Fossil hunting day trips from Calgary, Alberta

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Fossils and the Law

- The fossilized remains of plants and animals, or traces of their activities, are protected under the Government of Alberta's *Historical Resources Act*. Violation of the Act is punishable by fines of up to $50,000 and/or one year in prison.
- SURFACE COLLECTING (collecting isolated fossils that are clearly on the surface of the ground) is only permitted on private land with the landowner's permission and on provincial Crown land.
- EXCAVATING (digging) refers to dislodging in any manner, fossils imbedded/buried in the ground or rock face. Excavating requires a permit, which is available only to professional palaeontologists.
- Fossils may not be collected in any provincial/national park or protected area.
- If you live in Alberta, and legally surface collected, you may keep the material as a custodian of the fossil, although ownership remains with the Province of Alberta.
- The *Historical Resources Act* prohibits removal of fossils from the province without a Disposition Certificate issued by the Government of Alberta.

Introduction

- Fossils and the Law
- A few hints and tips
- Alberta's fascinating geology, and why fossils occur where they do
- The stratigraphic column, and an explanation
- Fossil sites through time
- Summary

NOTE:

These symbols show whether you can collect fossils at each locality:

You can collect!

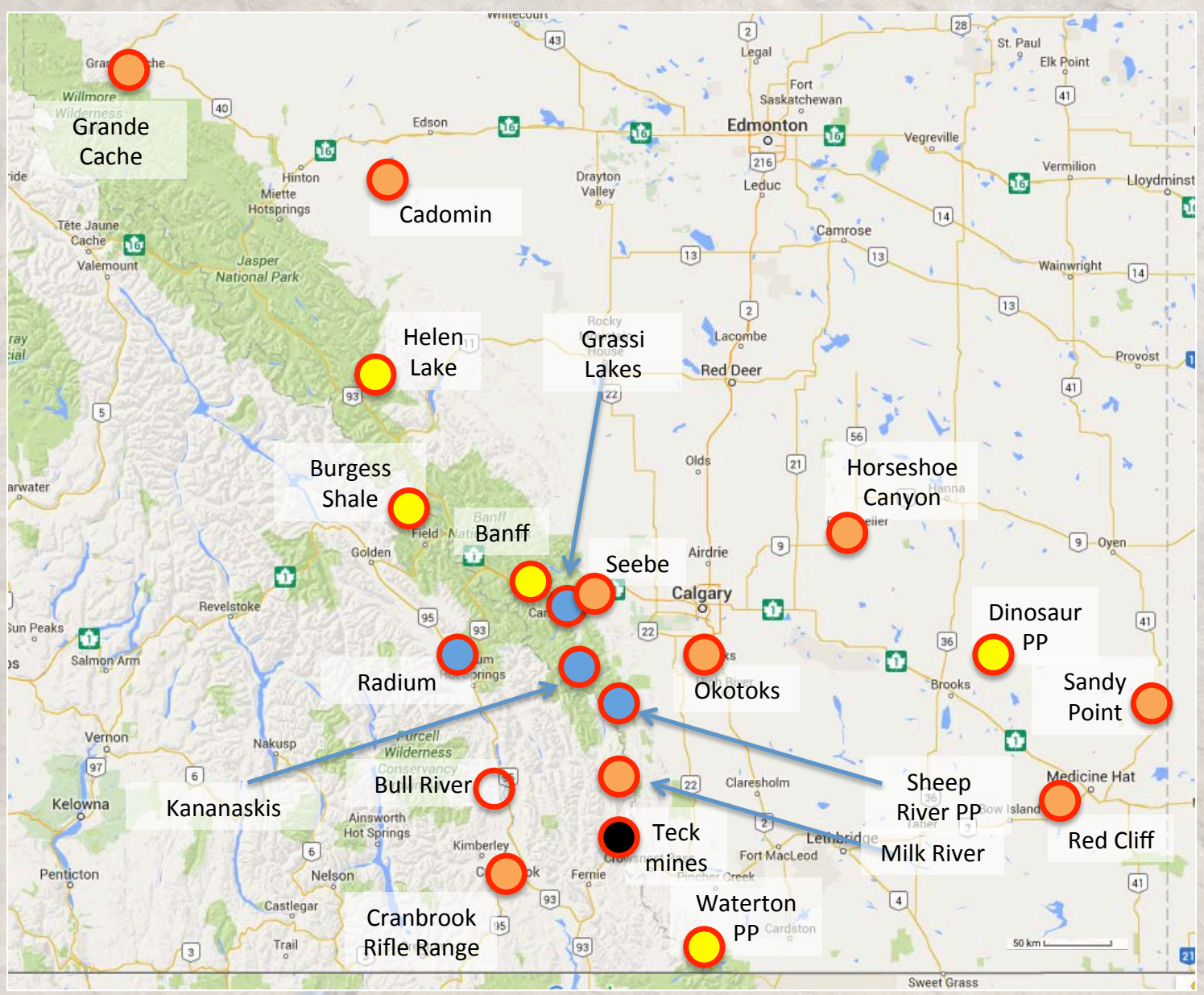
Look but don't touch

A few hints and tips

- Be safe – hard hats, reflective vests, boots with ankle support
- Drive safely, concentrate and don't take silly chances
- Watch out for overhanging and falling rocks

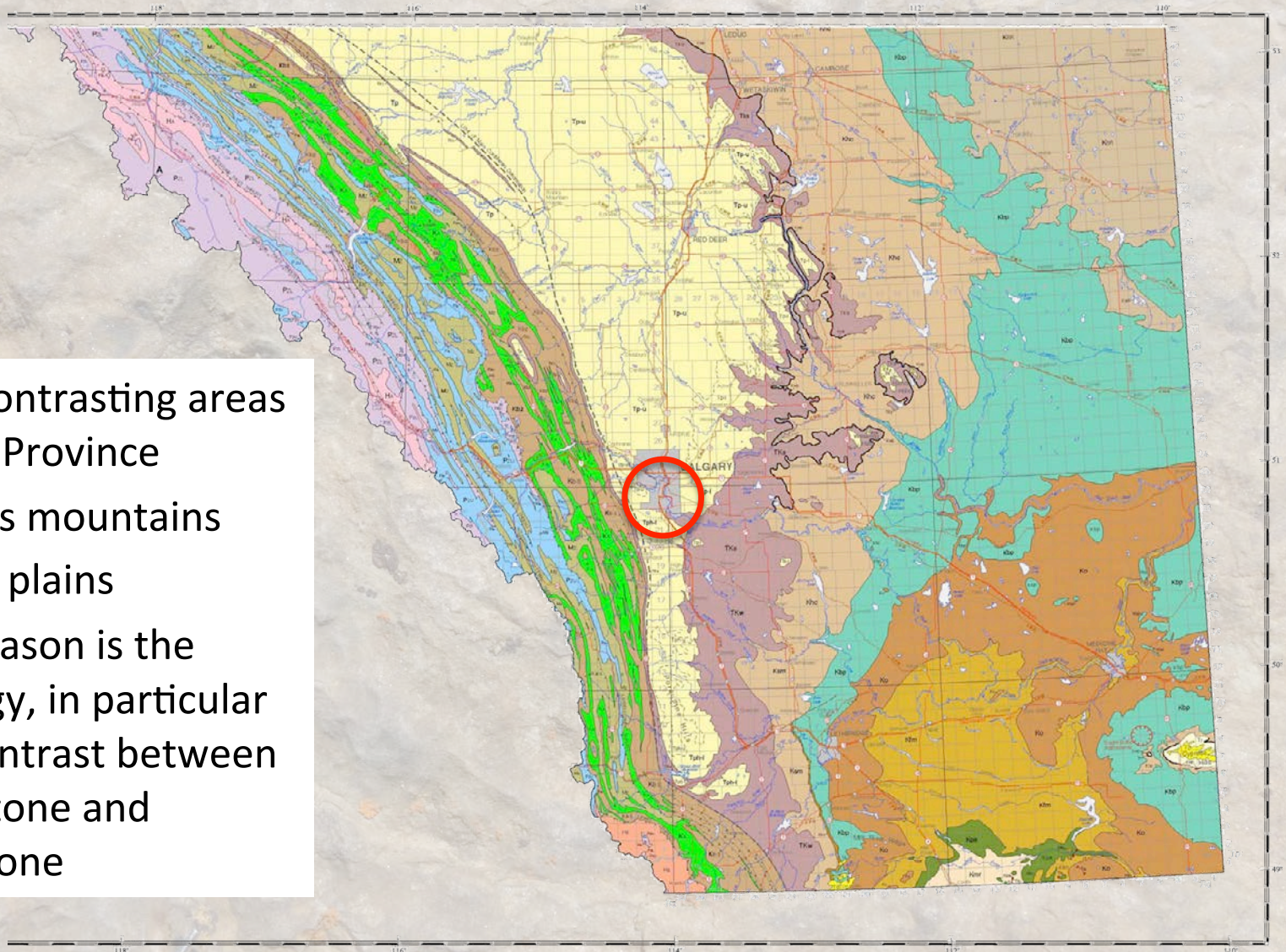
- Don't collect every fossil you find – be selective
- Be realistic, a fossil in a huge boulder made of hard limestone will not yield to your little hammer
- If you find something exciting, leave it where it is, grab a photo and contact your local museum or University

