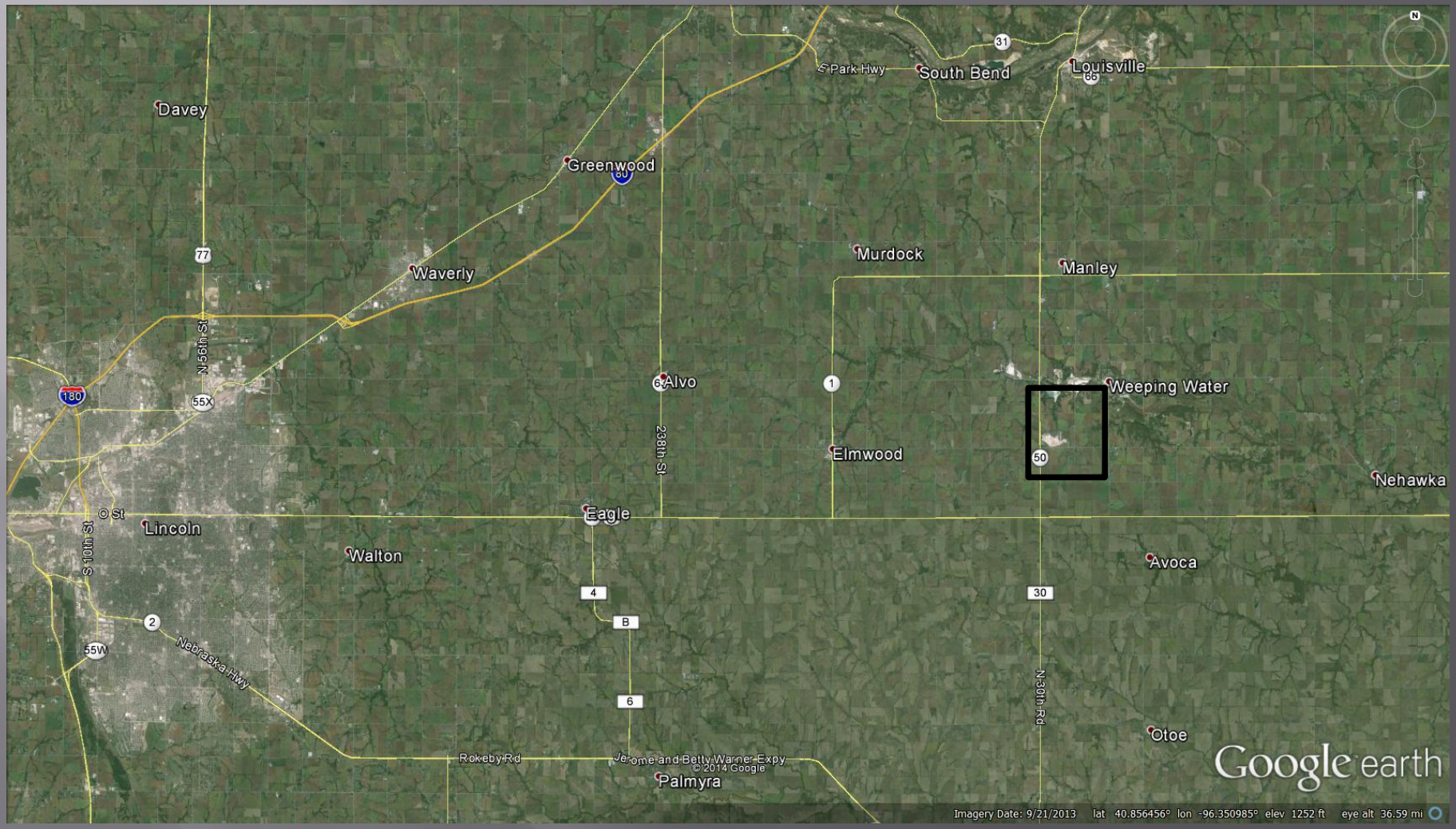
GEOLOGY OF WEEPING WATER NEBRASKA

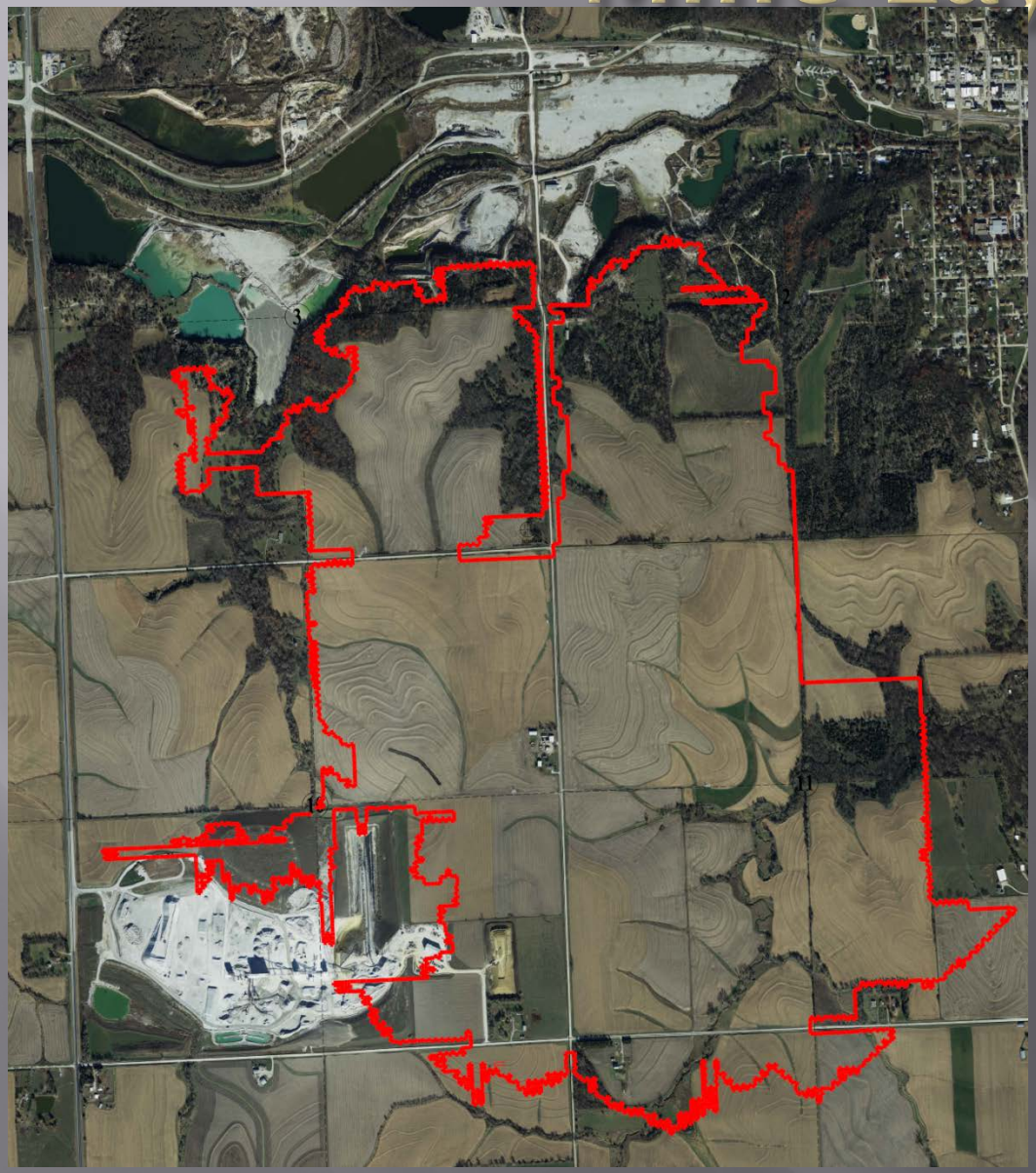
9/10/2014

General Location



Weeping Water Area

Mine Layout



- Covers 1090 acres
- 1.8 miles from north to south
- 2 miles east to west

