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31 Dinosaur Footprints of Western Canada

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Abstract

A rapid increase in the rate of discovery of dinosaur tracks in western Canada in recent years has resulted in the documentation of 27 localities, as compared with only four in the previous literature. These tracks range in age from Latest Jurassic to Latest Cretaceous and have yielded a large number of representative specimens, most of which are housed in the Tyrrell Museum of Palaeontology.

The oldest tracks include Jurassic forms like *Anomoepus*, which are quite distinct from the younger Cretaceous ichnofaunas dominated by large ornithopods, theropods and miscellaneous large ornithischians. Sauropod tracks are unknown, apparently for paleoecological reasons.

Western Canadian dinosaur tracksites have also yielded the oldest known bird footprints and the only known Late Cretaceous track with skin impressions. Other rare phenomena include a trackway which makes a 90° turn and reworking of Cretaceous tracks into Pleistocene sediments.

Introduction

Sternberg (1926) gave the first description of dinosaur footprints in western Canada, although McLearn (1923) had previously reported the discovery of dinosaur footprints in the Peace River Canyon. Sternberg (1932) collected in the Peace River Canyon in 1930, and reported on a rich footprint fauna that did not receive any additional professional attention until the construction of the W.A.C Bennett and Peace Canyon Dams. In response to the discovery and subsequent destruction of footprints during construction of the former dam, the Royal Ontario Museum worked in the Canyon in 1965. Sternberg's original sites in the Canyon and many new localities were worked by the Provincial Museum of Alberta (whose paleontological program formed the core of the Tyrrell Museum of Palaeontology) from 1976 to 1979 as a salvage operation prior to the inundation of the Canyon following completion of the latter dam.

Footprints found in the ~~Kootenay~~ Formation of southeastern British Columbia were reported to a number of museums in the 1940's but none of the footprints were ever reported or described in the literature.

In 1960, Langston described a hadrosaur footprint from southern Alberta. Subsequent to his study, a better specimen was found in Drumheller.

Storer (1975) described a specimen from the Dunvegan Formation of northeastern British Columbia that was found by an amateur collector.

Using the knowledge gained from working on the footprints of the Peace River Canyon, staff of the Tyrrell Museum of Palaeontology have substantially increased the number of known footprint sites in western Canada in recent years (Figs. 31.1, 31.2). These new sites are documented here for the first time, but work on some of the major sites will be ongoing for years to come.

Upper Jurassic/Lower Cretaceous Footprint Sites

The oldest dinosaur footprints presently known from western Canada are from Upper Jurassic and Lower Cretaceous (Upper Tithonian, Berriasian) strata of the ~~Upper~~ Kootenay Formation. Footprints have been recovered from three localities in the Crowsnest Pass of British Columbia where coal has been actively mined since the last century.

Some of the best footprints were collected from the ceilings of underground coal mines at Michel, B.C. (latitude 49°42'30"N, longitude 114°49'30"W). Samples of specimens from B seam of #3 mine of the Crow's Nest Pass Coal Company were sent to the National Museum of Canada (NMC 8827, 8828) and the Royal British Columbia Museum (RBCM 722) in the early 1940's by H.P. Wilson. Molds were made of other specimens that were retained by the company (now Crowsnest Pass Resources of Calgary) and are cataloged as TMP 79.22.2 (a theropod with a track 23 cm long and a very narrow, 52° divarication between digits II and IV) and TMP 79.22.3 (two tracks, 15 cm long, of the same type of animal). None of the footprints at Michel are larger than 35 cm in length, and all represent bipedal, tridactylous dinosaurs. Notes made by Sternberg identify NMC 8827 and NMC 8828 as *Irenesauripus* cf. *acutus*. RBCM 772 was made by small theropods (the smallest print is 12 cm long, a second is 14 cm and the largest is 20 cm wide) walking across a carbonaceous mud covered by a mat of fern fronds. It appears that many more footprints were found in the roofing shales about 1/2 kilometer inside the mine. Unfortunately, the mine has now been abandoned and the specimens that were collected have been dispersed.

