Record 1986/7

Edith River Region, Northern Territory; data record of 1:100 000 - scale mapping

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ABSTRACT

This record summarises the results of 1982-3 fieldwork by the Pine Creek Geological Party (BMR and NTGS) in the Katherine and Fergusson River 1:100 000 - scale Sheet areas. Reductions to 1:100 000 - scale of the 1:25 000 - scale compilation sheets, thin section locality sheets, petrographic descriptions of selected samples, and a list of age determination sampling sites, are enclosed.

The area contains strongly folded Burrell Creek Formation, moderately folded Tollis Formation (El Sherana Group), and gently warped Phillips Creek Sandstone and Plum Creek Volcanics (Edith River Group), of Early Proterozoic age. These are overlain unconformably to disconformably by the Middle Proterozoic Kombolgie Formation, and younger Middle Proterozoic and Palaeozoic strata mark the margin of the Daly River Basin in the southwest. The intrusive age of the granites of the Cullen Batholith postdate the depositional age of the El Sherana and Edith River Groups. Toscanite, rhyolite and microgranite dykes in the west are genetically related to the Plum Tree Creek Volcanics.

INTRODUCTION

This Record summarises results of the 1982-3 field work of the Pine Creek Geosyncline Geological Party of the Bureau of Mineral Resources (BMR) and the Northern Territory Geological Survey (NTGS) in the Katherine and Fergusson River 1:100 000 Sheet areas. The work was a continuation of geological field work in the Pine Creek Geosyncline, as part of the Pine Creek Project, whose overall objective is to study the geology, geophysics, and mineralisation of the geosyncline; an important subsidiary objective is to produce 1:100 000 - scale geological maps of the region. A detailed account of the geology of the area (the 'Edith River Region') is in preparation and will be published in the BMR Map Commentary Series.

This Record presents 1:100 000 - scale reductions (Figures 4b-17b) of the 1:25 000 - scale compilation sheets, and an outline of the stratigraphy. Age determination sample sites and petrographic descriptions are appended.

The location of the area is shown in Figure 1. Colour airphotos at 1:25 000 - scale were used, in conjunction with 1:89 000 - scale panchromatic airphotos. Figure 3 contains the geological reference and an index to the compilation sheets. Copies of the compilation sheets at 1:25 000 original photo-scale can be obtained from the Copy Service, Australian Government Printer (Production), P.O. Box 84, Canberra, ACT 2600 - price on application.

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The field positions of specimens described petrographically are shown on topographic bases accompanying each compilation sheet as 8-digit BMR sample submission numbers.

About 3000 field observation points were occupied over the 3400 km^2 area, representing an average density of about 1 per km^2; the density approaches 1.5 per km^2 in areas of Early Proterozoic rocks.

GEOLOGY

Generalised geology is shown in Figure 2, and the stratigraphy is summarised in Table 1.

The region is dominated in the west by a large mass of granite which forms the southernmost part of the late Early Proterozoic Cullen Batholith, and in the east by a basin of interlayered sandstone and basalt ('Edith Falls Basin'), which represents a thickened sequence of the Middle Proterozoic Kombolgie Formation at the western edge of the McArthur Basin. The granite complex and sandstone basin are separated by a northerly belt of low-grade Early Proterozoic sediments, which in the north (Burrell Creek Formation) belongs to the Pine Creek Geosyncline sequence. The southern part of this belt (Tollis Formation) and felsic volcanics and minor sediments of the Plum Tree Creek Volcanics and Phillips Creek Sandstone, represent an unconformity-bounded late Early Proterozoic suite separating the Pine Creek Geosyncline sequence from the McArthur Basin sequence, which is approximately coeval with the Cullen Batholith and

Yenberrie Granite.

The Proterozoic rocks are overlain by thin Mesozoic sediments in the northwest and northeast, and by Cambrian basalt and sediments forming the edge of the Daly River Basin in the south and southwest.

Walpole and others (1968) briefly described the geology of the region as part of a reconnaissance survey of the Katherine-Darwin regon. Siginificant changes to their stratigraphy are:

1. The distinction of an unconformity separating two greywacke-siltstone sequences (the Burrell Creek Formation and Tollis Formation), both previously mapped as Burrell Creek Formation.

2. The recognition of a number of geographically and petrologically distinct plutons within the Cullen Batholith.

3. The recognition of an arkosic, partly regolithic and evaporitic sequence (Jindare Sandstone) below the Daly River Group, and sandstone interbeds within the Antrim Plateau Volcanics.

4. The recognition of major swarms of ENE - trending post-Kombolgie Formation dolerite dykes in the southeast, and NNW to W - trending post-Plum Tree Creek Volcanics

felsic dykes in the west.

5. Correlation of new units with those of the South Alligator Valley area (Needham and Stuart-Smith, 1985), namely Tollis Formation with Big Sunday Formaton of the El Sherana Group, and Phillips Creek Sandstone with Kurrundie Sandstone, and Plum Tree Creek Volcanics (previously Edith River Volcanics) with the Plum Tree Creek Volcanics (previously Plum Tree Creek Volcanic Member of the Kombolgie Formation), of the Edith River Group.

6. Determination of the relative age of the Cullen Batholith and the Plum Tree Creek Volcanics, indicated by granitic dykes invading the base of the volcancis.

Greywacke and phyllite with minor slate and siltstone and rare argillite of the Burrell Creek Formation are complexly folded, with refolded isoclinal folds commonly evident. The lithological similarity with the overlying Tollis Formation and rubbly exposure prevents observation of the contact between these two formations, but an unconformable relationship is inferred from the simple, moderate to tight fold style of the younger sequence. Pale green argillite, and cherty and crystal tuffs are common in the Tollis Formation, and varying percentages of the main lithologies has enabled subdivision into a lower greywacke-dominant sequence (Bbt_1, about 900 m thick), a middle argillite and tuff-dominant sequence (Bbt_2, about 700 m thick), and an upper sequence with roughly equal amounts of phyllite, argillite,

greywacke and tuff (Bbt_3, about 500 m thick). Bbt_1 contains a feldspar porphyry flow about 80 m thick and 13 km long near Edith Falls (Fig. 2), and a basalt flow (Dorothy Creek Basalt Member) about 200 m thick in the extreme southeast of the region. Sills about 200 m thick and irregular bodies totalling about 6 km^2 of Maud Dolerite intrude Bbt_1 also in the southeast.

The Burrell Creek and Tollis Formations are intruded and hornfelsed by granites of the Cullen Batholith. The contact is highly discordant and dips shallowly, as cordierite hornfels (the outer limit closely approximates the biotite isograd) extends up to 5 km from granite, and albite-epidote facies hornfels extends east to the western edge of the Edith River Basin. The composition of rock types within the batholith ranges from granodiorite to leucogranite, and this variation together with its geographic distribution enable definition of four plutons, the Driffield Granite, Tennnysons Leucogranite, Fingerpost Granodiorite and Yenberrie Granite (Figs 2 and 3). In addition to the main phases, fine to medium-grained monzonite (mapped as Pgc_1) in the Driffield Granite may represent remnants of an older, pre-Cullen Batholith intrusion, and a sulphidic equigranular mainly medium-grained leucogranite mostly near the outer edge of the Fingerpost Granodiorite, may represent the youngest phase of the batholith. The central part of the batholith contains a zone of shearing up to 16 km wide, comprising many discrete shear zones commonly accompanied by epidote, silica, iron and greisen alteration. Greisen is also common at the margins of leucogranite phases. This zone is continuous northwards with the Pine Creek Shear Zone, and

southwards with the Phillips Creek Fault, a sinistral wrench fault with about 2 km displacement.

The Yenberrie Granite is an extensively greisenised leucogranite within the biotite isograd of the Cullen Batholith aureole, and is probably an apophysis of the larger granite body.

Immature sandy sediments of the Phillips Creek Sandstone rest with marked angular unconformity on the Tollis Formation. It forms a continuous ridge 17 km long on the western margin of the Edith Falls Basin where in places it is up to 28 m thick, but it pinches out northwards, and forms a lens about 4 km long northeast of Katherine. Like the younger Proterozoic rocks of the region, the rocks are unmetamorphosed, and deformation is confined to basinal warping; dips in the Edith Falls Basin average 10-20°. The Plum Tree Creek Volcanics rest conformably on the Phillips Creek Sandstone and are mostly red-brown massive ignimbrite, with interlayered basalt or andesite near the base and in places minor cherty and sandy sediments and tuff. In places the ignimbrite oversteps the Phillips Creek Sandstone to rest with marked unconformity on the Tollis and Burrell Creek Formations. The outcrops of ignimbrite in the west of the region, named 'Fergusson River Toscanite' by Carter (1952), are in places near the base cut by fine to medium granitic dykes related to the Tennysons Leucogranite. Numerous dykes up to 700 m across of Lewin Springs Syenite in the northeast of the region cut the Cullen Batholith and 'Fergusson River Toscanite', and appear to roughly define the southern part of a ring dyke system.

A 3 x 3 km mass of banded purple and cream rhyolite appears to truncate interlayered ignimbrite and basalt of the Plum Tree Creek Volcanics in the southeast, about 21 km ENE of Katherine, and may represent a rhyolite dome. It has been named the Mount Shepherd Rhyolite Member.

The Kombolgie Formation forms a plateau over much of the eastern half of the region, which is bounded by cliffs commonly over 100 m high. The dominant lithology is sandstone, and in the Edith Falls Basin the sequence is conformable, totalling about 2000 m, and comprises about 1000 m of sandstone (Bhk_1) below the 250 m-thick McAddens Volcanic Member (Bhm), which is overlain by 200 m of sandstone (Bhk_2), 120 m of the Henwood Creek Volcanic Member (Bhh), and then about 175 m more of Bhk_2 sandstone. The top of the formation is not preserved. East of the Edith Falls Basin only the lower part of the sequence is preserved and thicknesses are reduced; Bhk_1 is about 800 m thick, and a siltstone unit about 30 m thick, 100 m below the base of Bhm, can be traced for over 12 km.

A swarm of at least 20 dolerite dykes, each commonly 10-20 m thick, trend ENE through the southeast of the region, many filling subvertical faults. Both dykes and faults post-date the Plum Tree Creek Volcanics and Kombolgie Formation sandstone. Outcrop is rare but deep red soil commonly gives rise to prominent linear photo-tonal features. Narrow contact aureoles up to 5 m wide are evident in places where the dolerite cuts Tollis Formation rocks.

The Depot Creek Sandstone is the only representative in the region of the Middle or Late Proterozoic sedimentary sequence developed mainly in the Victoria River Basin (Sweet, 1977). It forms a strongly faulted narrow plateau comprising about 250 m of sequence in the extreme west. Dips are about 10° to the southwest.

The Antrim Plateau Volcanics is probably of early Cambrian age and, except for the Depot Creek Sandstone against which no contact is preserved, rests with marked unconformity on older units. It is a valley-fill basalt flow up to 40 m thick with ferruginous sandstone interbeds near the base and in places a basal conglomerate up to 7 m thick. It dips about 2° south and pinches out against basement highs of mainly Kombolgie Formation, Tollis Formation and Plum Tree Creek Volcanics, and its perimeter is in places marked by a ridge-forming hematitic cherty breccia, which is possibly a flow-front breccia.

The sandstone interbeds near the base of the Antrim Plateau Volcanics are laterally equivalent to the ferruginous, arkosic, and cherty lower <50m section of the Jindare Sandstone, whereas the upper, well-sorted <20 m section of the Jindare Sandstone rests conformably on top of the basalt flow. The Tindal Limestone rests conformably on the Jindare Sandstone but commonly oversteps it to rest on older Cambrian or Proterozoic units. Grey crystalline limestone and minor limonitic flaggy limestone is overlain, apparently conformably, by buff-orange well-sorted sandstone which may form part of the Cambrian sequence, or may alternatively be an unusually mature Cretaceous

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sandstone, in contrast to the typical coarser and labile sandstone occuring at higher elevations.

Tin has been produced from many small mines on transgressive quartz reefs and shear zones in the low-grade sediments of the Burrell Creek and Tollis Formations, and the Burrell Creek Formation has also produced gold from similar settings. Gold mines in the southeast of the region are hosted by quartz reefs cutting Maud Dolerite. Minor copper occurs in shear zones in the Cullen Batholith, Maud Dolerite and Dorothy Creek Volcanic Member, and is in some instances associated with uranium in the several uranium prospects in sheared leucogranite of the Cullen Batholith. Disseminated uranium also occurs at one locality in the McAddens Creek Volcanic Member. Small tungsten prospects lie in quartz reefs hosted by greisenised or hornfelsed Burrell Creek Formation close to the Cullen Batholith contract. The only polymetallic occurence in the region is tungsten, molybdenum and bismuth and minor uranium associated with aplite veining and alteration of the Yenberrie Granite.

The Antrim Plateau Volcanics has been quarried for blue metal.

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Table 1: Summary of Stratigraphy of the Edith River Region, N.T.

		Unit	Description	Field Relationships
MESOZOIC		CRETACEOUS K	Fine to coarse commonly ill-sorted and friable ferruginous sandstone, pebbly in places; conglomerate, porcellanite kaolinite; rare fossils.	Unconformable on older units; forms low areas commonly with wide sandy aprons.
		U N C O N F O R M I T Y		
PHANEROZOIC (CAMBRIAN)	DALY RIVER GROUP	TINDAL LIMESTONE Cmt	Grey crystalline limestone with chert nodules, flaggy limonitic silty limestone, buff-orange well-sorted sandstone.	Overlaps Jindare Sandstone in places.
		JINDARE SANDSTONE Clw	Massive, laminated and brecciated chert, sandstone, arkose, siltstone, conglomerate; rare calcite crystals <3 cm.	Upper part conformable on Antrim Plateau Volcanics, lower part infingers with it.
		ANTRIM PLATEAU VOLCANICS Cla	Massive dark grey basalt, vesicular in places, minor jasper and chert; interbedded medium-grained equigranular to conglomeratic sandstone near base.	Unconformable on older units.
		U N C O N F O R M I T Y		
PROTEROZOIC	TOLMER GROUP	DEPOT CREEK SANDSTONE Ptd	Mainly medium-grained equigranular pink quartzite, in places, minor jasper and chert; interbedded medium-grained equigranular to conglomeratic sandstone near base.	Unconformable on older units
		U N C O N F O R M I T Y		
MIDDLE			Fine dolerite dykes	Cut Kombolgie Formation and older units as an ENE-trending swarm.

MIDDLE PROTEROZOIC	KATHERINE RIVER GROUP	KOMBOLGIE FORMATION k_1, Bhk_2	Massive or cross-bedded medium-coarse buff-grey sandstone, pebbly in places, conglomerate beds mainly near base, rare siltstone beds.	Comprise a conformable sequence, itself unconformable on older units. Slight angular unconformity on Plum Tree Creek Volcanics, major angular unconformity elsewhere.
		HENWOOD CREEK VOLCANIC MEMBER Bhh	Partly amygdaloidal andesite and basalt, tuff	
		McADDENS CREEK VOLCANIC MEMBER Bhm	Fine grey-green basalt - andesite, vesicular in places, banded purple - cream tuff.	
			U N C O N F O R M I T Y	
		YENBERRIE GRANITE Bgl_c, Bgl_d	Coarse pink and fine white and pink leuco-granite, commonly altered and greisenised	Intrudes and hornfelses Burrell Creek Formation; probably continuous at depth with Cullen Batholith.
		LEWIN SPRINGS SYENITE Bew	Grey-pink glassy to very fine equigranular or porphyritic syenite, rhyolite and microgranite dykes, rarely flow-banded.	Intrudes Cullen Batholith and Fergusson River Toscanite.
EARLY PROTEROZOIC		CULLEN BATHOLITH $Bgc_{a,c,d,e,h,i,k\ l,m,o,z}$	Fine to coarse equi-granular to porphyritic leuco-granite, granite and granodiorite with rafts and screens of cordierite hornfels	Four plutons, two of leucogranite, one of mainly granodiorite, and one of granite and leucogranite. Intrude and hornfels Burrell Creek Formation Tollis Formation, and Fergusson River Toscanite; cut by Lewin Springs Syenite.
	EDITH RIVER GROUP	PLUM TREE CREEK VOLCANICS Bep	Red-brown glassy to fine ignimbrite, red and mauve banded agglomeratic rhyolite, massive and amygdaloidal basalt, minor cherty and sandy	Conformable sequence of mainly felsic volcanics with intermediate to mafic flows in lower part of sequence. Conformable on Phillips Creek

			sediments and massive to laminated tuff; porphyritic andesite in Edith Falls area	Sandstone. Elsewhere highly angular unconformity on older units.
PROTEROZOIC	EDITH RIVER GROUP	MOUNT SHEPHERD RHYOLITE MEMBER	Purple-cream banded rhyolite	Forms possible rhyolite dome in southeast of region.
		'FERGUSSON RIVER TOSCANITE' Bef	Red-brown glassy to fine ignimbrite	Correlative of similar ignimbrite within Plum Tree Creek Volcanics. Highly angular unconformity on older units, except for conformity with Phillips Creek Sandstone. Intruded by Tennysons Leucogranite.
		PHILLIPS CREEK SANDSTONE Bel	Fine to coarse, partly tuffaceous, and in places pebbly, sand-stone, arkose, conglomerate	Highly angular unconformity on older units, conformable beneath other units of the group.
			U N C O N F O R M I T Y	
		MAUD DOLERITE Bdm	Fine pink-grey to coarse grey-green ophitic dolerite	Hornfelses Tollis Formation, unconformable under Kombolgie Formation.
EARLY	EL SHERANA GROUP	TOLLIS FORMATION Bbt_1, Bbt_2, Bbt_3	Interbedded greywacke, siltstone, argillite, tuff and minor phyllite, feldspar porphyry flow rock	Unconformable relationship with Burrell Creek Formation interpreted from differing fold styles. Cut by dolerite, porphyry and felsite dykes.
		DOROTHY CREEK BASALT MEMBER Bbt_d	Basalt, minor banded chert and tuff	Conformable within Tollis Formation.
			U N C O N F O R M I T Y	
	FINNISS RIVER GROUP	BURRELL CREEK FORMATION Bfb	Interbedded greywacke, phyllite, slate, meta-siltstone, rare siliceous argillite.	Oldest unit in the Edith River Region.

Table 2: Changes in stratigraphic nomenclature in the Edith River Region

New names, variations of names, and relevant definitions, have been approved by the Stratigraphic Nomenclature sub-committee.

Walpole & others 1968	This Record	Comments
not recognised	Jindare Sandstone	new name
Depot Creek Sandstone Member (of Buldiva Sandstone)	Depot Creek Sandstone	elevation to formation status.
part of Edith River Volcanics	Lewin Springs Syenite	new name
part of Edith River Volcanics	Plum Tree Creek Volcanics	new name; extends into Stow region to where it has been redefined (previously Plum Tree Creek Volcanic Member of Kombolgie Formation; Needham & Stuart-Smith, 1985). Includes Carter's (1952) 'Fergusson River Toscanite'.
not recognised	Mount Shepherd Rhyolite Member	new name
Edith River Volcanics		name discontinued
Phillips Creek Member	Phillips Creek Sandstone	elevation to formation status.
part of Cullen Granite	Yenberrie Granite	new name
Cullen Granite	Driffield Granite, Fingerpost Granodiorite, Tennysons Leuco-granite, and Yenberrie Granite of the Cullen Batholith	new names
un-named dolerite	Maud Dolerite	new name
part of Burrell Creek Formation	Tollis Formation	new name
Dorothy Volcanics	Dorothy Creek Basalt Member	name variation

APPENDIX 1
SAMPLES COLLECTED FOR AGE DETERMINATION

Sample no	grid ref.	rock type	stratigraphic unit	technique
83126002	JE 932271	rhyodacite	Tollis Formation	no zircon
83126003	JE 931269	rhyodacite	Tollis Formation	U-Pb zircon
83126004	JE 928266	altered rhyodacite	Tollis Formation	
83126005	KE 238104	basalt	Plum Tree Creek Volcanics	geochem only
83126006	KE 244084	ignimbrite	Plum Tree Creek Volcanics	geochem only
83126019	KE 254080	banded ignimbrite	Mt Shepherd Rhyolite Member	U-Pb zircon
79125008	HK 197403	microsyenite	Lewin Springs Syenite	U-Pb zircon
79125009	JE 958312	ignimbrite	Plum Tree Creek Volcanics	U-Pb zircon
79125010	KE 131122	ignimbrite	Plum Tree Creek Volcanics	U-Pb zircon
79125011	KE 214087	ignimbrite	Plum Tree Creek Volcanics	
79125012	HK 054454	granodiorite	Fingerpost Granodiorite	U-Pb zircon, Rb-Sr whole rock

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APPENDIX 2. THIN SECTION DESCRIPTIONS

The first line of each entry records BMR sample number, rock type, AMG grid reference, and compilation sheet number

BURRELL CREEK FORMATION

82120180 HORNFELSED METASILTSTONE HK204381 2

Laminated fine rock consisting of bands of silty quartz grains interlayered with microcrystalline bands of biotite, white mica and quartz. Spotting in mica-rich laminae results from biotite-free patches, probably after cordierite.

82120181 ARGILLITE JE954498 4

Microcrystalline mosaic of weakly foliated chlorite, white mica and minor scattered silty quartz grains. Minor holes in slide related to Fe-oxide rich spots after cordierite?

82120182 QUARTZ METAGREYWACKE HK217382 2

Medium-grained poorly sorted to recrystallised mosaic of quartz, minor felsic volcanic rock fragments, plagioclase (altering to white mica) grains and fine metamorphic biotite, muscovite and magnetite. Unstrained contact metamorphic fabric.

82120183 ARGILLITE JE980395 4

Microcrystalline mosaic of chlorite, white mica with

scattered silty quartz grains. Massive, unfoliated, possibly slight hornfels texture.

82120184 MEDIUM-GRAINED GREYWACKE JE970454 4

Medium-grained poorly sorted quartz (subangular), chert, felsic volcanic rock fragments, white mica clusters (possibly detrital), and muscovite in a weakly foliated sericitic matrix. Rare detrital zircon. Volcanic rock fragments extensively altered to sericite and Fe oxides.

82120185 VOLCANOLITHIC PEBBLE CONGLOMERATE HK219402 2

Subrounded pebbles mostly of sericitised pitchstone, minor quartz porphyry (quartz phenocrysts in Kspar groundmass), chert and vein quartz, in a medium-grained hornfelsed quartz greywacke matrix containing metamorphic biotite, muscovite and magnetite.

82120186 BANDED IRON FORMATION KE087482 4

Laminated microcrystalline hematite-rich/sericite-rich bands with scattered hematite plates; vein of specular hematite.

82120197 ALTERED CORDIERITE-MUSCOVITE -BIOTITE HORNFELS JE867373 3

Very fine mosaic of biotite, muscovite, and minor quartz. Round spots of biotite-poor areas, now rich

in muscovite, probably after cordierite.

82120198 BIOTITE-MUSCOVITE-QUARTZITE HORNFELS JE827357 8

Fine recrystallised unstrained quartz, muscovite and minor biotite. Hornfelsed quartz sandstone.

82120200 FINE GREYWACKE HORNFELS HK227406 2

Poorly sorted fine to silty subangular quartz (mono and poly-crystalline), minor felsic volcanic(?) rock fragments, and plagioclase, in a recrystallised base of quartz, biotite and muscovite. White mica-rich elliptical spots up to 5 mm are probably altered cordierite.

82120201 MEDIUM-GRAINED QUARTZ GREYWACKE HK186386 2

Medium-grained poorly sorted quartz (mono and poly-crystalline), minor felsic volcanic rock fragments, Kspar, plagioclase, detrital muscovite flakes, in a biotite-chlorite-rich matrix. Very weakly foliated, texture indicates possible mild hornfelsing.

82120202 ARGILLITE HK189378 2

Microcrystalline mosaic of weakly foliated chlorite, white mica and very minor quartz.

82120203 LAMINATED HEMATITIC SILTY SHALE HK196404 2

Finely divided hematite, sericite, quartz and silty quartz grains.

82120204 COARSE VOLCANOLITHIC METAGREYWACKE JE825426 3

Coarse poorly sorted subangular grains of quartz, felsic volcanic rock fragments (quartz-Kspar-plagioclase agglomerates), Kspar and plagioclase. Rock fragments and matrix with scattered very fine metamorphic biotite and minor muscovite. All grains are recrystallised, unstrained and have sutured boundaries indicative of contact metamorphic fabric.

82120205 ANDALUSITE? HORNFELS JE903450 3

Fine mosaic of chlorite, mica and quartz with scattered prismatic mineral which has been plucked out of slide-possibly andalusite.

82120206 COARSE GREYWACKE JE944410 4

Coarse poorly sorted quartz, felsic volcanic rock fragments (Kspar agglomerates), white mica agglomerates (after feldspar), and minor detrital muscovite flakes, in a weakly foliated matrix of white mica and chlorite.

82120236 COARSE GREYWACKE JE980438 4

Coarse poorly sorted flattened quartz, felsic volcanic rock fragments (pitchstone, Kspar agglomerates), minor chert, shale, white mica agglomerates (after plagioclase?), in a strongly foliated matrix of chlorite and white mica and very fine opaques.

TOLLIS FORMATION

82120028 VOLCANOLITHIC GREYWACKE KE294020 15

Volcanolithic greywacke, as for 82120065, hematised. Qm 3%, Qp 0.6%, P 2.1%, K 3.9%, Lv 70.6%, Ls 0.1%, Matrix 19.6%

82120029 DEVITRIFIED VITRIC TUFF KE059123 12

Scattered angular very fine quartz in matrix of sericite and very fine Fe oxides with eutaxitic texture - probably altered devitrified glass shards.