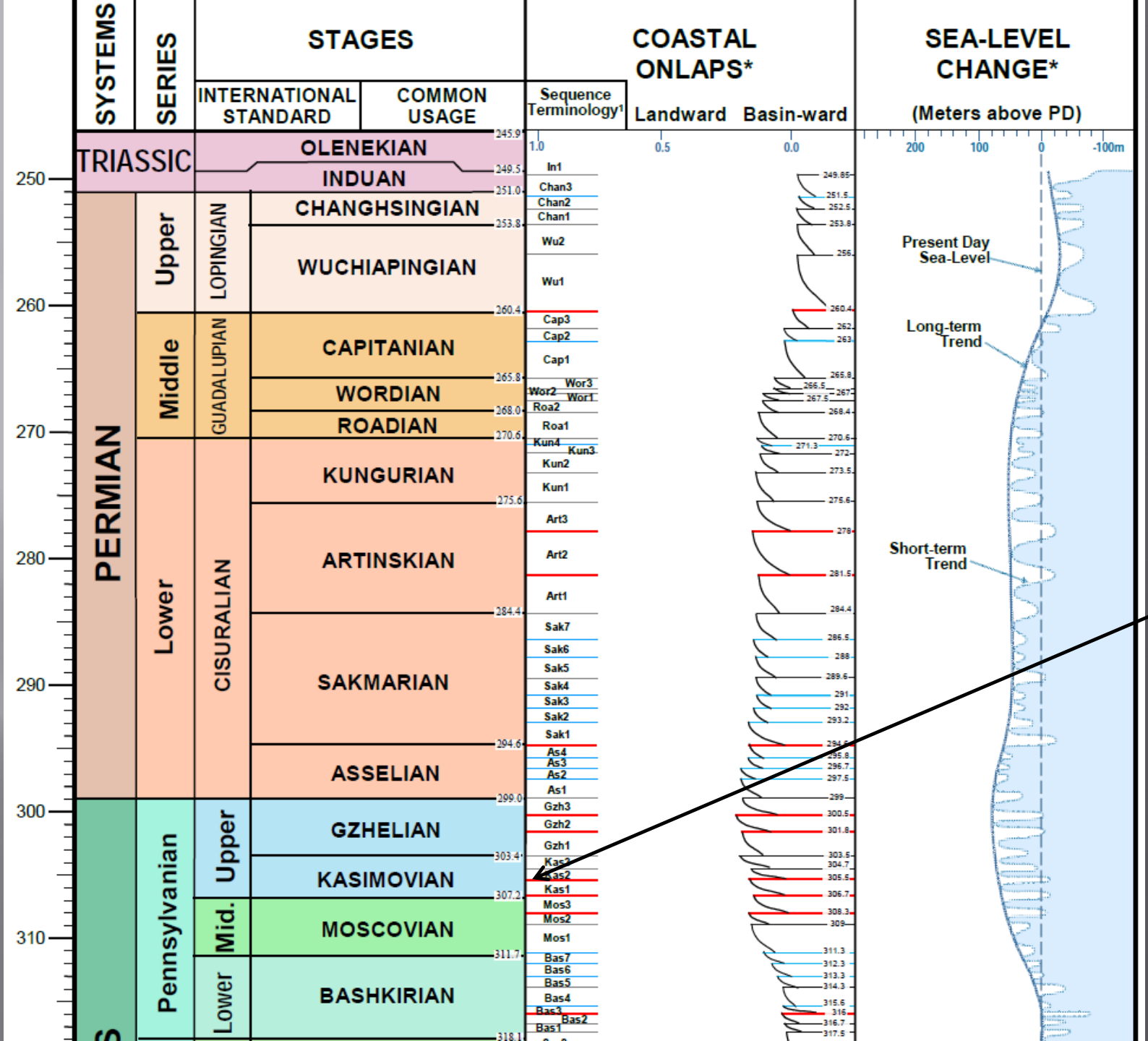
Late Pennsylvanian Paleogeography

- Rock in mine was deposited in shallow water in the northwestern part of a shallow sea
- Rock is ~305 million years old

Mine Stratigraphy

Deposition Cycles

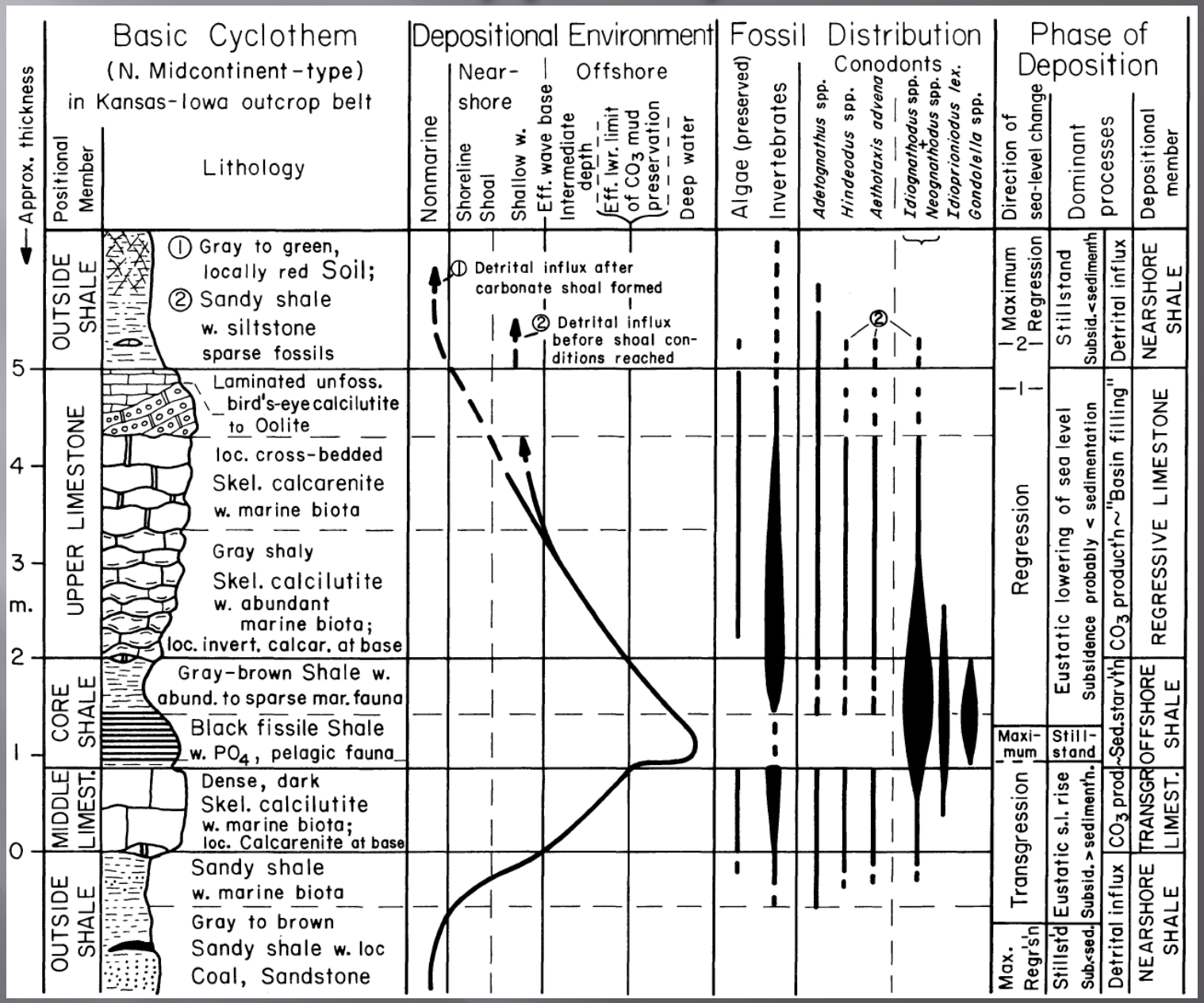
- Rock in the mine was deposited during periods of rising and falling sea level controlled by glaciation at the south pole
- Thickest limestone units formed during early stages of glaciations
- Thinnest limestone units formed during early stages of interglacial periods



