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Katherine Group of the northern Mackenzie Mountains,
Northwest Territories, and implications for
mapping its subdivisions**

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Abstract

Reconnaissance section FNA16A documents a well-exposed section through the Neoproterozoic Katherine Group and Cambrian Nainlin Formation along a creek in southwest Sans Sault Rapids map area (NTS 106H), northern Mackenzie Mountains, Northwest Territories. It provides a useful control point for the character and thickness of units not typically well-exposed in the northern Mackenzie Mountains, and will assist in the mapping of these units. The described units include: the uppermost Tsezotene Formation (interbedded mudrock, dolostone, and sandstone), the Eduni Formation (sandstone dominated), Tawu Formation (interbedded mudrock and sandstone), the Grafe River Formation (sandstone dominated), the Etagochile Formation (mudrock, sandstone, and dolostone), the Shattered Range Formation (sandstone dominated), the Nainlin Formation (red-weathering mudrocks and minor sandstone), and the lowermost beds of the Franklin Mountain Formation (dolostone). Identification of the recessive intervals within Tawu and Etagochile formations is important for the mapping of the formations of the lower Katherine Group.

Introduction

The Katherine Group, originally named by Hume and Link (1945), is a Neoproterozoic siliciclastic unit, part of the Mackenzie Mountains Supergroup, found throughout the northern and eastern portions of the Mackenzie Mountains. Aitken et al. (1982) documented its presence in the Sans Sault Rapids and Upper Ramparts River map areas (National Topographic System maps 106G and 106H). In their work, the Katherine Group was reported to reach a minimum thickness of 712 m. It was subdivided into a lower division (424 m thick at section U-3 of Aitken et al., 1973) consisting mainly of quartzite with minor recessive intervals of mudrocks and dolostone, and an upper division (288 m thick at section U-4 of Aitken et al., 1973) of quartzite, dolostone, and mudrock. Aitken et al. (1973) additionally reported a thickness range of 335-1220 m for the lower division, and 120-674 m thick for the upper division (see Table 1 for subdivisions of the Katherine Group). The upper division was further subdivided into a lower recessive sub-unit dominated by mudrock and dolostone (80-244 m; Aitken et al., 1973), and an upper sub-unit of quartzite (40-430 m; Aitken et al., 1973). Alternating intervals of resistant sandstone and of recessive mudrock and dolostone, on the order of 50-500 m, allowed Aitken et al. (1978) to subdivide the Katherine Group into seven formation-scale units, informally known as K1 through K7. Units K1, K3, K5, and K7 are sandstone-dominated intervals, and these are separated by recessive mudstone and carbonate intervals K2, K4, and K6. K1 through K5 correspond to the lower Katherine Group of Aitken et al. (1973), K6 corresponds to the lower sub-unit of the upper Katherine Group in Aitken et al. (1973), and K7 corresponds to the upper sub-unit. After additional work establishing the regional extent and continuity of these seven units, Long and Turner (2012) formalized them as named formations (Table 1). These units are: Eduni Formation (former K1; quartz arenite dominated), Tawu Formation (former K2; mudrock dominated with lesser sandstone), Grafe River Formation (former K3; quartz arenite dominated), Etagochile Formation (former K4; mudrock dominated with sandstone and minor carbonate), Shattered Range Formation (former K5; quartz arenite dominated), McClure

Formation (former K6; mudrock dominated with lesser dolostone and sandstone), and Abraham Plains Formation (former K7; quartz arenite dominated).

Table 1. Katherine Group terminology.

	Aitken et al. (1973)	Aitken et al. (1978)	Long and Turner (2012)
Katherine Group	upper Katherine Gp (120-674 m)	K7	Abraham Plains Formation (15-270 m)
		K6	McClure Formation (123-253 m)
	lower Katherine Gp (335-1220 m)	K5	Shattered Range Formation (124-376 m)
		K4	Etagochile Formation (16-99 m)
		K3	Grafe River Formation (22-454 m)
		K2	Tawu Formation (25-138 m)
		K1	Eduni Formation (126-600 m)
	Tsezotene Fm	Tsezotene Fm	Tsezotene Fm

Section FNA16A

During field work in 2016 (Fallas et al., 2016), exposures along an unnamed creek in southwest Sans Sault Rapids map area (Fig. 1) were observed to provide a largely continuous exposure from the Tsezotene Formation, through the Katherine Group and up into Cambrian strata of the Franklin Mountain Formation (Fig. 2). This included very good exposure of the lower five formations of the Katherine Group: Eduni Formation, Tawu Formation, Grafe River Formation, Etagochile Formation, and Shattered Range Formation. Directly below Franklin Mountain Formation at the upper end of the section, the Cambrian Nainlin Formation was also recognized in an area where it had previously been thought to be absent (MacNaughton and Fallas, 2014). Time and logistical constraints precluded detailed measurement of this section; however, a series of low-level helicopter photographs (Figs. 3 through 11) allowed for the basic description presented here. Lithologies were assessed based on general appearance and comparison to visited outcrops within corresponding intervals elsewhere in northern Mackenzie Mountains, and to published section descriptions of J.L. Usher (Aitken et al., 1973) and D.G.F. Long (Long and Turner, 2012). Effectively vertical bedding permitted reliable estimates for the thickness of each described interval to be obtained. This was done using 1.5 m-resolution satellite imagery in GIS software to identify unit boundaries and to directly measure unit thicknesses in map view.

Consistent with the definitions of Long and Turner (2012), the strata assigned to Eduni, Grafe River, and Shattered Range formations in section FNA16A all appear to be quartz sandstone dominated (in excess of 95% of each unit). A thickness of 195 m for Eduni Formation falls within the reported range of 126-600 m of Long and Turner (2012). At 415 m, the Grafe River Formation is within the reported range of 22-454 m, and the 140 m of Shattered Range Formation (here truncated by the sub-Cambrian unconformity) also falls within the range of 124-376 m reported by Long and Turner (2012). The strata assigned to the Tawu Formation, a recessive interval of interbedded mudrocks and sandstone, are consistent with the definition of Long and Turner (2012), and the thickness of 55 m at FNA16A falls within their reported range of 25-138 m. Long and Turner (2012) indicate that the base of the Etageochile Formation is taken at the “first laterally extensive mudstone unit” above the Grafe River Formation. Since lateral extent cannot be assessed at section FNA16A, it is taken at the base of the first mudrock-dominated unit of significant thickness (unit 10) above the Grafe River Formation. In Aitken et al. (1978, p. 481), Etageochile Formation (their K4) is described as “purple and maroon shales, sandstone, (tr.) carbonate”, suggesting that unit 12 in section FNA16A should also be included in Etageochile Formation. Therefore it is considered reasonable to assign units 10 through 12 to Etageochile Formation here. The covered interval, unit 13, is also included on the assumption that the trees grow preferentially on fine-grained bedrock with better soil development. However, unit 13 may include significant beds of sandstone assignable to the overlying Shattered Range Formation. In total, the strata assigned to Etageochile Formation in section FNA16A (including unit 13) are 190 m thick, which is notably thicker than the reported range of Long and Turner (2012) of 16-99 m. It is also worth noting that the Etageochile Formation is shown alternately as a single recessive interval (their sections 13, 25, 30) or as two or more recessive intervals (their sections 16, 23) in the sections documented by Long and Turner (2012).