82120030 FINE GREYWACKE JE905357 8

Fine weakly layered moderately sorted matrix-supported greywacke. Angular quartz grains to 0.5 mm, minor chert, in a microcrystalline matrix of sericite, chlorite, epidote, quartz, scattered and clustered Fe oxides with minor biotite, secondary muscovite. Detrital tourmaline. Fe oxide dusting common in quartz grains.

82120032 PHYLLITE HORNFELS JE895412 3

Microcrystalline mosaic of recrystallised quartz, chlorite, granular epidote and minor opaques. Compositional laminae, originally silty bands. Quartz-chlorite veinlets cut metamorphic minerals and early quartz veins. Patches of chlorite-free, epidote-rich areas indicate outer albite-epidote hornfels facies.

82120033 MEDIUM-GRAINED VOLCANOLITHIC GREYWACKE KE087068 14

As for 82120065 but medium-grained and cut by quartz-chlorite-carbonate veinlets.

82120034 LAMINATED PHYLLITE JE895412 3

Foliated chlorite, minor sericite and quartz with silty laminae, cut by pre-foliation chlorite microveinlet. Opaques. Possibly slightly carbonaceous.

82120035 FELDSPATHIC GREYWACKE JE927274 8

Medium-grained poorly sorted subangular quartz, plagioclase and alkali feldspar in a matrix of sericite, chlorite, iron oxides, carbonate. Minor detrital muscovite and zircon.

82120036 PHYLLITE KE198246 10

Very fine green phyllite cleaved 15° to compositional banding. Angular to rounded quartz

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grains to 0.2 mm. Foliated sericite and chlorite with discontinuous silty laminae.

82120037 VOLCANOLITHIC GREYWACKE JE748212 11

As 82120065

82120038 VOLCANOLITHIC GREYWACKE JE929208 11

As 82120065. Qm 1.8%, Qp 0.4%, P 2.6%, K3.6%, Lv 65.0%, matrix 26.4%, Modal count 1500.

82120039 LITHIC VITRIC TUFF JE865266 8

Angular clasts to 1 cm of felsic volcanics (pitchstone-rhyolite), shale? and coarse subangular quartz and alkali feldspar grains in a devitrified glassy matrix of quartz, chlorite, sericite and Fe oxides.

82120040 ALTERED DEVITRIFIED JE867269 8
VITRIC TUFF

Recrystallised mosaic of epidote, chlorite and quartz with eutaxitic texture and scattered quartz and feldspar grains

82120041 TUFFACEOUS SILTSTONE JE927271 8

Angular silty crystal fragments of quartz and alkali feldspar, in a fine matrix of sericite, chlorite, iron oxides and quartz.

82120042 ALTERED VITRIC TUFF KE204075 15

Carbonate-chlorite-hematite mosaic with eutaxitic fabric, minor angular clasts of felsic volcanics up to 2mm.

82120043 GRADED VOLCANOLITHIC GREYWACKE JE907327 8

Graded coarse to fine (less than mudstone grade) bed. Greywacke composition similar to 82120065.

82120044 ALTERED FELDSPAR PORPHYRY JE927264 8

Stubby to rectangular kaolinised and sericitised plagioclase and chloritised green to colourless clinopyroxene in brown iron-stained devitrified glassy matrix with crystallites and spherulite texture. In places granophyric quartz-feldspar, and globular clinopyroxene-feldspar, intergrowths. Abundant apatite laths. Rounded opaques to 1 mm. Late quartz epidote carbonate veining.

82120045 LAMINATED SILTY PHYLLITE JE895412 3

Foliated sericite and silty quartz laminae cut by pre-foliation quartz veinlets.

82120046 META - VITRIC TUFF? JE864397 3

Fine recrystallised mosaic of quartz, chlorite and muscovite. Coarse spots up to 5 mm of poikolitic muscovite, dark greenish-grey chlorite, epidote, carbonate and quartz. Tuff or dolomitic pelite,

hornfelsed.

82120047 SILTY METAPHYLLITE JE878423 3

Foliated mosaic of chlorite, quartz and minor biotite. Recrystallised texture and biotite indicate contact metamorphism.

82120048 ALTERED VITRIC CRYSTAL TUFF JE868277 8

Angular crystal fragments of quartz, feldspar and minor mafic minerals (now epidote-chlorite) in a groundmass of chlorite, epidote, quartz and carbonate. Eutaxitic texture in places indicates some devitrified glass shards. Rounded secondary carbonate growths to 3 mm.

82120049 DEVITRIFIED VITRIC TUFF JE872279 8

Sericite, chlorite, minor Fe oxides, with remnant eutaxitic fabric. Probably altered devitrified shards. Minor scattered quartz.

82120050 DEVITRIFIED VITRIC CRYSTAL TUFF JE939311 8

Angular quartz fragments, curved shards, in cryptocrystalline siliceous matrix-eutaxitic fabric. Also crystal fragments of feldspar now altered to calcite, and chlorite after a mafic mineral.

8212005 META VITRIC TUFF OR ARGILLITE JE795216 11

Similar to 82120046. Microcrystalline mosaic of

27

quartz, muscovite, chlorite, epidote and magnetite? Rare quartz grains.

82120052 PHYLLITE JE800226 8

Foliated sericite and minor chlorite at low angle to compositional laminae. Kink cleavage with minor quartz remobilised into fractures along kink plane. Quartz microveinlet disrupted by slaty cleavage.

82120053 SHALE JE962353 9

Microcrystalline white mica and minor ?hematite with scattered silty quartz grains. Tuffaceous?

82120057 VOLCANOLITHIC GREYWACKE JE852262 8

Medium-grained poorly sorted angular clasts of fine-grained volcanics (pitchstone, rhyolite), alkali feldspar, sericitised plagioclase, and minor quartz in a foliated sericitic matrix with minor chlorite, carbonate and Fe oxides.

82120058 ARGILLITE JE882329 9

Microcrystalline sericite and chlorite mosaic with minor quartz. Scattered silty quartz grains.

82120059 ARGILLITE JE923310 8

As 82120058

82120060 VOLCANOLITHIC GREYWACKE JE911317 8

As 82120065. Qm 6.0%, Qp 0.6%, P 1.4%, K 5.1%, Lv 51.4%, Matrix 35%. Modal count 1500.

82120063 PHYLLITE HORNFELS KE057106 12

Fine sericite mosaic, laminated, with spots of fine granular hematite to 1 mm probably after chlorite which probably replaced cordierite. Hornfels adjacent to dolerite dyke.

82120064 PHYLLITE HORNFELS KE057106 12

As 82120065

82120065 VOLCANOLITHIC GREYWACKE JE908319 8

Coarse poorly sorted angular clasts of felsic volcanics (rhyolite, pitchstone) and plagioclase, Kspar and minor quartz, in a matrix of secondary iron oxides, chlorite, epidote and sericite. Qm 7.0%, Qp 1.4%, P 1.4%, K 5.7%, Lv 35.7%. Ls 0.2%, matrix 48.6%. Modal count 1500.

8212006 VOLCANOLITHIC GREYWACKE JE915328 8

As 82120065

82120069 VOLCANOLITHIC PEBBLE CONGLOMERATE KE048117 12

Subrounded pebbles to 1 cm of felsic volcanics (pitchstone, minor vitric tuff), in a coarse poorly sorted matrix of angular quartz, felsic volcanic

rock fragments, sericitised feldspar and secondary Fe oxides. Quartz vein cuts hematite-filled microfault.

82120072 GRITTY VOLCANOLITHIC GREYWACKE KE053078 14

Very poorly sorted angular to subrounded clasts to 5 mm of felsic volcanics (pitchstone, rhyolite, vitric tuff), minor vein quartz and shale, in a medium-grained, poorly sorted matrix of same composition. Abundant sericite after feldspar, minor chlorite. Qm 12.8%, Qp 1.4%, P 0.1%, K 0.2%, Lv 25.1%, Ls 0.5%, Matrix 59.8%. Modal count 1500.

82120074 FINE VOLCANOLITHIC GREYWACKE JE872400 3

Poorly sorted fine-grained quartz, subangular felsic volcanic clasts, serecitised and chloritised feldspar.

82120120 GRITTY VOLCANOLITHIC GREYWACKE KE121056 14

Very poorly sorted, gritty subrounded, felsic volcanic rock fragments (pitchstone, porphyritic rhyolite, tuff), minor plagioclase and metamorphic rock fragments (fine foliated greywacke, phyllite, foliated quartzite), polygonal crystalline quartz and monocrystalline quartz clasts. Extensive alteration to secondary carbonate, chlorite, Fe oxides, and minor white mica.

82120122 FINE VOLCANOLITHIC GREYWACKE KE287020 15

Poorly sorted, fine-grained, subangular grains of felsic volcanic (quartz-feldspar mosaics), quartz, white mica aggregates ?after plagioclase, minor Kspar, phyllite and muscovite flakes. Rare rounded tourmaline and detrital biotite. Pervasive metamorphic fine white mica and chlorite.

82120123 ALTERED PELITIC VOLCANICLASTIC KE294020 15

Very fine-microcrystalline chlorite, white mica and quartz mosaic with very minor scattered silty quartz grains. Tuffaceous phyllite?

82120124 COARSE VOLCANOLITHIC GREYWACKE KE294020 15

Poorly sorted subrounded altered felsic volcanic rock fragments, quartz (about 10%). Some quartz grains appear to be phenocrysts in the felsic clasts, which are mostly altered to fine white mica. Minor chlorite, secondary Fe oxides.

DOROTHY BASALT MEMBER

82120107 PITCHSTONE KE297012 15

Subhedral phenocrysts of kaolinised plagioclase as single crystals or aggregates to 2 mm, in an altered brown glassy groundmass with radiating and bowtie

and structured microlites.

82120254 ALTERED MAFIC TUFF? KE258023 15

Angular to subhedral crystals of fibrous actinolite-t lite (after clinopyroxene?) and sericitised feldspar crystals in a base of fine fibrous actinolite with granular opaques. Fragmental texture.

82120255 ALTERED MAFIC TUFF? KE258023 15

Same as 82120254

MAUD DOLERITE

82120246 MEDIUM-GRAINED QUARTZ DOLERITE KE281063 15

Subprismatic augite with hornblende margins and chlorite alteration, plagioclase lath altering to white mica, interstitial quartz and quartz-Kspar graphic intergrowths (about 10%). Minor granular epidote, opaques.

82120249 QUARTZ DOLERITE KE278067 15

Coarse ophitic colourless augite moulding plagioclase crystals which commonly show white mica and minor epidote alteration. Augite rimmed with hornblende and altering to chlorite. Interstitial quartz and quartz-feldspar graphic intergrowths. Trace apatite.

82120250 ALTERED MEDIUM-GRAINED DOLERITE KE268018 15

Interlocking plagioclase laths completely replaced by white mica, subophitic colourless augite, chloritised actinolite, patchy chlorite and prehnite, interstital Fe oxides.

82120253 FINE QUARTZ META-DOLERITE KE278067 15

Fibrous pale green to colourless actinolite-tremolite, plagioclase laths altering to fine white mica, interstitial quartz. Patchy secondary chlorite, minor carbonate and epidote. Rare primary biotite.

BLUDELLS MONZONITE

82120016 MEDIUM-GRAINED EQUIGRANULAR HORNBLENDE-QUARTZ MONZODIORITE HK238433 2

10% interstitial quartz, 60% sericitized subhedral-euhedral feldspar, probably all plagioclase, 30% dark green to pale green-brown subprismatic hornblende, minor chloritised biotite, apatite, opaques.

82120017 MEDIUM-GRAINED BIOTITE -HORNBLENDE-QUARTZ MONZONITE HK238477 2

Medium-grained, equigranular subhedral plagioclase (andesine?) with sericitised cores, anhedral

microcline, pale green-colourless hornblende as subprismatic to recrystallised polygonal aggregates, irregular biotite altering to chlorite along margins and cleavage planes. Anhedral quartz about 10%. Minor carbonate, trace apatite. Kspar 20%, Mafics 25%, hornblende: biotite 2:1, Kspar: Plagioclase 1:2. Undulose extinction, bent crystals.

82120019 MEDIUM-GRAINED BIOTITE-HORNBLENDE MONZODIORITE HK238474 2

Subhedral sericitised plagioclase, pale green to colourless subprismatic hornblende and chloritised biotite (40%), 10% anhedral feldspar, anhedral quartz 5%. Trace apatite. Patchy carbonate and epidote alteration.

TENNYSON'S LEUCOGRANITE

82120020 FINE TO MEDIUM-GRAINED EQUIGRANULAR LEUCOGRANITE GK051377 1

Anhedral Kspar, plagioclase (oligoclase) 10%, quartz 50%. Minor secondary epidote, chlorite, muscovite. Cataclastic zones of recrystallised polygonal quartz with undulose extinction.

82120022 FINE EQUIGRANULAR BIOTITE LEUCOGRANITE JE792257 8

Fine to medium-grained anhedral Kspar (mostly microcline), fine anhedral quartz 35%, fine

subhedral plagioclase 5%. About 3% biotite, altering to chlorite + Fe oxides. 1% muscovite, trace zircon.

82120156 MEDIUM-GRAINED LEUCOGRANITE JE811255 8

Medium-grained anhedral microcline, fine anhedral quartz about 30%, and fine subhedral plagioclase about 25%, with undulose extinction. Chloritised biotite 1%, muscovite 1%, both kinked.

82120159 COARSE PORPHYRITIC BIOTITE LEUCOGRANITE HK216278 7

Phenocrysts to 1 cm of subhedral sericitised plagioclase about 5%, anhedral quartz with muscovite inclusions 30%, anhedral microcline, pale to golden brown to red-brown biotite to 3 mm with zircon inclusions 3%. Medium-grained groundmass of microcline, quartz, albite, and biotite altering to chlorite.

82120161 SHEARED COARSE PORPHYRITIC LEUCOGRANITE HK237373 2

Deformed and fractured coarse Kspar phenocrysts, coarse sericitised plagioclase (10%), quartz about 5%, less than 1% chloritised biotite. Secondary sericite and muscovite. Cut by cataclastic zones.

82120162 FINE EQUIGRANULAR LEUCOGRANITE JE779274 8

Andedral microcline, quartz 35%, oligoclase 5%, chloritised biotite 2%, primary muscovite 1%.

82120166 SHEARED ALTERED COARSE PORPHYRITIC LEUCOGRANITE JE812336 8

Coarse fractured microperthitic phenocrysts in a fine groundmass of recrystallised polygonal quartz and secondary muscovite-sericite, trace topaz and sphene.

82120167 FINE EQUIGRANULAR BIOTITE LEUCOGRANITE JE791253 8

Anhedral microcline, quartz 50%, plagioclase (albite?) to 5%, minor graphic intergrowths of Kspar and quartz in places with muscovite. Muscovite 1%, biotite 1% altering at margins to white mica.

82120171 MEDIUM EQUIGRANULAR ALKALI FELDSPAR GRANITE HK073353 7

Medium-grained anhedral Kspar (microcline, microperthite), quartz 40%, plagioclase about 2%, biotite 2%. Minor primary muscovite, secondary chlorite. Some Kspar-quartz graphic intergrowths. Trace zircon.

82120172 DEFORMED COARSE EQUIGRANULAR BIOTITE LEUCOGRANITE JE806415 3

Anhedral Kspar (microperthite), quartz 30%, plagioclase 10%, biotite altering to chlorite 3%, trace muscovite, zircon. Plagioclase subhedral and zoned with sericite cores. Highly strained and deformed.

82120211 COARSE PORPHYRITIC BIOTITE LEUCOGRANITE JE806289 8

Subhedral phenocrysts of sericitised oligoclase to 1 cm (5%), anhedral quartz with muscovite inclusions (30-40%), minor dark golden brown biotite 1%, muscovite 1%, minor microcline to 5 mm. Fine groundmass of anhedral microcline, quartz, biotite, muscovite and plagioclase. rare sphene, zircon and apatite. Biotite altering to chlorite-epidote, with undulose extinction.

82120212 COARSE PORPHYRITIC MUSCOVITE LEUCOGRANITE JE789406 3

Phenocrysts of mainly subhedral quartz to 1 cm with muscovite inclusions, also subhedral perthitic microcline to 2 cm with muscovite replacement of plagioclase intergrowths, and minor biotite. Fine groundmass of microcline, quartz, plagioclase altered to sericite and muscovite, muscovite (2%) and biotite-chlorite (1%). Plagioclase 10%, quartz 30-40%.

82120213 COARSE PORPHYRITIC MUSCOVITE HK232268 7
LEUCOGRANITE

Phenocrysts to 1 cm of subhedral sericitised plagioclase and anhedral quartz in equal proportions, and minor dark to light golden brown biotite. Medium-grained groundmass of anhedral microcline, quartz, plagioclase (oligoclase), biotite with trace zircon and apatite. Minor chlorite alteration of biotite, undulose extinction Biotite 3%, quartz 25%, plagioclase 5%.

82120214 COARSE PORPHYRITIC BIOTITE HK205268 7
LEUCOGRANITE

As 82120213, plagioclase phenocrysts zoned, quartz phenocrysts with muscovite inclusions, biotite forms clusters to 5 mm and contains apatite and zircon inclusions. Trace primary muscovite. Biotite moderately altered to chlorite and epidote.

82120215 COARSE PORPHYRITIC BIOTITE HK132299 7
LEUCOGRANITE

Equal proportions of perthitic microcline, sericitised plagioclase, and quartz phenocrysts to 1 cm, minor dark brown biotite crystals and aggregates with apatite and opaques inclusions. Medium groundmass of Kspar, plagioclase, quartz, biotite with minor secondary chlorite and muscovite. Rare primary muscovite in quartz phenocrysts. Quartz 30%,

biotite 3%.

82120216 COARSE PORPHYRITIC BIOTITE HK220315 7
LEUCOGRANITE

Phenocrysts of sericitised subhedral plagioclase and subhedral perthitic microcline to 1 cm in equal amounts, and minor anhedral quartz with muscovite inclusions to 5 mm and dark golden brown to 3 mm. Fine groundmass of anhedral quartz (about 50%), microcline, minor plagioclase (to 5%), biotite and primary and secondary muscovite. Trace apatite and zircon. Biotite 4% overall, with minor chlorite-epidote alteration.

82120217 COARSE PORPHYRITIC BIOTITE JE774377 3
LEUCOGRANITE

Phenocrysts of subhedral perthitic microcline to 1 cm with outer rims of graphic intergrowths with quartz, and quartz with muscovite inclusions. Fine groundmass of Kspar, quartz, plagioclase (5%), biotite (2%), muscovite (1%), and minor quartz-Kspar graphic intergrowths. Quartz 30% overall.

82120218 COARSE PORPHYRITIC BIOTITE HK212319 7
LEUCOGRANITE

Phenocrysts of subhedral perthitic microcline to 1.5 cm, anhedral quartz with muscovite inclusions, and minor sericitised plagioclase to 5 mm and biotite. Fine groundmass of anhedral quartz, Kspar and

oligoclase, and biotite altering to chlorite with apatite inclusions. Trace primary muscovite. Quartz 35%, plagioclase 10%, biotite 3%.

82120219 COARSE PORPHYRITIC LEUCOGRANITE HK178295 7

Phenocrysts of embayed quartz mainly to 1 cm, with muscovite inclusions. Medium-grained groundmass of anhedral microcline, quartz, plagioclase chloritised biotite 1% with zircon inclusions, poikilitic muscovite. Plagioclase 5%, quartz 30%.

82120220 COARSE PORPHYRITIC LEUCOGRANITE HK162322 7

As 82120219, with minor sericitised plagioclase phenocrysts. Groundmass plagioclase determined as albite-oligoclase. Undulose extinction.

82120221 COARSE PORPHYRITIC BIOTITE LEUCOGRANITE HK086399 2

Phenocrysts of perthitic microcline to 1.5 cm, and anhedral quartz and sericitised oligoclase, and minor dark golden brown to red brown biotite, to 5 mm. Medium-grained groundmass of quartz, Kspar, plagioclase, muscovite and biotite. Minor apatite, secondary muscovite, chlorite, carbonate. Plagioclase to 10%, biotite 2%, muscovite 1%, quartz 30%.

82120222 COARSE PORPHYRITIC LEUCOGRANITE HK175293 7

Phenocrysts of anhderal quartz to 5 mm, and minor Kspar, plagioclase and biotite. Fine groundmass of subhedral microcline, quartz, oligoclase, and biotite with apatite and zircon inclusions. Minor secondary muscovite. Biotite, altering to chlorite, 1%.

82120224 COARSE PORPHYRITIC BIOTITE LEUCOGRANITE JE764384 3

Coarse subhedral microperthite phenocrysts in a coarse groundmass of anhedral quartz, Kspar, subhedral plagioclase and about 4% biotite showing chlorite-epidote alteration. Minor apatite. Plagioclase altering to epidote, sericite and? fluorite. Kspar: plagioclase 3:1, quartz 25%

82120225 COARSE PORPHYRITIC BIOTITE LEUCOGRANITE HK130411 2

Scattered microperthite phenocrysts to 1 cm with abundant quartz inclusions near rims, in coarse groundmass on anhedral Kspar, quartz (40%), and subhedral sericitised oligoclase (5%) and biotite (4%) with zircon and apatite inclusions. Primary muscovite 1%. Minor Kspar-quartz graphic intergrowths.

82120226 COARSE EQUIGRANULAR BIOTITE HK229383 2

LEUCOGRANITE

Coarse equigranular anhedral microcline, quartz 25%, subhedral sericitised plagioclase 10%, chloritised biotite (4%), minor muscovite, trace apatite.

82120228 COARSE PORPHYRITIC BIOTITE HK234368 2

LEUCOGRANITE

Subhedral microperthic phenocrysts to 1 cm in coarse groundmass of anhedral microcline, plagioclase 10%, quartz 25%, chloritised biotite about 4%, and about 1% primary and secondary muscovite. Trace apatite.

82120230 COARSE PORPHYRITIC BIOTITE HK087408

LEUCOGRANITE

Phenocrysts of tabular microperthitic microcline to 2 cm in a fine-coarse groundmass of anhedral microcline, quartz 30%, subhedral sericitised plagioclase 5%, biotite with apatite inclusions and chlorite and minor white mica alteration 2%. Strained, undulose extinction.

82120231 COARSE PORPHYRITIC BIOTITE HK236368 2

LEUCOGRANITE

Subhedral microperthitic microcline phenocrysts to 1 cm in a coarse groundmass of microcline 10%, sericitised oligoclase, quartz 25%, biotite about 2% altering to chlorite, iron oxides. Strained grains, some recrystallisation. Quartz is unstrained with sutured grain boundaries.

82120232 FINE PORPHYRITIC BIOTITE LEUCOGRANITE JE768389 3

Phenocrysts of embayed quartz about 5 mm, perthitic microcline to 10 cm, sericitised plagioclase to 5 mm, and minor biotite aggregates in a fine groundmass of anhedral microcline, quartz, plagioclase and altered (chlorite, epidote) biotite. Plagioclase 5%, Quartz 40%, biotite 2%.

82120235 COARSE EQUIGRANULAR BIOTITE LEUCOGRANITE HK077407 2

Coarse anhedral perthitic microcline, quartz 25%, altered plagioclase 10% (sericite, epidote, prehnite), biotite 2% with chlorite-epidote alteration). Undulose extinction, fractured recrystallised zones. Accessory allanite, apatite, zircon.

82120247 VERY COARSE PORPHYRITIC LEUCOGRANITE JE821245 8

Microperthite megacrysts (2 cm), subhedral very coarse oligoclase 30%, biotite with zircon and apatite inclusions (2%) and minor secondary muscovite. Kaolinite and fluorite replace plagioclase and chlorite partly replaces biotite.

FOELSCHE LEUCOGRANITE

82120023 FINE EQUIGRANULAR LEUCOGRANITE HK002387 1

Anhedral microperthite, quartz 30%, sericitised plagioclase 10%, chloritised biotite 1%.

82120024 FINE EQUIGRANULAR LEUCOGRANITE HK018409 1

Anhedral Kspar, quartz 50%, subhedral plagioclase 10%, minor chloritised biotite less than 1%. Plagioclase, Kspar and quartz form graphic intergrowths. Secondary carboante, trace pyrite.

82120160 MEDIUM-GRAINED EQUIGRANULAR LEUCOGRANITE HK035414 1

Anhedral quartz about 50%, microperthite, and plagioclase 10%, commonly all intergrown. Less than 1% slender biotite. Trace pyrite and secondary iron oxides. Undulose extinction.

82120164 FINE EQUIGRANULAR LEUCOGRANITE HK025388 1

Anhedral Kspar (some microcline), quartz 50%, and plagioclase 5%, commonly graphically intergrown. About 1% biotite.

82120165 FINE EQUIGRANULAR LEUCOGRANITE HK063419 1

Anhedral and graphically intergrown Kspar 45%, quartz 50%, and plagioclase 5%. About 1% chloritised biotite.

82120168 MEDIUM-GRAINED EQUIGRANULAR LEUCOGRANITE GK980475 1

As 82120165, minor graphic intergrowths.

82120227 MEDIUM-GRAINED EQUIGRANULAR ALKALI FELDSPAR LEUCOGRANITE HK063419 1

Anhedral Kspar, microperthitic in places, quartz 30%, and subhedral plagioclase 5%, with about 1% chloritised biotite. Minor Kspar-quartz graphic intergrowths.