Rock in mine deposited

Exxon, 1998

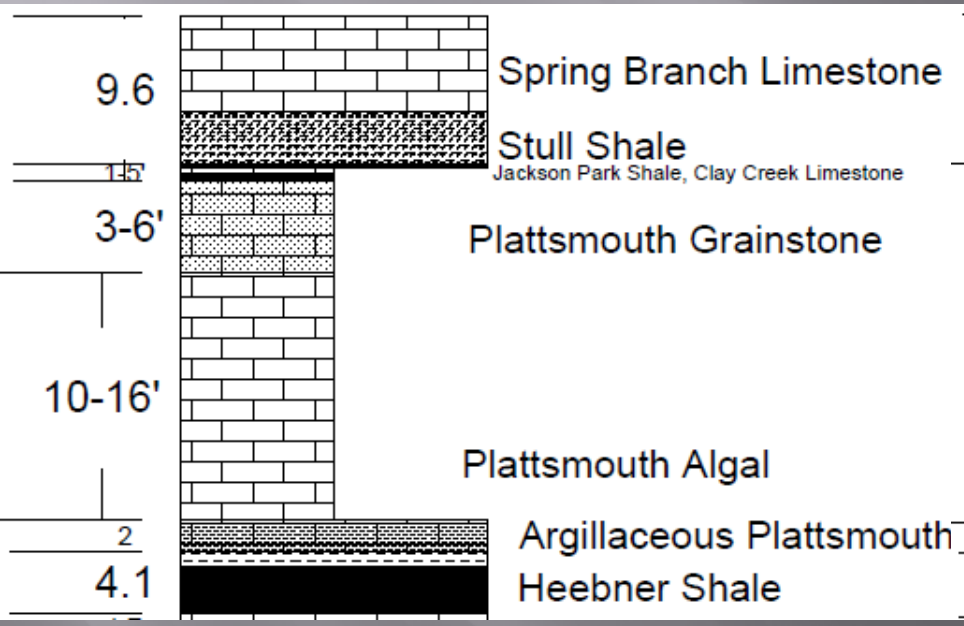
Kansas Type Cyclothems



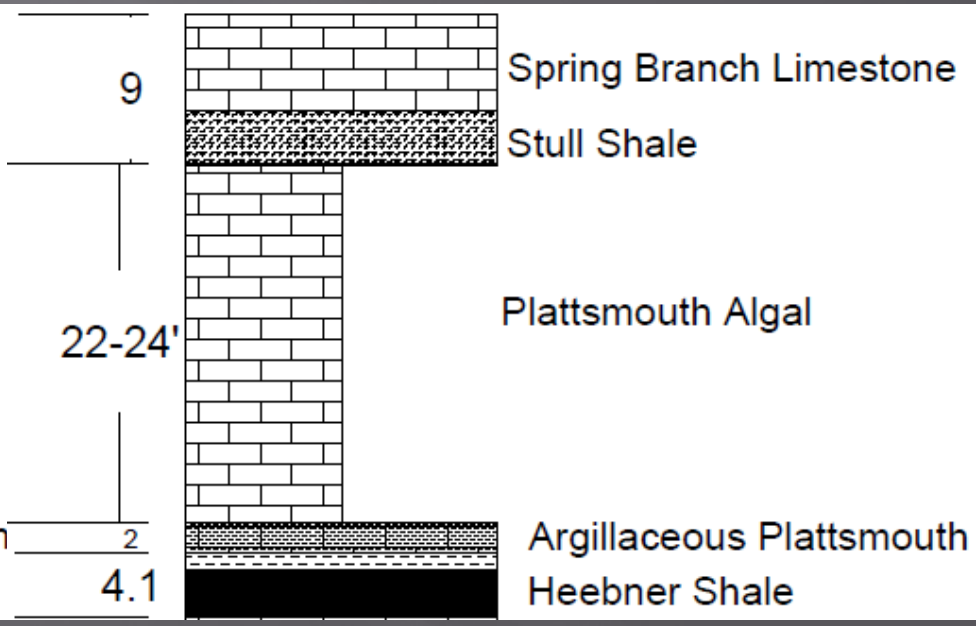
From Heckel 1992

Mine Horizon

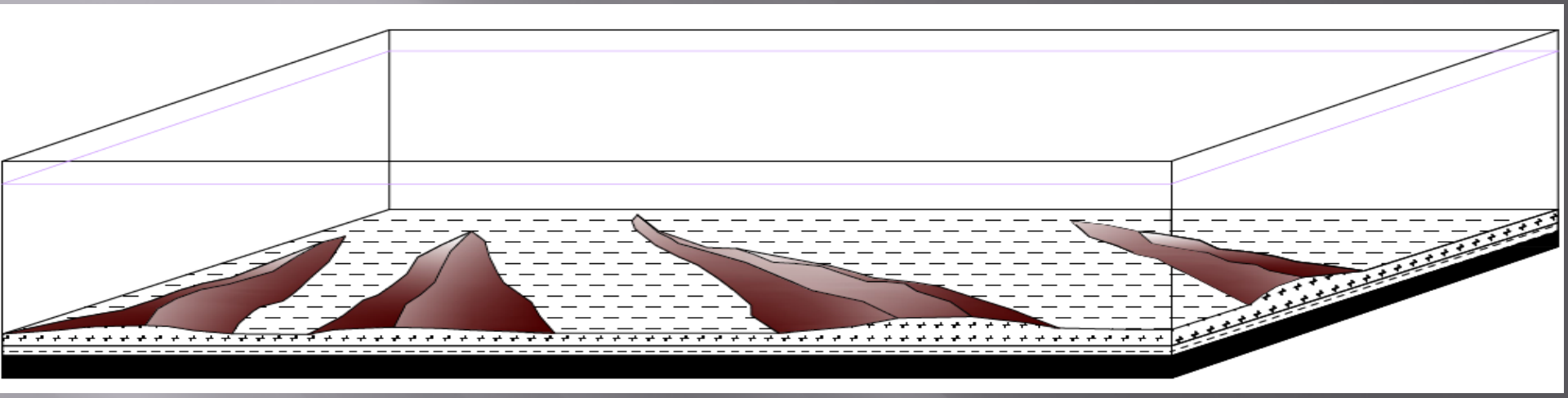
Inter-bank Headings



Algal Bank Headings

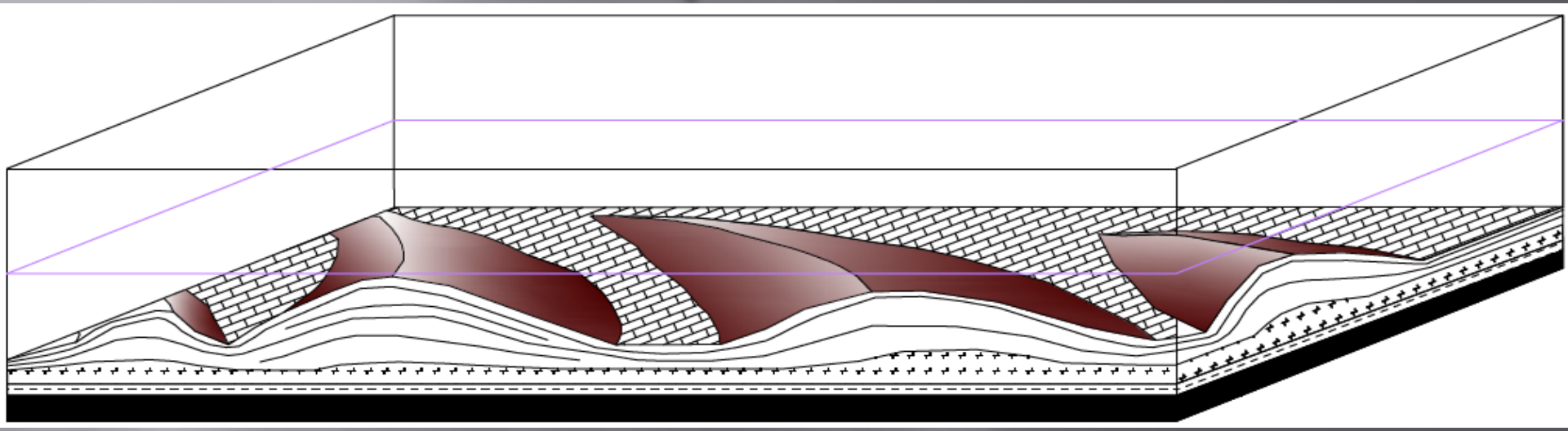


Early Plattsmouth Deposition