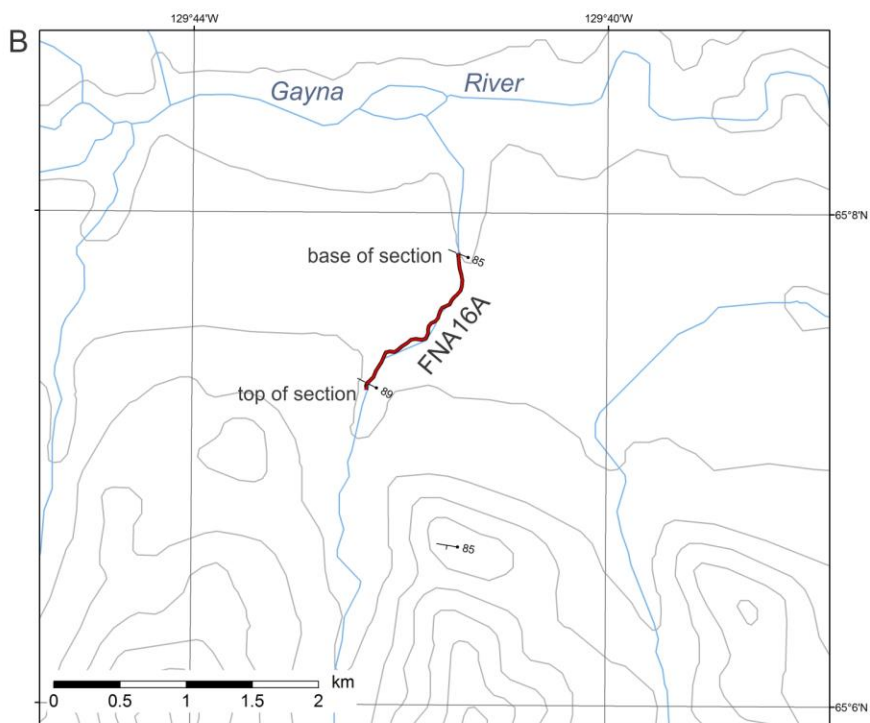
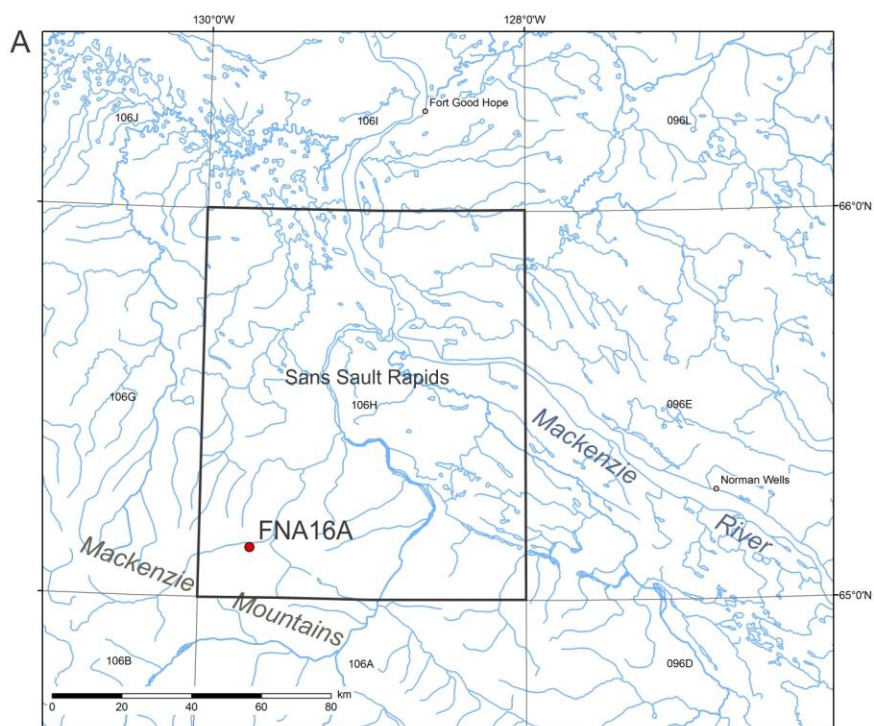


Figure 1. Location of section FNA16A. A) Position of section relative to local communities and Mackenzie Mountains. B) Detail of section location, just south of Gayna River.

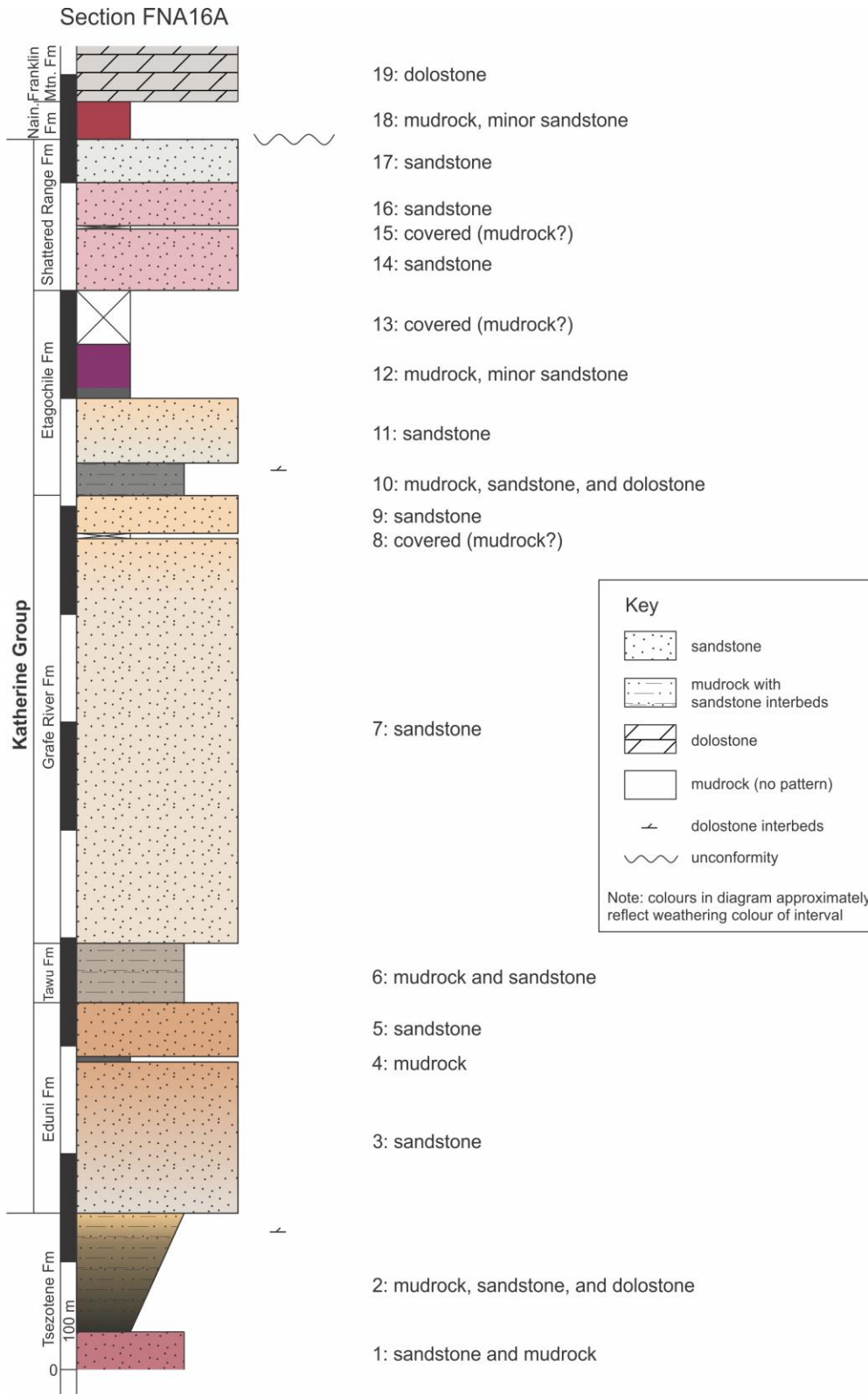


Figure 2. Graphic log of section FNA16A illustrating general character of strata and approximate weathering colour.

Reconnaissance section FNA16A. Observations made 21 July 2016 of well exposed creek section south of Gayna River through units of the Neoproterozoic Katherine Group. The section includes upper Tsezotene Formation at the base and Cambrian Nainlin and Franklin Mountain formations at the top. Section was documented using field photographs taken from helicopter, and was measured using high-resolution georeferenced satellite imagery (facilitated by effectively vertical bedding along the entire section). Weather was high overcast. Descriptions are derived from field photographs taken by K.M. Fallas and G.S. Stockmal.

Base: 65.130591°N, 129.690668°W (NAD83)
 Top: 65.121327°N, 129.705303°W (NAD83)
 Bedding: 115°/89° SW (estimated)

Unit thickness totals:

Franklin Mountain Formation (incomplete)	> 40 m
Nainlin Formation	35 m
Shattered Range Formation	140 m
Etagochile Formation	190 m
Grafe River Formation	415 m
Tawu Formation	55 m
Eduni Formation	195 m
Tsezotene Formation (incomplete)	> 145 m

Unit	Description	Thickness (m)	Cumulative (m)	Photos
19	Base sharp. Moderately resistant. 80% dolostone, weathers tan to light grey; beds appear to be medium- to thick-bedded. 20% mudrock as interbeds forming sharp, recessive notches. Becomes thicker bedded up section.	40+	1215	Figure 11
	<i>Base of Franklin Mountain Formation</i>			
18	Base sharp and unconformable. Interval recessive. Mudrock (85%), weathers dominantly brick red, but also greenish-grey. Interbedded with sandstone (15%), weathers brown, grey, and brick red, thin-to medium-bedded. Bedding estimated at 120°/89° SW.	35	1175	Figure 11
	<i>Base of Nainlin Formation</i>			

17	Lower contact covered. Resistant. Sandstone, weathers light grey to cream, very thick-bedded. Bedding estimated at 115-120°/89° SW.	40	1140	Figure 11
16	Base sharp. Moderately resistant. Sandstone, weathers light reddish brown, thick-bedded.	40	1100	Figure 11
15	Base sharp. Recessive. Inferred to be mudrock in pronounced recessive notch.	3	1060	Figures 10, 11
14	Base covered. Moderately resistant. Sandstone, weathers light reddish brown, thick bedded.	57	1057	Figures 10, 11
<i>Base of Shattered Range Formation (Katherine Group)</i>				
13	Covered interval, recessive. Reddish mudrock talus visible at upper end.	50	1000	Figure 10
12	Base very sharp. Recessive. Mudrock (85%), weathers dark grey in lower 10 m and purplish red in remainder of interval. Interbedded with sandstone (15%), weathers light brown.	50	950	Figures 9, 10
11	Base sharp. Moderately resistant. Sandstone, weathers cream to light orange, medium- to thick-bedded.	60	900	Figure 9
10	Sharp to gradational base. Moderately recessive. Mudrock (50%), weathers dark grey, red, and greenish grey. Interbedded with sandstone (30%), weathers brown, medium-bedded, and with dolostone (20%), weathers light orange, medium- to thick-bedded. Sandstone more abundant in lower half of interval, dolostone more abundant in upper half of interval.	30	840	Figures 8, 9
<i>Base of Etagogchile Formation (Katherine Group)</i>				
9	Base sharp. Resistant. Sandstone, weathers red to light orange, thick-bedded.	35	810	Figure 8
8	Sharp base. Recessive notch, covered with trees.	5	775	Figure 8