FINGERPOST GRANODIORITE

82120026 COARSE HORNBLENDE BIOTITE GRANODIORITE HK066408 2

Coarse subhedral sericitised andesine, anhedral Kspar, quartz, biotite and minor chloritised and recrystallised pale green hornblende. Biotite altering to chlorite and epidote, minor secondary carbonate. Kspar: plagioclase 1:3, quartz 20%, mafics about 5%.

82120027 COARSE PORPHYRITIC BIOTITE -HORNBLENDE GRANODIORITE HK063481 2

Microperthite phenocrysts in a coarse groundmass of subhedral sericitised plagioclase, anhedral Kspar, anhedral quartz 20%, prismatic hornblende and biotite, trace apatite. Chlorite-epidote alteration of biotite. Mafics about 5%, Kspar: plagioclase 1:3.

82120157 COARSE BIOTITE-HORNBLENDE GRANODIORITE HK022424 1

Coarse subhedral sericitised plagioclase, anhedral quartz 25%, Kspar, prismatic hornblende, biotite, trace allanite. Mafics 5%, hbl > biot. Kspar: plagioclase 1:2.

82120158 COARSE BIOTITE-HORNBLENDE GRANITE HK094424 2

Equal proportions of coarse subhedral sericitised plagioclase, anhedral Kspar and quartz, 4% prismatic hornblende, 2% biotite with chlorite and epidote alteration, trace epidote.

DRIFFIELD GRANITE

82120163 DEFORMED FINE EQUIGRANULAR LEUCOGRANITE HK197449 2

Deformed, undulose bent mosaic of Kspar, quartz 45%,

plagioclase 5%, about 1% chloritised biotite, with sutured recrystallised polygonal fine grains and agglomerates. Secondary epidote, trace zircon.

82120170 FINE EQUIGRANULAR LEUCOGRANITE HK203472 2

Anhedral quartz 50%, Kspar, and plagioclase 5%. Up to 1% chloritised biotite with iron oxides. Trace apatite, undulose, bent crystals.

82120223 SHEARED COARSE BIOTITE LEUCOGRANITE HK215427 2

Fractured and deformed coarse Kspar, plagioclase and quartz with minor secondary chlorite and carbonate. Very minor biotite, mostly replaced by chlorite and epidote. Trae apatite. Plagioclase 25%, quartz 40%, mafics about 2%.

82120229 COARSE EQUIGRANULAR BIOTITE LEUCOGRANITE JE787496 3

Coarse anhedral microperthite, kaolinised plagioclase, quartz 30%, biotite with apatite inclusions and altering to epidote and chlorite, 4%. Strained grains, recrystallised sutured grain boundaries, recrystallised polygonal unstrained quartz. Kspar: plagioclase 1:1

PHILLIPS CREEK SANDSTONE

82120179 COARSE FELDSPATHIC QUARTZ SANDSTONE KE134082 15

Poorly sorted subrounded to subangular coarse (to 1 mm) quartz and chert grains, and sericitic aggregates after feldspar. Compact. Cemented by secondary iron oxides and minor clay-sericite?

82120190 CONGLOMERATIC GREYWACKE HK152429 2

Angular poorly sorted clasts to 1 cm of fine quartz greywacke, rhyolite and quartzite in very fine ill-sorted matrix containing chloritised biotite, plagioclase, quartz and graphically intergrown quartz-feldspar grains in a chlorite-clay base. Scattered Fe-oxides.

82120071 VOLCANOLITHIC GREYWACKE JE928214 11

Coarse poorly sorted angular clasts of pitchstone, plagioclase, Kspar, quartz, in sericitic and chloritic, Fe oxide matrix of same composition. Sericite after feldspar and possibly devitrified glass fragments. Qm 3.2%, Qp 1.0%, P 0.8%, K 3.6%, Lv 68.8%, Matrix 22.4%. Modal count 1500.

PLUM TREE CREEK VOLCANICS

82120009 HORNFELSED RHYODACITE HK138381 2

Strongly porphyritic. Phenocrysts of subhedral plagioclase (albite?), Kspar, and embayed quartz and biotite in a microcrystalline granuloblastic groundmass of quartz, poikilitic Kspar and very minor plagioclase. Some biotite rimmed by metamorphic poikilitic biotite and hornblende. Contact metamorphism also indicated by the rock's recrystallised texture. Feldspar phenocrysts rimmed by poikilitic Kspar.

82120010 VERY COARSE QUARTZ SANDSTONE HK159424 2

Poorly sorted very coarse well-rounded strained quartz, minor chert, and rhyolite fragments cemented by chlorite, sericite and minor quartz overgrowths.

82120011 ALTERED RHYODACITE HK196407 2

Porphyritic subhedral crystals and aggregates of kaolinised feldspar to 3 mm, embayed quartz and altered mafics (biotite and possibly hornblende), altered to chlorite, epidote, carbonate, in a micro-crystalline granoblastic groundmass of Fe oxides, stained quartz, and Kspar.

82120012 RHYOLITE HK160424 2

Phenocrysts to 2 mm of subhedral Kspar, plagioclase,

embayed quartz and euhedral chloritised biotite in an unaltered microcrystalline groundmass of quartz, Kspar and chlorite. Rock fractured and veined by epidote, chlorite and minor muscovite. Low grade hornfelsing.

82120014 LITHIC CRYSTAL TUFF HK188372 2
OR IGNIMBRITE
Angular crystal fragments of quartz, Kspar, plagioclase and chloritised biotite to 1 mm, and minor rhyolite fragments, in a recrystallised microcrystalline chloritic siliceous base. Possible low grade contact metamorphism.

82120075 ALTERED MAFIC VOLCANIC KE264092 15
Rounded (to 2 mm) ?amygdales of carbonate with minor quartz in centres, in fine altered groundmass of Fe oxides, chlorite and carbonate with chlorite pseudomorphs after mafic mineral crystals to 2 mm. Possibly altered highly vesicular basalt.

82120076 VITRIC RHYOLITIC TUFF KE155094 13
Minor phenocrysts of embayed quartz, polygonal quartz aggregates and white mica aggregates after feldspar, in a kaolinised and Fe-oxide stained devitrified glassy base with a eutaxitic texture. Minor sphene and chlorite? possibly replace mineral fragments.

82120077 IGNIMBRITE JE945167 12

Layered. Crystal fragments (quartz, kaolinised feldspar), minor chloritised mafic mineral and vitric tuff lithic fragments in a strongly hematitised devitrified glassy base with eutaxitic fabric.

82120080 PEBBLY VOLCANOLITHIC GREYWACKE KE040118 12

Angular poorly sorted coarse clasts of felsic volcanics, quartz-Kspar graphic intergrowths, and quartz in a clay-hematite matrix. Includes a pebbly layer of same composition.

82120082 ALTERED IGNIMBRITE? KE228124 13

Phenocrysts of sericitised feldspar, aggregates of chlorite-quartz-sercite (altered volcanic rock fragments or aggregated biotite and feldspar), minor apatite, zircon and quartz, in a fine groundmass mosaic of quartz, Kspar dusted with hematite granules, and minor secondary chlorite.

82120083 DACITE? KE212218 13

Phenocrysts of sericitised or carbonated euhedral plagioclase, mafic mineral altered to chlorite-carbonate-iron oxides, sphene and minor Kspar, in a fine groundmass of quartz with inclusions of minute stubby Kspar crystals clouded by Fe oxides, numerous apatite needles, and patchy chlorite alteration.

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82120084 VOLCANOLITHIC PEBBLE CONGLOMERATE JE911156 11

Well rounded pebbles of hematitised porphyritic felsic volcanics and gritty quartz in a moderately sorted medium-grained sandy quartz matrix. Quartz grains well rounded with Fe oxide coated rims, cemented by polygonal quartz, minor rounded opaque grains, chert, tourmaline and zircon.

82120085 WEATHERED RHYOLITIC IGNIMBRITE KE192194 13

Rounded crystals of quartz, feldspar (alkali: plag 1:1), muscovite-chlorite opaques-carbonate after biotite and carbonate after plagioclase. Brown fluidal devitrified glassy groundmass, shards. Crystals aligned parallel to flow textures.

82120086 RHYOLITE? KE204122 13

Very minor angular quartz phenocrysts in a microcrystalline groundmass of quartz and white mica (devitrified glass).

82120087 ALTERED RHYODACITE KE137093 13

Subhedral phenocrysts of carbonated plagioclase, minor Kspar, and a mafic mineral now completely altered to fine actinolite aggregates. Very fine groundmass of stubby Kspars, quartz crystallites, actinolite, chlorite, sericite and carbonate. Trace apatite.

82120088 IGNIMBRITE? KE204122 13

Phenocrysts and aggregates of sericitised euhedral plagioclase, chlorite-carbonate Fe oxide pseudomorphs after mafic minerals, minor Kspar, in groundmass of mosaic Kspar-quartz with dusty hematite granules, scattered apatite, minor chlorite, carbonate.

82120089 DACITE? JE959310 9

Phenocrysts of carbonated euhedral oligoclase, minor apatite, chlorite after ?biotite, opaques, in devitrified brown glassy groundmass with spherulitic texture and very weak flow layering. Carbonate veins.

82120090 RHYOLITE KE140102 13

Kaolinised subhedral feldspar and minor embayed quartz phenocrysts in an iron-stained granoblastic microcrystalline groundmass of kaolinised feldspar and quartz.

82120091 ALTERED RHYODACITE JE928124 11
-PALAEOWEATHERED?

Phenocrysts to 15 mm of kaolinised subhedral feldspar, minor embayed quartz, and Fe oxides after mafic minerals, in a microcrystalline granoblastic groundmass of kaolinised feldspar, quatz and iron oxides (hematite).

82120093 RHYOLITE KE262091 15

Embayed quartz and kaolinised euhedral feldspar phenocrysts to 5 mm in a microcrystalline groundmass of quartz, kaolinised feldspar and iron oxides.

82120094 PEBBLY COARSE LITHIC SANDSTONE JE869192 11

Scattered strained rounded vein quartz pebbles and poorly sorted very coarse angular fragments of highly foliated and strained quartz greywacke, minor phyllite and siltstone, in a matrix of fine unstrained polygonal quartz. Hematite staining throughout.

82120095 RHYOLITE KE221200 13

As 82120110. Rounded quartz phenocrysts and sericitised feldspar phenocrysts in a fine groundmass of anhedral quartz, sericite, opaques; rare euhedral zircon.

82120096 VOLCANOLITHIC PEBBLE/ CONGLOMERATE JE938156 11

As 82120084

82120098 ALTERED MAFIC VOLCANIC JE946290 9

Interlocking plagioclase laths (andesine), acicular opaque mineral. Patchy carbonate and chlorite, rare interstitial quartz, acicular

apatite.

82120099 ALTERED AMYGDALOIDAL BASALT KE237103 13

Very minor euhedral labradorite phenocrysts in a very fine groundmass of plagioclase laths, secondary chlorite, carbonate and Fe oxides. Rounded amygdales to 5 mm of chlorite-carbonate chalcedony-Fe oxide.

82120100 ALTERED MAFIC VOLCANIC KE189202 13

Interlocking plagioclase laths (sericitised), interstitial quartz, patchy carbonate and chlorite, granular and acicular opaques. Minor altered euhedral feldspar phenocrysts to 3 mm, and carbonate-filled amygdales.

82120101 ALTERED AMYGDALOIDAL MAFIC VOLCANIC KE229124 13

Rounded to amoeboid amygdales to 5 mm filled with quartz, chlorite, carbonate and hematite in a microcrystalline altered base of interlocking sericitised plagioclase laths. Granular iron oxides and interstitial chlorite.

82120103 ALTERED MAFIC VOLCANIC JE952312 9

Interlocking andesine laths mostly sericitised, patchy carbonate and chlorite, acicular and granular opaques, and interstitial brown glass.

82120104 BASALT KE247094 13

Scattered phenocrysts of clinopyroxene euhedra (fractured and altered to chlorite and carbonate in places) and plagioclase crystals altered to white mica, albite?, and minor carbonate. Groundmass is stubbly Kspar crystals and plagioclase laths, euhedral clinopyroxene, secondary carbonate, opaques and rare biotite.

82120105 LAMINATED VITRIC TUFF KE205175 13

As 82120119, rhombs of carbonate

82120106 ALTERED VOLCANIC-DACITE? KE058096 12

Minor scattered phenocrysts to 2 mm of plagioclase, and chlorite pseudomorphs after ?clinopyroxene, in a very fine base of plagioclase crystals, quartz, actinolite, chlorite, carbonate and hematite. Minor ? Kspar crystals.

82120108 MEDIUM-GRAINED LITHIC QUARTZ SANDSTONE KE006139 12

Medium-grained poorly sorted, subrounded to angular grains of quartz, felsic volcanic rock fragments, chert and flattened mud clasts (to 5 mm) in a clay matrix. Quartz grains are commonly strained, some are well-rounded with broken quartz rims, and appear reworked from a pre-existing sandstone.

82120109 MEDIUM-GRAINED LITHIC QUARTZ SANDSTONE JE930169 11

As 82120108

82120110 RHYOLITE KE221200 13

Euhedral quartz and sericitised feldspar phenocrysts to 2 mm in a fine groundmass of anhedral quartz, sericite and Fe oxide, minor coarser patches of muscovite suggest some hornfelsing.

82120111 DEVITRIFIED VITRIC TUFF KE196329 10

Devitrified glass-fine white mica, opaques, with weak eutaxitic texture.

82120113 RHYOLITIC IGNIMBRITE-PALAEOWEATHERED KE048107 12

Minor crystals of kaolinised feldspar and quartz in a base of quartz, kaolinised feldspar, iron oxides (hematite) and minor chlorite. Wavy concentrations of iron oxides outline 'fragments' with disorientated fabrics to each other, suggesting a fragmental texture.

82120115 CRYSTAL VITRIC TUFF KE136339 10

Very fine scattered angular quartz and minor sericitised feldspar crystal fragments in a devitrified glassy base with relict eutaxitic fabric. Shards altered to chlorite-sericite-quartz, opaques.

82120116 TUFFACEOUS CHERT KE204329 10

Scattered angular fine quartz, kaolinised feldspar, in a microcrystalline mosaic of quartz, white mica and iron oxides.

82120117 TUFFACEOUS SILTSTONE KE197194 13

Graded laminae of silty angular quartz, opaques, yellow-brown devitrified glass, chlorite after mafic mineral, and muscovite flakes.

82120118 DEVITRIFIED VITRIC TUFF? KE248092 13

Layered microcrystalline quartz-sericite-iron oxide mosaic with weak eutaxitic fabric. Spotted appearance caused by sericite aggregates.

82120119 LAMINATED VITRIC TUFF KE205175 13

Devitrified glass, white mica varying to pale yellowish brown, fine opaque granules, with eutaxitic texture. Scattered rhombs of dark brown carbonate or iron oxide, and rare angular quartz. As 82120105.

82120125 SUBVARIOLITIC BASITE KE293039 15

Slender plagioclase laths altered to clay and chlorite, and crystallites, in a devitrified base with chlorite aggregates after a mafic mineral, and minor epidote. Carbonate-chlorite veinlets.

82120128 HORNFELSED RHYODACITE HK142387 2

As 82120009

82120248 SHEARED MAFIC VOLCANICLASTIC KE264092 15

Strongly foliated chlorite and crustified carbonate veinlets, minor quartz lenses parallel to foliation, cut by extensive patchy carbonate. Relict fragmental texture indicates probable breccia. Possibly Antrim Plateau Volcanics-refer 82120260.

MOUNT SHEPHERD RHYOLITE MEMBER

82120097 ALTERED RHYOLITE- KE 248082 15

PALAEOWEATHERED

As 82120102

82120102 ALTERED RHYOLITE- KE251084 15

PALAEOWEATHERED

Minor subhedral kaolinised (or other clay mineral) feldspar phenocrysts in a microcrystalline base of granoblastic ?kaolinised feldspar, quartz, iron oxide granules and ?diaspore.

82120112 RHYOLITE KE242086 15

As 82120093, finer grained

LEWIN SPRINGS SYENITE

82120001 ALTERED FINE GRANODIORITE? GK989452 1

Fine subhedral plagioclase, anhedral Kspar, quartz, and aggregates of epidote, actinolite, chlorite and minor carbonate after a primary mafic mineral.

82120002 ALTERED PORPHYRITIC HORNBLENDE-BIOTITE-QUARTZ SYENITE? HK002425 1

Porphyritic megacrysts to 1 cm of plagioclase with white mica and epidote alteration, subhedral Kspar, minor quartz, in a medium-grained groundmass of quartz and Kpar, mostly graphically intergrown, hornblende altering to actinolite, biotite altering to chlorite, plus epidote and apatite and very minor plagioclase.

82120003 PORPHYRITIC MICROGRANITE HK174437 2

Corroded phenocrysts of Kspar, quartz and altered (white mica) plagioclase to 3 mm, in a microcrystalline groundmass of Kspar, quartz, chlorite, actinolite, epidote and very minor carbonate.

82120004 RHYOLITE HK088415 2

Euhedral phenocrysts of orthoclase, oligoclase, embayed quartz and biotite, as single crystals to 3 mm and in aggregates, in a flow banded devitrified

glassy groundmass of feldspar, quartz and chlorite mosaic. Spherulitic texture in places and coarse patches of granoblastic ?Kspar. Accessory zircon, apatite euhedra, secondary carbonate.

82120005 PORPHYRITIC MICROGRANITE HK022476 1

Strongly porphyritic, with corroded euhedra of Kspar to 1 cm, oligoclase to 5 mm, quartz, and biotite to 2 mm, in a microcrystalline groundmass of granuloblastic Kspar, quartz, chlorite and minor carbonate. Biotite phenocrysts partly altered to actinolite or epidote, and in places chlorite and with numerous apatite inclusions.

82120006 PORPHYRITIC MICROGRANITE HK066420 2

Phenocrysts of Kspar to 1 cm, euhedral oligoclase as single crystals and clusters, and embayed quartz to 1 mm, in a very fine groundmass of graphically intergrown Kspar and quartz, minor plagioclase crystals, biotite altering to chlorite, rare fluorite, and minor secondary carbonate.

82120007 ALTERED PORPHYRITIC HK053444 1
HORNBLENDE-BIOTITE-QUARTZ
SYENITE

Megacrysts, forming 50% of rock, of subhedral Kspar to 15 mm, embayed quartz to 5 mm, and plagioclase altering to white mica, in a fine groundmass of

quartz, Kspar, biotite altering to chlorite, actinolitic hornblende, sphene, apatite, epidote and opaques. Groundmass hornblende euhedra overgrown and replaced by actinolite.

82120008 PORPHYRITIC HORNBLENDE -BIOTITE GRANITE HK013477 1

Megacrysts, forming 50% of rock, of subhedral plagioclase to 1 cm altering to white mica, subhedral Kspar to 2 cm, embayed quartz to 1 cm, biotite, and very minor hornblende. Biotite and hornblende partly altered to actinolite and lesser chlorite, and apatite inclusions in biotite. Very fine groundmass of anhedral quartz, Kspar, stubby plagioclase crystals, biotite-chlorite, and minor epidote and zircon.

82120013 COARSE PORPHYRITIC HORNBLENDE-BIOTITE-QUARTZ MONZONITE HK198398 2

Euhedral plagioclase and Kspar megacrysts to 1 cm in a medium-grained base of subhedral Kspar, anhedral quartz, biotite, actinolitic hornblende crystals, minor apatite, epidote, and rare carbonate. Alteration of biotite to chlorite and plagioclase to sericite and epidote.

82120015 MEDIUM-GRAINED BIOTITE HORNBLENDE-QUARTZ MONZONITE HK048375 1

Subhedral Kspar, plagioclase and actinolitic hornblende crystals, chlorite-biotite, quartz, sphene, apatite. Secondary epidote. Minor quartz-Kspar micrographic intergrowths.

82120239 ALKALI FELDSPAR MICROSYENITE HK102442 2

Minor scattered euhedral oligoclase phenocrysts to 1 mm in a microcrystalline groundmass of Kspar?, chlorite, minor carbonate and white mica mosaic with radiating crystallites around phenocrysts. Spotting due to chlorite-crystallite masses around phenocrysts (devitrified glass?) between Kspar-rich areas.

82120243 ALKALI FELDSPAR MICROSYENITE HK105430 2

As 82120239.

KOMBOLGIE FORMATION

82120114 HEMATITIC SILTSTONE KE077359 9

Graded laminated silty quartz grains with minor muscovite, impregnated by hematite. Disrupted laminae with clasts of fine sand of same composition.

McADDENS CREEK VOLCANIC MEMBER

82120174 WEATHERED AMYGDALOIDAL MAFIC VOLCANIC JE986301 9

Phenocrysts of euhedral Kspar, sericitised plagioclase (oligoclase), and chlorite and carbonate after a mafic mineral, and quartz-chlorite amygdales, in a hematitic microcrystalline groundmass of plagioclase and chlorite.

82120175 HEMATITIC MICACEOUS SANDY SILTSTONE KE135138 13

Silty to fine sandy, poorly sorted, quartz grains and muscovite flakes, with pervasive finely divided hematite and some clay minerals.

82120176 ALTERED MAFIC VOLCANIC KE147147 13

Interlocking sodic plagioclase (oligoclase?) laths, and anhedral pyroxene extensively altered to chlorite and epidote, in an interstitial altered brown devitrified glass containing minor microlites, and epidote and chlorite-filled cavities.

82120177 BANDED TUFF KE287105 13

Angular quartz grains, rare muscovite, in a laminated base of iron oxides, carbonate, and ?devitrified glass shards.

HENWOOD CREEK VOLCANIC MEMBER

82120178 ALTERED FELSIC VOLCANIC KE161134 13

Scattered euhedral phenocrysts of completely kaolinised feldspar in a mosaic base of quartz-sericite and iron oxide.

ANTRIM PLATEAU VOLCANICS

82120187 MEDIUM-GRAINED QUARTZ SANDSTONE JE946114 12

Moderately sorted, well rounded, loosely packed, medium-grained quartz, about 15% crystal and rock fragments of chert, alkali feldspar, plagioclase, tourmaline, hematitised volcanic, and opaque grains, cemented by a polygonal quartz mosaic heavily impregnated with iron oxide along grain boundaries.

82120188 ALTERED BASALT KE146034 15

Fine interlocking kaolinised plagioclase laths and anhedral to stubby subhedral augite with marginal chlorite alteration. Patchy secondary chlorite, carbonate and hematite.

82120189 FINE QUARTZ SANDSTONE JE937114 11

Moderately sorted, fine, well rounded, quartz and minor subangular alkali feldspar (to 5%) grains with optically continous quartz rims. Grain boundaries outlined by iron oxide coatings. Very minor chert

and opaques. Many quartz rims surrounded by a second quartz rim, indicating derivation from an older sandstone.

82120260 SHEARED MAFIC VOLCANICLASTIC KE212064 15

Strongly foliated carbonate-chlorite alteration product of fine grained mafic volcanic rock fragments, in a base of foliated chlorite and patchy carbonate. Some rock fragments may be fine Kspar mosaics. Possibly Plum Tree Creek Volcanics-compare 82120248.

DYKE ROCKS

82120018 ALTERED DOLERITE JE786487 3

Fine sericitised plagioclase laths with secondary fibrous actinolite, chlorite and granular epidote. Minor interstitial quartz and relict augite crystals. Skeletal opaques.

82120021 FINE EQUIGRANULAR HK017435 1
LEUCOGRANITE

Anhedral Kspar (microcline and orthoclase), 40% quartz, 10% subhedral plagioclase (oligoclase) commonly rimmed by Kspar, and 1% chloritised biotite with apatite inclusions.

82120207 QUARTZ-CHLORITE GREISEN HK055396 1

60% chlorite as medium-grained crystals and fine radiating aggregates with anhedral quartz.

82120209 MUSCOVITE-QUARTZ GREISEN HK215427 2

Fine quartz, 50%, and muscovite. Strongly deformed and recrystallised.

82120210 MUSCOVITE-QUARTZ GREISEN HK138381 2

Fine quartz 60%, radiating muscovite aggregates.

82120237 DOLERITE KE188196 13

Glomerophyritic aggregates and embayed single phenocrysts of augite to 2 mm, in a brown altered microcrystalline groundmass of granular pyroxene, plagioclase laths, and patchy interstitial chlorite possibly after clinopyroxene.

82120238 PORPHYRITIC ALKALI FELDSPAR JE870225 11
MICROSYENITE

Euhedral phenocrysts of oligoclase and Kspar in a microcrystalline groundmass of Kspar and quartz, with patchy carbonate and chlorite, minor secondary white mica, and apatite.

82120241 ALTERED MEDIUM-GRAINED JE774269 8
DOLERITE

Medium-grained plagioclase laths now altered to granular epidote and fine white mica, irregular

hornblende probably after clinopyroxene, and altered to fibrous pale green actinolite and minor chlorite, with interstitial partly chloritised biotite, quartz and minor apatite and opaques.

82120242 FINE PORPHYRITIC GRANITE JE881300 8

Euhedral phenocrysts to 1 cm and scattered crystal aggregates of feldspar (plagioclase?) totally replaced by fine white mica, in a groundmass of fine anhedral quartz, Kspar and patchy chlorite, iron oxides and white mica.

82120256 ALTERED FINE QUARTZ JE808366 3
MONZONITE?

Fine plagioclase laths, anhedral Kspar? and minor quartz with patchy chlorite, carbonate and iron oxides. Minor scattered altered white mica aggregates after ?plagioclase phenocrysts. Rounded quartz-chlorite-carbonate ?cavity infillings or ocelli.

