

Mangahouanga Stream (Dinosaur Stream)



Key Values

Cultural

Landscape (geological features)

Natural Character

Table 1: List of publications reviewed

Year	Name	Author
1980	Dinosaur bone found in Hawke's Bay	Daily telegraph
1993	The Hunt for New Zealand's Dinosaurs	The New Zealand Geographic
1994	Cretaceous Research Paper – A Late Cretaceous polar dinosaur fauna from New Zealand	Molnar, Wiffen
1994	Rocks hold special treasures	Dominion post
1994	Dinosaur centre expected to be top attraction	Napier Courier
1994	Ancient exhibit	Dominion post
1994	Small bone was the beginning of a gigantic discovery for Hawke's Bay	Napier courier
1994	Napier Centre to feature New Zealand Dinosaur relics	Dominion post newspaper
2000	"Romancing the bone" how an amateur fossil hound unearthed dinosaur remains in a most unlikely place and rocked the word of palaeontology	Discovery Magazine
2001	Email to MTG	J. Wiffen
2016	Terrestrial fossils	The Encyclopaedia of New Zealand
2016	New Zealand Geo-preservation Inventory	Geological Society of New Zealand
2016	Scientists and Tūhoe to hunt dinosaur fossils in the Urewera range	Stuff.co.nz
2016	Tūhoe and scientists collaborate on dinosaur hunt	Science media centre
2016	Fossicking for fossils	Victorious (Victoria University)
2018	Cultural Values Table	Hawke's Bay Regional Council

Discussion

Purpose of report

1. The purpose of this report is to assist the RPC members to determine whether any of the values of the Mangahouanga Stream are outstanding for the purposes of the National Policy Statement for Freshwater Management (NPSFM).
2. This report presents the summarised findings of the values attributed to the Mangahouanga Stream in those documents referred to in Table 1, above.

Overview

3. The Mangahouanga Stream is a small stream in northern Hawke's Bay, which contains one of the most significant discoveries ever made in New Zealand – dinosaur bones. The remote mountain stream, now located high in the Urewera Ranges, was previously part of a large estuary area in the late cretaceous period, 65 million years ago.
4. In 1975, the first dinosaur bones were found at the Mangahouanga Stream, proving beyond doubt that dinosaurs had once lived in New Zealand. Prior to this discovery, it was widely thought that dinosaurs had not been present in New Zealand, with scientists believing New Zealand's land mass was too small for dinosaurs to exist.
5. The Mangahouanga Stream contains rich and diverse fossil concentrations, and is recognised as internationally significant on the New Zealand geo-preservation inventory. In the 1970s and 80s, fossil bones from four new species of dinosaur were found here, including a new genus of mosasaur that was from a previously unknown lineage of mosasaur.
6. In 2010, remains of a titanosauris were found at the Mangahouanga Stream site, which is the largest known dinosaur ever to have lived. In total, the remains of six separate species of dinosaurs have been found in the Mangahouanga Stream, and also New Zealand's oldest fossil insect. These discoveries gave scientists the very first glimpse into what New Zealand was like in the age of the dinosaurs.
7. The Mangahouanga Stream is internationally renowned, with the discoveries made in this stream changing scientific thinking around the type and size of land masses needed to support dinosaurs. These discoveries proved beyond doubt that land masses the size of New Zealand had the potential to support the full range of dinosaurs.
8. To date, the Mangahouanga Stream is the only place in New Zealand where significant dinosaur remains have been found. Other discoveries include theropod dinosaur remains in the Chatham Islands, a single theropod fossil bone (from the Jurassic period) by the mouth of the Waikato River, and dinosaur footprints in Nelson.

Location

9. The Mangahouanga Stream is located in the Urewera Ranges around 120 km inland, to the east of Te Hoe River. It is part of the Mohaka catchment and is a tributary of Te Hoe River.
10. The location of Mangahouanga Stream can be seen in Figures 1 and 2, below.



Figure 1: location of Mangahouanga Stream



Figure 2: location of Mangahouanga Stream

Cultural values

11. The Mangahouanga Stream is located within an area with interests relating to Ngāti Kahungunu, Ngāti Tūwharetoa, Ngai Tūhoe and Ngāti Pāhauwera.
12. While no direct customary linkages have been established back to the Mangahouanga Stream by name in the documents reviewed in Table 1, it is recognised that all fresh water bodies have special cultural, spiritual, historical and traditional associations with freshwater. The relationship between Tāngata whenua and freshwater is founded in whakapapa, which is the foundation for an inalienable relationship between Māori and freshwater that is recorded, celebrated and perpetuated across generations. Freshwater is recognised by Māori as a taonga of paramount importance, and as such, all waterbodies have important spiritual, physical and customary value.
13. Attachment 1 contains further information on the cultural values associated with the Mangahouanga Stream.