Map of selected localities



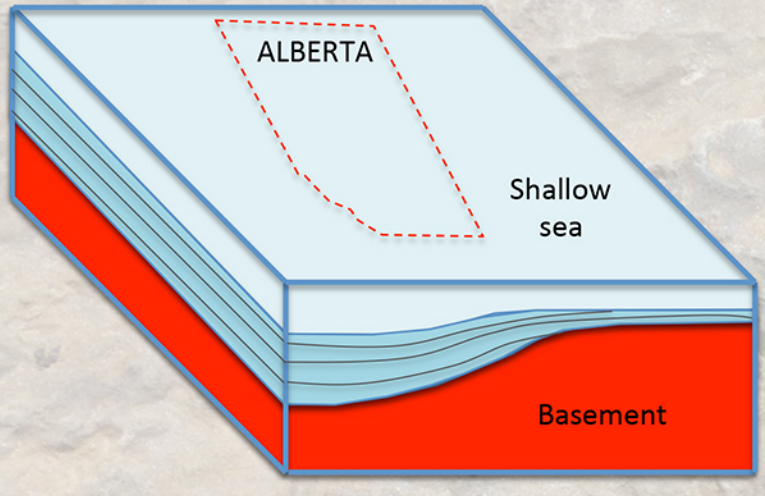
- World Heritage Site
- Provincial park
- Fossil locality
- No access without permission

Southern Alberta's Geology

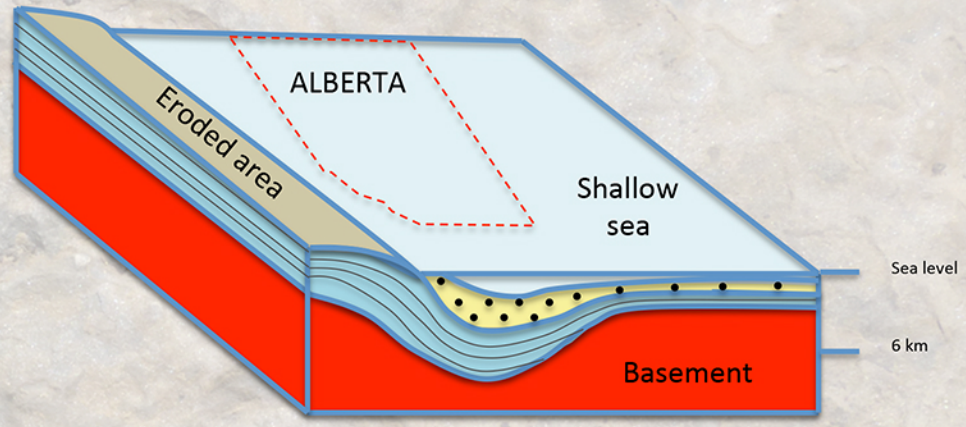


- Two contrasting areas of the Province
- West is mountains
- East is plains
- The reason is the geology, in particular the contrast between sandstone and limestone