82120257 ALTERED PORPHYRITIC DOLERITE? HK168385 2

Euhedral phenocrysts to 1 cm of ?plagioclase totally replaced by white mica, in a fine groundmass of chlorite, white mica, iron oxides, carbonate and minor quartz. A texture of interlocking feldspar laths is preserved by the mica pseudomorphs.

82120258 ALKALI FELDSPAR MICROGRANITE HK077407 2

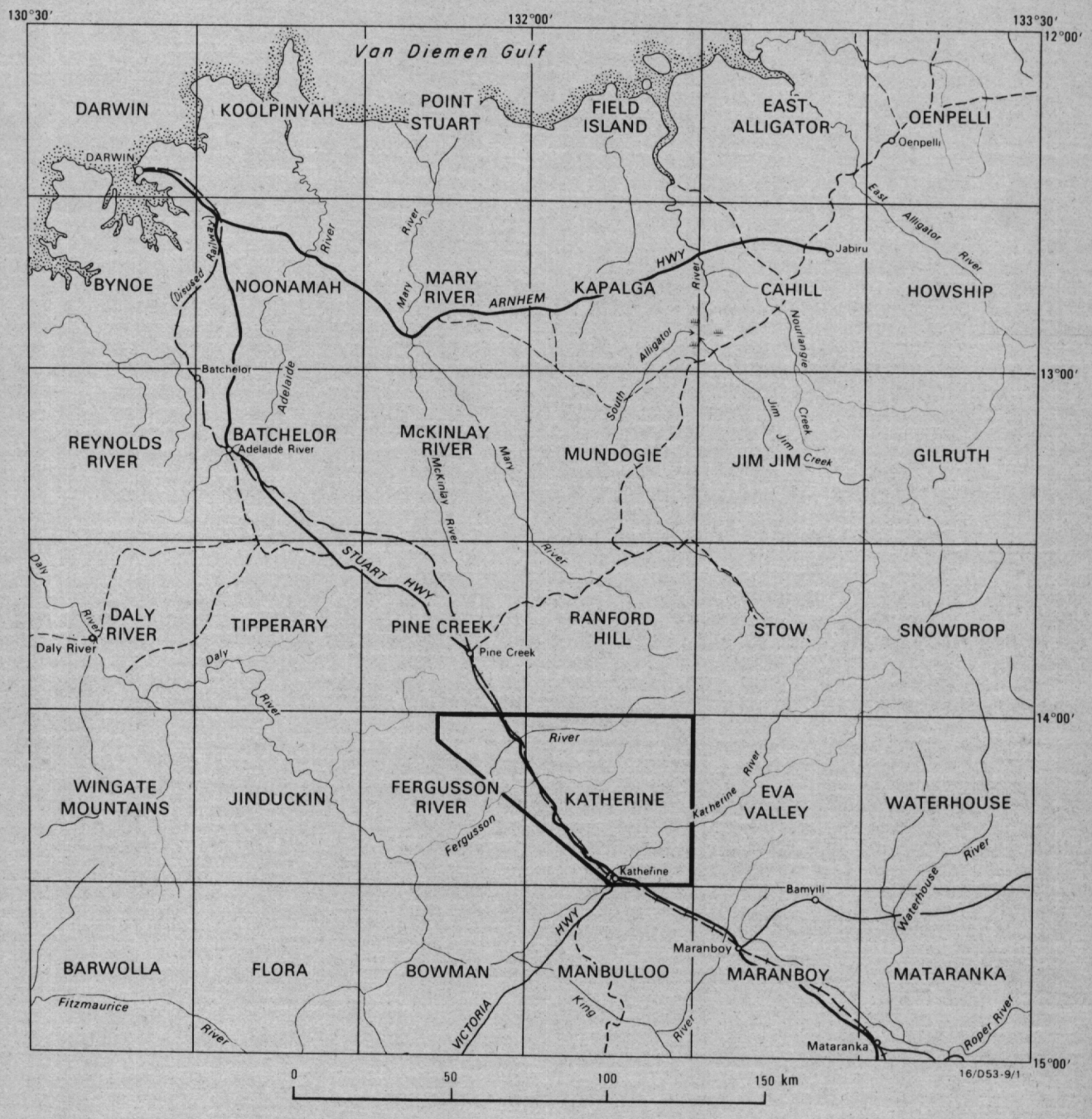
Microcrystalline anhedral quartz and Kspar, commonly graphically intergrown, trace biotite, cut by granular epidote veinlets.

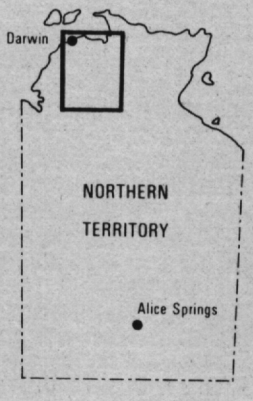
82120261 PORPHYRITIC ALKALI FELDSPAR HK230396 2
QUARTZ MICROSYENITE

Euhedral phenocrysts to 5 mm of Kspar, minor plagioclase, and embayed quartz, in a microcrystalline groundmass of Kspar euhedra, quartz and chlorite with minor muscovite.

82120262 DOLERITE KE210192 13

Fine labradorite laths, interstitial colourless augite, minor interstitial quartz, patchy secondary carbonate and chlorite. Skeletal opaques. Alteration of clinopyroxene partly to hornblende and then chlorite, and plagioclase to sericite.





KATHERINE *1:100 000 Sheet area*

Area covered in Figure 2

Figure 1. Locality map of the Edith River region

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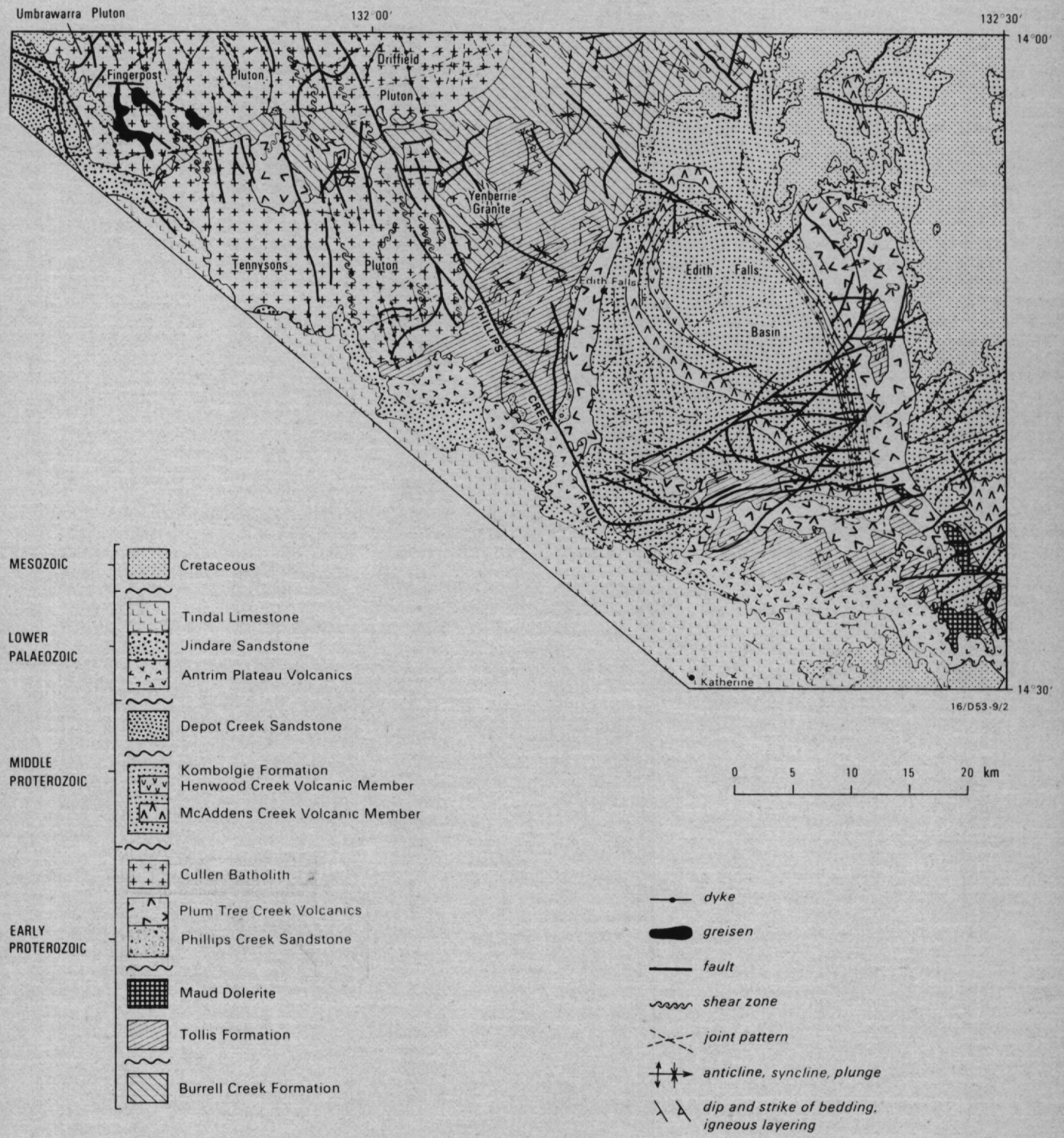
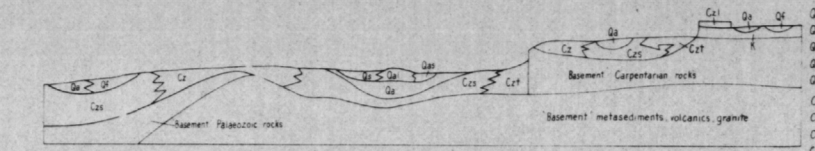


Figure 2. Solid geology of the Edith River region



Qa	Silt, sand, clay: creek and river alluvium	QUATERNARY	CAINOZOIC
Qs	Unconsolidated sand: outwash and colluvium		
Qf	Black and brown humic soils and clays		
Qal	Silt, clayey silt, sand: levee deposit		
Qas	Silt, clay: abandoned channel deposit		
Cz	Soil, rubble, sand: regolith obscuring bedrock		
Czs	Ferruginous and clayey sand	TERTIARY	
Czt	Sandstone rubble: talus and scree		
Czl	Nodular, concretionary and pisolitic laterite		
K	Fine white sandstone, yellow and brown ferruginous fine to medium-grained friable sandstone, kaolinitic white to purple sandstone near base; minor red-brown siltstone	CRETACEOUS	MESOZOIC
Emt	Massive grey crystalline limestone with rare chert nodules; minor flaggy yellow chert-banded limonitic fine limestone in places brecciated where near base of sequence	LOWER TO MIDDLE CAMBRIAN	PALAEOZOIC
Emt_3	Friable massive white to pale yellow medium-grained sandstone		
Emt_2	Massive grey crystalline limestone		
Clw_2	Fine to coarse, well-sorted white friable sandstone		
Clw_1	Pink to purple ferruginous poorly sorted sandstone, pebbly friable arkose, laminated chert commonly brecciated and limonite		
Cla	Purple to black, commonly weathered, fine basalt, vesicular in places. Minor red ferruginous medium-grained to coarse sandstone interbeds near base in places. Local basal breccia containing fragments of underlying rock in sandy matrix		
Eta	Laminated to thinly bedded fine to coarse, pink quartzite, commonly ripple marked and in places pebbly; minor thin dark grey hematitic quartzite interbeds; rare calcite pseudomorphs after evaporites near base	? MIDDLE PROTEROZOIC	
Ehk_3	Medium to coarse massive buff sandstone, commonly cross-bedded and ripple-marked; pebbly in places, minor brown ferruginous siltstone beds	MIDDLE PROTEROZOIC	
Ehh	Deeply weathered grey massive to vesicular andesite		
Ehm	Dark grey massive andesite-basalt vesicular in places		
Ehk_{1c}	Massive purple polymictic cobble conglomerate		
Ehk_1	Coarse, commonly poorly sorted pebbly and clayey white to buff sandstone, brown ferruginous siltstone interbeds, cross-bedded and ripple-marked; ..... denotes siltstone lenses		
Pgc	Undifferentiated Cullen Granite Complex	PROTEROZOIC	
Pgc_a	Coarse pink and green porphyritic granite		
Pgc_c	Coarse pink equigranular leucogranite		
Pgc_b	Fine white, buff, pink and salmon leucogranite		
Pgc_e	Altered granite		
Pgc_m	Fine to medium-grained monzonite		
Pgc_i	Strongly porphyritic pink granite		
Pgc_k	Coarse porphyritic pink and green leucogranite		
Pgc_l	Fine to medium-grained light grey to pale pink porphyritic leucogranite		
Pgc_m	Coarse porphyritic granodiorite		
Pgc_o	Fine to medium-grained, light grey to pale pink, sparsely porphyritic leucogranite		
Pgc_z	Cordierite-andalusite-biotite-quartz hornfels; hornfels rafts and screens		
Pgl_c	Coarse pink equigranular leucogranite, commonly altered and greisenised		
Pgl_a	Fine white and pink leucogranite, commonly altered		
Pep	Massive to poorly layered red to reddish brown xenolithic and xenocrystic ignimbrite massive to amygdaloidal basalt, red pink rhyolite, minor cherty and sandy sediments. v-v-v denotes tuff; ..... denotes cherty sediments; xxx denotes mafic volcanics		
Pep_3	Massive white, purple banded rhyolite		
Pef	Red-grey and pink porphyritic glassy rhyolite, ignimbrite; minor dark grey glassy rhyolite near base		
Pew	Red grey, massive or rarely flow-banded, porphyritic rhyolite dykes		
Pel	Labile and tuffaceous, poorly sorted sandstone, purple, medium-grained arkose, conglomeratic breccia conglomerate; minor siltstone and phyllite	EARLY PROTEROZOIC	
Pdm	Medium-grained grey-green dolerite		
Pbt_3	Phyllite, argillite, greywacke, crystal tuff		
Pbt_2	Pale green argillite, spotted crystal tuff, greywacke, tuffaceous greywacke, siltstone		
Pbt	Interbedded greywacke, pink tuffaceous greywacke, siltstone, pale green argillite, cherty tuff; xxxx denotes grey-pink feldspar porphyry flow		
Pbt_b	Basalt, minor banded chert and dark grey tuff		
Pfb	Fine to coarse grey to grey-green or purple feldspathic greywacke, grey, brown and mauve phyllite, slate and siltstone, rare interbeds of siliceous argillite		

CULLEN GRANITE COMPLEX: Umbrawarra Pluton; Driffield Pluton; Fingerpost Pluton; Tennysons Pluton; Yenbernie Granite*

EDITH RIVER GROUP*: Fergusson River Toscanite; Lewin Springs Syenite*; Plum Tree Creek Volcanics*; Mount Shepherd Rhyolite Member*; Phillips Creek Sandstone*

Maud Dolerite*

EL SHERANA GROUP*: Tollis Formation*; Dorothy Creek Basalt Member*

FINNISS RIVER GROUP: Burrell Creek Formation

TOLMER GROUP: Depot Creek Sandstone*

KATHERINE RIVER GROUP: Hemwood Creek Volcanic Member; McAddens Creek Volcanic Member; Kombolgie Formation

Tindall Limestone; Jindare Sandstone*; Antrim Plateau Volcanics

* Informal name — Unconformity — Sedimentary facies boundary — △△△ denotes breccia

RECORD 1986/7 Figure 3 (a). Reference to accompany 1:25 000 compilation sheets of Edith River region, NT

16/D53-9/3

Geological boundary

Anticline
Syncline
F_2 denotes 2nd generation

Fault

Normal fault; tick on downthrown side indicates direction of dip

Fault; U, D indicates relative movement; up, down

Fault containing breccia

Fault containing; b-breccia, e-epidote, g-greisen, h-hematite, m-mylonite, q-quartz, qb-quartz breccia, t-tourmaline

Where location of boundaries, folds and faults is approximate line is broken, where inferred, queried; where concealed boundaries and folds are dotted, faults are shown by short dashes

Minor anticline

Minor syncline

FA — Fold axis

Arrow indicates trend, value indicates plunge of fold axis

Shear zone

Dome

Strike and dip of strata

Vertical strata

Horizontal strata

Strike and dip of overturned strata

Strike and dip of strata showing proved direction of facing based on sedimentary structures

Curving dip

Strike and dip of strata, dip less than 5°

Strike and dip of strata, dip 5°-15°

Strike and dip of strata, dip 15°-45°

Strike and dip of strata, dip greater than 45°

Dip-slope

Trend-line

Lineament

Joint pattern

} Airphoto interpretation

Strike and dip of joint

Vertical joint

Strike and dip of foliation

Vertical foliation

Strike and dip of cleavage

Vertical cleavage

Strike and dip of kink cleavage

Vertical kink cleavage

Trend of plunge of mineral elongation

Trend of plunge of crenulation

Strike and dip of platy flow structure

Vertical platy flow structure

Some structural elements observed at a single locality may be combined on the map

Direction of volcanic flow indicated by flow lobes

Direction of movement of sediment-bearing currents: f-fluting, r-asymmetrical ripple marks, x-cross-stratification

Dyke or vein; a-aplite, dl-dolerite, f-felsite, g-greisen, h-hematite, lgr-leucogranite, ms-magnesite, p-porphyry, peg-pegmatite, q-quartz, si-silica, s-syenite

Dyke, tick on downthrown side indicates direction of dip

Cu — Minor mineral occurrence

Abandoned prospect

Open cut, quarry; minor

Abandoned mine

Open cut, quarry; not being worked

Alluvial workings; not being worked

Abandoned battery

Limit of extensive workings

Costean

Au-gold, Bs-basalt, Cu-copper, Gg-aggregate other than crushed rock, Gr-gravel aggregate devoid of sand, Mo-molybdenum, Sn-tin, U-uranium, W-tungsten

Bore

Earth dam

Earth dam with wall

Waterhole

Sinkhole

Swamp

Escarpment

Highway

Minor road

Vehicle track

Foot track

Road bridge, railway bridge, railway embankment

Abandoned railway, single track, station, siding

Telegraph line, disused

Fence

Quarry

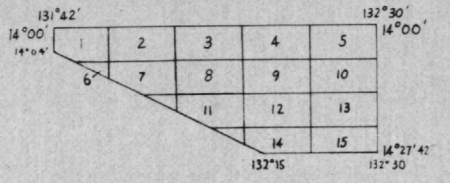
Kumbidgee — Homestead

Building

Yard

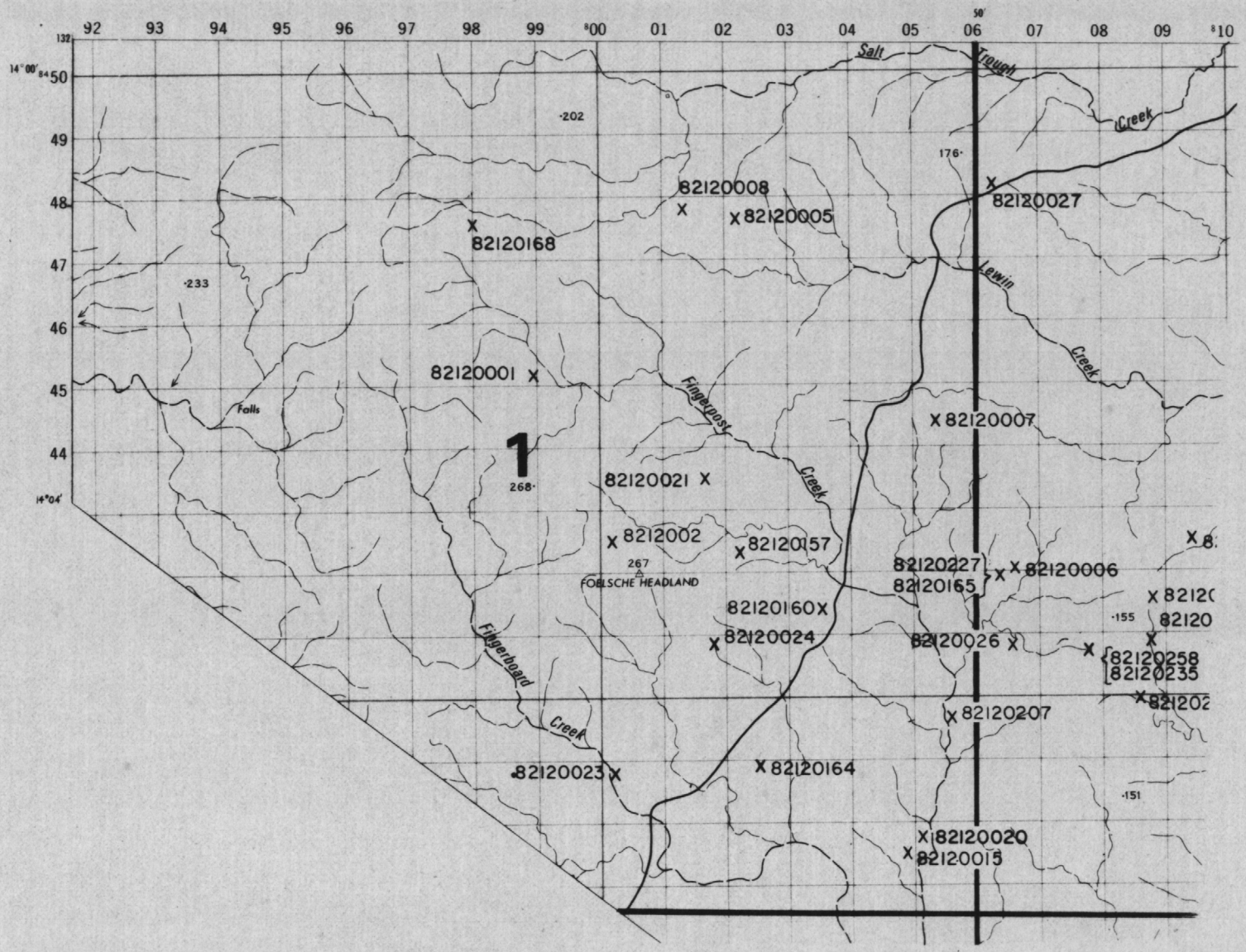
Trigonometrical station

Elevation in metres



INDEX TO PLATES

Figure 3 (b). Reference to accompany 1:25 000 compilation sheets for Edith River region, NT



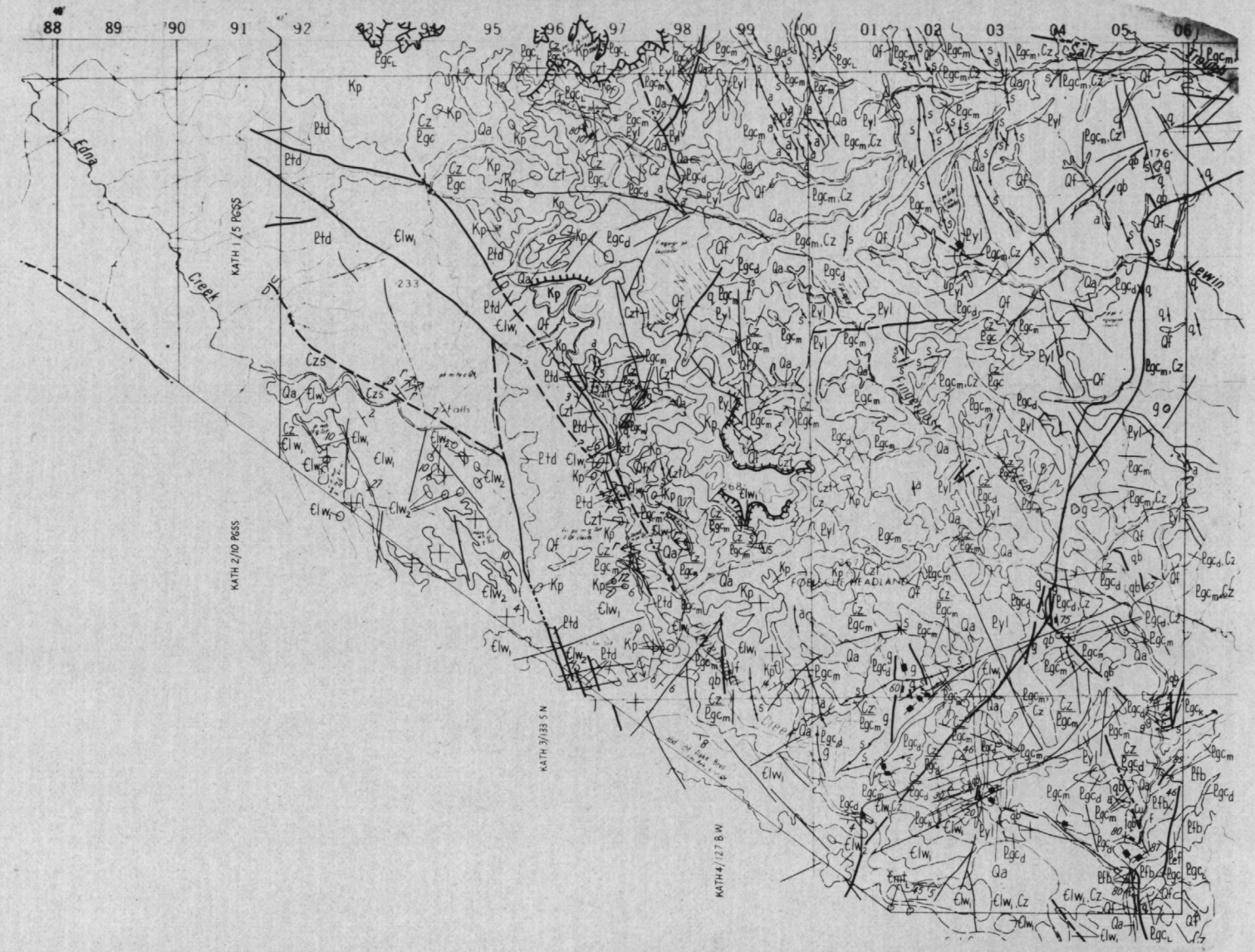
X 82120001 *Thin section locality with BMR registered number*