7	Base covered by talus. Resistant. Sandstone, weathers cream to light grey and brown, light orange in upper 30 m, thick-bedded. Some minor variations in bedding but average is vertical.	375	770	Figures 5 to 8
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Base of Grafe River Formation (Katherine Group)

6	Base covered by talus. Recessive. Mudrock (50-60%), weathers dark grey and red; interbedded with sandstone (40-50%), weathers light brown, thin- to thick-bedded.	55	395	Figure 5
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Base of Tawu Formation (Katherine Group)

5	Base sharp. Moderately resistant. Sandstone, weathers light orange to rusty red, thick-bedded.	50	340	Figure 5
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4	Base sharp. Recessive notch between units 3 and 5. Mudrock, weathers grey to greenish grey.	5	290	Figures 4, 5
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3	Base gradational. Resistant. Sandstone, weathers light orange to rusty red, thick-bedded. Bedding 115-120°/89° SW.	140	285	Figure 4
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Base of Eduni Formation (Katherine Group)

2	Base sharp. Recessive at base of unit, becoming semi-resistant at top. Mudrock (70%), weathers dark grey; interbedded with sandstone (25%), weathers light brown, thin- to medium-bedded, and with dolostone (5%), weathers orange. Proportion of sandstone and dolostone increases upsection into unit 3.	110	145	Figures 3, 4
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1	Base covered. Semi-resistant. Sandstone (60%), weathers grey to light brown, medium- to thick-bedded; interbedded with mudrock (40%), weathers red. Bedding approximately 115°/85° SW.	35	35	Figure 3
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Base of section is within upper part of Tsezotene Formation, at the beginning of continuous exposure on west side of creek.



Figure 3: Lowermost portion of section FNA16A on an unnamed creek flowing north (to the right) into the Gayna River on NTS map area 106H, with base of exposure as marked. Units 1 and 2 are within the Tsezotene Formation. Orange weathering beds in the upper part of unit 2 are interpreted as dolostone, based on comparison with visited outcrops elsewhere within the map area. Upper contact of unit 2 marks the base of the Eduni Formation, the lowermost formation of the Katherine Group.

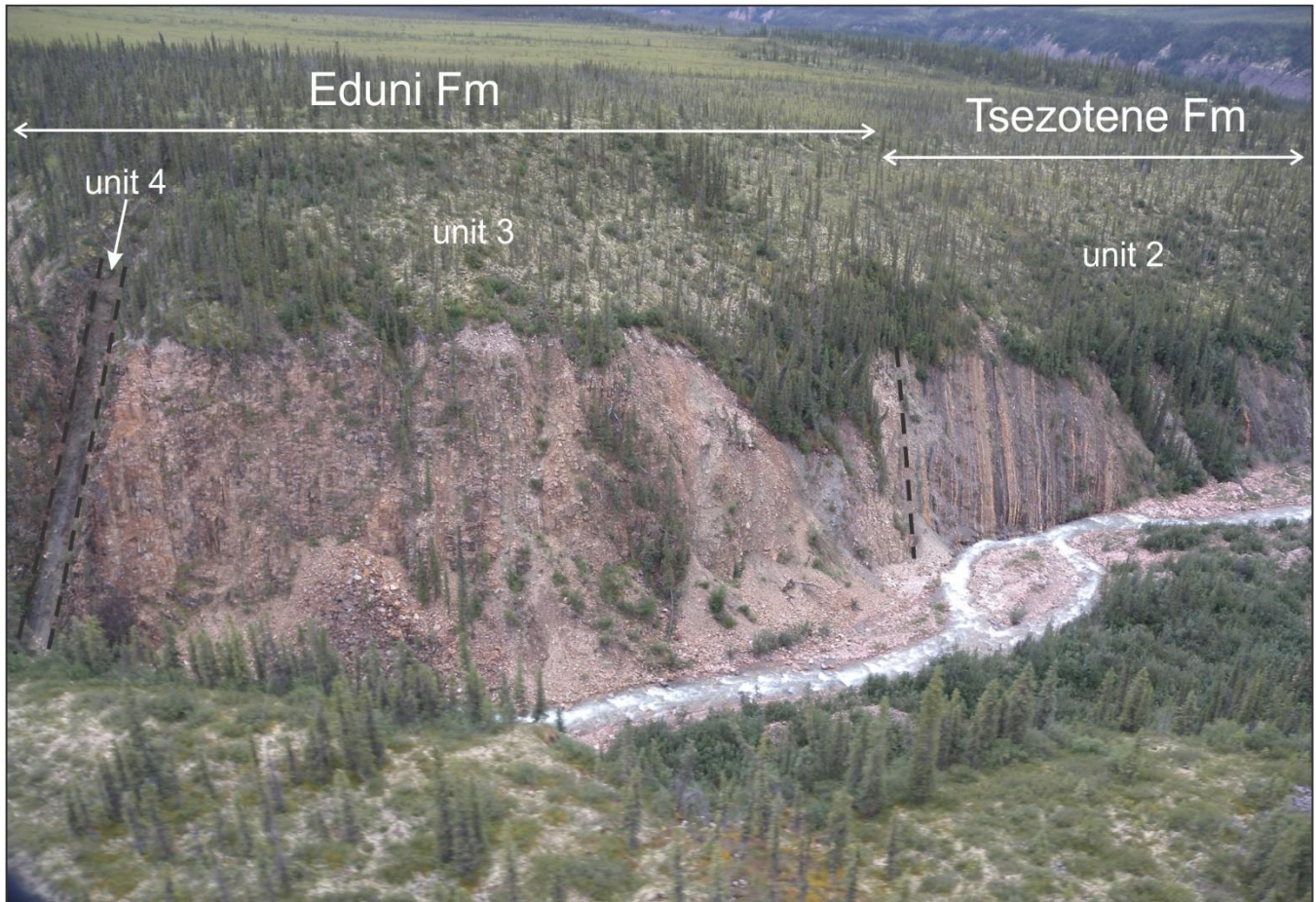


Figure 4. View looking northwest at unit 2 within the Tsezotene Formation, overlain by units 3 and 4 assigned to the Eduni Formation (K1) of the Katherine Group. The transition from interbedded mudrock and dolostone of unit 2 to sandstone of unit 3 is sharp. Dark, recessive mudrock of unit 4 is visible in this view.