TMP 79.22.1 is a cast of an original specimen that currently is sitting in storage in a yard of the B.C. Ministry of Mines in Victoria. The specimen was found near Fernie, B.C. on top of Flathead Ridge (latitude 49°20'N, longitude 114°53'W) by Dave Pearson and Mike Welder in 1981. Although the coarse, cross-bedded sandstone block was not found *in situ*, it appears to have come from a level 440 m (1450') above the base of the ~~Upper Kootenay~~ Formation. There are four footprints preserved as natural casts on the block, representing at least two individuals that can be identified as *Anomoepus*, a general form of footprint that may be primitive for ornithischians (Olsen and Galton 1984). The footprints are 188–200 mm long with divarications of 76–83°. The toes were long and slender, had distinct phalangeal pads, and were armed with claws. Some additional, poorly-preserved marks may be manus prints.

The third ~~Upper Kootenay~~ Formation site is the Fording Coal open pit mine on Eagle Mountain (latitude 50°05'N, longitude 115°00'W) near Elkford, B.C. A single large block (TMP 85.105.1) was discovered by T. J. Wozniak in 1984, approximately 520 m (1700') above the base of the formation. Four footprints of a single individual are preserved as natural casts (Fig. 31.3). The animal was walking across a wet, ripple marked substrate that shows many invertebrate trails and burrows. Using the formula developed by Alexander (1976) to estimate the speed of trackmaking vertebrates, the dinosaur was accelerating to a speed of 5.6 km/hr. The trackmaker was a tridactylous biped (footprint length is 17 cm), but the feet were relatively wide, and the step is strongly inturned, characteristics that are suggestive of ornithopods rather than theropods. Details of the tracks are not well preserved, but are sufficient to assign them to the ichnogenus *Anomoepus*.

Lower Cretaceous Footprint Sites

A major trackway site in the Lower Cretaceous Minnes Formation (Berriasian/Valangian) has been found along the Narraway River (latitude 54°21'N, longitude 120°03'W). Ironically, the locality is located northwest of Dinosaur Ridge, a topographic ridge named for its sinuous shape. More than two hundred footprints are preserved in at least eight trackways on a single ripple-marked, sandstone bedding plane. Because the site is accessible only by helicopter or a long hike across rough terrain, only an initial survey was completed in 1981 by staff of the Tyrrell Museum of Palaeontology. The majority of footprints were made by small theropods, but the most dramatic trackway was made by a large biped whose feet were more than a half meter in length (Fig. 31.4). This individual came to a stop, turned sharply to the right, paused and then set off in a direction perpendicular to the original route.

The Lower Cretaceous (Barremian–Aptian) Cadomin Formation is a predominately conglomeratic facies that crops out at the base of the Peace River Canyon at the W.A.C. Bennett Dam. The Cadomin grades laterally into the coarse-grained sandstones and coal-bearing beds of the Gething Formation in this region (Stott 1973). During construction of the dam (latitude 56°01'N, longitude 122°12'W), more than fifty footprints were discovered when ledges on the canyon walls were hydraulically cleaned. The Royal Ontario Museum made molds of two trackways at this site in 1965, and a couple of individual footprints (ROM 4869, 4870). The footprints were made by both theropods (*Irenesauripus*) and ornithopods (*Amblydactylus*). Manus prints associated with the latter showed that ornithopods were quadrupedal at least part of the time. This site is considered by some to be in the base of the Gething Formation.

Dinosaur footprints from the Gething Formation (Aptian–Albian) of the Peace River Canyon (latitude 55°57'30"N, longitude 122°10'W) were first reported in 1923 (McLearn). However the footprints are so well preserved and numerous, it is difficult to imagine that they weren't seen by Sir Alexander MacKenzie when he explored the canyon in 1793. An expedition by C. M. Sternberg in 1930 to the canyon led to the establishment of five new ichnogenera and seven ichnospecies (Sternberg 1932). When construction started on the Peace Canyon Dam, four expeditions by the Provincial Museum of Alberta (the parent institution of the Tyrrell Museum of Palaeontology) collected data and specimens between 1976 and 1979 (Mossman and Sarjeant 1983). Ninety original specimens (including TMP 78.11.17, an *Amblydactylus* track with a double impression, Fig. 31.5) now in the Tyrrell Museum of Palaeontology and the Royal B.C. Museum (Victoria) were collected, and molds were made of more than 200 footprints. All in all, more than 1700 footprints were discovered, most of which were preserved in a hundred trackways. Trackway evidence indicated that large ornithopds were abundant and probably gregarious (Currie 1983). Another ornithopod ichnospecies was described (Currie and Sarjeant 1979), as well as the earliest known bird tracks (Currie 1981). A set of poorly preserved footprints may represent Lower Cretaceous mammal tracks (Sarjeant and Thulborn 1986).