Recreation values

14. The Mangahouanga Stream is surrounded by private forestry and is difficult to access by road. The stream is accessible by car if prior arrangements are made with the forestry company who will open any locked gates and ensure no logging trucks are present in the area.
15. As such, the Mangahouanga Stream is not highly used for recreational activities.

Ecology values

16. The Mangahouanga Stream is a remote stream surrounded by private forestry and native bush areas. Given the lack of development pressures in the surrounding area the river is expected to be in a near natural state.
17. There are likely to be some native fish and wildlife associated with the Mangahouanga Stream however, no surveys or studies have been undertaken of this area so this information is unknown.
18. Future harvesting of the pine forest may have some effects on the ecology of the river and water quality.

Landscape / scenic values

19. The Mangahouanga Stream is located high in the Urewera Ranges, surrounded by a combination of private forestry and native forest areas. While the secluded bush landscape around the stream is attractive, the Mangahouanga Stream is renowned for its rich and diverse fossil concentrations.

20. The Mangahouanga Stream is internationally renowned with the remains of six separate species of dinosaurs, including four new species of dinosaurs and New Zealand's oldest known fossil insect, having been discovered here.
21. The National Geo-preservation Inventory, which identifies and ranks geological features according to their relative significance, classifies the following features in the Mangahouanga Stream as nationally significant:
 - The first, and to date the only, record of terrestrial dinosaurs found in New Zealand.
 - Rich and diverse Cretaceous vertebrate fossils in concentrations, including New Zealand's only known dinosaurs and New Zealand's oldest known fossil insect, as well as fossil turtles, mosasaurs, elasmosaurs, plesiosaur and early fish.
22. Photographs of the Mangahouanga Stream are contained in Attachment 2.

Geological features

23. Around 70 million years ago the Mangahouanga Stream was part of a very different New Zealand landscape, vastly different from the mountain stream it is today. In the late cretaceous period the Mangahouanga Stream was part of a larger estuarine environment lying directly on the east coast. At this time, New Zealand was covered in lush rainforest and was a much larger land mass than today.
24. The fossil dinosaur remains found at Mangahouanga Stream were washed into streams by heavy rains on land, and swept down to the sea where they were preserved as marine fossils along the coast, finally ending up in the concretionary boulders in the valley of the Mangahouanga Stream.
25. In 1975, a tailbone from a four metre long, half a tonne carnivorous dinosaur was found at the Mangahouanga Stream site. In the years to follow, evidence of a nine metre allosaur, an economy version of the T-rex, an ankylosaur, a low slung armoured beast, a hypsilophosont and a four metre long plant eater were found, proving beyond doubt that both marine and terrestrial dinosaurs had once lived in New Zealand.
26. Until these discoveries, New Zealand was considered to be one of the least likely places for dinosaurs to have lived. Scientists considered the islands were too small and too isolated to have supported hungry reptilian giants. Further, experts considered dinosaur survival to be very unlikely due to New Zealand's turbulent geological history in which the land has sunk and emerged from beneath the waves many times.
27. To date, the Mangahouanga Stream has provided rich and diverse fossil concentrations. A total of six separate species of dinosaurs, four of which are unique to New Zealand, have been found at this location, in addition to a range of other marine and plant fossils, including New Zealand's oldest known fossil insect, and teeth from the first known southern hemisphere sawfish.
28. Of the species of dinosaur discovered, three were meat eaters and three were herbivores. A number of marine reptiles, notably mosasaurs and plesiosaurs, and the pterosaurs, otherwise known as the flying reptile, were also found at this site.
29. The most significant findings at Mangahouanga Stream are outlined in Table 2, below.

Table 2: Significant fossil findings at Mangahouanga Stream

Year	Dinosaur name/ type	Description
1974	Theropod	The toe bone of a small theropod dinosaur was the first dinosaur remains found at the Mangahouanga Stream. This was followed by the discovery of a nine metre long allosaur, a large headed carnivorous, creature resembling a smaller spryer T. Rex. In total, three different types of theropods dinosaurs were found at the Mangahouanga Stream. Theropods are groupings of carnivorous dinosaurs.
1975, 1986	Ankylosaur	The remains of ankylosaur dinosaurs were found at the Mangahouanga Stream. This was the first dinosaur fossil which was also found in Antarctica, the significance being that dinosaur fossils were found in all lands that once made up Gondwana. Ankylosaur's are "stiff lizards" and known as the military tanks for the dinosaur world, weighing half a tonne, three metres long, with bony armour set into leathery skin for defence.