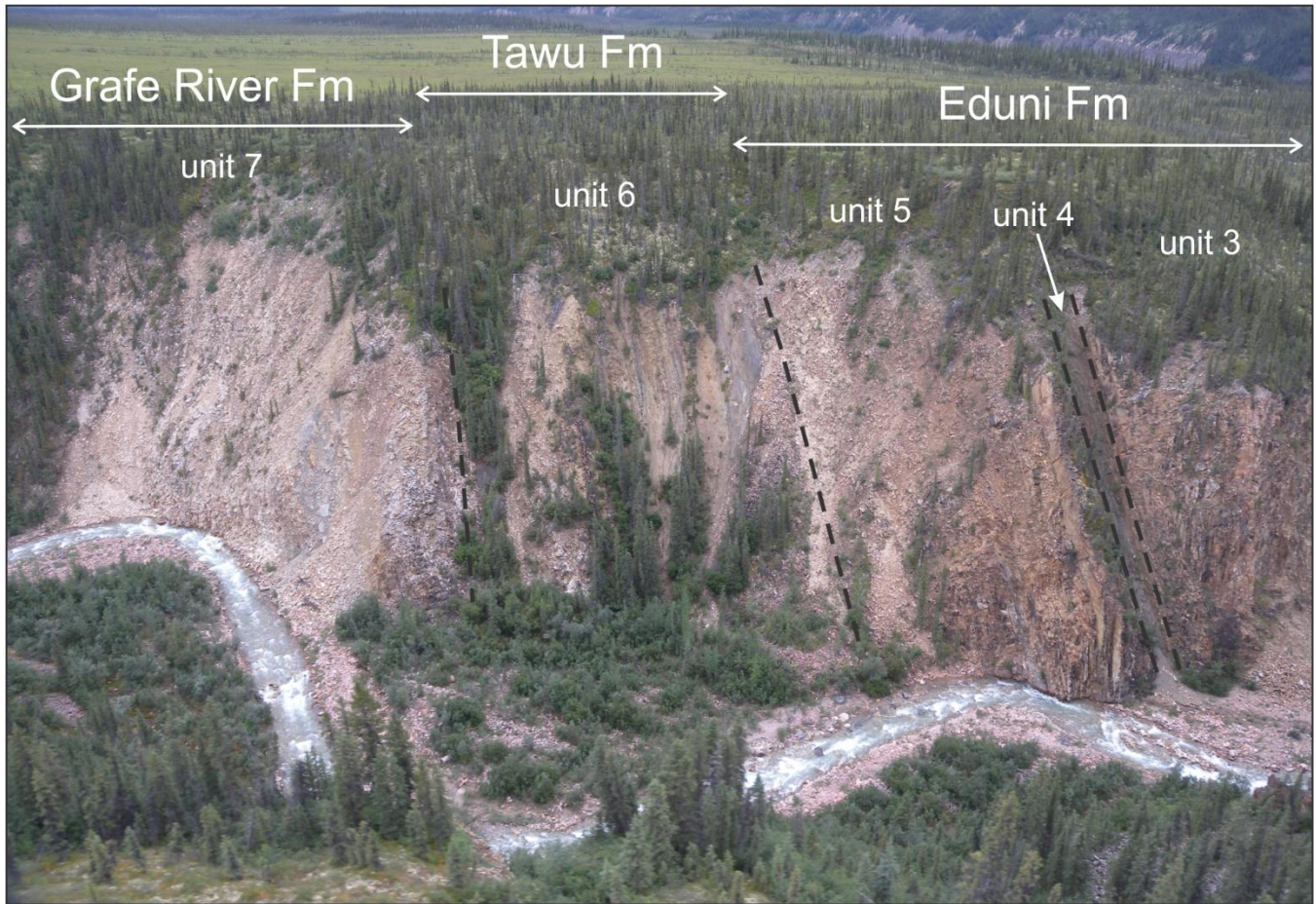


Figure 5. View looking northwest at the upper part of the Eduni Formation (K1) in units 3 through 5, the Tawu Formation (K2) in unit 6, and the lowermost Grafe River Formation (K3) in unit 7. Although not well exposed, some mudrock debris is visible high on the exposure of unit 6, and along the trees at the upper contact of the unit. The generally recessive interval of the Tawu Formation can be recognized elsewhere within Sans Sault Rapids map area (NTS 106H), allowing for separation of the resistant sandstones of the Eduni and Grafe River formations.

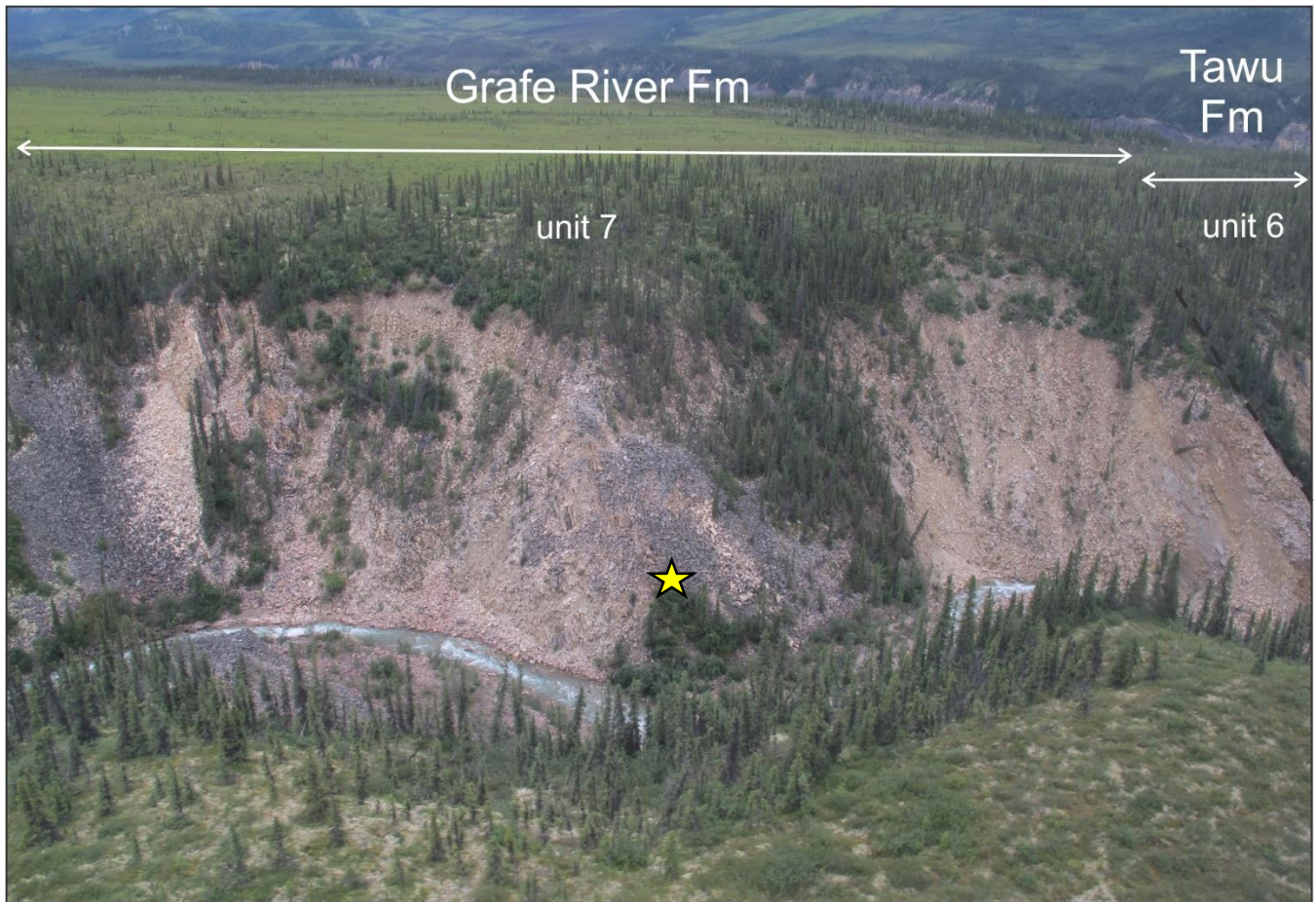


Figure 6. View looking northwest at the lower portion of the Grafe River Formation (K3) in unit 7. The top of the Tawu Formation (K2) is present on the far right, corresponding to the top of unit 6; this contact also appears in Figure 5. Star shows position of reference point for comparison with Figure 7.

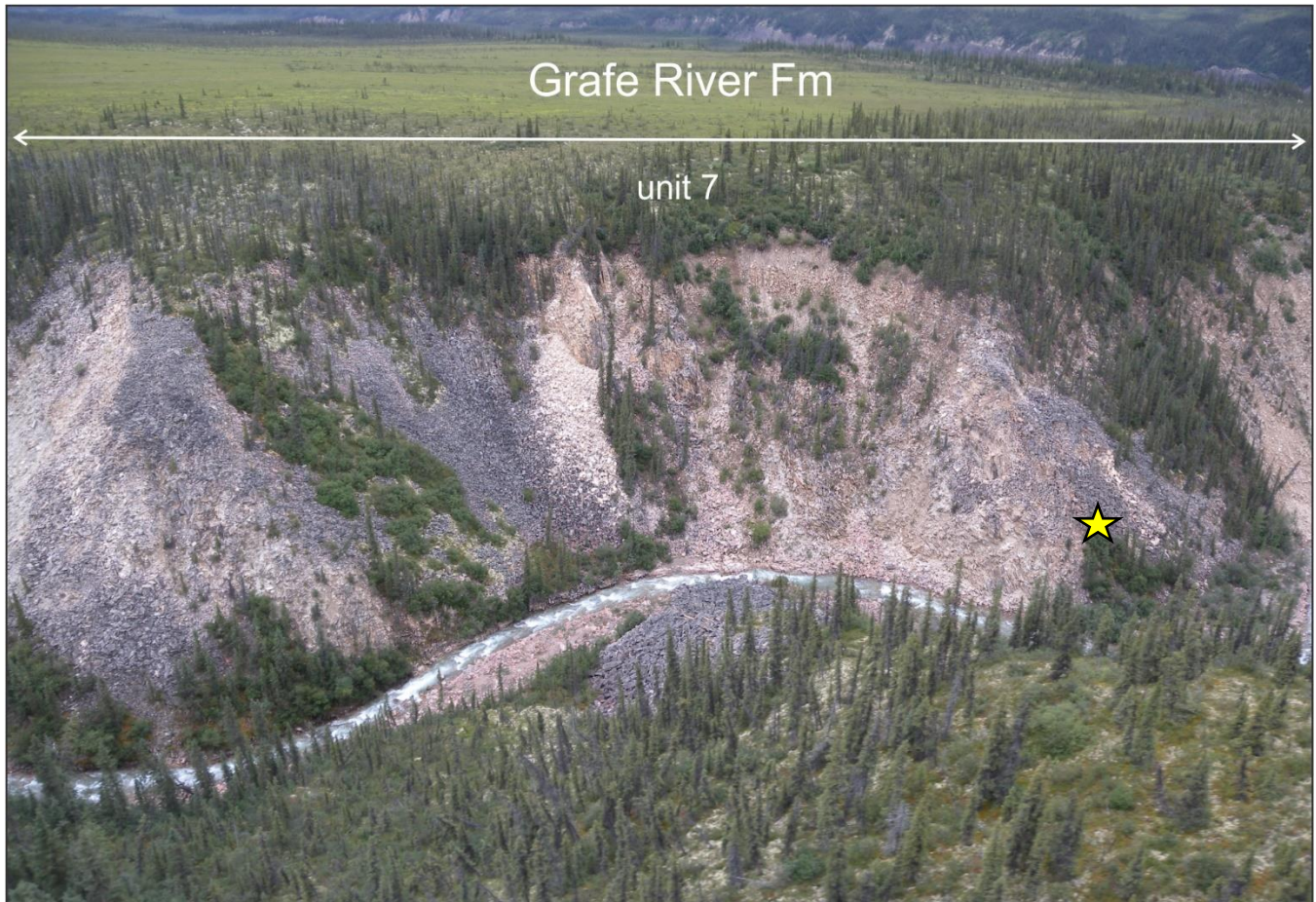


Figure 7. View looking northwest at the upper two-thirds of unit 7, the main unit of the Grafe River Formation (K3). Pale-weathering sandstone exposures in this view also appear in part in figures 6 and 8. Star shows position of reference point for comparison with Figure 6. Prominent sandstone ridge at left also appears in Figure 8.

