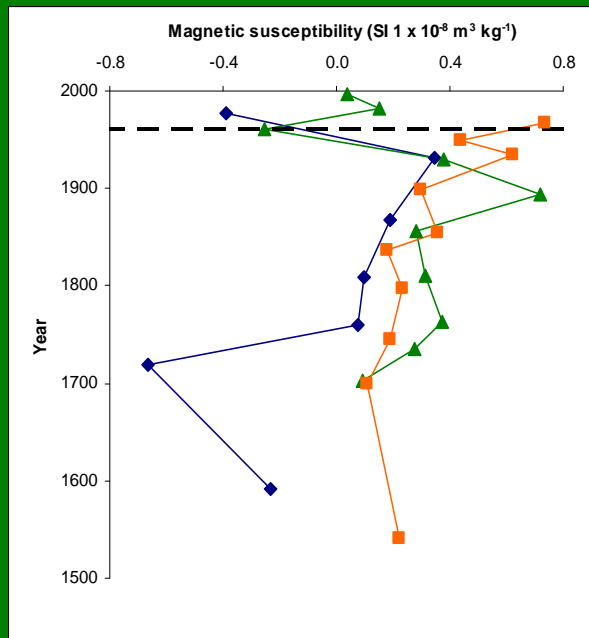
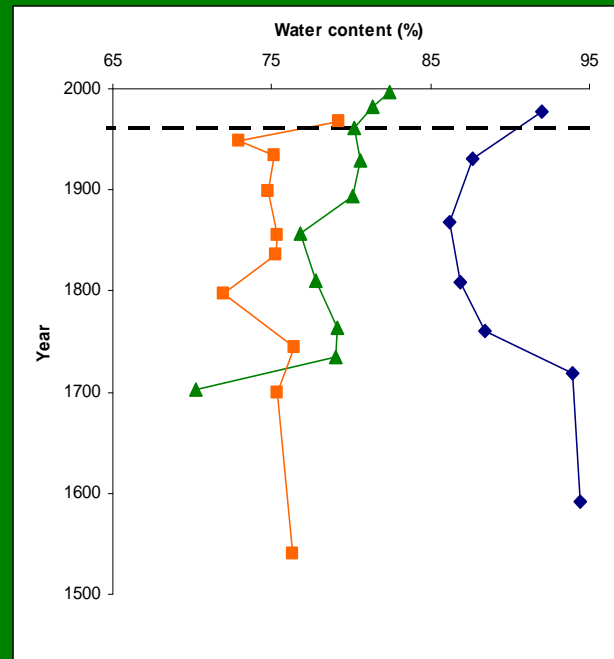
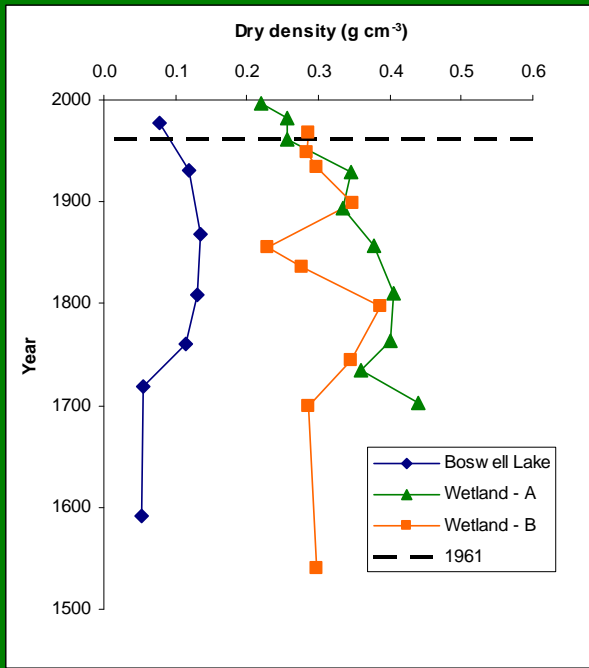
- Core Chronology
  - $^{210}\text{Pb}$  &  $^{137}\text{Cs}$
- Bulk Physical Properties
  - Bulk density, %  $\text{H}_2\text{O}$
- Magnetic susceptibility
- C & N