FERGUSSON RIVER, NT

RECORD.1986/7

Figure 4(a). **Edith River region thin section localities**

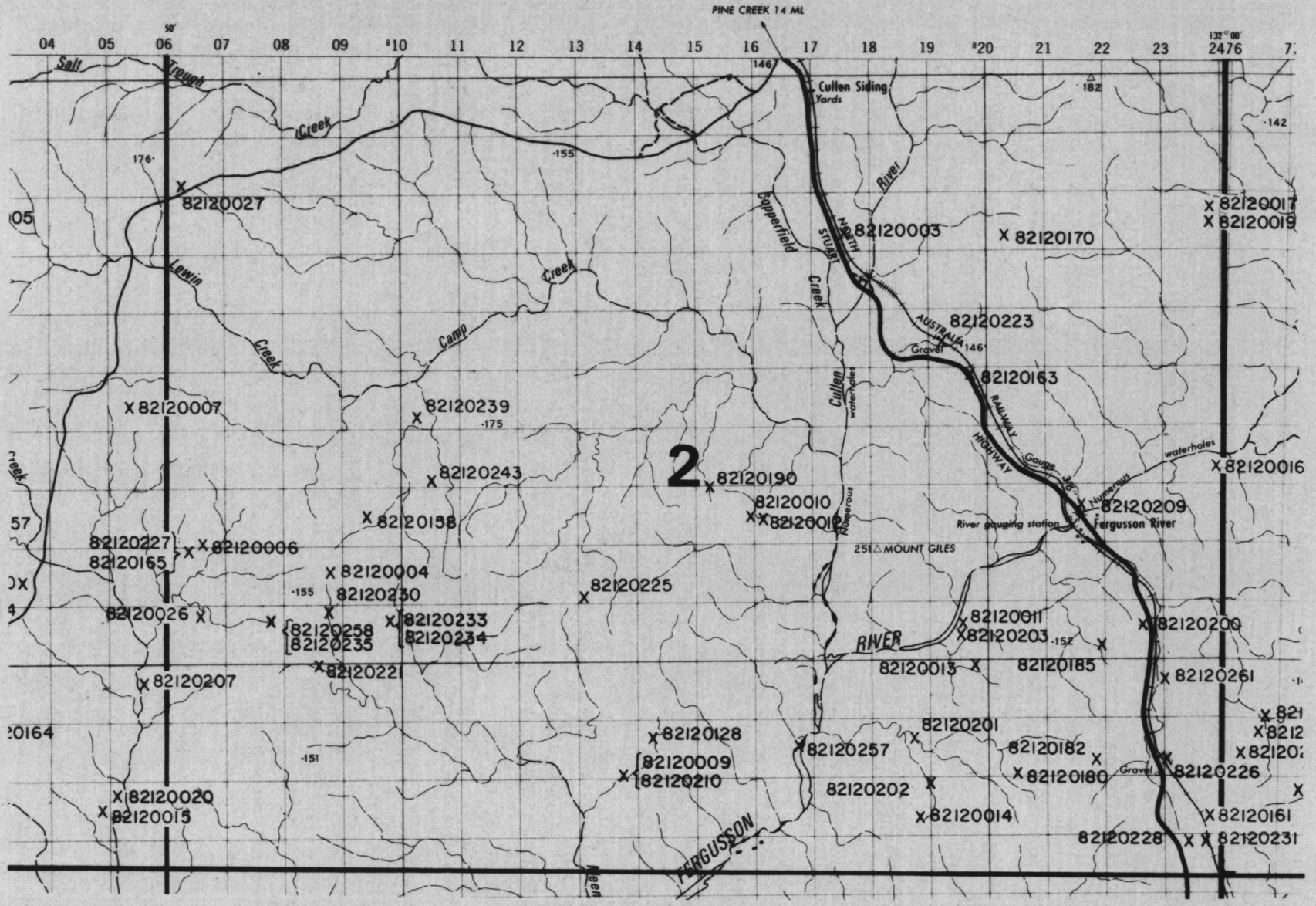
16/D53-9/5



RECORD 1986/7

16/D 53-9/6

Figure 4(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

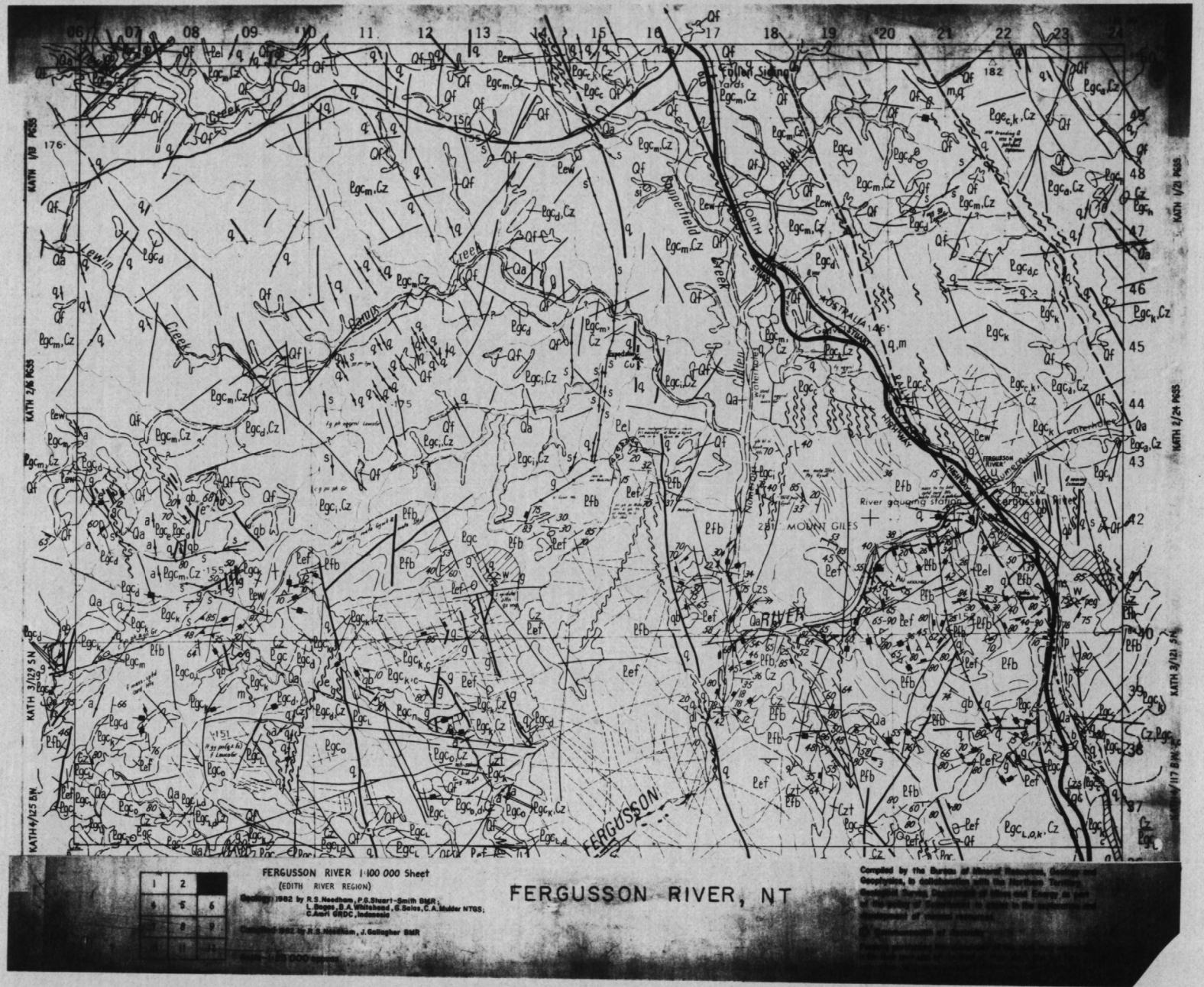
FERGUSSON RIVER, NT

0 2 4 6 km

RECORD 1986/7

Figure 5(a). Edith River region thin section localities

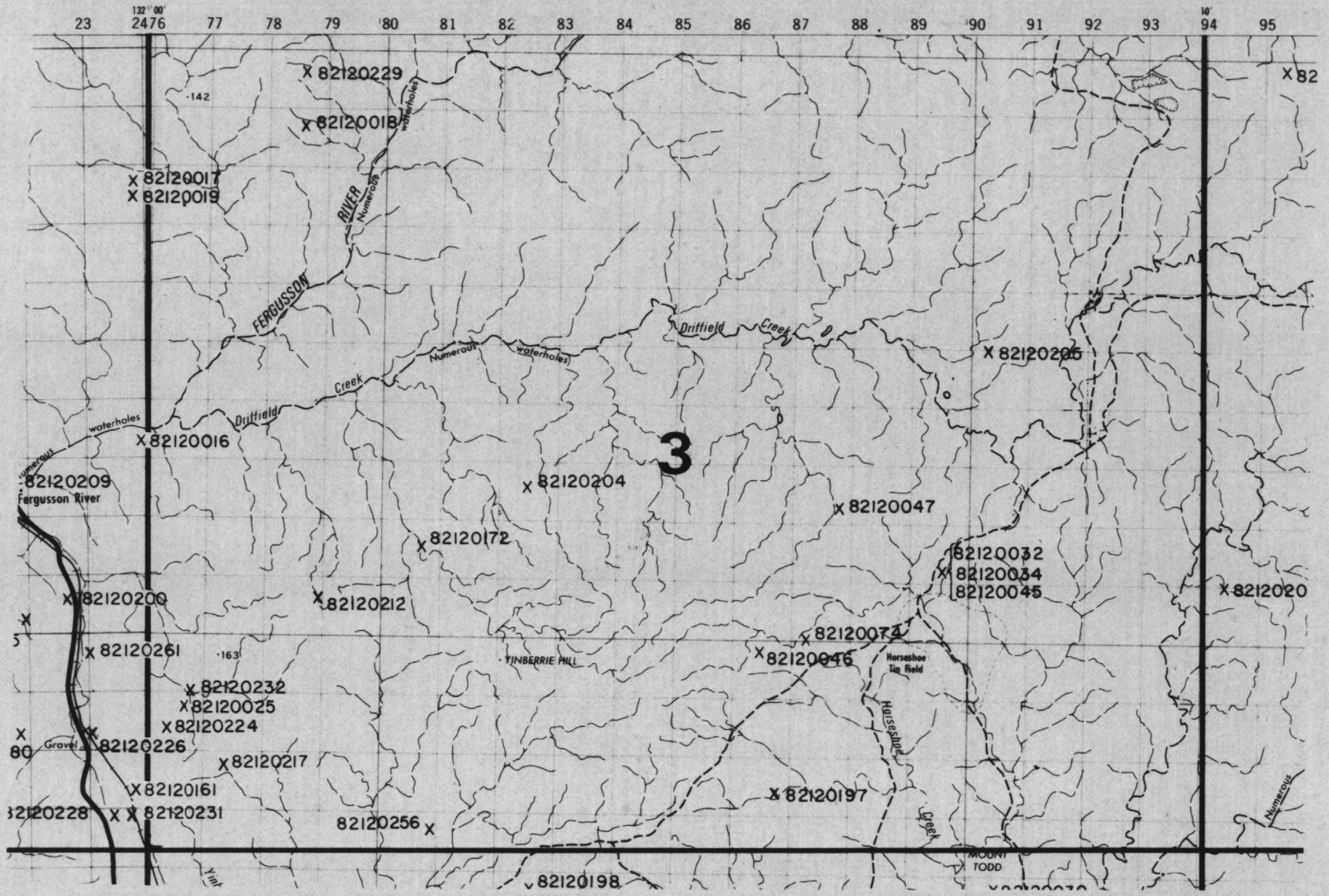
16/D 53-9/7



RECORD 1986/7

16/D53-9/8

Figure 5(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

16/D 53-9/9

Figure 6(a). Edith River region thin section localities

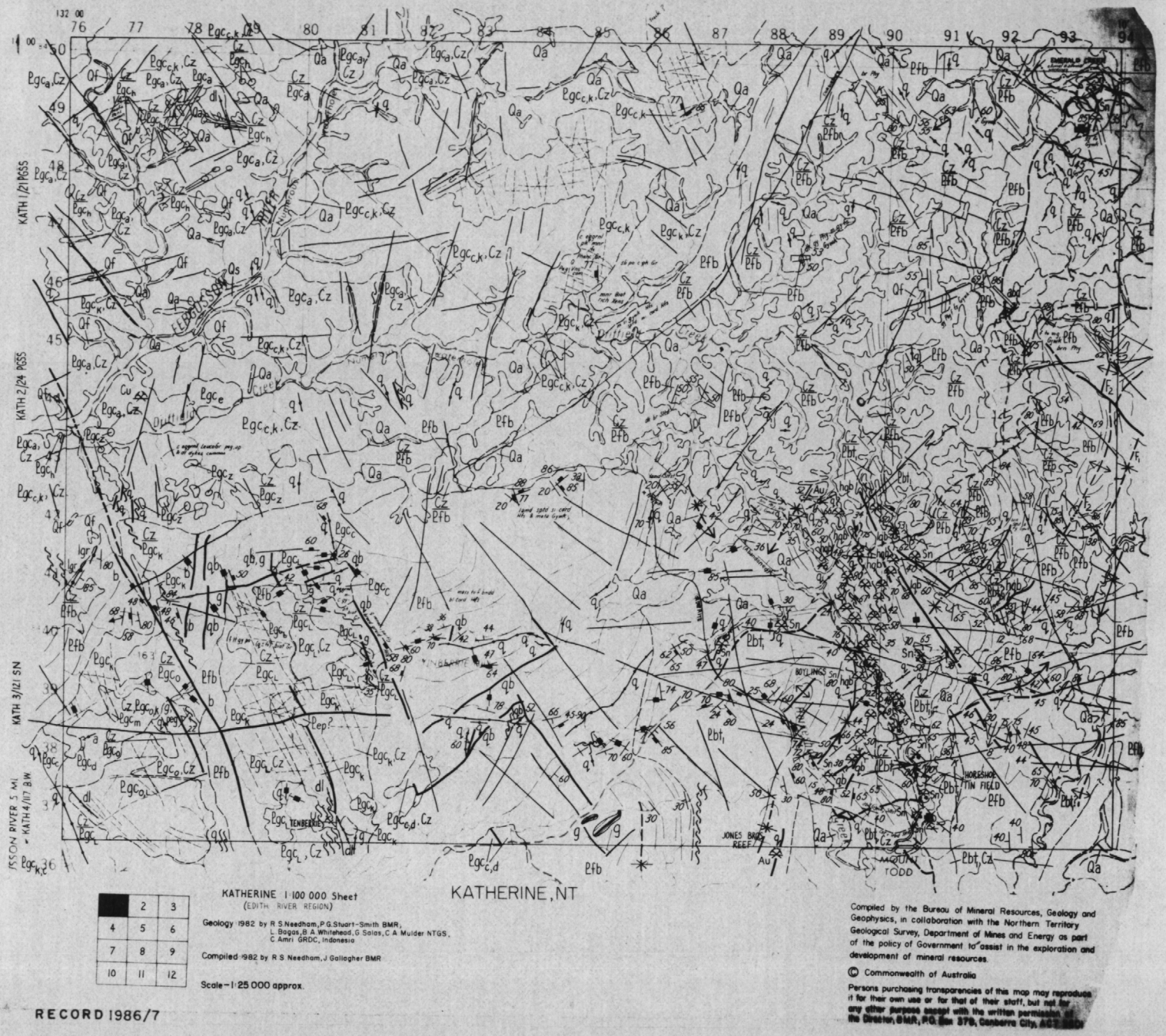
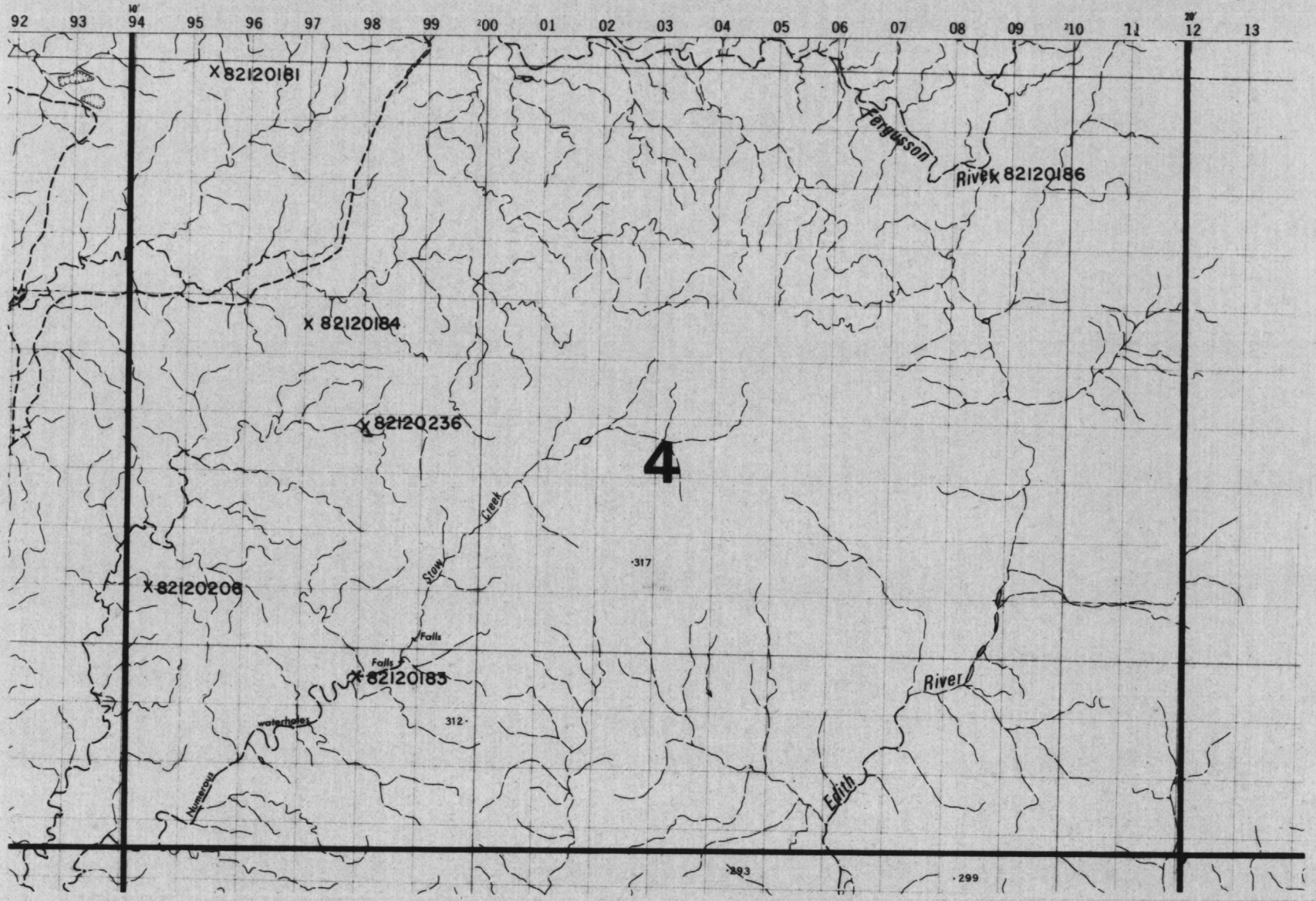


Figure 6(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

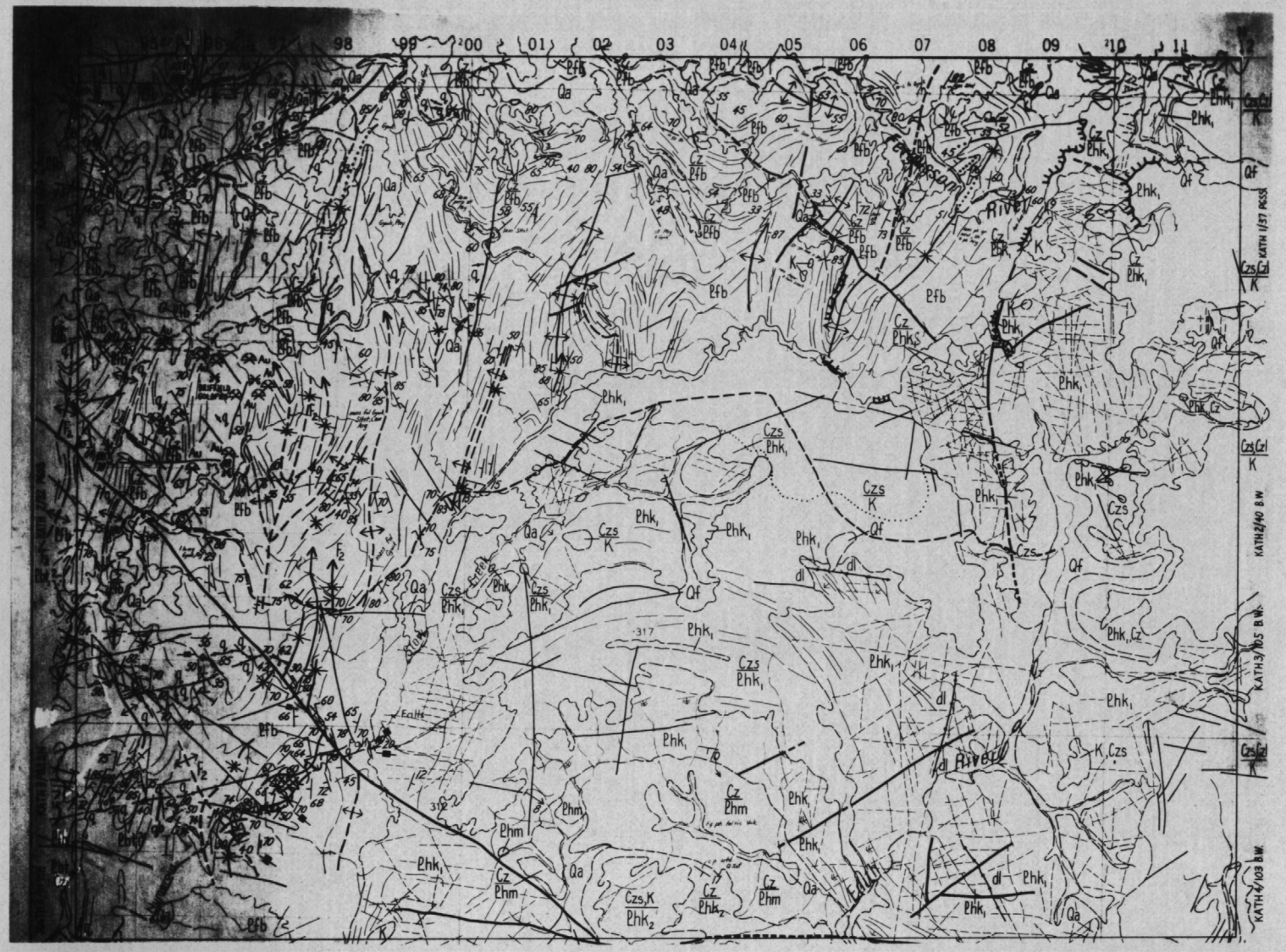
KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