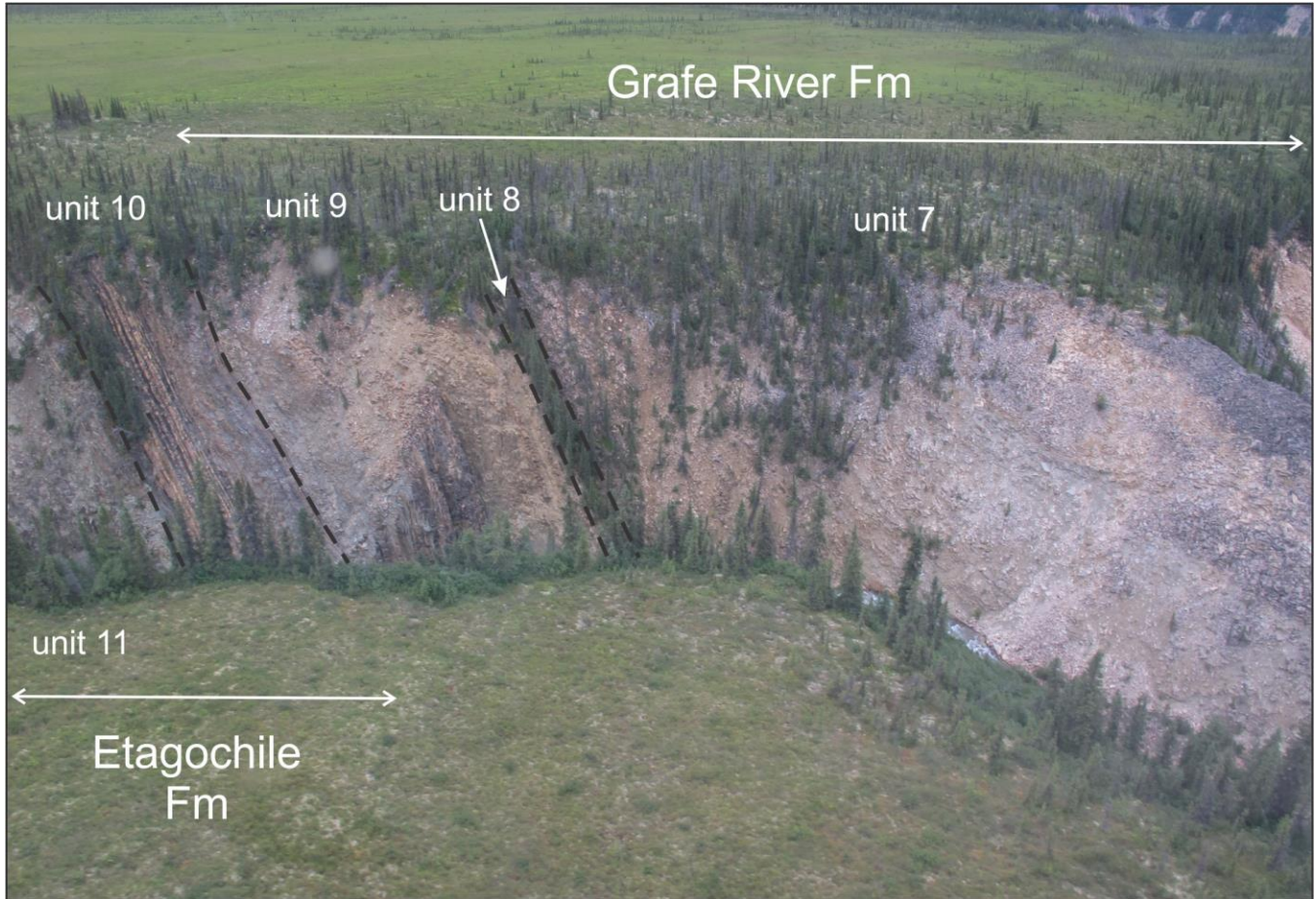


Figure 8. View northwest looking at the upper portion of the sandstone-dominated Grafe River Formation (K3), units 7 to 9. The more recessive interval of unit 10 marks the base of the Etagochile Formation (K4). Orange-weathering beds interbedded with grey mudrock in the upper half of unit 10 are interpreted as dolostone. Prominent sandstone ridge at right also appears on the left edge of Figure 7.

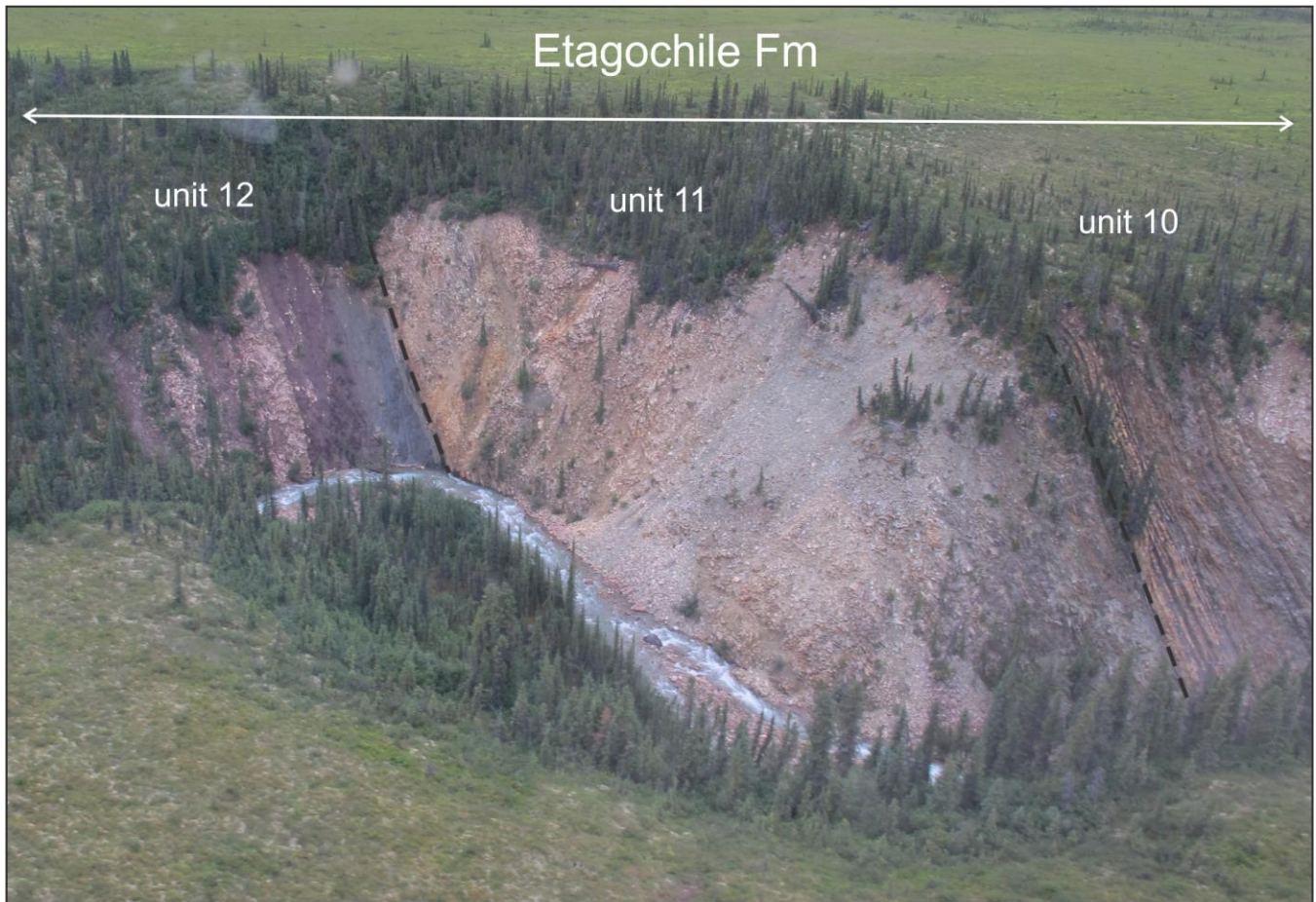


Figure 9. View to the northwest showing the two main recessive intervals of the Etagochile Formation (K4), units 10 and 12, and the intervening sandstone of unit 11. The distinctive, vivid purple mudrock of unit 12 makes this the most easily recognized interval of the Etagochile Formation, and is therefore an excellent marker for mapping where these recessive beds are exposed. Unit 10 is also a relatively recessive unit due to the presence of mudrock interbeds. This pair of recessive intervals is recognizable throughout the Sans Sault Rapids map area (NTS 106H) where this part of the Katherine Group is exposed.