The Gething Formation exposed in the Canyon is approximately 300 m (1000 ft) thick (Stott 1968), and tracks have been recovered throughout the section. Dinosaur footprints were recovered from carbonaceous mudstones, siltstones, sandstones and even coarse grained channel sandstones.

The Peace River Canyon represented one of the best documented major trackway sites in the world. By 1980, the trackway sites had been inundated by the reservoir behind the new Peace Canyon Dam at Hudson's Hope. Footprints will continue to be found in the Gething Formation adjacent to the Canyon, but there are few horizontal bedding planes that are likely to produce lengthy sections of trackways.

In 1981, dinosaur footprints were found on an exposure of the Gething Formation 60 km west of Hudson's Hope on the west side of Carbon Creek (latitude 55°55'50"N, longitude 122°38'40"W). The site is at the northwestern end of an area cleared for a temporary campsite for Utah Coal Exploration, about 900 m south of Little Carbon (Indian) Creek. The largest footprint, which can be identified as *Amblydactylus kortmeyeri*, is more than 600 mm long. Only two of the three digits left an impression, but the "heel" is well defined. Another *Amblydactylus* track illustrated by Busbey (1983) is slightly smaller and appears to be overlain by an *Irenesauripus* track. There are other footprints on the bedding plane, but are not as well preserved and were not photographed.

Upper Cretaceous Footprint Sites

A natural cast of a large left manus print (TMP 81.32.1) of *Tetrapodosaurus* was found by Carl Kortmeyer on the Murray River approximately twenty-five miles upstream (about 55°N, 121°15'W) from the East Pine Bridge. The manus was 27 cm wide. Unfortunately it was found on an isolated block and it cannot be determined with any certainty whether it originated in the Lower Cretaceous Minnes, Cadomin or Gething Formations or the Late Cretaceous Dunvegan Formation. The location, sandstone coloration and print morphology all suggest that it is probably from the Dunvegan.

In 1975, John Storer reported on the discovery of footprints on the Pine River at East Pine Bridge. Three natural casts of *Columbosauripus ungulatus* were described from a single slab of thinly-bedded siltstone in the private collection of Mr. and Mrs. H. C. Calverly. The original specimen has since been donated to the Tyrrell Museum of Palaeontology (TMP 75.4.1). The locality (55°44'N, 121°12'W) was revisited in August 1977 and numerous footprints were found in blocks at the base of the cliff. A natural cast of a small (20 cm long) pes track of *Tetrapodosaurus* (TMP 77.16.22) was collected.

In 1951, Dr. C. R. Stelck (University of Alberta) collected a block of eight footprints from the Dunvegan Formation along the Pouce Coupe River in Alberta (56°00'N, 119°55'W), about three kilometers downstream from the mouth of the Doe River. Apparently there are many footprints preserved in large blocks of sandstone for a stretch of about two kilometers along the river. The uncataloged specimen on display in the Palaeontology Museum (Geology Department, University of Alberta) has small, tridactylous footprints. The most distinct footprint is 3.5 cm long. The divarication of the toes is less than 90°, which suggests that it was made by a dinosaur rather than a bird (Currie 1981). The remaining footprints consist mostly of toe drags made by swimming animals. A curious feature of all prints is that the back of the impression of what appears to be digit II is placed more anteriorly than the backs of digits III and IV. This suggests the possibility that the footprints were made by a functionally didactylous animal, and that only the tip of digit II was touching the ground. Because of the size of the footprints and the peculiar orientation of the toes, it is also possible that the footprints were made by hesperornithiform and/or ichthyornithiform birds. Hesperornithiform birds are best known from Kansas, but ranged as far north as the Arctic Circle (Russell 1967), and *Ichthyornis* has been reported from Lower Turonian beds not far from the footprint site (Fox 1984).

The coal-bearing Upper Cretaceous Cardium Formation (Turonian) between Luscar and Cadomin, Alberta has not been explored for footprints. However, three dinosaur tracks collected by Luke Lindoe from the roadside in this area show that the formation may be rich in trace fossils. The tracks were made by theropods with long slender toes. Divarication between digits II and IV is 65° in the best preserved footprint, which is 14 cm long, and 55° in a slightly smaller print.