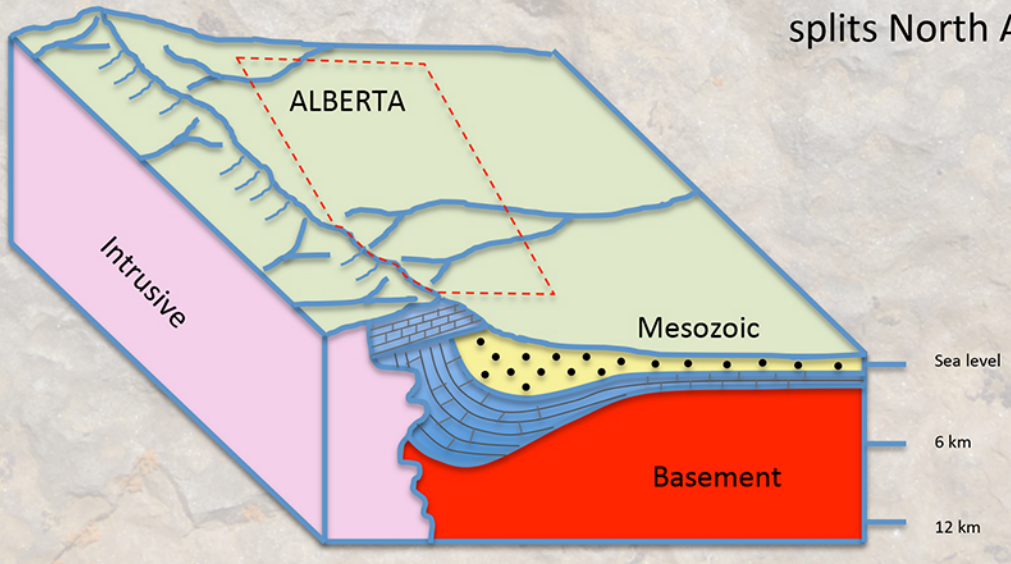
Alberta's Geology



1. PALAEOZOIC
Limestones deposited in shallow seas



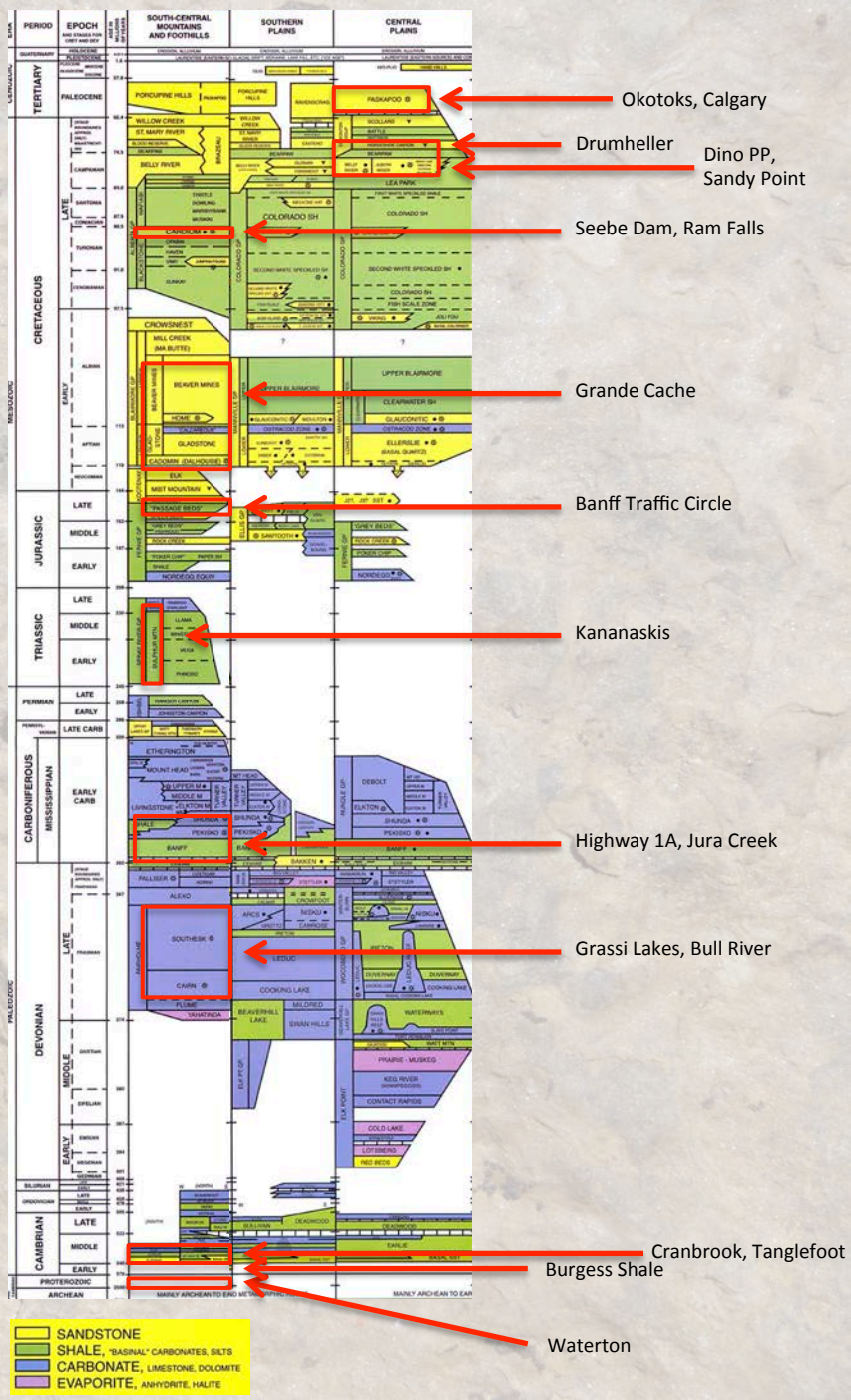
2. MESOZOIC
A N/S trending shallow sea splits North America in half