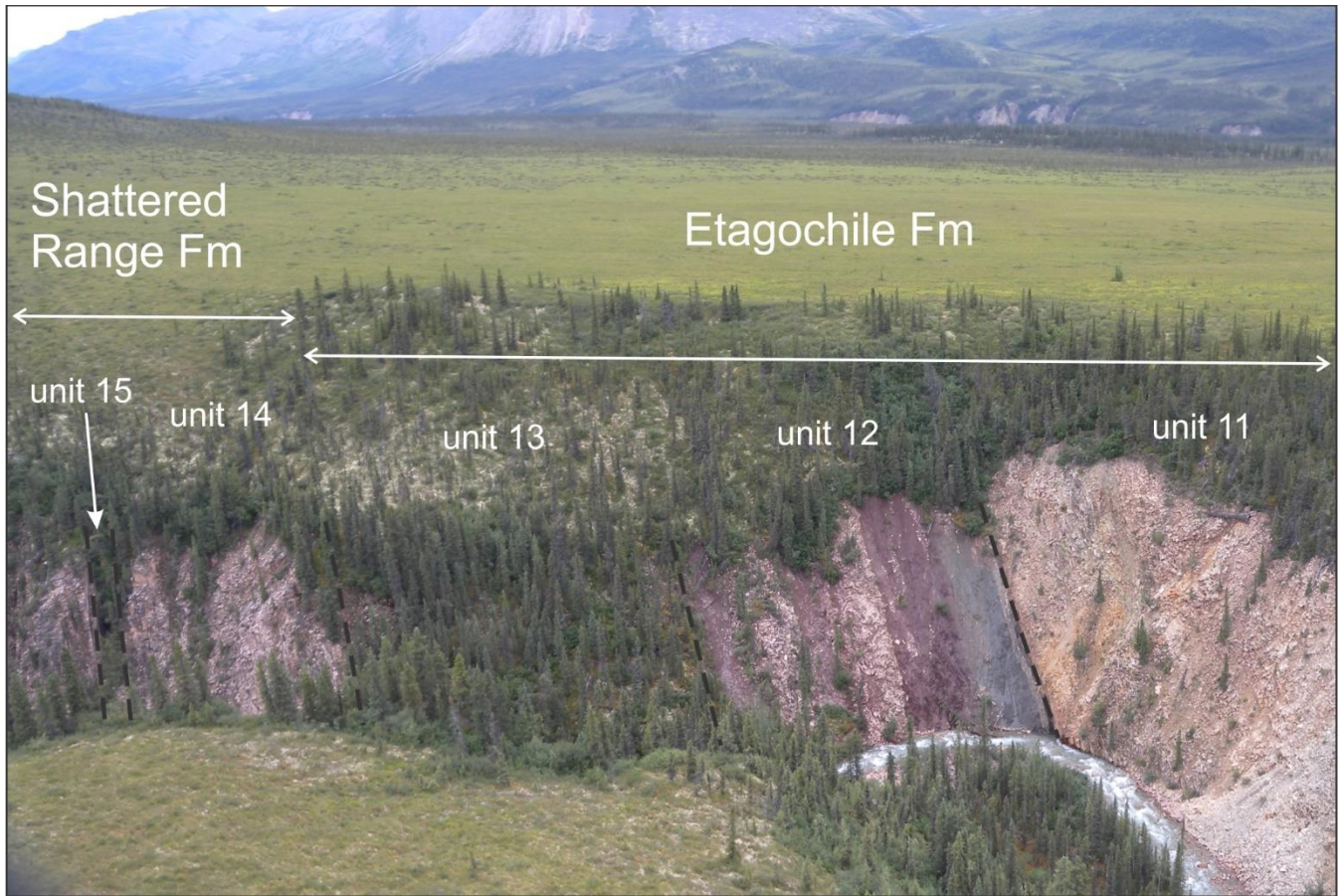


Figure 10. View northwest of units 12 and 13 of the upper part of the Etagochile Formation (K4). Units 14 and 15 comprise part of the Shattered Range Formation (K5). Due to the tree cover on unit 13, it is not clear if the contact between Etagochile and Shattered Range formations is gradational or sharp at this locality.

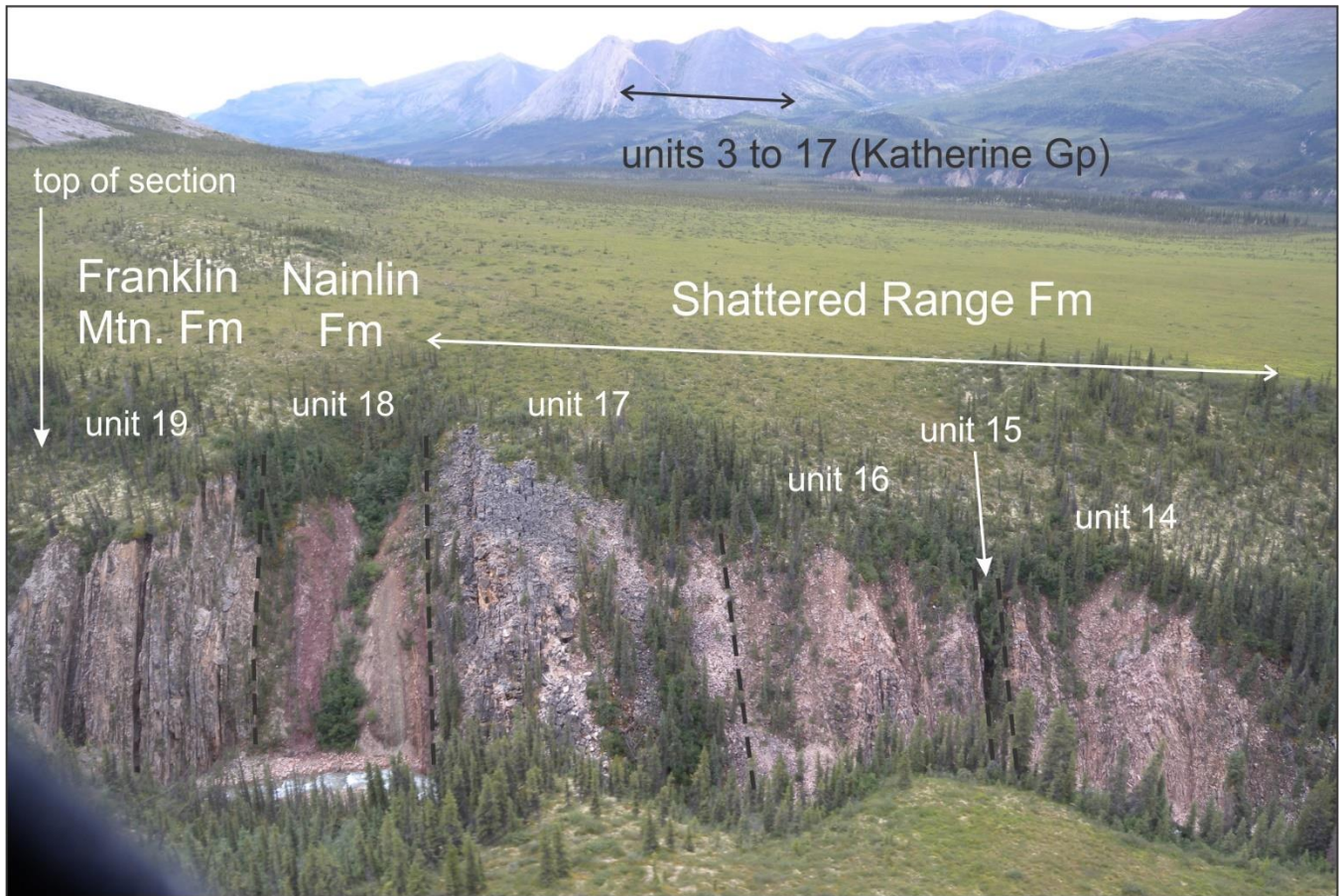


Figure 11. View looking northwest at the upper end of section FNA16A: top as marked. Units 14 through 17 are assigned to Shattered Range Formation (K5) of the Katherine Group. The contact between units 17 and 18 represents the sub-Cambrian unconformity at this locality, with units 18 and 19 assigned to Nainlin Formation and Franklin Mountain Formation respectively. The full Katherine Group in this area (units 3 to 17) is also exposed along strike on the mountainside to the northwest, on the far side of the Gayna River. The overlying Franklin Formation weathers pale grey on the distant mountainside. These steeply dipping beds make up the southwest limb of the Stony Anticline.

Implications for mapping the lower Katherine Group

Mapping the divisions of the Katherine Group below the McClure Formation has proven difficult due to the predominance of well-cemented quartz arenites (in Eduni, Grafe River, and Shattered Range formations), which are prone to fracturing and frost-shattering, generating an abundance of rubble and talus that commonly covers the recessive intervals (Tawu and Etagochile formations). The lower five formations of the Katherine Group have been treated as an undivided map unit by many bedrock mappers (Gabrielse et al., 1973; Aitken and Cook, 1974; Aitken et al. 1982; Gordey et al., 2011; Roots et al., 2011) due to the difficulty in recognizing these recessive intervals. Field observations in the northern Mackenzie Mountains, made in 2016-2018 as part of the Mackenzie Project of the Geo-Mapping for Energy and Minerals (GEM) Program of the Geological Survey of Canada (Fallas et al., 2016; MacNaughton et al., 2017, 2018), provided opportunities to look for the recessive intervals of the Tawu and Etagochile formations in hope of subdividing the lower five formations of the Katherine Group.