16/D 53-9/11

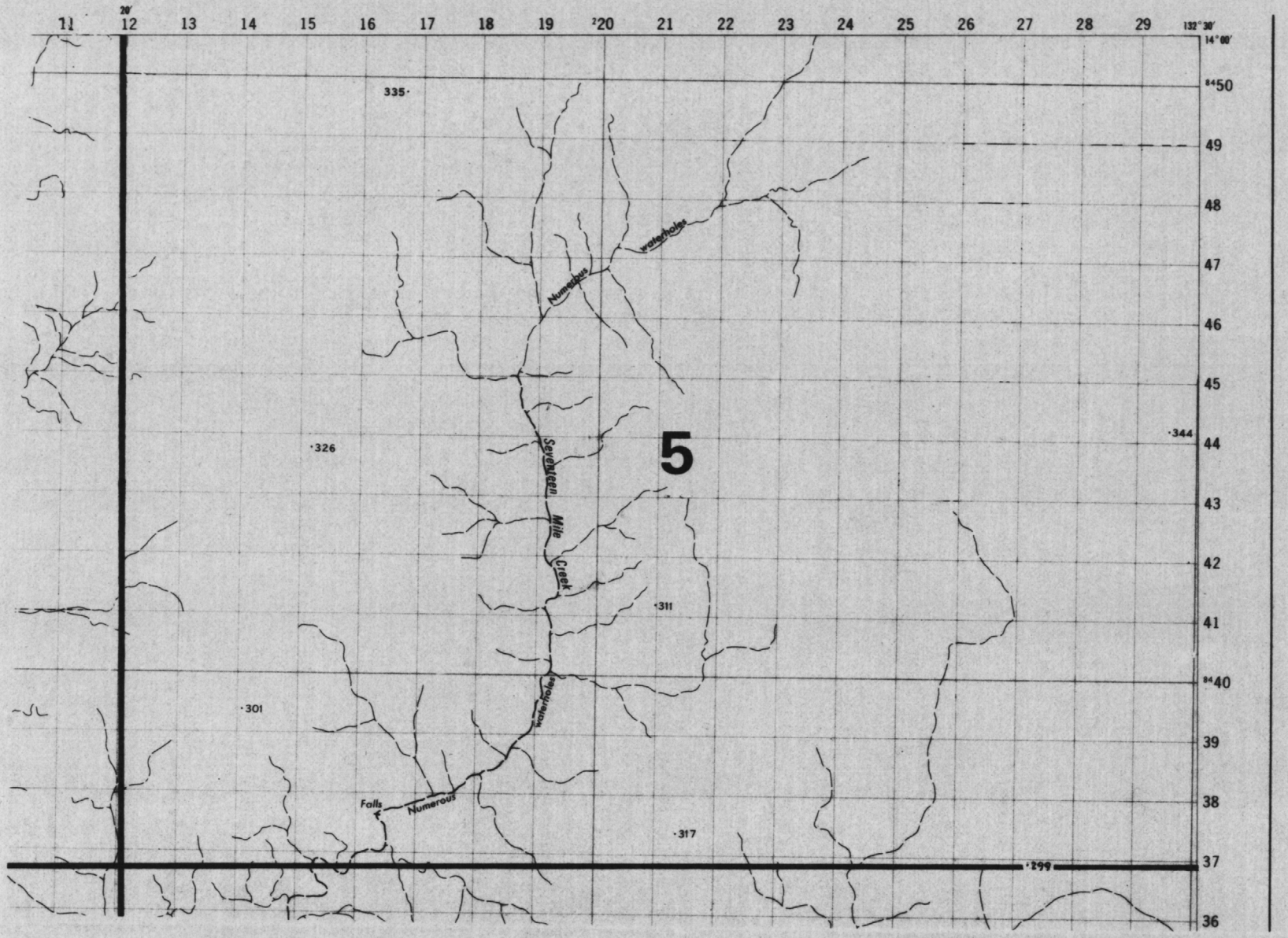
Figure 7(a). Edith River region thin section localities



RECORD 1986/7

Figure 7(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet

16/D 53-9/12



X 82120001 *Thin section locality with BMR registered number*

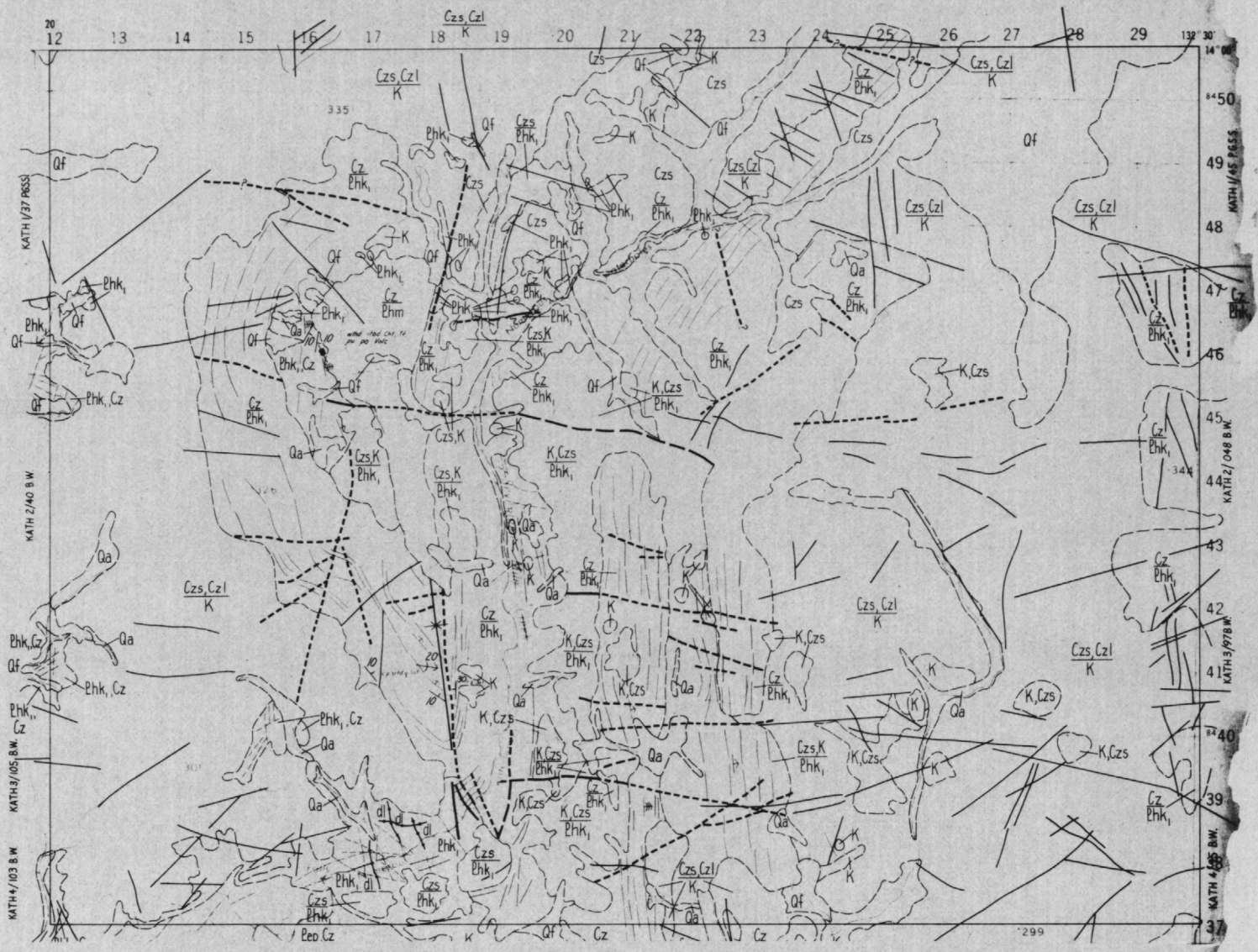
KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

Figure 8(a). Edith River region thin section localities

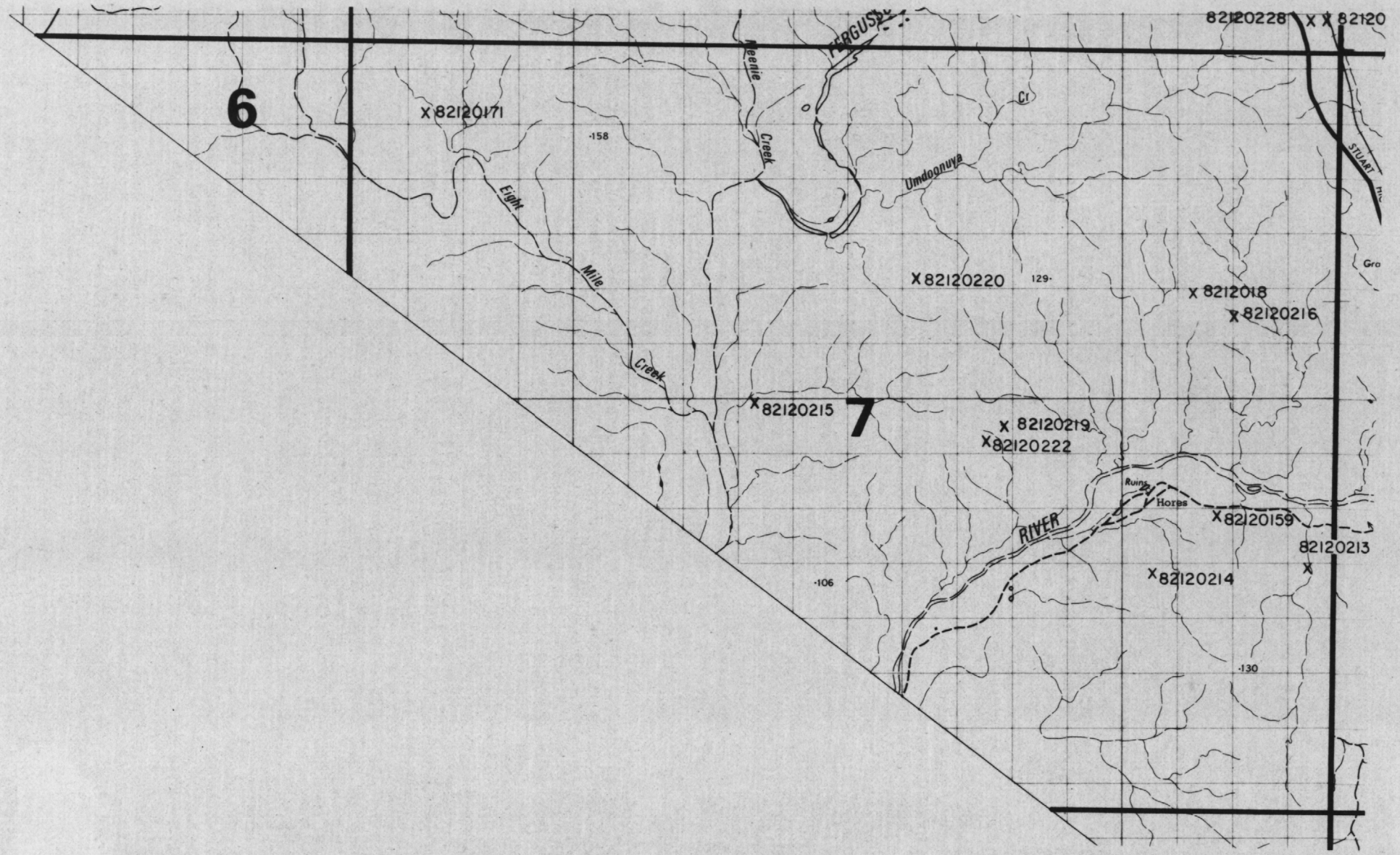
16/D 53-9/13



RECORD 1986/7

16/D53-9/14

Figure 8(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

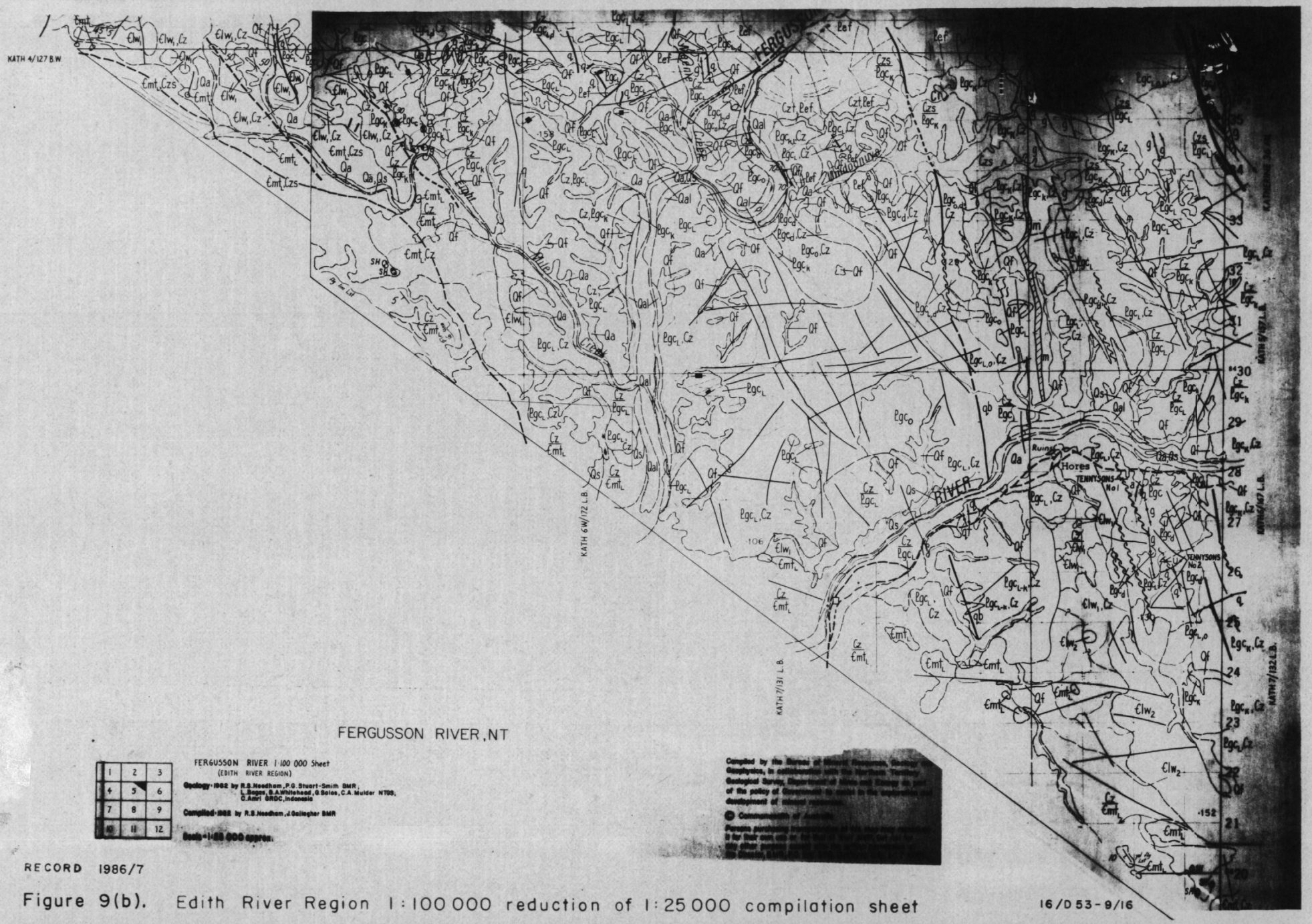
RECORD 1986/7

FERGUSSON RIVER, NT

0 2 4 6 km

Figure 9(a). Edith River region thin section localities

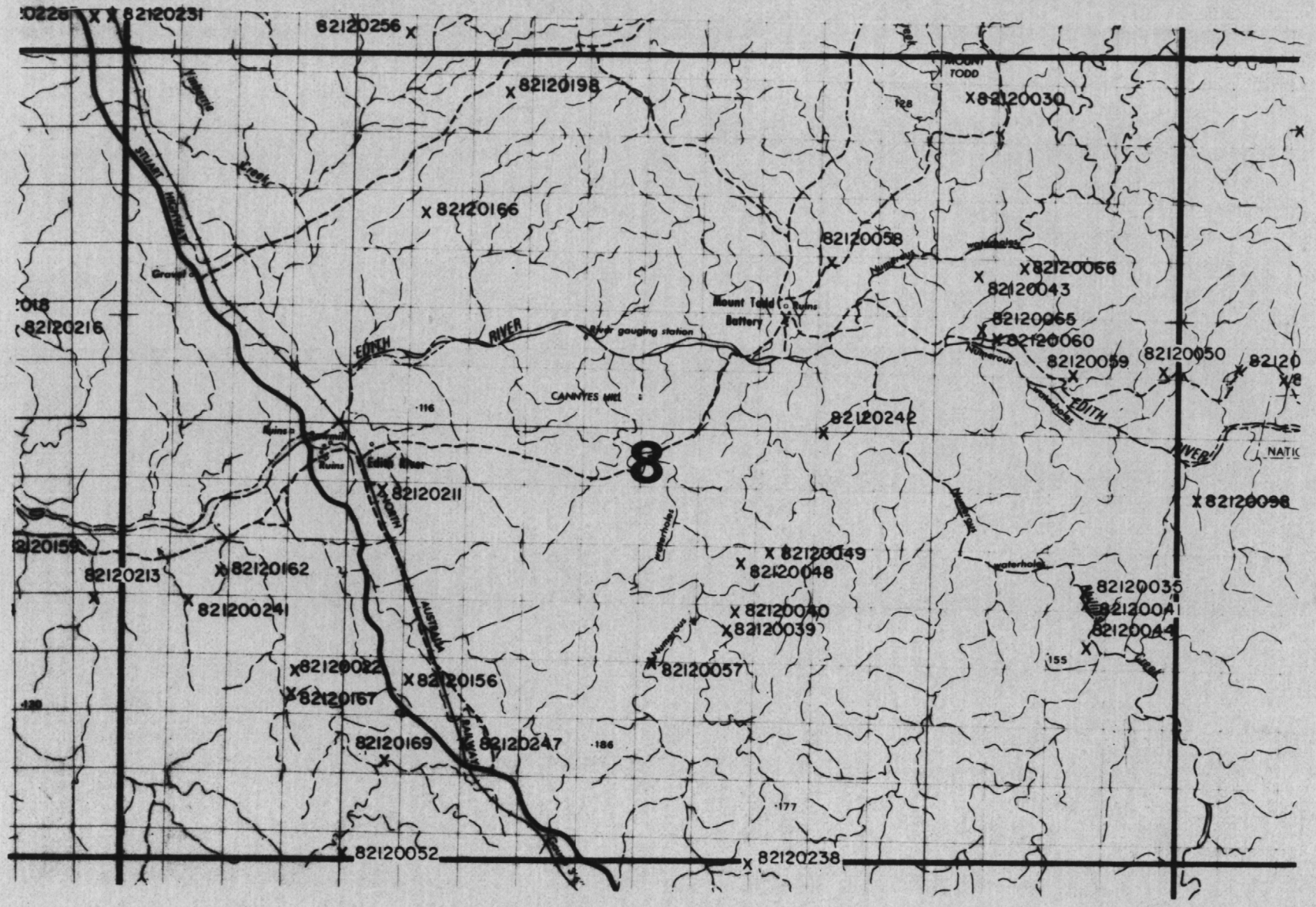
16/D 53-9/15



RECORD 1986/7

Figure 9(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet

16/D53-9/16



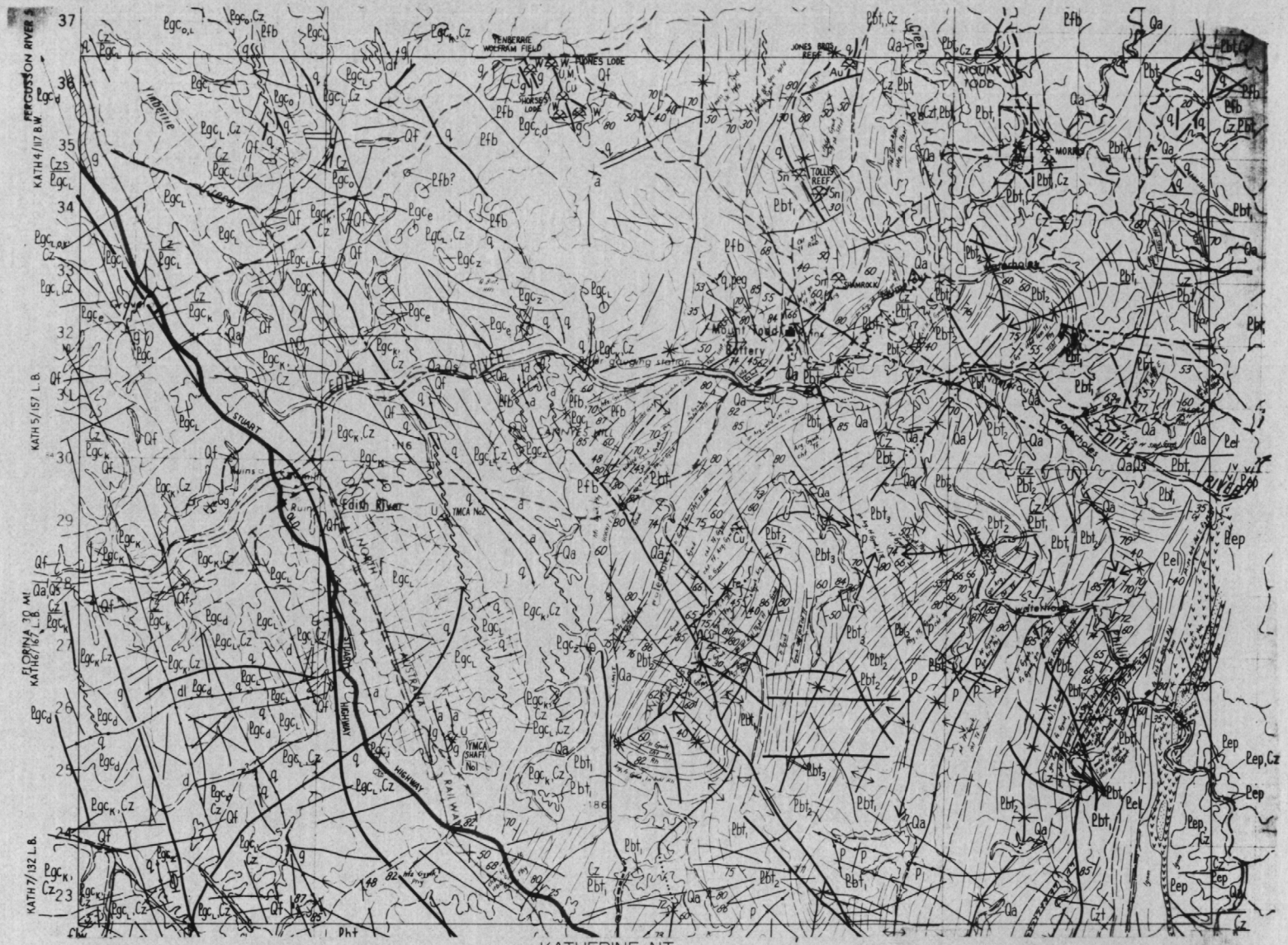
X 82120001 *Thin section locality with BMR registered number*

KATHERINE, NT

RECORD 1986/7

Figure 10(a). Edith River region thin section localities

16/D 53-9/17



1	2	3
	5	6
7	8	9
10	11	12

KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

Geology 1982 by R.S.Needham, P.G.Stuart-Smith BMR, L.Bagas, B.A.Whitehead, G.Salas, C.A.Mulder NTGS, C.Amri GRDC, Indonesia

Compiled 1982 by R.S.Needham, J.Gallagher BMR

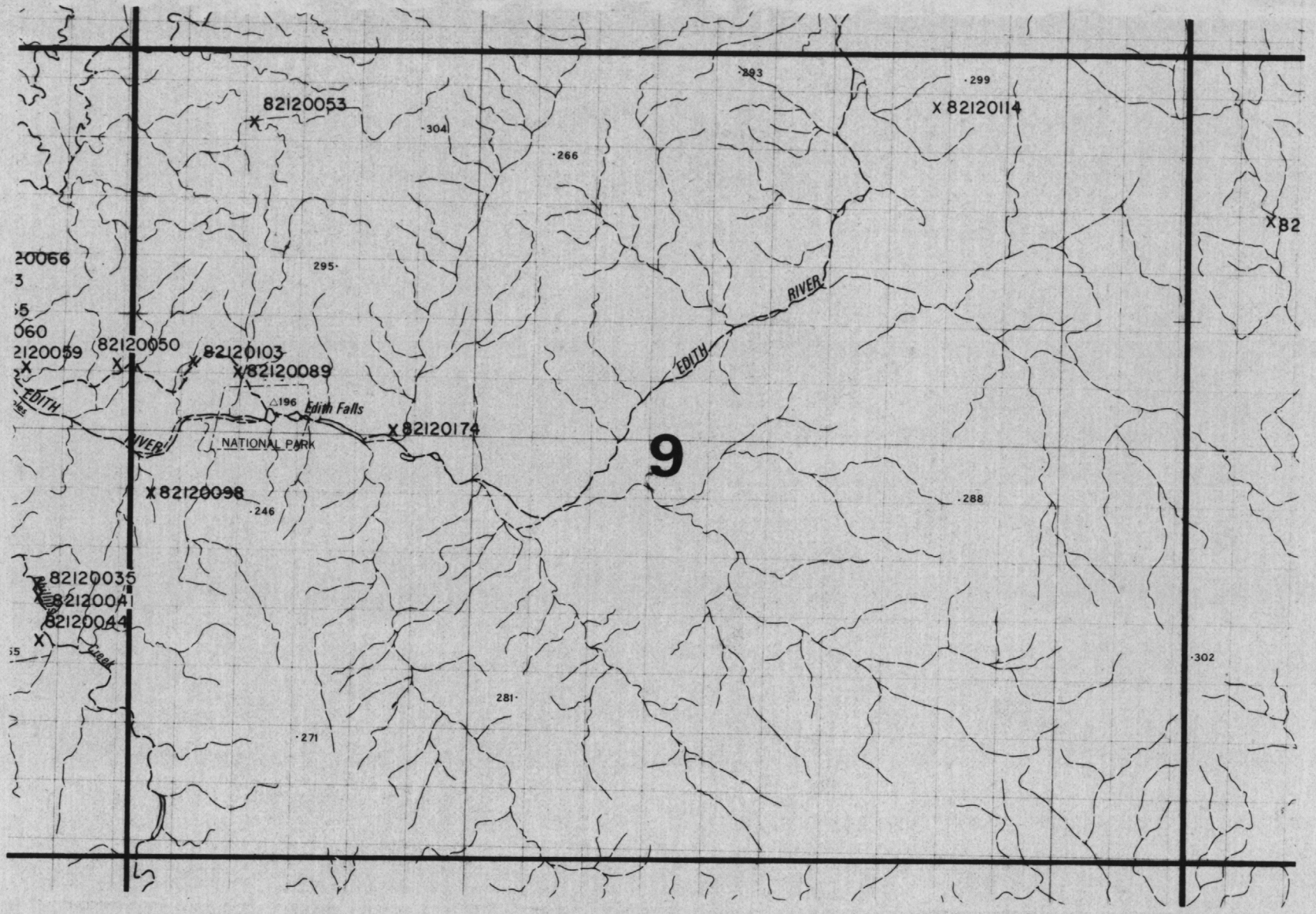
Scale-1:25 000approx.