In 1987, two large hadrosaur footprints were found in Red Creek (49°01'N, 112°07'30"W) by Tyrrell Museum staff. Strata in this area are from the Milk River Formation (Lower Campanian). The footprints are more than a half meter long, but are poorly preserved subtraces.

Around 1960, Luke Lindoe discovered dinosaur footprints in the Foremost "Formation" (now the lower part of the mid-Campanian Judith River Formation), on the north shore of the South Saskatchewan River (50°03'N, 110°46'W) near Redcliff, Alberta. The footprints originate from a level about 30 m below the contact between the Foremost and Oldman sections of the Judith River Formation. Seven hadrosaur and two tyrannosaurid tracks were observed in 1979, and the track-bearing layer, a coarse red sandstone, continues into the hillside. The hadrosaur tracks are between 40 and 64 cm in length, the corresponding widths being 44 and 66 cm.

The Foremost is also exposed at a site (49°45'N, 111°40'W) near Grassy Lake, Alberta, and footprints have been found in a coarse sandstone two meters above a mined coal seam (Taber Coal Zone). Only one hadrosaur footprint (TMP 79.9.2) has been recovered to date (33 cm wide), but another half dozen negative and positive footprints were observed in the immediate area, most of which were poorly preserved.

Dinosaur Provincial Park (Judith River [= Oldman] Formation) has produced one of the richest Cretaceous terrestrial faunas known (Currie 1987), based largely on the articulated remains of dinosaur skeletons and disarticulated bones of dinosaurs and other animals. Footprints are rare in the park, although there is ample evidence of massive disturbance of the sediment by "dinoturbation". In 1981, a large hadrosaur footprint (TMP 81.34.1) was discovered in the center of the badlands in the park (50°46'N, 111°28'W). The specimen was excavated (Quarry #155, Danis 1986), and is now on display in the Field Station of the Tyrrell Museum of Palaeontology. A second, incomplete footprint was less than two meters away, and was probably made by the same individual.

The Belly River Formation near the source of the St. Mary River (49°01'N, 113°17'W) has produced one good carnivore track (25 cm long), and three other tracks on a large slab of sandstone. The locality was discovered by Greg Nadon, but specimens have not been collected again.

Two footprint sites are known in the Horseshoe Canyon Formation near Drumheller. *Ornithomimipus angustus* was described by Sternberg in 1926 on the basis of four footprints discovered southwest (51°48'N, 112°58'W) of Rumsey. Although these were considered to be synonymous with *Irenesauripus* by Haubold (1971), the digits are quite different in that they are broader proximally, and were made by an entirely different sort of theropod. For these reasons, *Ornithomimipus* should remain a distinct ichnogenus.

A large (length = 67 cm, width = 70 cm), well preserved negative of a hadrosaur footprint was collected low in the Horseshoe Canyon Formation close to the mouth of Willow Creek (51°23'N, 112°31'W) by Allan Jensen and his father in 1967, and is on display in the Drumheller and District Fossil Museum. The specimen seems to have been extracted from one of the coal mines in the Red Deer River valley near Drumheller, but its exact provenance is unknown.

An ichnite was found in the Horseshoe Canyon Formation north of Stettler along the Battle River (latitude 52°29'30"N, longitude 112°11'W). This specimen is preserved on a sandstone block that was torn up in a strip mining operation. It is a four-digit impression of a pes of a quadrupedal dinosaur, and resembles *Tetrapodosaurus* (Sternberg 1932) from the Peace River Canyon. The specimen is relatively small (the width is 17.5 cm) and has a prominent metatarsal pad or "heel". It was probably made by a ceratopsian. The specimen has been photographed (TMP PN79.43), but not collected.

The Late Campanian St. Mary River Formation of southwestern Alberta has produced a number of footprint localities. Langston (1960) described a hadrosaur footprint (NMC 9487) near Barons (latitude 49°58'N, longitude 113°05'W), that he cast but was unable to collect. The site was destroyed when the irrigation canal where it was found was upgraded around 1985.