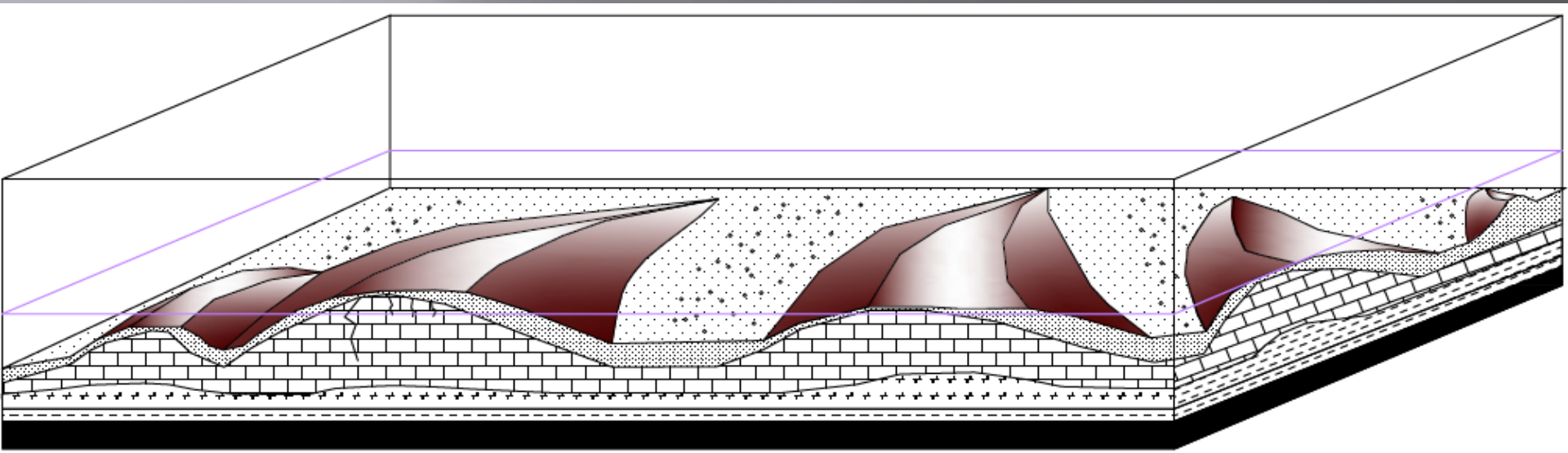
- Sea level high
- Carbonate production begins with deposition of calcareous shale and argillaceous limestone at base of Plattsmouth
- This is the mine floor

Plattsmouth Algal Bank Deposition



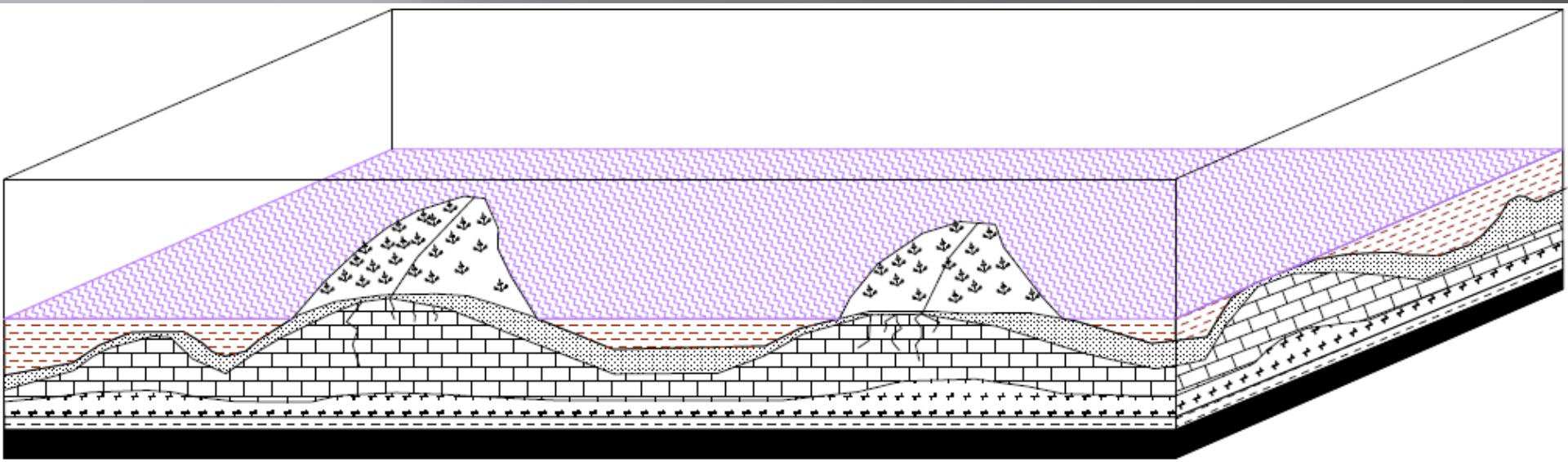
- Sea level falls to medium depth, area is still below wave base
- Major carbonate deposition begins
- Algal banks form on high spots in underlying calcareous shale
- Thinner algal deposits form between main bank complexes
- Some shoaling occurs around edges of larger algal banks allowing some grainstone to form
- This is the bulk of the thickness of the mine headings