In mountainsides where the entire lower Katherine Group is exposed, the lower five formations commonly can be subdivided (Fig. 12). However, given that the lower five formations can have a combined thickness on the order of 1000 m (995 m in section FNA16A), it is often the case that an exposure on a mountainside includes only part of the lower Katherine Group. Important stratigraphic context provided by the upper contact of the Katherine Group, or the contact between lower and upper parts of the Katherine Group, can be obscured by erosional truncation at the sub-Cambrian unconformity. So an individual may interpret the units of the lower Katherine Group differently depending on whether they have counted recessive intervals down from the top of the succession or up from the contact with the underlying Tsezotene Formation. Additional complications may arise if one or more recessive intervals are either not well developed or well exposed in an area. In Figure 13A, the stratigraphy exposed on the mountainside is open to interpretation, with an obvious red-weathering, less-resistant interval halfway down the slope. On the basis of the colour, Etagochile Formation seems to be the most suitable assignment for this interval. Lower on the slope, a thinner, darker weathering recessive interval is poorly exposed and could be interpreted as Tawu Formation, or interpreted as the lower, carbonate-bearing interval of the Etagochile Formation (as in Fig. 13B) by comparison with section FNA16A (unit 10). In the absence of the context provided by exposures of the underlying units, some uncertainty remains regarding this interpretation unless units can be followed along strike where additional context is available (e.g. confirmation of the recessive McClure Formation above the Shattered Range Formation, or of an additional recessive interval below beds here assigned to Grafe River Formation).

Subdividing the lower Katherine Group for mapping purposes is also aided by comparing the weathering character of strata on mountainsides with poor exposure with better exposures on cliff-faces or stream-cuts. The area around Fan Creek in Sans Sault Rapids map area (NTS 106H) provides such an opportunity. In Figure 14, the darker weathering beds of the Etagochile Formation exposed in the canyon pass up-dip into moss-covered slopes, in contrast to the sandstone rubble of the underlying Grafe River Formation and the overlying Shattered Range Formation. Based on observations by the author, this alternation of sandstone rubble and moss-covered intervals is consistently developed where bedding is close to horizontal in the cores of anticlines throughout the northern Mackenzie

Mountains. This suggests it may be possible to subdivide the lower Katherine Group into its constituent formations, even where exposure is poor, if structural complications such as faults are absent.

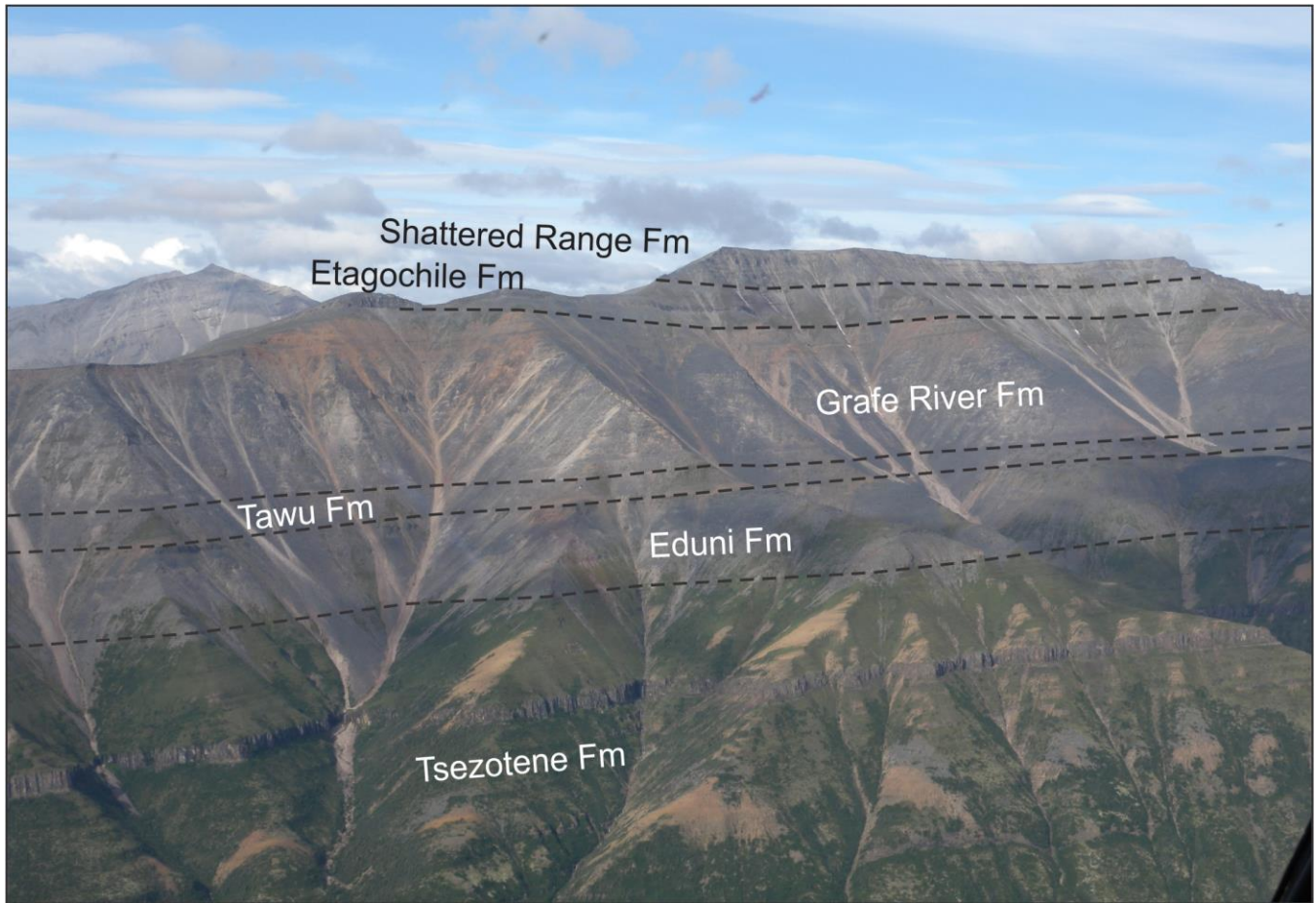


Figure 12. View looking west at the lower Katherine Group of Aitken et al. (1982), west of Arctic Red River, NTS 106G (from approximately 65.2224°N, 131.2985°W). In this view recessive benches of orange-brown weathering, or purple weathering talus are visible, marking the Tawu and Etagochile formations respectively and allowing for the differentiation of the grey- to orange-weathering sandstones of the Eduni, Grafe River, and Shattered Range formations. Confidence in the formation assignments is greater where both recessive-weathering formations are present, and is helped by exposure of the underlying Tsezotene Formation for stratigraphic context. Note the similarity in unit thickness proportions to those documented in section FNA16A.