1978	Plesiosaur	<p>A complete plesiosaur skull was exhumed, which is one of only a dozen complete plesiosaur skulls in the world.</p> <p>Plesiosaur's are the most numerous inhabitants of the "valley graveyard", with the remains of very young offspring as well as 10 metre adults being found.</p>
1987	Pterosaur	<p>The first pterosaur fossil, otherwise known as the flying reptile, was found at Mangahouanga Stream.</p>
1990	Mosasaur	<p>A skeleton of a mosasaur, otherwise known as the rapacious predator in our seas, was found at Mangahouanga Stream. This discovery turned out to be a completely new genus and species of mosasaur, which Joan Wiffen named Rikisaurus tehoensis and Mosasaurus flemingi.</p> <p>This creature was a massive carnivorous marine reptile that grew to be as long as 13 metres. It had powerful sinuous bodies, broad, webbed paddles for limbs and long conical, tooth filled heads like those of alligator. Mosasaurs were the dominant marine predators during the last 20 million years of the Cretaceous period.</p> <p>While mosasaurs had been discovered in New Zealand before, they are not particularly common.</p>
1999	Titanosaurid	<p>A titanosaurid was found at the Mangahouanga Stream site, dated at 80 million years old - three million years after New Zealand split from Gondwanaland.</p> <p>Titanosaurids were widespread globally and lived during the Cretaceous period, between 83 and 65 million years ago. They had small heads, a long neck and tail, and a large body. They were up to 45 metres in length and weighed up to 50 tonnes. The dinosaur would have been a "plant vacuum cleaner" living in the fringes of bush and shorelines.</p>

Naturalness/intactness of waterbody

- Given the lack of development pressures around the Mangahouanga Stream it is expected to be in a near natural state.

Water Quality

- Hawke's Bay Regional Council does not monitor the water quality of the Mangahouanga Stream. However, future harvesting of the forestry land in this catchment may have effects on the water quality and ecology of this stream.

Other

- Joan Wiffen's discoveries are internationally significant, proving the full range of dinosaurs lived in New Zealand after it split away from Gondwana in the early cretaceous period.
- Joan's achievements are recognised within scientific publications, an award from an international scientific society (Society of Vertebrate Paleontology), and an honorary doctorate from Massey University. In 1995, Joan received an appointment as Commander of the Order of the British Empire from the queen, and in 2004, she accepted the Morris Skinner Award from the US-based Society of Vertebrate Palaeontology for outstanding and sustained contributions to scientific knowledge.

Values Summary

Overarching Value	Sub-value	Description	Outstanding Yes/no	Comments
Cultural	TBC	TBC	TBC	TBC
Recreational	TBC	TBC	TBC	TBC
Ecological	TBC	TBC	TBC	TBC
Landscape	TBC	TBC	TBC	TBC
Natural Character	TBC	TBC	TBC	TBC

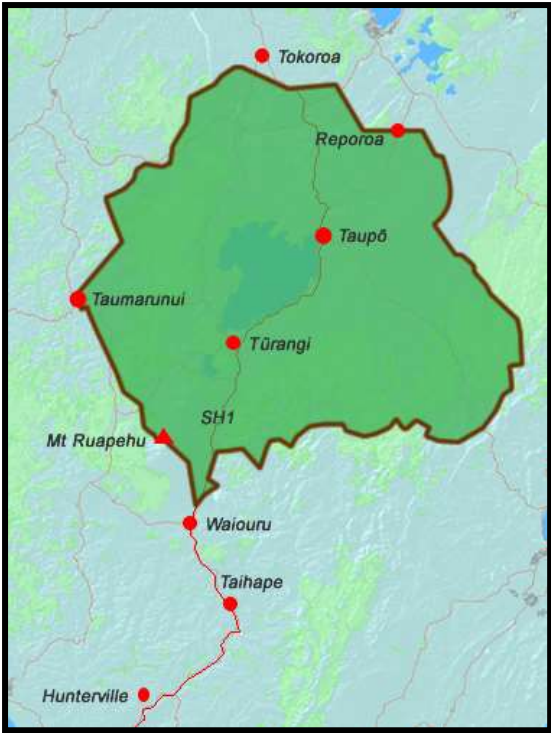


Figure 3: Ngāti Tūwharetoa Area of Interest

4. Resource Management Plans

There are no relevant provisions in resource management plans that are specific to the Mangahouanga Stream.

Attachment 2: Photographs– Mangahouanga Stream



Tuarangisaurus keyesi
Mangahouanga Stream - 1978
Photo by Steve Anderson