Plattsmouth Grainstone Deposition



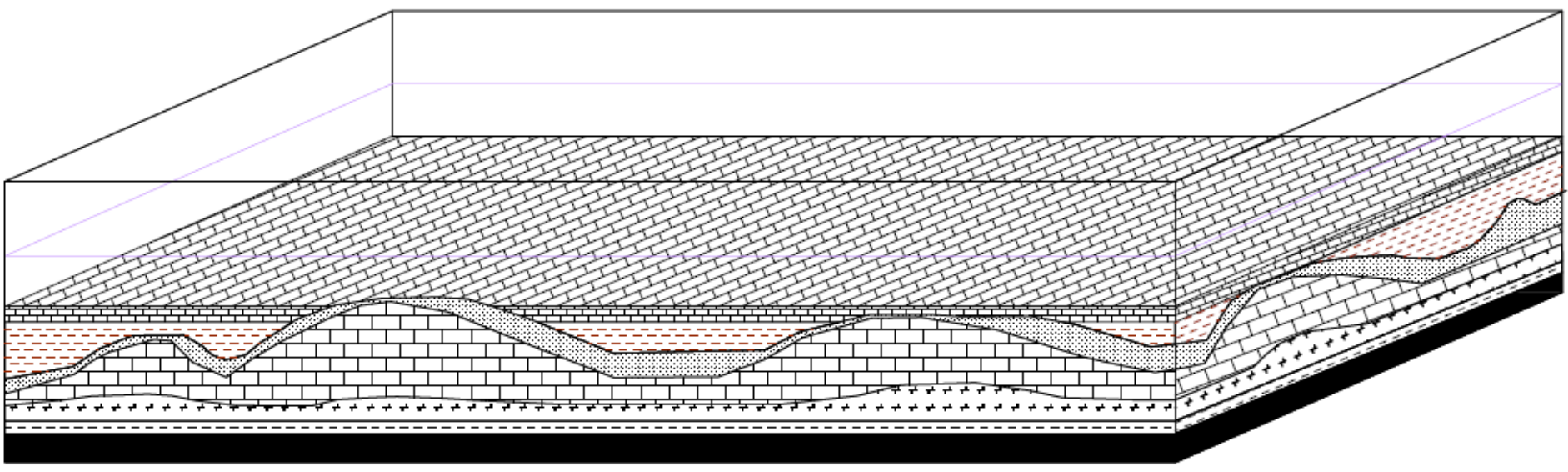
- Sea level falls
- Area is at wave base allowing dunes of coarse material to form
- Some of the largest banks become exposed at surface and dissolution of the limestone begins
- Dunes form around rims of algal banks and between bank complexes
  - Dunes composed of oolites and fossil fragments
- This is the top 1/3rd of mine headings in the southeast part of the mine and on smaller algal buildups

Jackson Park Shale Deposition



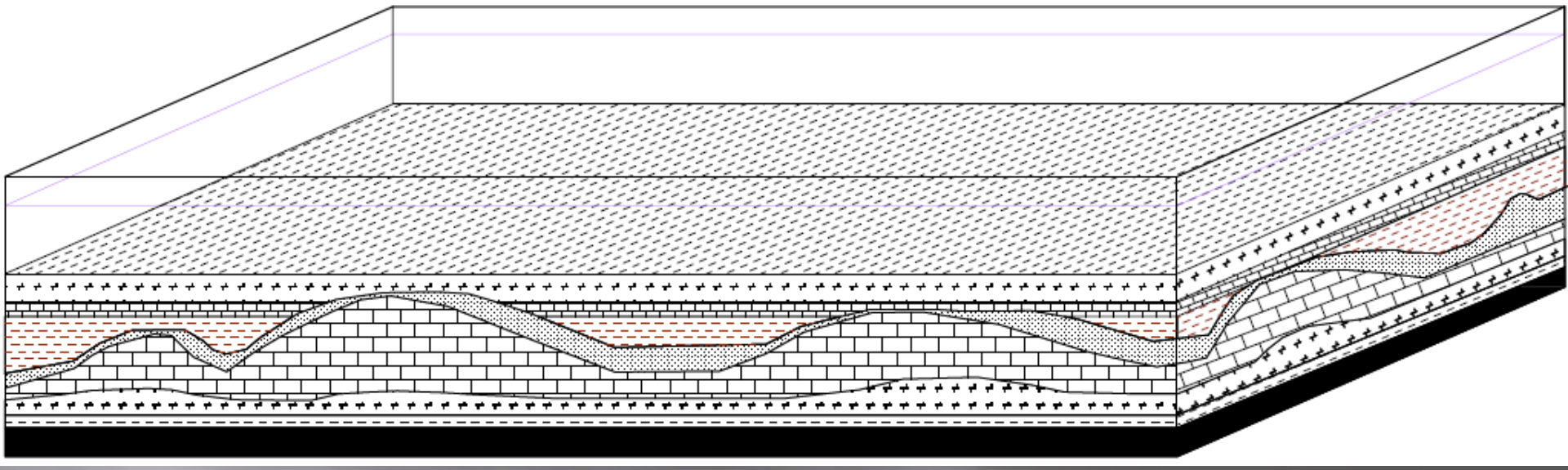
- Sea level low stand
- Largest banks exposed at surface
- Swamps form in interbank areas
- Soils form leaving behind red shale in topographic lows
  - Karst and root damage to algal banks occurs during this time leaving fractured "peanut rock" in some algal banks
- This is the shale found at the top of the mine headings between algal banks