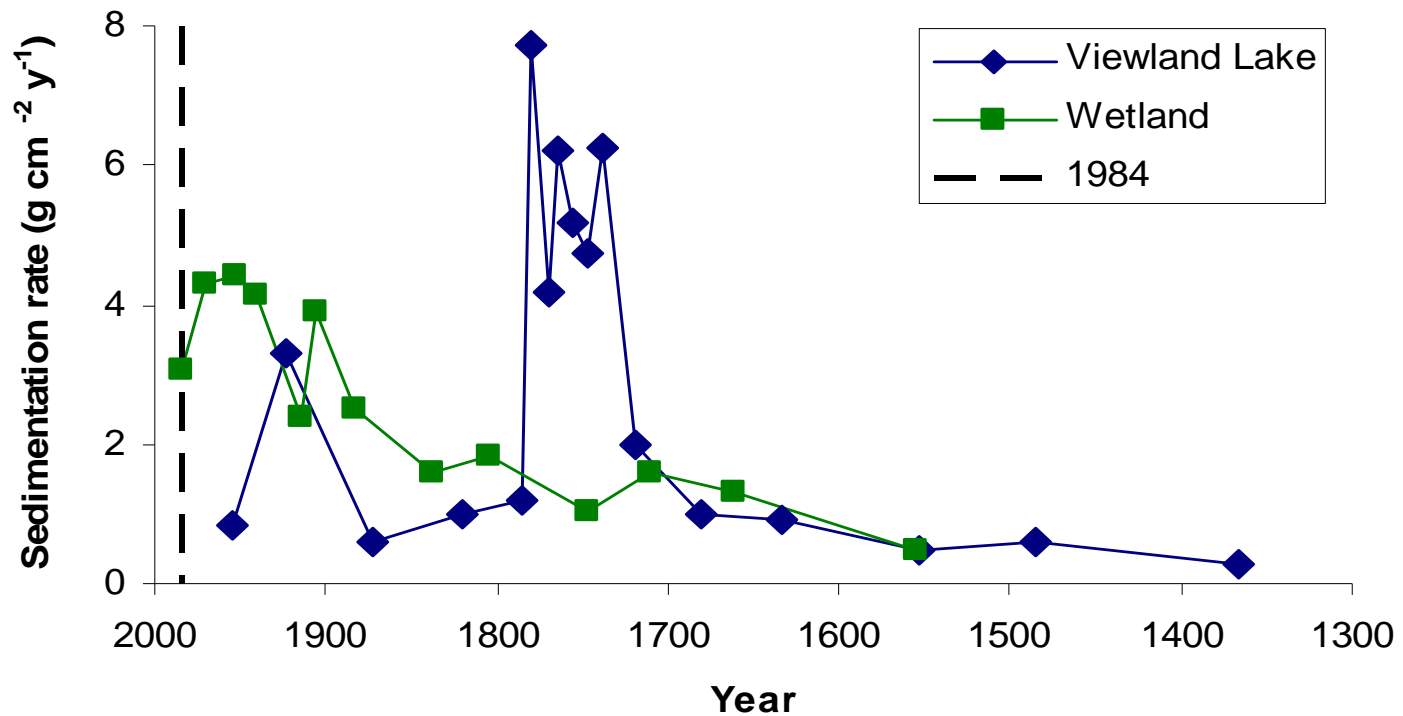
# Boswell Lake



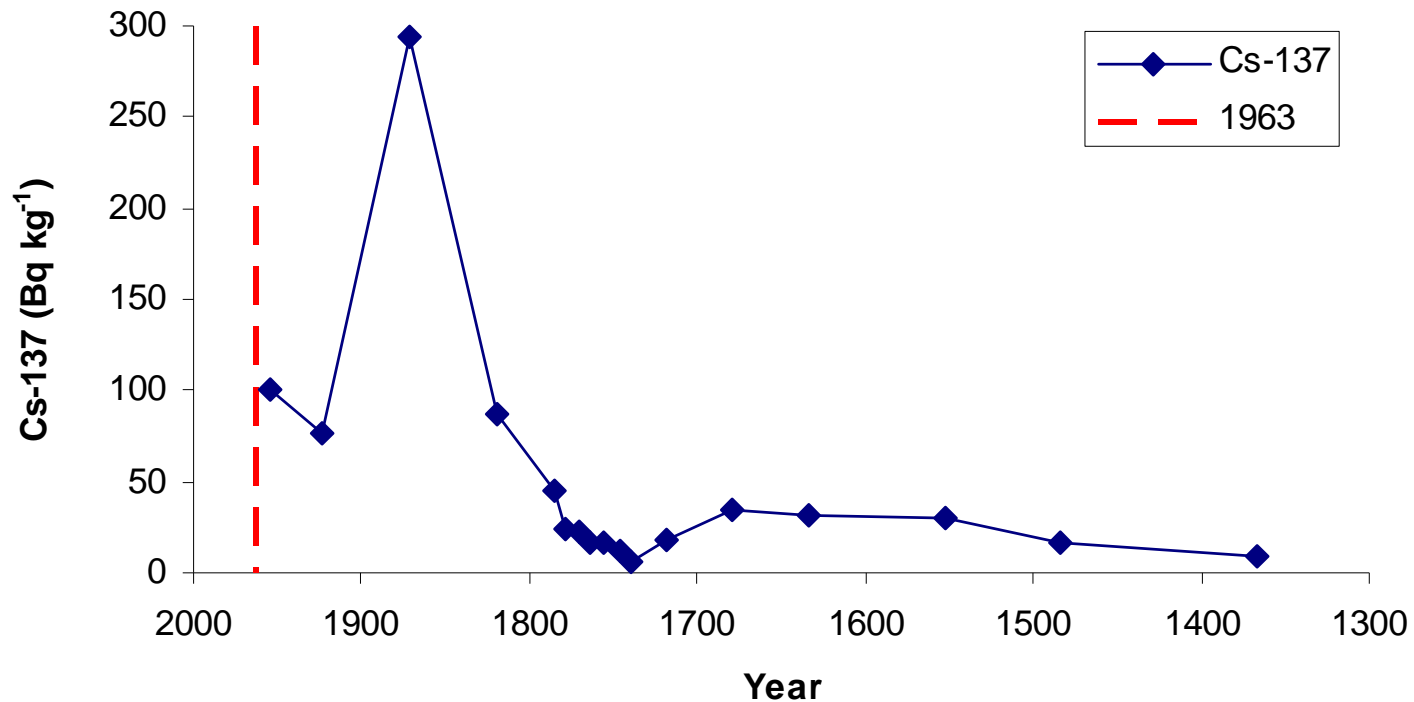




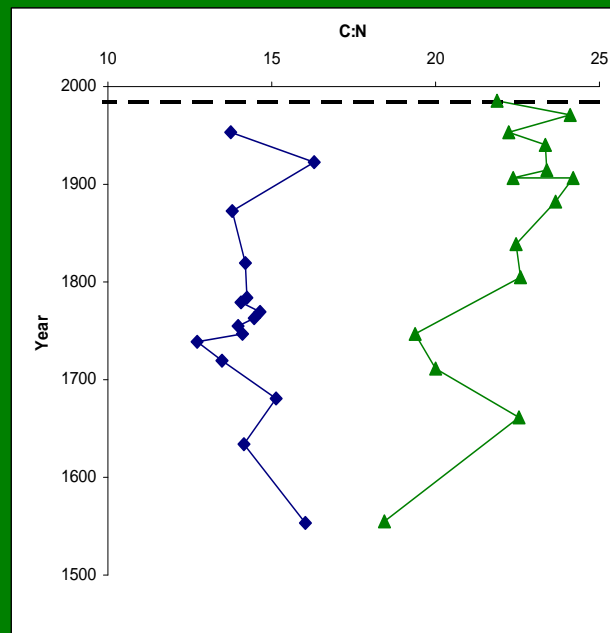