In 1986, Greg Nadon (University of Toronto) reported the discovery of numerous tracks along the St. Mary (49°25'N, 113°01'W) and Oldman Rivers (49°47'N, 113°12'W). More than forty footprints of tyrannosaurids and hadrosaurs have already been found. Most are in blocks of sandstone that have tumbled from the valley walls, but some of these blocks, which represent crevasse splay deposits, are so large that short segments of trackways are revealed. Almost all of the specimens are negatives (natural casts) because most of the footprints (counterparts) were preserved in friable siltstones that break up as soon as they are exposed. A manus (TMP 87.76.7) and a pes (TMP 87.76.6) from a hadrosaur have been excavated. The footprint was covered with skin impressions that are currently under study (Currie, Lockley and Nadon, in prep.). This is one of only two Cretaceous dinosaur tracks known to exhibit skin impressions (see Lockley and Gillette, Summary Chapter, this volume).

The Wapiti Formation of northwestern Alberta is a thick unit laid down during Campanian and Maastrichtian times. TMP 86.80.1 is a hadrosaur footprint discovered in 1983 along the Red Willow River (55°03'N, 119°22'W). The specimen is a negative made up of a medium-grained sandstone, but the original footprint appears to have been made in soft mud because the toes are widely spread (width of the footprint is 61 cm compared with a length of 52 cm). Less than a kilometer downstream from this site, a negative theropod track (TMP 86.80.9) was discovered and collected by Darren Tanke (Tyrrell Museum). Finally, a possible ankylosaur track (TMP 87.56.39) was found along Pinto Creek (54°56'N, 119°27'W).

Dinosaur footprints are rare in terminal Cretaceous beds, but the negative (TMP 81.12.3) of a manual impression was collected from the Scollard Formation (Maastrichtian) east of Huxley, Alberta. The manus was pentadactylous and very large (46 cm across), and would have been made by either *Ankylosaurus* or *Triceratops*, which are both recovered from adjacent strata. The specimen was recovered from the ravine (51°55'N, 113°02'W) below a *Tyrannosaurus rex* skeleton.

Reworked Footprints

I am not aware of any previous reports of Pleistocene dinosaurs, but two such sites in western Canada have produced dinosaur footprints. An *Amblydactylus* natural cast was found in 1979 in the Pleistocene gravels of the blocked, preglacial channel of the Peace River. The specimen was unfortunately too large to collect. D. Schowalter also collected a natural cast of a hadrosaur footprint (TMP 80.39.2) from the "Saskatchewan Sands and Gravels" being quarried along the North Saskatchewan River near Fort Saskatchewan (53°38'N, 113°18'W). This specimen (length = 41 cm, width = 45 cm) is probably derived from Maastrichtian beds, which are only shallowly buried in this area.

Summary

Whereas only four dinosaur footprint sites had previously been reported in the literature for western Canada, an additional 23 are documented in this paper. Footprints have been found from all ages of the Cretaceous except Santonian, Coniacian and Barremian (Table 31.1). Although many of these localities have produced relatively poor and/or relatively few footprints, each seems to contribute information that wasn't otherwise available. For example, hadrosaur footprints from Campanian and Maastrichtian sites are from formations that have abundant skeletal remains. This permits a greater degree of confidence in the identification of the footprints, and shows that certain animals represented by both footprints and skeletons actually did live in the region (rather than being carcasses carried in from other environments by the rivers).

Sauropods are known from tracks and trackways of the Lower Cretaceous of Texas (Farlow 1987) and by skeletal material from the Upper Cretaceous of the United States and Asia (Currie in press). Although their distribution goes well beyond this, there would have been no physical restrictions preventing their access to western Canada throughout the Cretaceous. The complete absence of sauropod tracks and bones is a good indication that sauropods did not penetrate into Canada for ecological reasons, as suggested by Lockley (in press) and Lockley and Conrad (this volume).

The Upper Jurassic/Lower Cretaceous Mist Mountain Formation has footprints that are much more primitive in appearance than all other sites in western Canada, and are similar to Jurassic tracks from the United States that have relatively low angles of divarication between the toes and more distinct phalangeal pads. *Anomoepus* tracks are not found in younger beds in western Canada. Differences between Jurassic and Cretaceous footprint types can be added to a growing body of evidence that suggests there was a major faunal turnover at the end of the Jurassic.

Early Cretaceous footprints were made by more primitive dinosaurs than those of the Late Cretaceous. However, the morphological appearance of footprints of the Early and Late Cretaceous are remarkably similar within any major group of animals. The faunal composition of theropods, ornithopods and quadrupedal dinosaurs also seems to remain relatively constant throughout the Cretaceous.