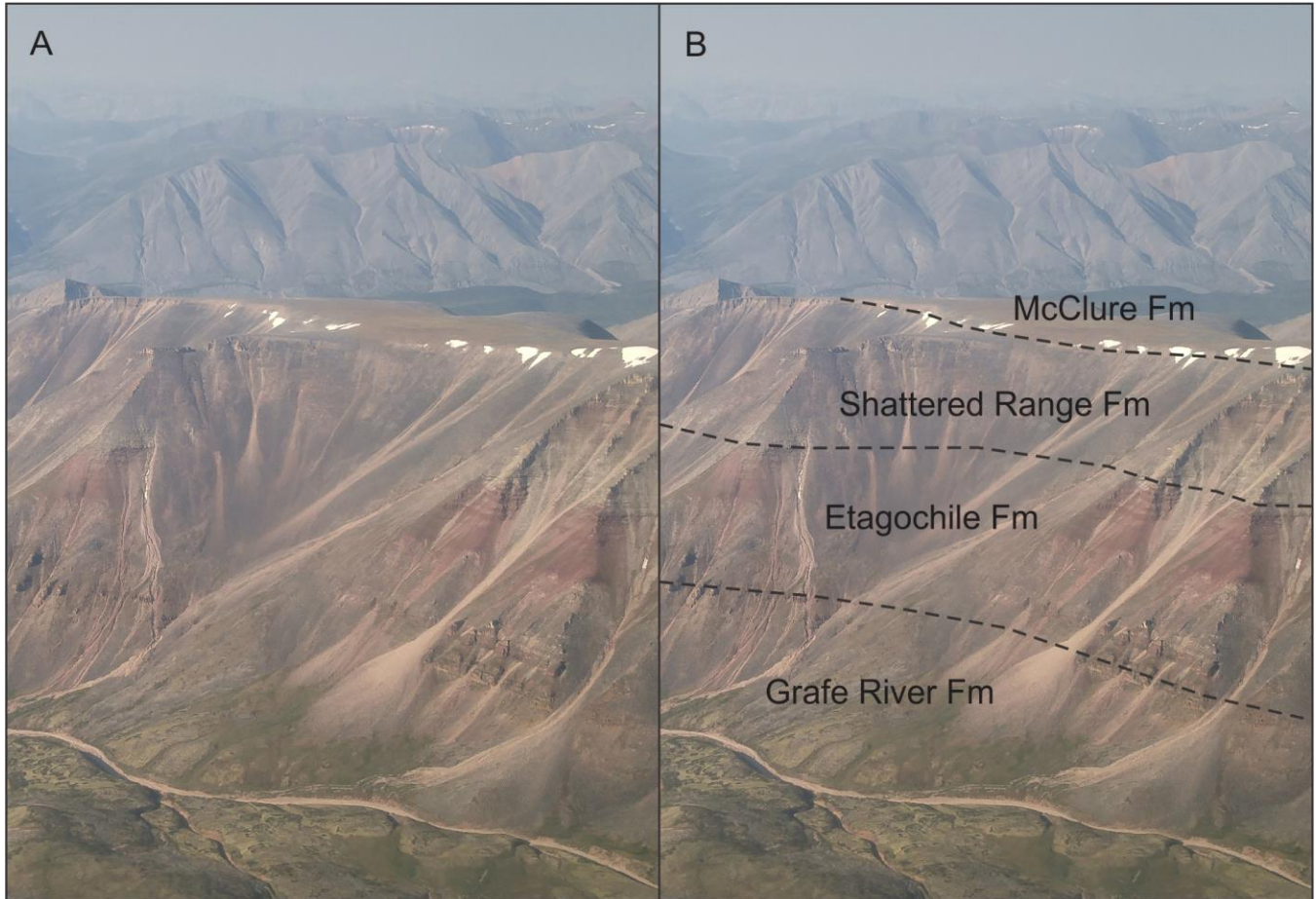


Figure 13. View looking southwest at part of the lower Katherine Group in NTS 106A (from approximately 64.9293°N, 129.2686°W). A) Un-interpreted exposure to illustrate the potential difficulty in assigning units when only part of the Katherine Group is present. B) Interpretation of the Katherine Group exposure based on features described in section FNA16A.

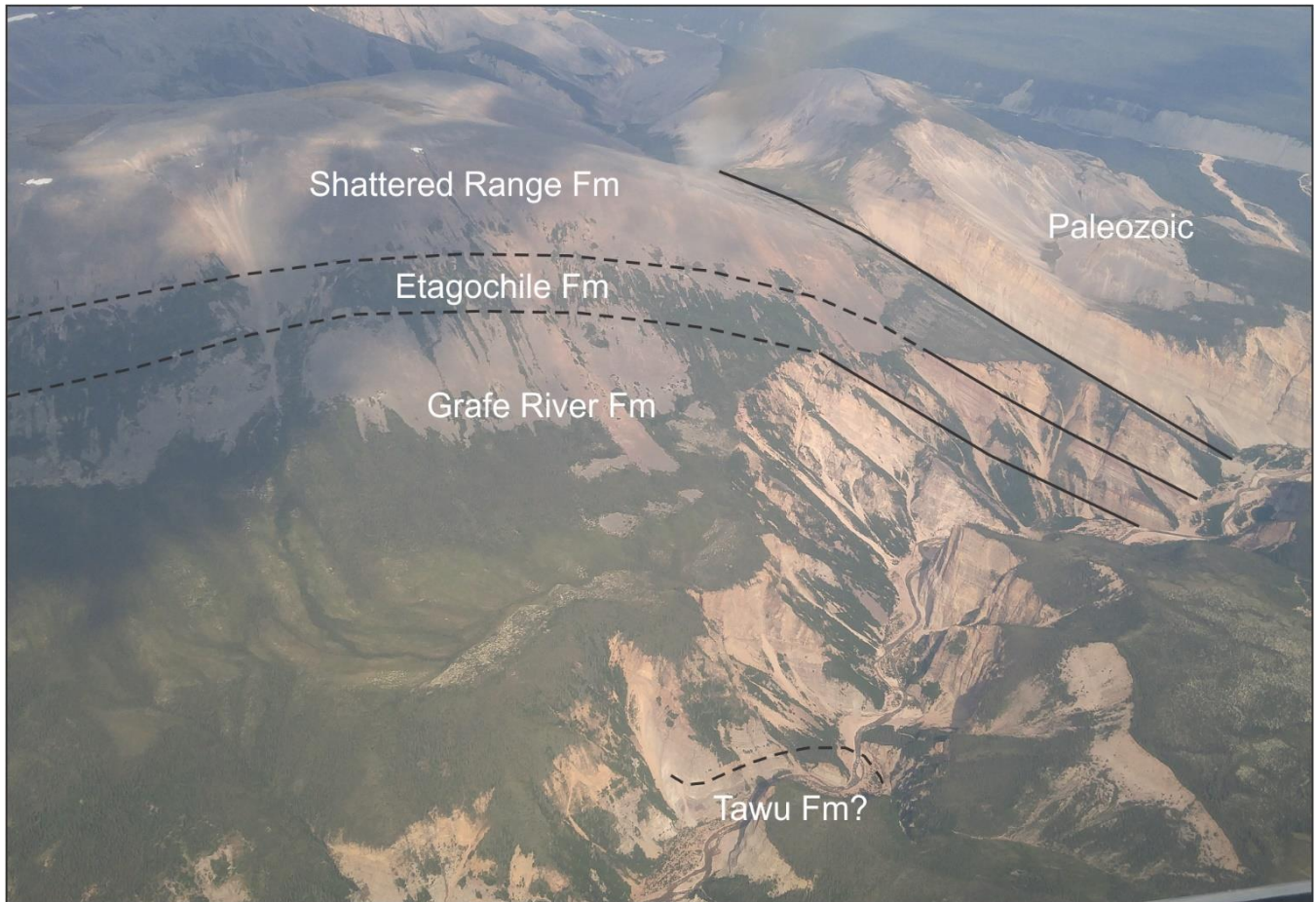


Figure 14. View looking north-northwest at Fan Creek, NTS 106H (from approximately 65.1314°N, 128.3795°W). Katherine Group strata bend from horizontal (on the left), to northeast dipping on the right. The canyon provides excellent exposure of the darker, reddish, recessive interval of the Etagochile Formation to be recognized, as identified in FNA16A, and then traced into the moss-covered slope to the left.

Acknowledgements

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References

- Aitken, J.D. and Cook, D.G., 1974. Carcajou Canyon map-area, District of Mackenzie, Northwest Territories; Geological Survey of Canada, Paper 74-13, 28 p., 1 map.
- Aitken, J.D., Cook, D.G., and Yorath, C.J., 1982. Upper Ramparts River (106G) and Sans Sault Rapids (106H) map areas, District of Mackenzie; Geological Survey of Canada, Memoir 388, 48 p., 3 maps.
- Aitken, J.D., Long, D.G.F., and Semikhatov, M.A., 1978. Progress in Helikian stratigraphy, Mackenzie Mountains; Geological Survey of Canada, Paper 78-1A, p. 481-484.
- Aitken, J.D., Macqueen, R.W., and Usher, J.L., 1973. Reconnaissance studies of Proterozoic and Cambrian stratigraphy, lower Mackenzie River area (Operation Norman), District of Mackenzie; Geological Survey of Canada, Paper 73-9, 178 p.
- Fallas, K.M., MacNaughton, R.B., Finley, T.D., and Gouwy, S.A., 2016. Report of activities for the GEM 2 Mackenzie Project: Northern Mackenzie Mountains bedrock mapping, stratigraphy, and related studies; Geological Survey of Canada, Open File 8132, 15 p.
- Gabrielse, H., Blusson, S.L., and Roddick, J.A., 1973. Geology of Flat River, Glacier Lake, and Wrigley Lake map-areas, District of Mackenzie and Yukon Territory; Geological Survey of Canada, Memoir 366, Part I & II, 153 p. and 268 p.
- Gordey, S.P., Roots, C.F., Martel, E., MacDonald, J.D., Fallas, K.M., and MacNaughton, R.B., 2011. Bedrock geology, Mount Eduni (106A), Northwest Territories; Geological Survey of Canada, Open File 6594, scale 1:250,000.
- Hume, G.S., and Link, T.A., 1945. Canol geological investigations in the Mackenzie River area, Northwest Territories and Yukon. Geological Survey of Canada, Paper 45-16, 87 p.
- Long, D.G.F. and Turner, E.C., 2012. Formal definition of the Neoproterozoic Mackenzie Mountains Supergroup (Northwest Territories), and formal stratigraphic nomenclature for terrigenous clastic units of the Katherine Group; Geological Survey of Canada, Open File 7113, 40 p.
- MacNaughton, R.B. and Fallas, K.M., 2014. Nainlin Formation, a new Middle Cambrian map unit from the Mackenzie Mountains, Northwest Territories; Bulletin of Canadian Petroleum Geology, v. 62, p. 37-67.
- MacNaughton, R.B., Fallas, K.M., Fischer, B.J., Pope, M.C., Chan, W.C., Finley, T.D., and Martell, J., 2017. Report of activities for GEM 2 Mackenzie Project: Bonnet Plume River map area (NTS 106B) bedrock mapping, stratigraphy, and related studies, Northwest Territories and Yukon; Geological Survey of Canada, Open File 8333, 14 p.
- MacNaughton, R.B., Fallas, K.M., Martell, J., and Edgeworth, I., 2018. Report of Activities for GEM 2 Mackenzie Project: Bedrock mapping, stratigraphy, and related studies, Bonnet Plume Lake (NTS 106-B) and Wrigley Lake (NTS 95-M) map areas, Northwest Territories and Yukon; Geological Survey of Canada, Open File 8471, 17 p.
- Roots, C.F., Martel, E., MacNaughton, R.B., and Gordey, S.P. (compilers), 2011. Bedrock geology, Sekwi Mountain (105P), Northwest Territories; Geological Survey of Canada, Open File 6592, scale 1:250,000.