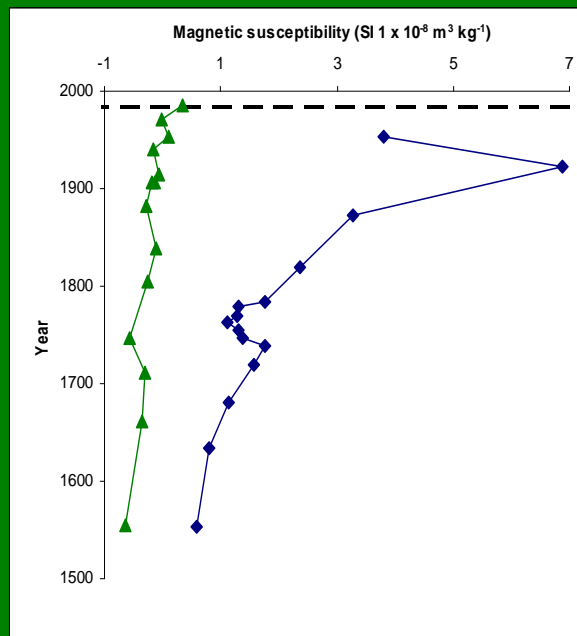
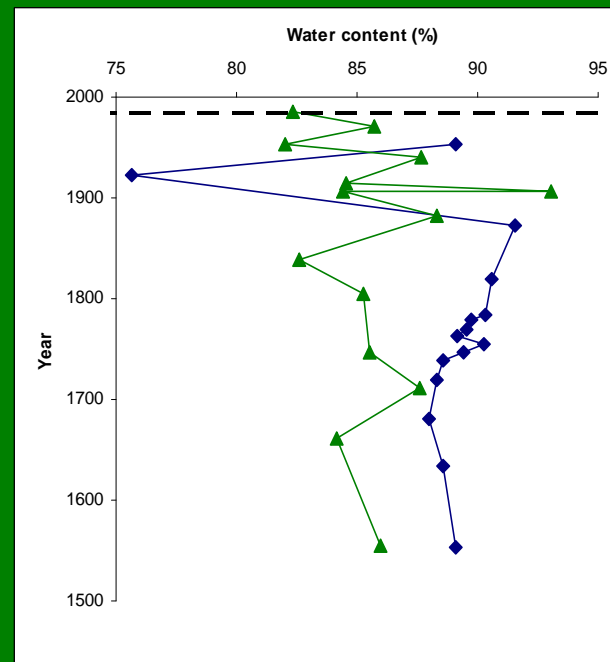
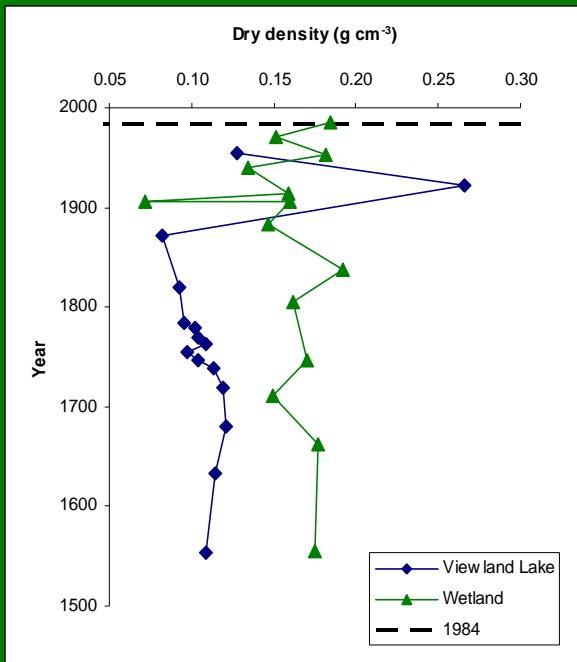