3. CENOZOIC
Mountain building exposes limestones to west and sandstone and mudstone to east

Today's Fossil Field Trip

- We will work our way through the stratigraphy
- We will try to put the fossils into context:
  - Why are the fossils there?
  - What other fossils are associated with them?
  - What can the sediment type, sedimentary structures, and fossils tell us
  - What environment did they live in?
- Fossils tell you a great deal about the geology, so it is important to record where you found them

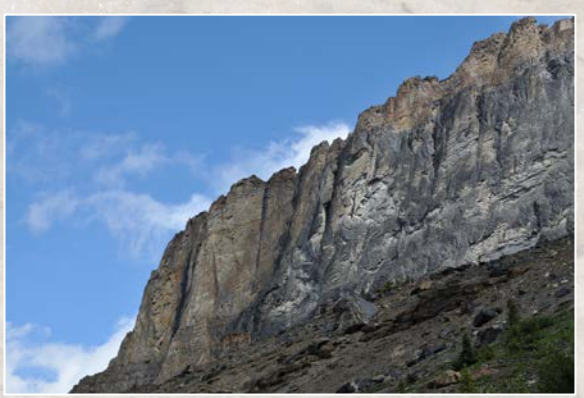


Begin at the beginning: Waterton

- Rocks are around 1400 MYO
- Waterton lay on the edge of huge sea
- The climate was warm but there were no plants
- Algae grew in the lagoons, there was nothing to feed on them

Cambrian: Burgess Shale & Mt. Stephen

- World Heritage Site
- Heavily protected – you need a guide
- Scene of the Cambrian explosion
- Not recommended for youngsters as a 7 hour hike; tough to see fossils when you get there



Cambrian: Tanglefoot Creek and Cranbrook Rifle Range

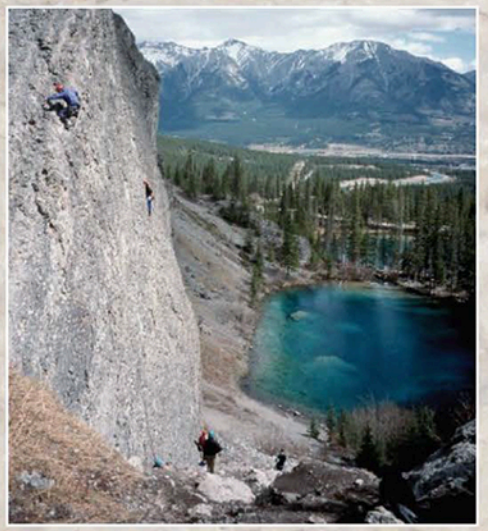
- Tanglefoot near Fort Steele, BC (MacKay Fm.)
- Protected site but many others nearby
- Many trilobites, preserved by calcite filaments
- Rifle Range is picked over but lots of tails (Eager Fm.)

