

# Productivity and Environmental Conditions Following the Permian-Triassic Mass Extinction: Lower Triassic Rocks from the Western Canada Sedimentary Basin

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- Trace element analysis and determination of %TOC and %TIC from sedimentary rocks deposited in the Western Canada Sedimentary Basin during and following the Permian-Triassic mass extinction suggest the following:
  - Primary productivity collapsed at the Permian-Triassic boundary, but recovered rapidly, within a few 10's of thousands of years.
  - Primary productivity remained robust through much of the remainder of the Early Triassic based on high %TOC values and elevated levels of Cu, Ni and Zn compared to World Shale averages.
  - Widespread anoxic conditions in deep water environments was likely the result of high levels of primary productivity.
  - High rates of primary productivity likely resulted in stresses that limited recovery to a narrow habitable zone along northwestern Pangea during the Early Triassic

## Depositional Model for Lower Triassic Rocks of the WCSB

### Basinal Facies

Laminated silty shale. Anoxic. Evidence for high primary productivity and good potential for preservation of organic matter (TOC values typically 5-10%).

### Turbiditic Sands

Interbedded sandy turbidites and silty shale. Anoxic to suboxic. Moderate potential for preservation of organic matter (TOC values typically 2-3% for sandy units and 5-10% for silts and shales). Rare trace fossils.

### Lower Shoreface

Hummocky cross-stratified sandstone. Oxygenated, low potential for preservation of organic matter (TOC values up to 2%). Common trace fossils.