# Viewland Lake



# Accurate dating model?





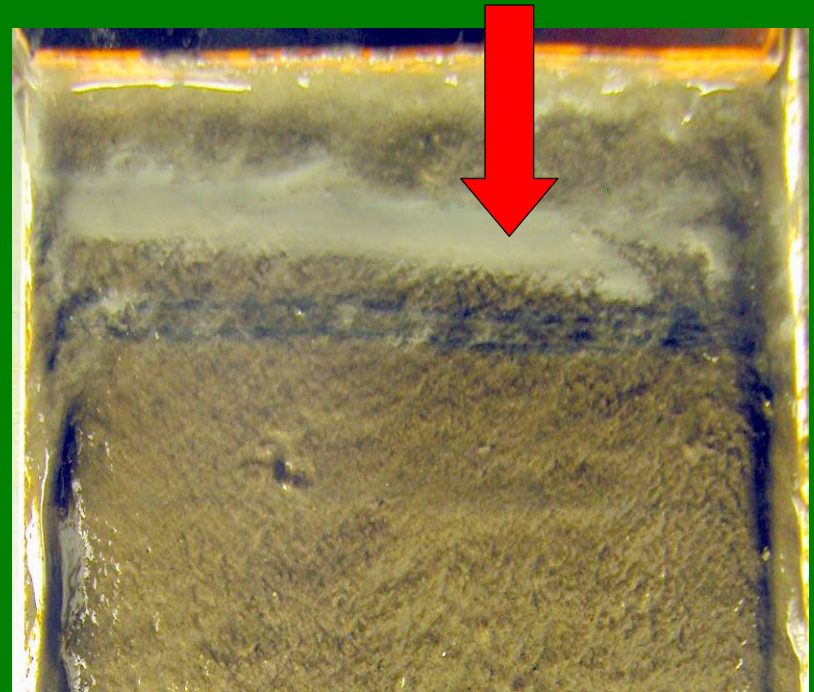


# Boswell vs. Viewland

Number of stream crossings by roads...