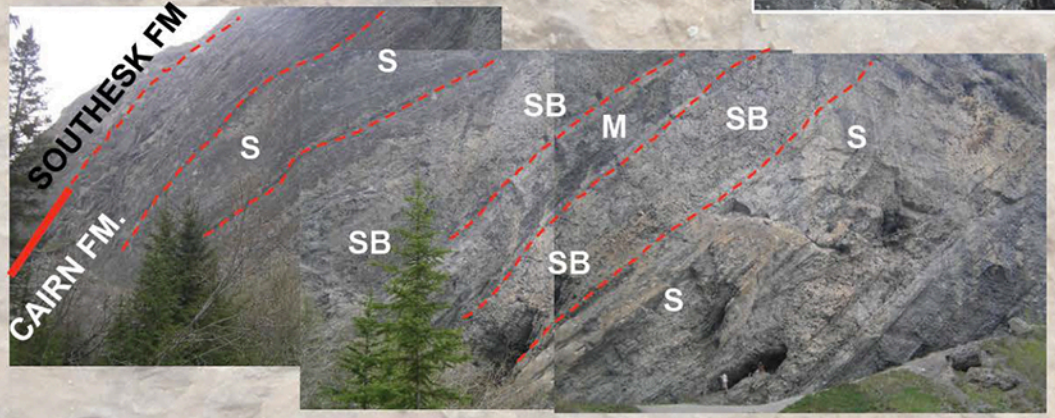
Devonian: Bull River

- Devonian coral reefs (Harrogate Formation)
- Outcrops in muds adjacent to the roadside
- Corals, brachiopods crinoids, bryozoa

Devonian: Grassi Lakes

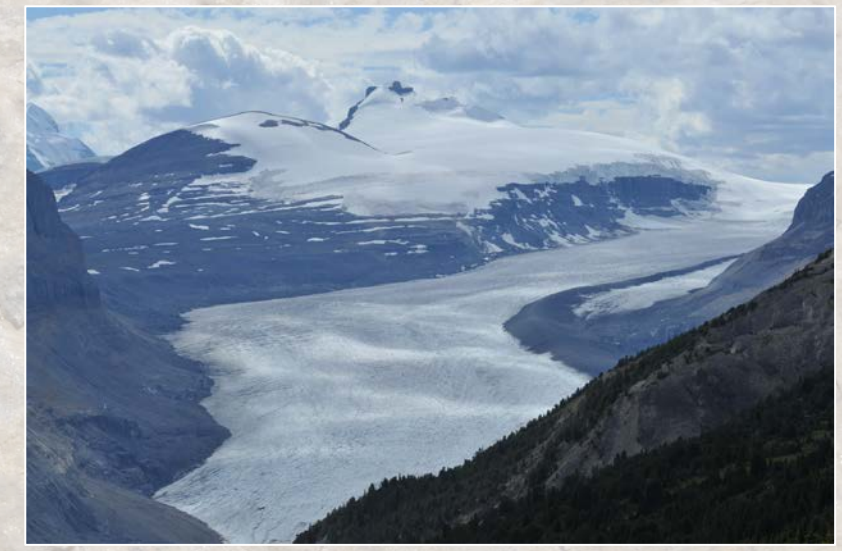
- Stunning scenery
- Many of the fossils are casts only
- Do not recommend collecting, just enjoy





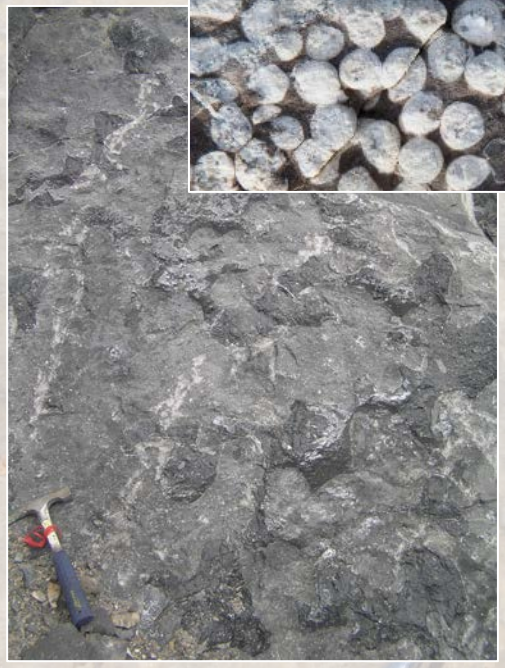
Devonian: Parker Ridge reef

- Outcrops on the Banff-Jasper highway
- Deposited as a coral reef in shallow marine, warm conditions



Mississippian: Highway 1A

- Banff Limestone and Pekisko Fm.
- Outcrops on the highway
- Deposited in shallow marine, warm conditions
- Fossil shrimp burrows, crinoids, brachiopods