Now that people are becoming more familiar with dinosaur footprints, we expect the number of known sites in western Canada to steadily increase. There are already unconfirmed reports of localities in the extreme northeastern corner of British Columbia (on the Liard River) and in the foothills west of Calgary. Unfortunately, the proliferation of sites has not been matched by a corresponding increase in qualified people willing to do the work.

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Figure 31.1. Localities of dinosaur footprints in British Columbia and Alberta. **1,** Michel (Upper Kootenay Formation). **2,** Flathead Ridge (Upper Kootenay). **3,** Eagle Mountain (Upper Kootenay). **4,** Narraway River (Minnes). **5,** W.A.C. Bennett Dam (Cadomin). **6,** Peace River Canyon (Gething). **7,** Carbon Creek (Gething). **8,** Murray River (?Dunvegan). **9,** East Pine Bridge (Dunvegan). **10,** Pouce Coupe River (Dunvegan). **11,** Luscar (Cardium). **12,** Red Creek (Milk River). **13,** Redcliff (Foremost Horizon, Judith River Formation). **14,** Grassy Lake (Foremost Horizon, Judith River Formation). **15,** Dinosaur Provincial Park (Oldman Horizon, Judith River Formation). **16,** St. Mary River (Belly River Formation). **17,** Rumsey (Horseshoe Canyon). **18,** Drumheller (Horseshoe Canyon). **19,** Battle River (Horseshoe Canyon). **20,** Barons (St. Mary River Formation). **21,** Oldman River (St. Mary River Formation). **22,** St. Mary River (St. Mary River Formation). **23,** Red Willow River (Wapiti). **24,** Pinto Creek (Wapiti). **25,** Huxley (Scollard Formation). **26,** Peace River Canyon (Pleistocene). **27,** Ft. Saskatchewan (Pleistocene).

Figure 31.2. Distinctive Cretaceous dinosaur tracks. *Amblydactylus* (Amb), ceratopsians (cer), *Irenichnites* (I), *Irenesauripus* (Ire), *Ornithomimipus* (Orn), *Tetrapodosaurus* (Tet) and tyrannosaurids (Tyr) are some of the forms known from western Canada. It is reasonable to expect that tracks similar to *Caririchnium* (Car) from Brazil and Colorado, and "*Iguanodon*" from England will eventually be identified in western Canada. The absence of *Brontopodus* (Bro) and other sauropod tracks, and *Ligabueichnium* (Lig) is probably related to the distribution of these trackmakers during the Cretaceous, and it is not expected that they will ever be found in western Canada. After Lockley, in press.

Figure 31.3. Trackway of a small ornithopod (TMP 85.105.1) from the Upper Kootenay Formation of Eagle Mountain, southeastern British Columbia. Scale = 50 cm.

Figure 31.4. Map of a portion of large theropod trackway and associated tracks of small theropods from the Minnes Formation (Lower Cretaceous) exposed on the Narraway River. Each of the large footprints is slightly longer than 50 cm.

Figure 31.5. *Amblydactylus* track (TMP 78.11.17) from the Gething Formation of the Peace River Canyon of British Columbia, showing a double impression as the animal slid and turned in soft mud. Scale = 20 cm.

Table 31.1. *Geological ages of footprint sites in western Canada.*

Epoch	Age	Formations	Sites
Late Cretaceous	Maastrichtian	Scollard	Huxley
	Campanian/ Maastrichtian	Wapiti	Pinto Creek, Red Willow River
	Campanian	Horseshoe Canyon	Drumheller, Rumsey, Battle River
		St. Mary River	Barons, St. Mary River, Oldman River
		Judith River (Oldman)	Dinosaur Provincial Park
		Judith River (Foremost)	Redcliff, Grassy Lake
		Belly River	St. Mary River
		Milk River	Red Creek
	Santonian	—	—
	Coniacian	—	—
	Turonian	Cardium	Luscar
	Cenomanian	Dunvegan	Murray River, East Pine Bridge, Pouce Coupe River
Early Cretaceous	Aptian/ Albian	Gething	Peace River Canyon, Carbon Creek
	Barremain/ Aptian	Cadomin	W.A.C. Bennett Dam
	Barremain	—	—
	Berriasian/ Valangian	Minnes	Narraway River
	Tithonian/ Berriasian	Upper Kootenay	Michel, Flathead Ridge, Eagle Mountain