Compiled by the Bureau of Mineral Resources, Geology and Geophysics, in collaboration with the Northern Territory Geological Survey, Department of Mines and Energy as part of the policy of Government to assist in the exploration and development of mineral resources.

RECORD 1986/7

16/D53-9/18

Figure 10(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

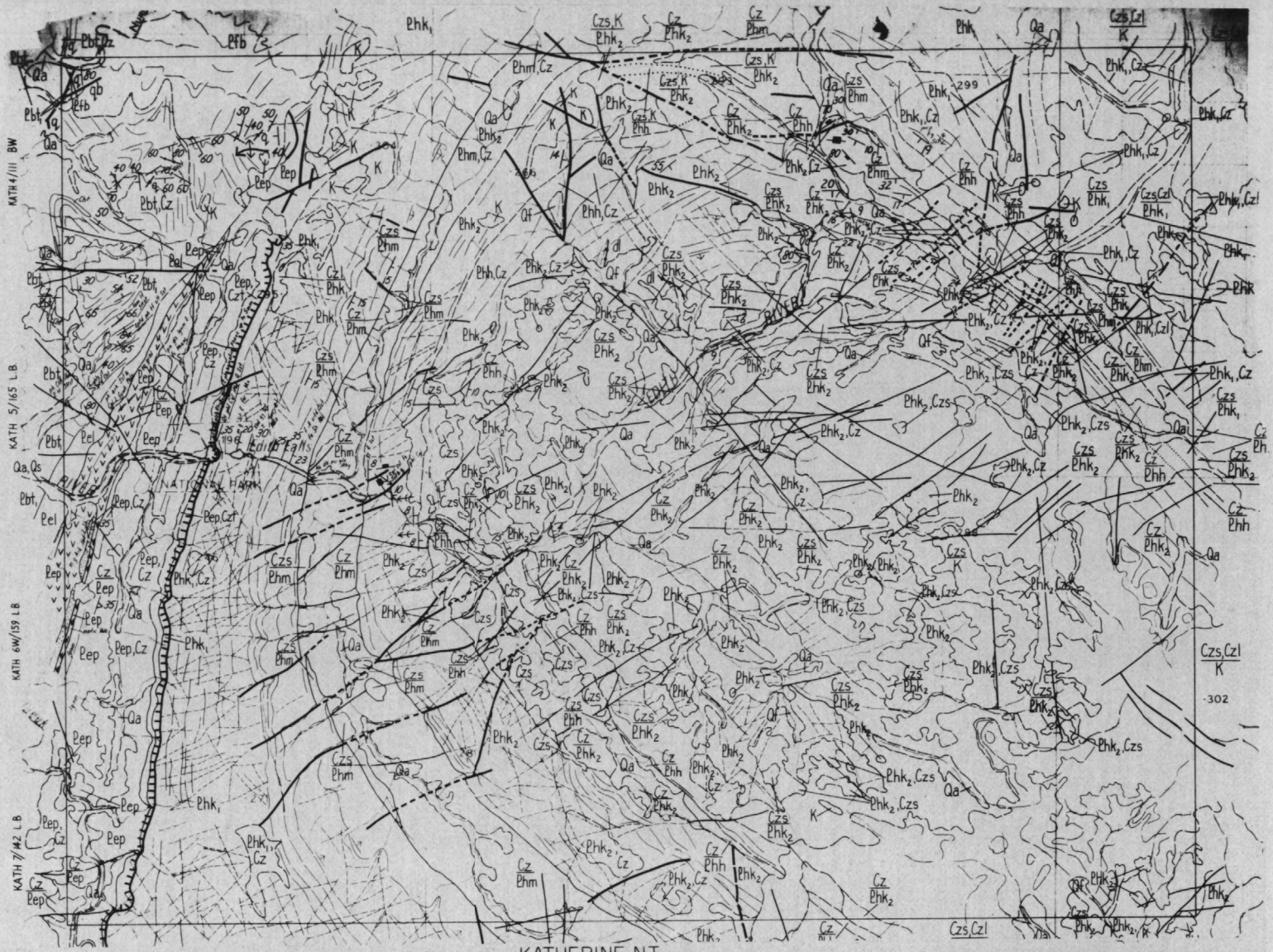
KATHERINE, NT

0 2 4 6 km

RECORD. 1986/7

Figure 11(a). Edith River region thin section localities

16/D 53-9/19



1	2	3
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7	8	9
10	11	12

KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

Geology 1982 by R.S. Needham, P.G. Stuart-Smith BMR, L. Bagas, B.A. Whitehead, G. Salas, C.A. Mulder NTGS, C. Amri GRDC, Indonesia

Compiled 1982 by R.S. Needham, J. Gallagher BMR

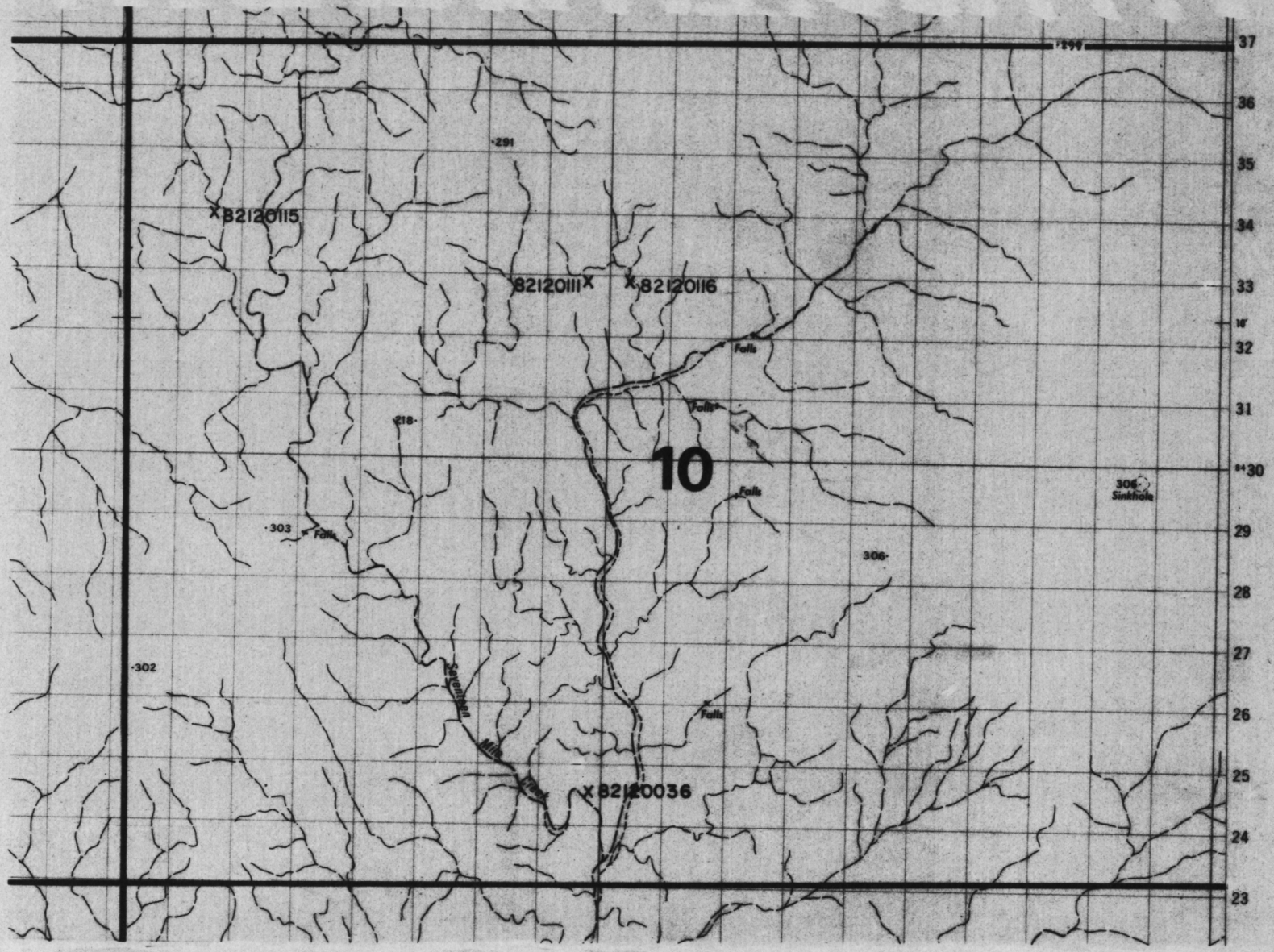
Scale - 1:25 000 approx.

Compiled by the Bureau of Mineral Resources, Geology and Geophysics, in collaboration with the Northern Territory Geological Survey, Department of Mines and Energy as part of the policy of Government to assist in the exploration and development of mineral resources.

RECORD 1986/7

16/D53-9/20

Figure 11(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

KATHERINE, NT

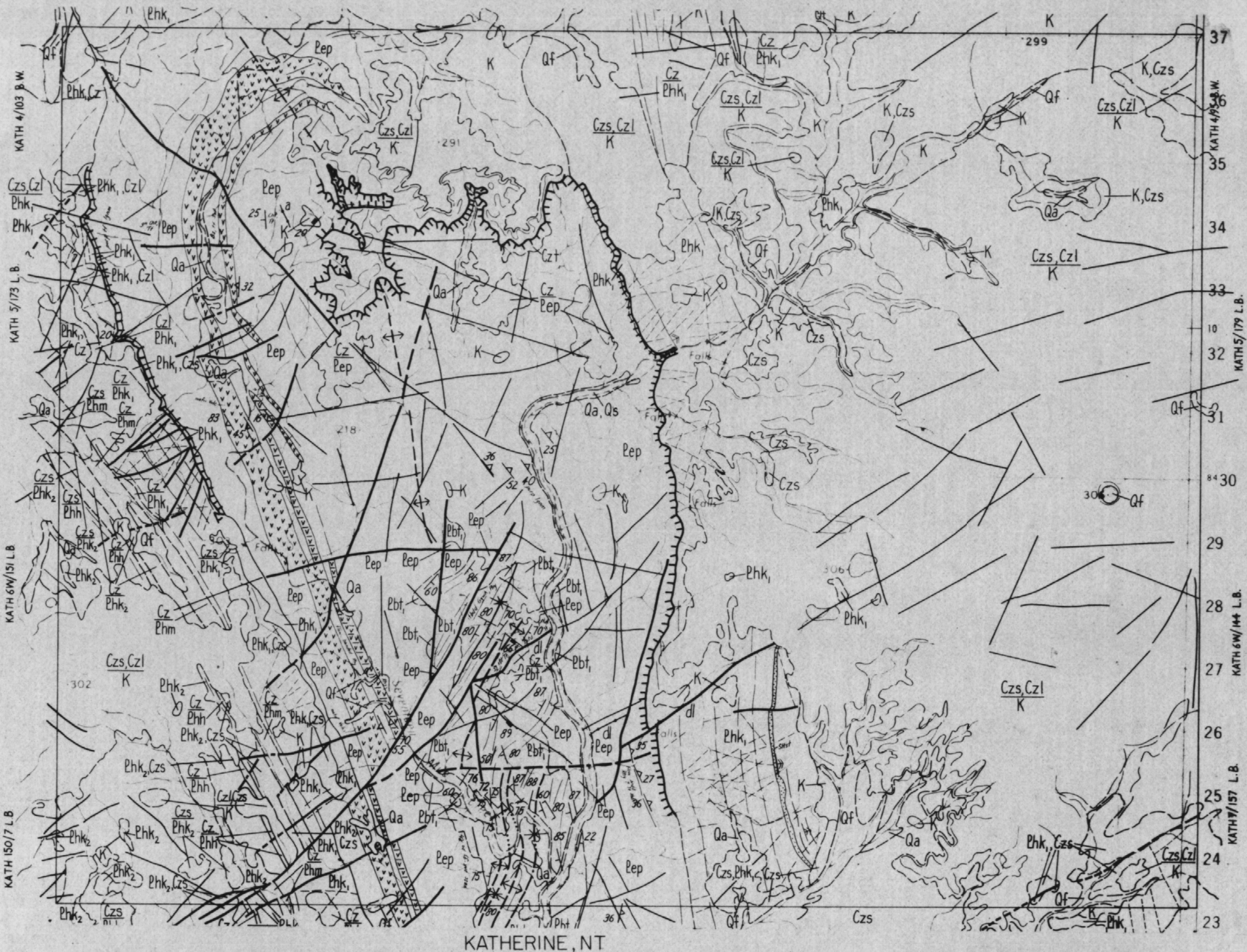
0 2 4 6 km

RECORD 1986/7

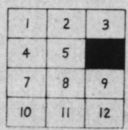
16/D 53-9/21

Figure 12(a). Edith River region thin section localities

91



KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)



Geology 1982 by R.S.Needham, P.G.Stuart-Smith BMR, L.Bagas, B.A.Whitehead, G.Salas, C.A.Mulder NTGS; C.Amri GRDC, Indonesia

Compiled 1982 by R.S.Needham, J.Gallagher BMR

Scale 1:25 000 approx

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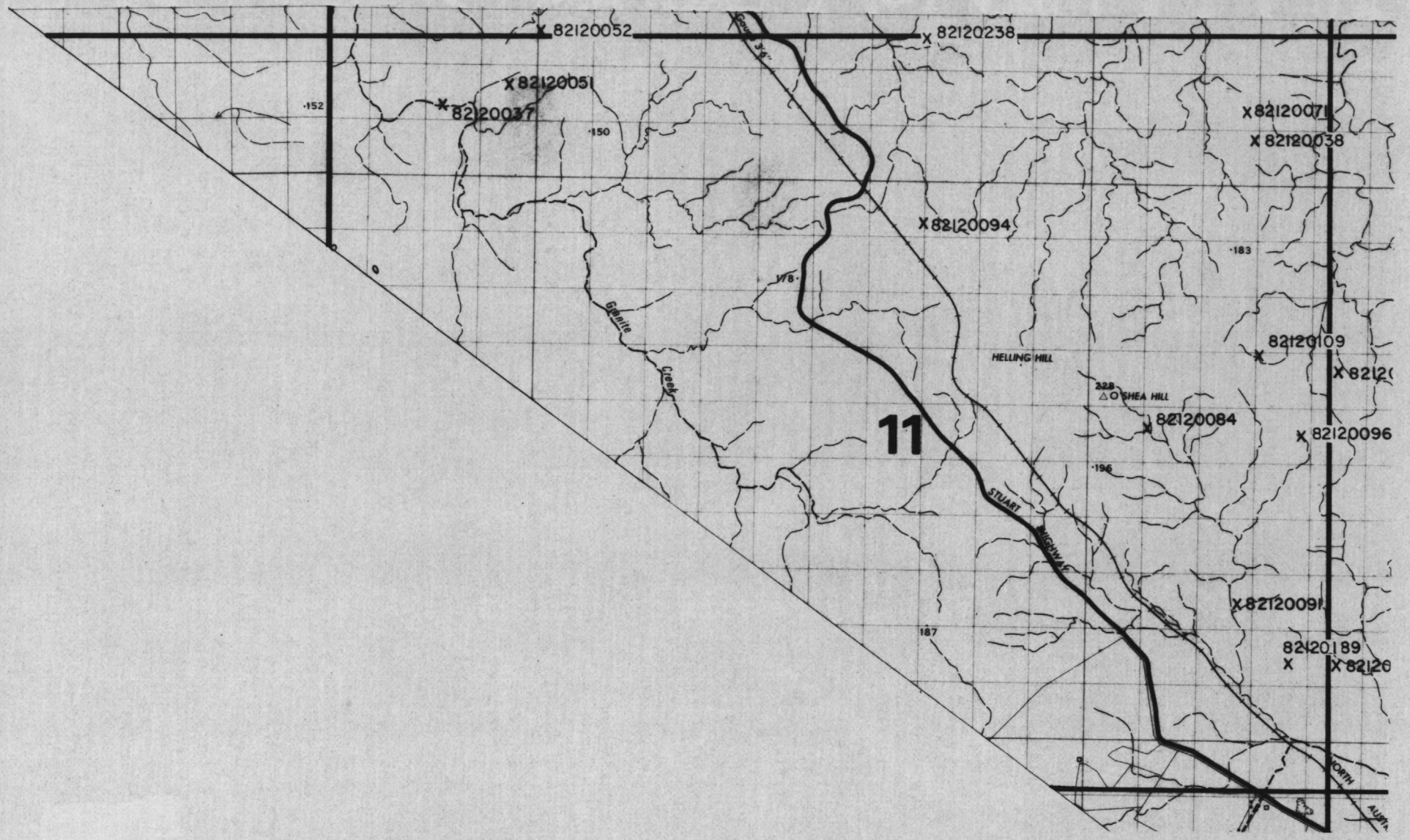
16/D 53-9/22

Figure 12(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



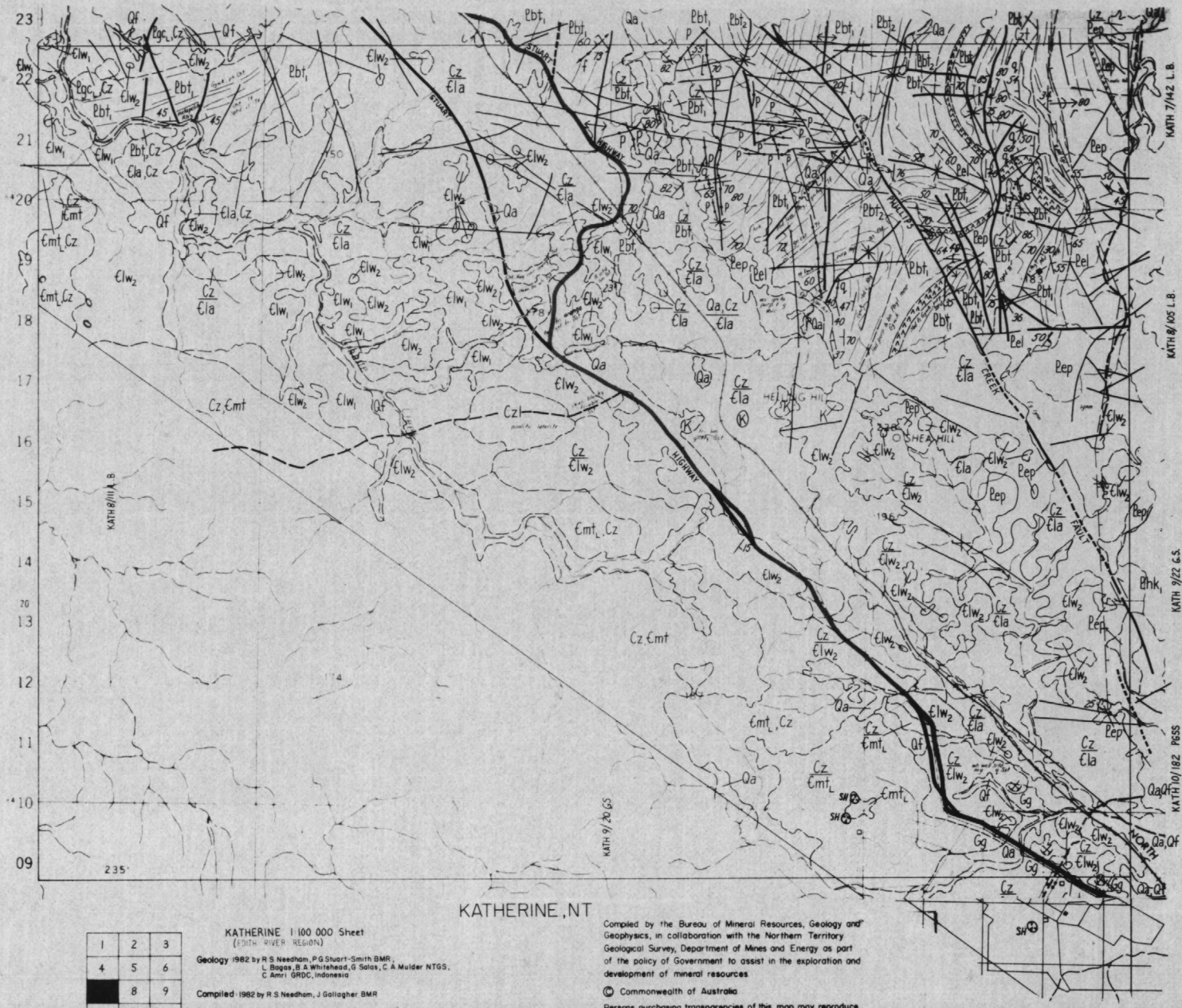
X 82120001 *Thin section locality with BMR registered number*

KATHERINE, NT

RECORD 1986/7

Figure 13(a). Edith River region thin section localities

16/D 53-9/23



1	2	3
4	5	6
	8	9
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KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

Geology 1982 by R.S. Needham, P.G. Stuart-Smith BMR, L. Bagas, B.A. Whitehead, G. Salas, C.A. Mulder NTGS, C. Amri GRDC, Indonesia

Compiled 1982 by R.S. Needham, J. Gallagher BMR

Scale - 1:25 000 approx.

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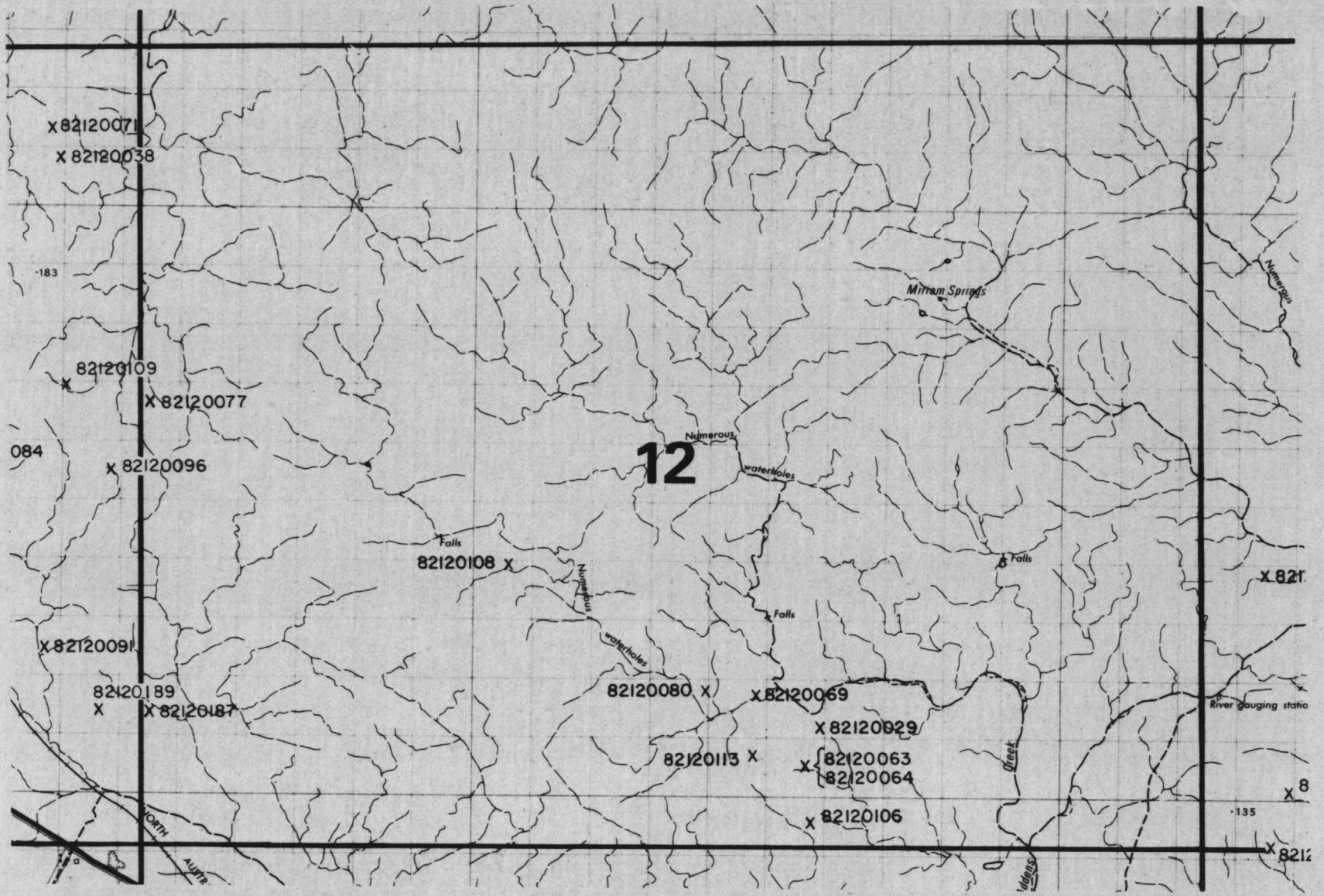
Figure 13(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet

16/D53-9/24



X 82120001 *Thin section locality with BMR registered number*

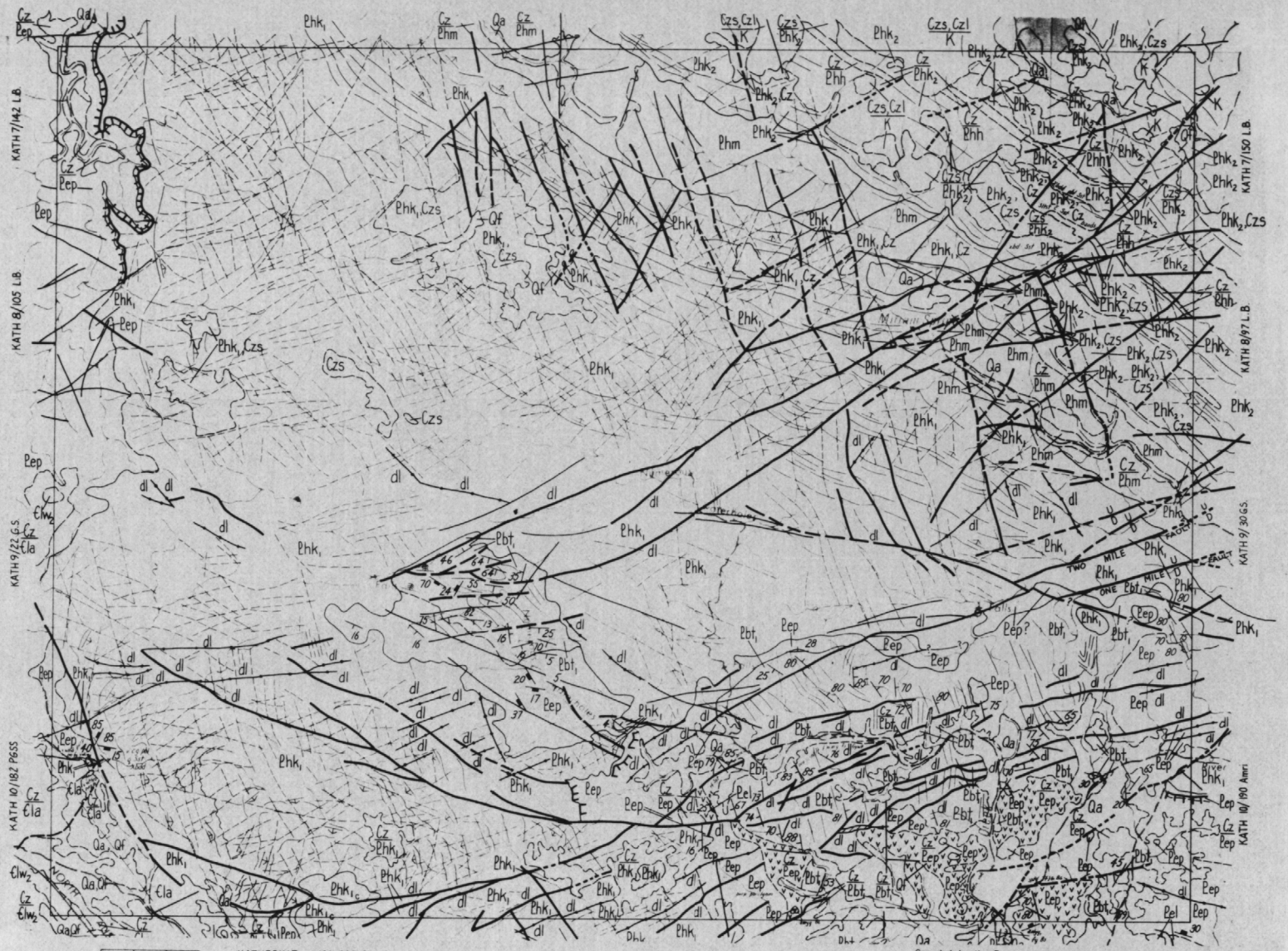
KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

16/D 53-9/25

Figure 14 (a). Edith River region thin section localities



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KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

Geology 1982 by R.S. Needham, P.G. Stuart-Smith BMR, L. Bagas, B.A. Whitehead, G. Salas, C.A. Mulder NTGS, C. Amri GRDC, Indonesia

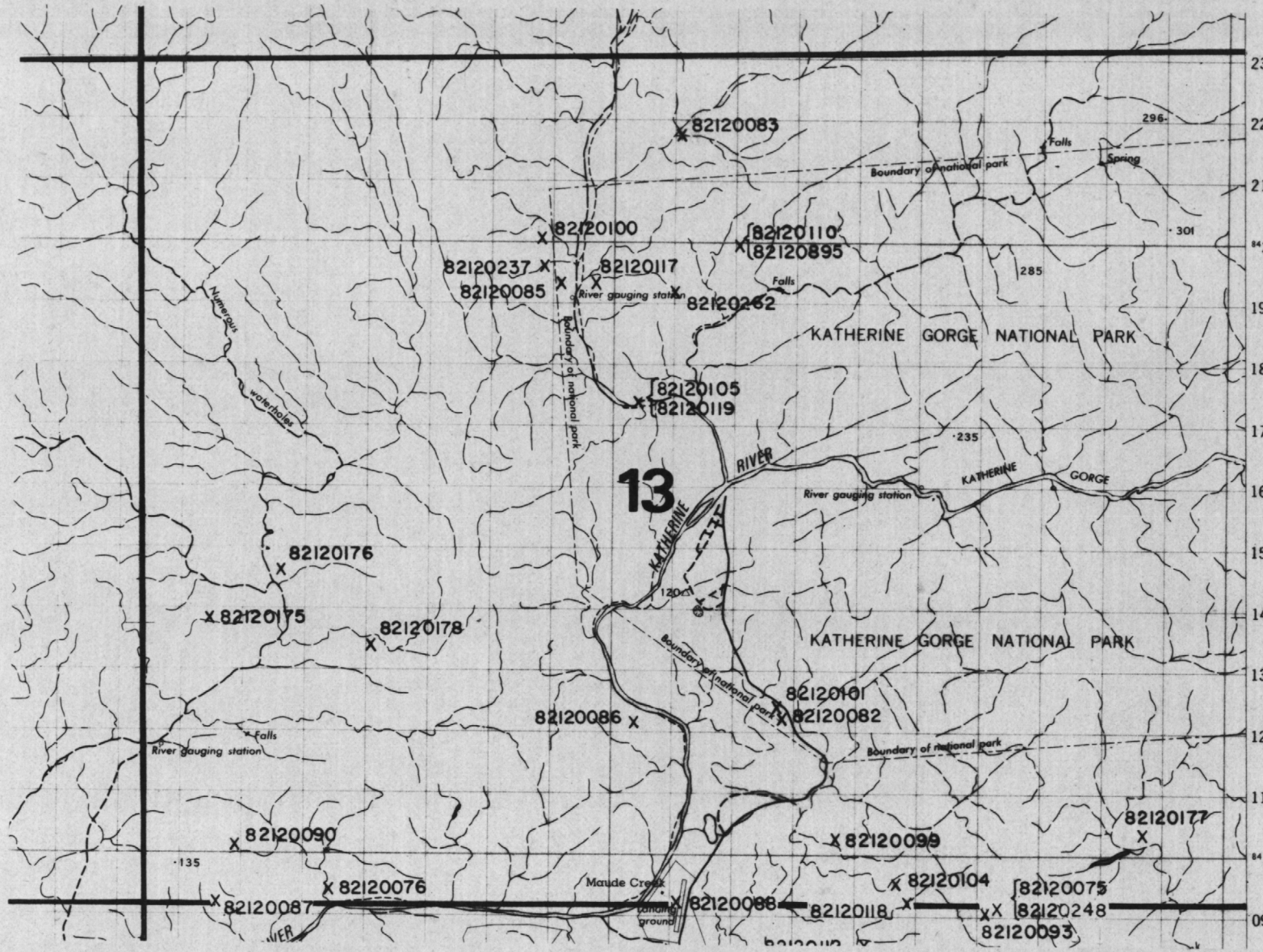
Compiled 1982 by R.S. Needham, J. Gallagher BMR

Scale - 1:25 000 approx.

KATHERINE, NT

Compiled by the Bureau of Mineral Resources, Geology and Geophysics, in collaboration with the Northern Territory Geological Survey, Department of Mines and Energy as part of the policy of Government to assist in the exploration and development of mineral resources.

Figure 14(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

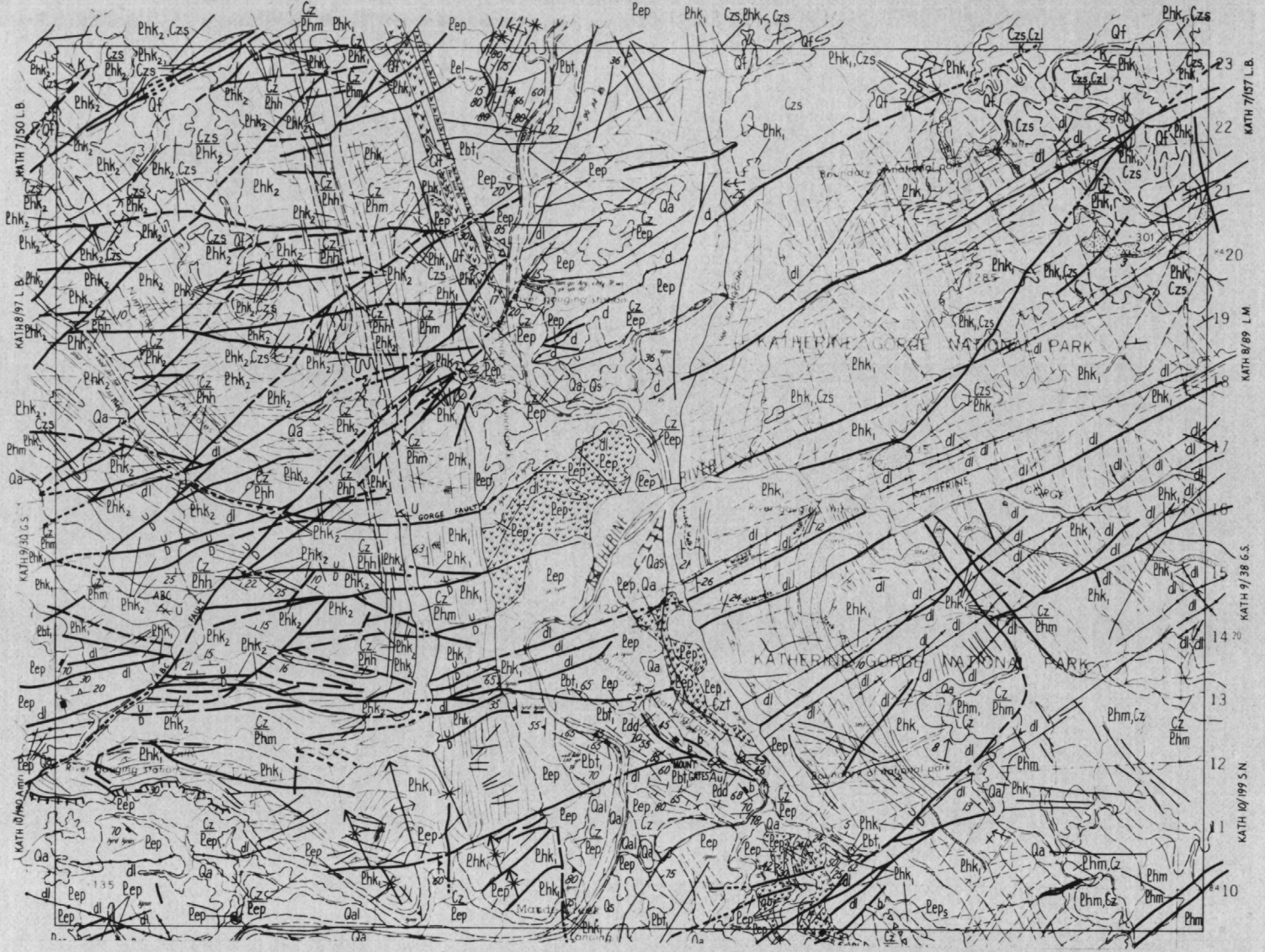
KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

Figure 15 (a). Edith River region thin section localities

16/D53-9/27



1	2	3
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7	8	
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KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

Geology-1982 by R.S.Needham, P.G.Stuart-Smith BMR, L.Bagas, B.A.Whitehead, G.Salas, C.A.Mulder NTGS, C.Amri GRDC, Indonesia

Compiled-1982 by R.S.Needham, J.Gallagher BMR

Scale-1:25 000 approx.

KATHERINE, NT

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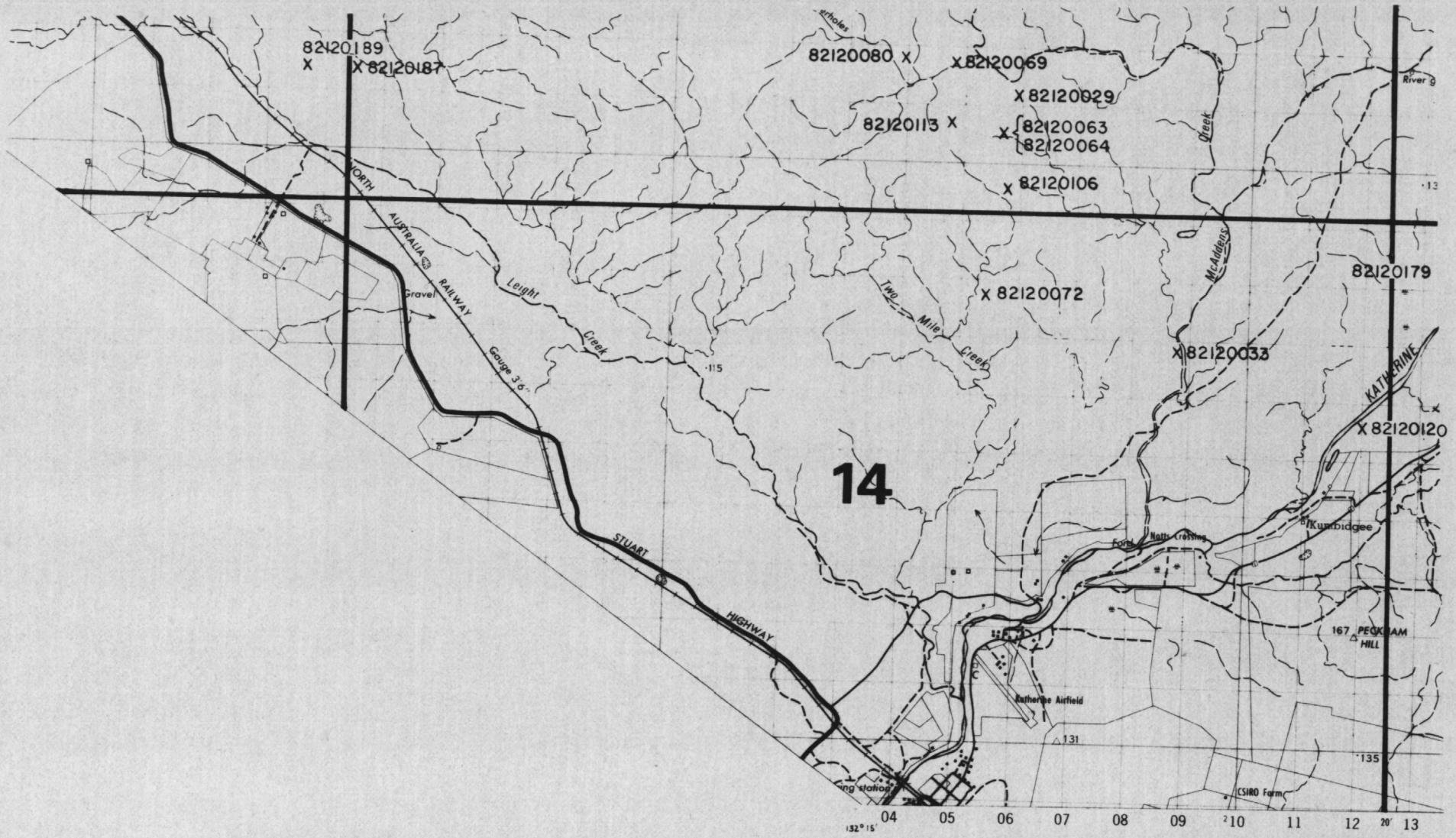
RECORD 1986/7

16/D53-9/28

Figure 15(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet



X 82120001 *Thin section locality with BMR registered number*

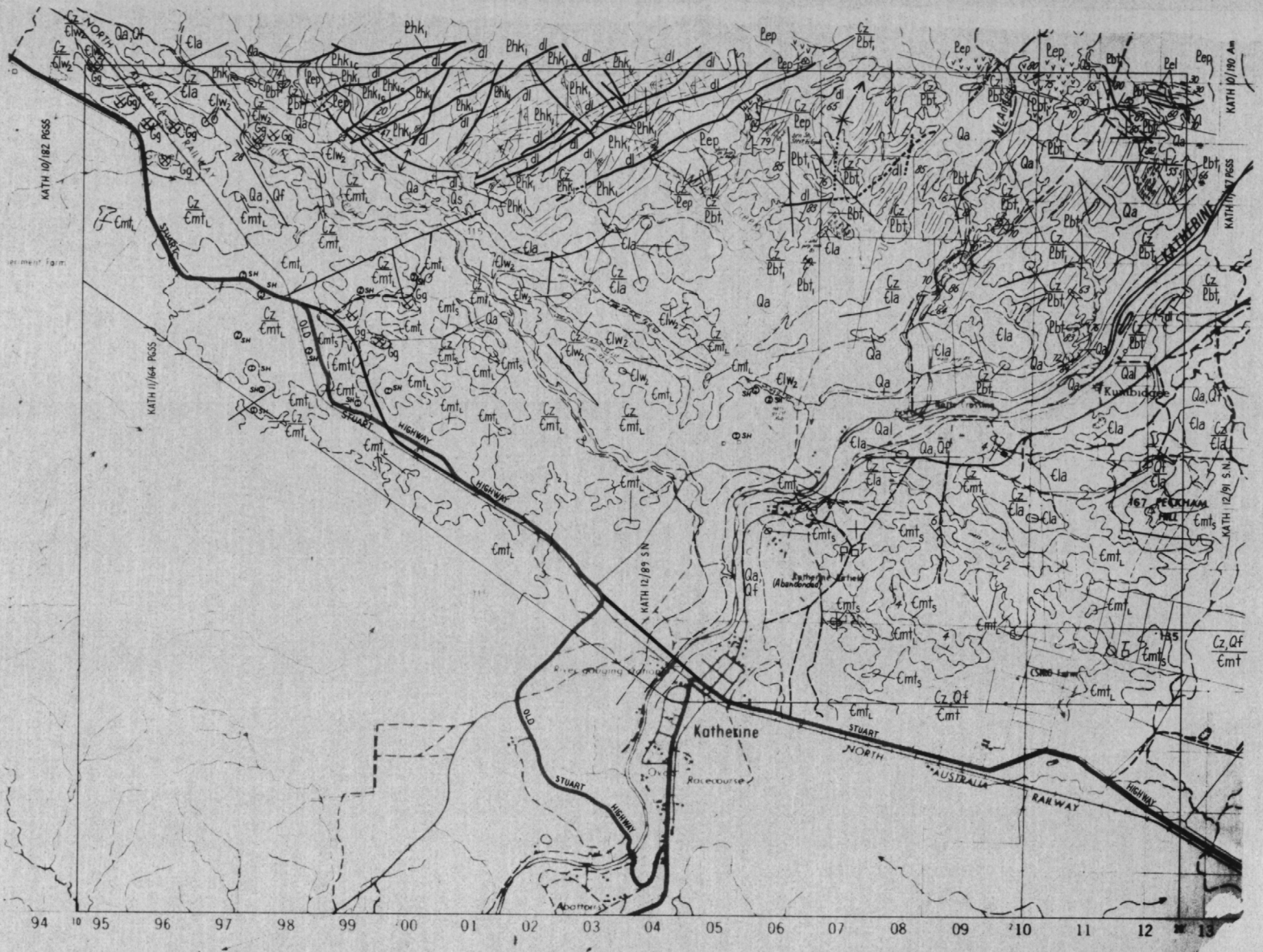
KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

16/D 53-9/29

Figure 16 (a). Edith River region thin section localities



KATHERINE, NT

KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

1	2	3
4	5	6
7	8	9
10		12

Geology: 1982 by R.S.Needham, P.G.Stuart-Smith BMR; L.Bagas, B.A.Whitehead, G.Salas, C.A.Mulder NTGS; C.Amri GRDC, Indonesia

Compiled: 1982 by R.S.Needham, J.Gallagher BMR

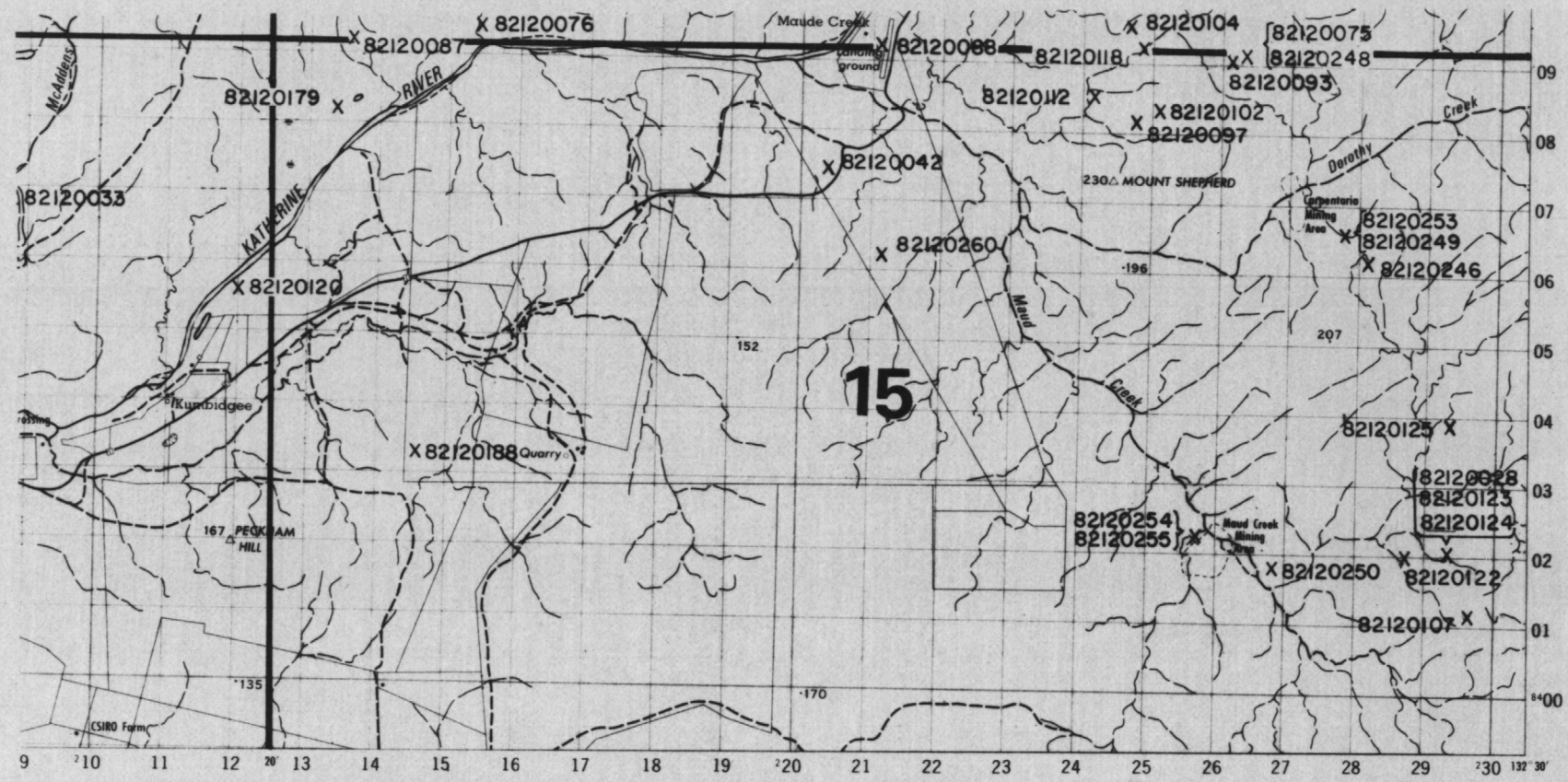
Scale - 1:25 000 approx.

Compiled by the Bureau of Mineral Resources, Geology and Geophysics, in collaboration with the Northern Territory Geological Survey, Department of Mines and Energy as part of the policy of Government to assist in the exploration and development of mineral resources.

RECORD 1986/7

Figure 16(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet

16/D 53-9/30



X 82120001 *Thin section locality with BMR registered number*

KATHERINE, NT

0 2 4 6 km

RECORD 1986/7

16/D 53-9/31

Figure 17 (a). Edith River region thin section localities

1	2	3
4	5	6
7	8	9
10	11	

KATHERINE 1:100 000 Sheet
(EDITH RIVER REGION)

Geology 1982 by R S Needham, P G Stuart-Smith BMR, L Bagas, B A Whitehead, G Solas, C A Mulder NTGS, C Amri GRDC, Indonesia

Compiled 1982 by R S Needham, J Gallagher BMR

Scale – 1:25 000 approx.

KATHERINE NT,

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16/D 53-9/32

RECORD 1986/7

Figure 17(b). Edith River Region 1:100 000 reduction of 1:25 000 compilation sheet