Clay Creek Deposition

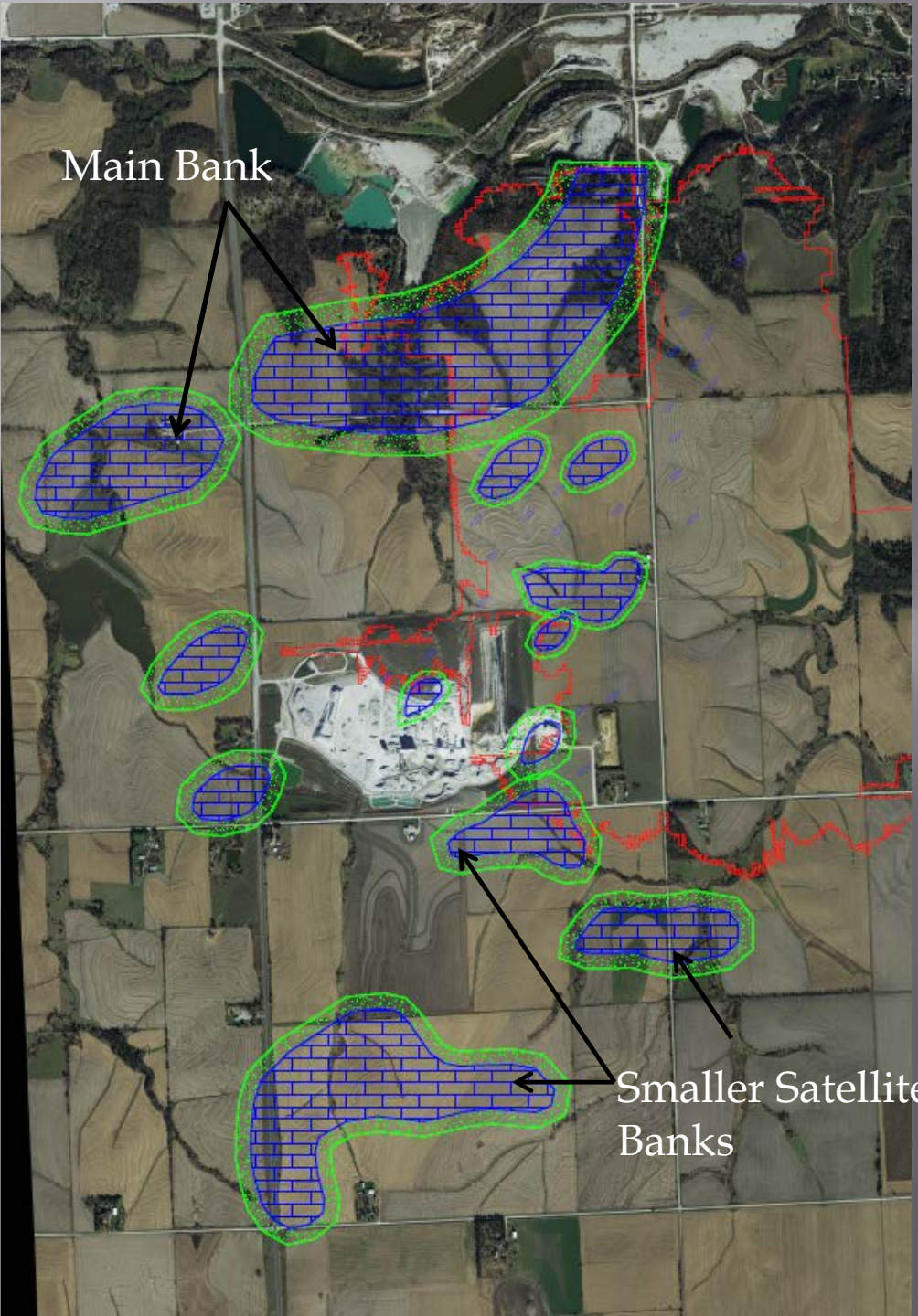


- Sea level begins to rise
- Thin transgressive limestone bed is deposited before sea level rises high enough to shut down carbonate production
- Limestone not present above tallest banks
- This is the thin limestone found at the top of the mine headings between algal banks

Stull Shale Deposition



- Sea level continues to rise
- Calcareous shale deposition begins due to water depth unfavorable for limestone production
- This is the mine roof



- Algal banks fringed with grainstone generally trend northeast to southwest in a 1.5 mile wide belt
- Inter-bank and off bank areas have thick grainstone dune deposits which thicken to the southeast

Questions?