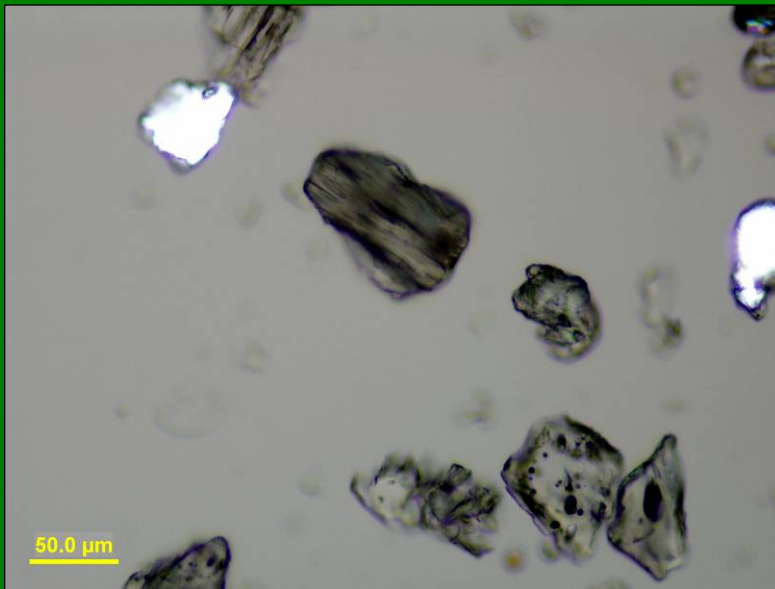
Boswell: 0  
Clay layer absent



Viewland: 1 + culvert  
Clay layer present

# Long-term sedimentation

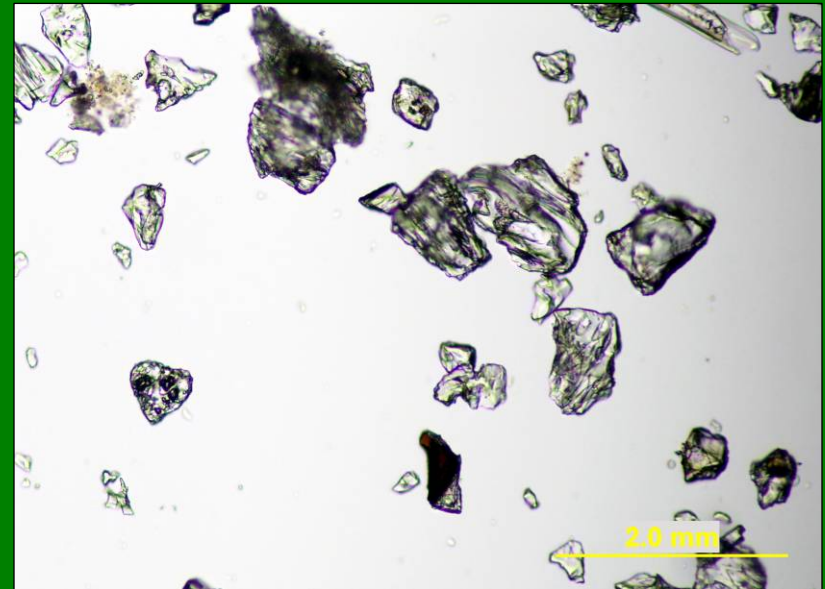
## Bridge River (2350 years BP)



Boswell Lake (at 56 cm)

Mean sedimentation rate =

$0.0018 \text{ (g cm}^{-2} \text{ y}^{-1}\text{)}$



Viewland Lake (at 67 cm)

Mean sedimentation rate =

$0.0032 \text{ (g cm}^{-2} \text{ y}^{-1}\text{)}$



# Sediment source tracing

- Deforested
- Undisturbed forest
- Road surface
- Channel bank
  
- % contribution by each land use type?



Phil Owens

# Summary

- Sedimentation rates have generally increased over time
- Recent changes in proxies may be the result of changing sediment sources
- Stream crossings by roads may have an impact on sediment delivery and wetland buffering





# Acknowledgments

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- Supervisory committee