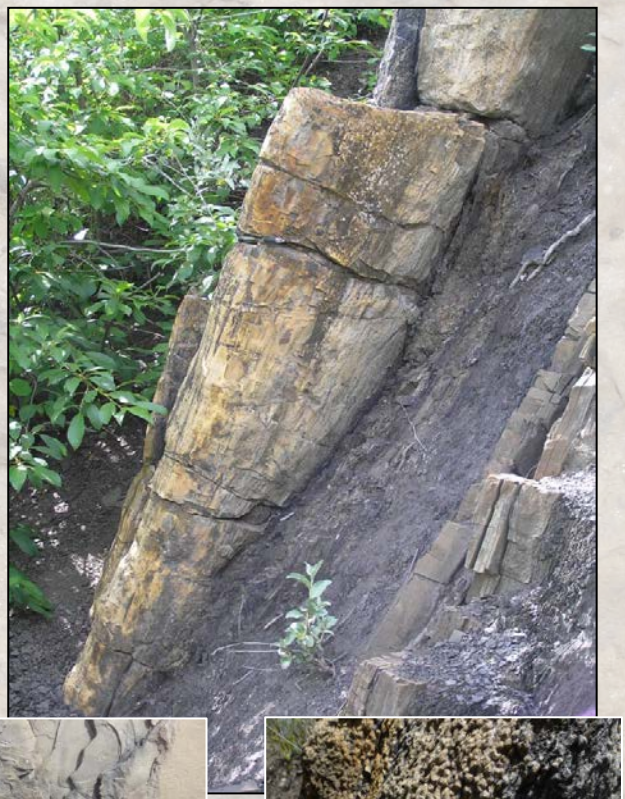


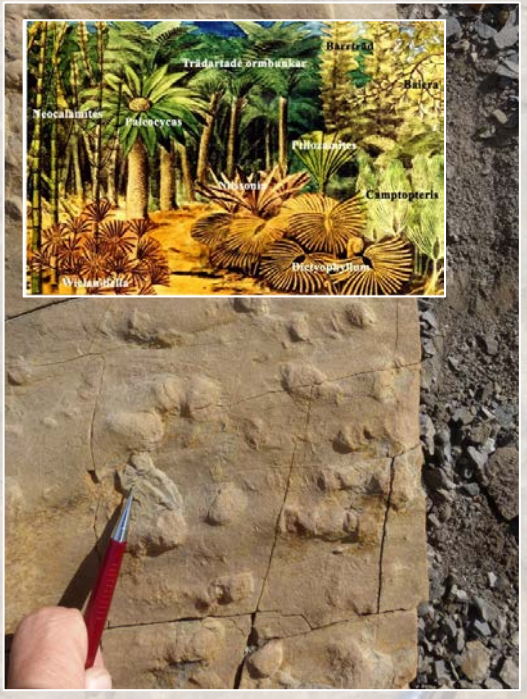
Triassic: Kananaskis

- Stratigraphic equivalent to Montney (Sulphur Mountain Fm.)
- Amazing ammonite fossils
- Bone bed with fossil bones and shark teeth
- Open marine setting envisaged, similar to Montney

Jurassic: Banff Traffic Circle

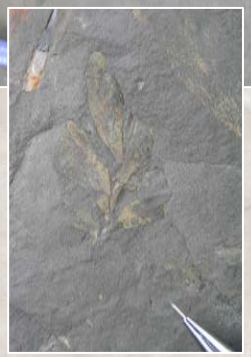
- Amazing outcrops by Highway 1
- Start with deep water sediments, then pass up through a delta into river deposits
- Fossils range from shrimp tracks to whole trees





Base Cretaceous: Grande Cache

- Several formations crop out
- Famous for dinosaur footprints, mostly in the coal mine (difficult to get permission to gain access)
- Also great plant fossils and trace fossils

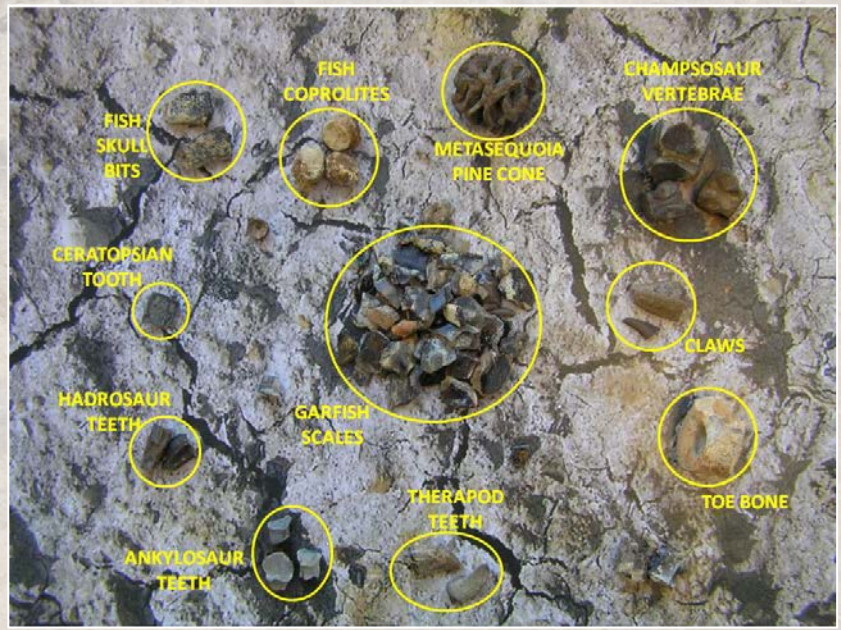


Cretaceous: Dinosaur Provincial Park

- +/- Richest dinosaur locality in the world
- World Heritage Site
- Can only enter if accompanied by a guide
- Some spectacular hikes and amazing number of dinosaur bones

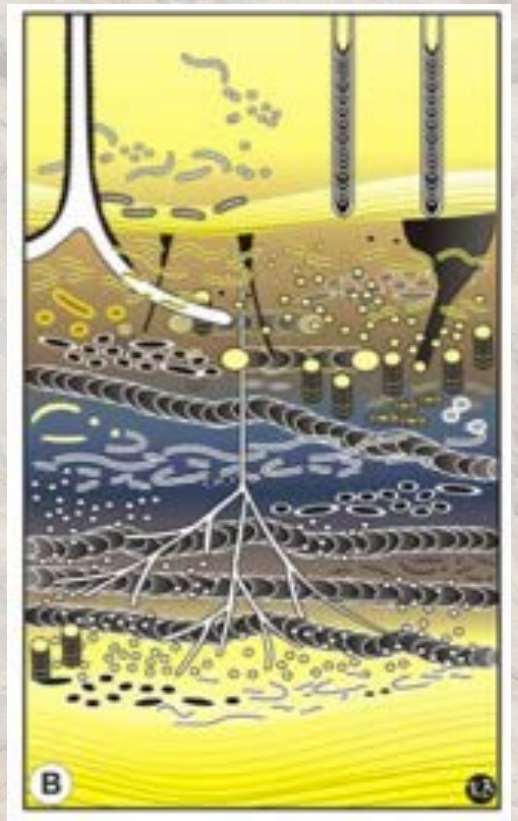
Cretaceous: Sandy Point & other localities

- Stratigraphic equivalent to Dinosaur Provincial Park
- Possible to collect, and microvertebrates most likely finds



Cretaceous: Seebe Dam

- Located at a dam, washed by water
- Few body fossils, but lots of trace fossils
- These are burrows and feeding traces of ancient organisms



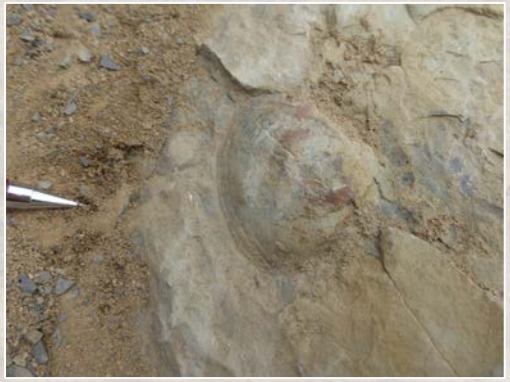
Paleocene: Okotoks and beyond

- Various outcrops around Calgary and Okotoks
- Usually sparse fauna, may include bivalves
- Occasionally turn up some spectacular fossils from a time after the dinosaurs became extinct

Summary

Alberta has a huge range of:

- Age from Precambrian to Paleocene, & glacial
- Sediments include limestone, sandstone, mudstone, evaporites
- Depositional environments include:
  - Land: rivers, soils, swamps
  - Marine: shallow to deep water, reefs, shorelines
  - Glacial
- Fossils of all kinds:
  - Vertebrates including fish, dinosaurs, mammals
  - Invertebrates of every kind (ammonites, etc.)
  - Trace fossils
- Many more outcrops (e.g. ammolite)
- Alberta is a paleontological treasure trove – time to get out there and see it!




THANK YOU!