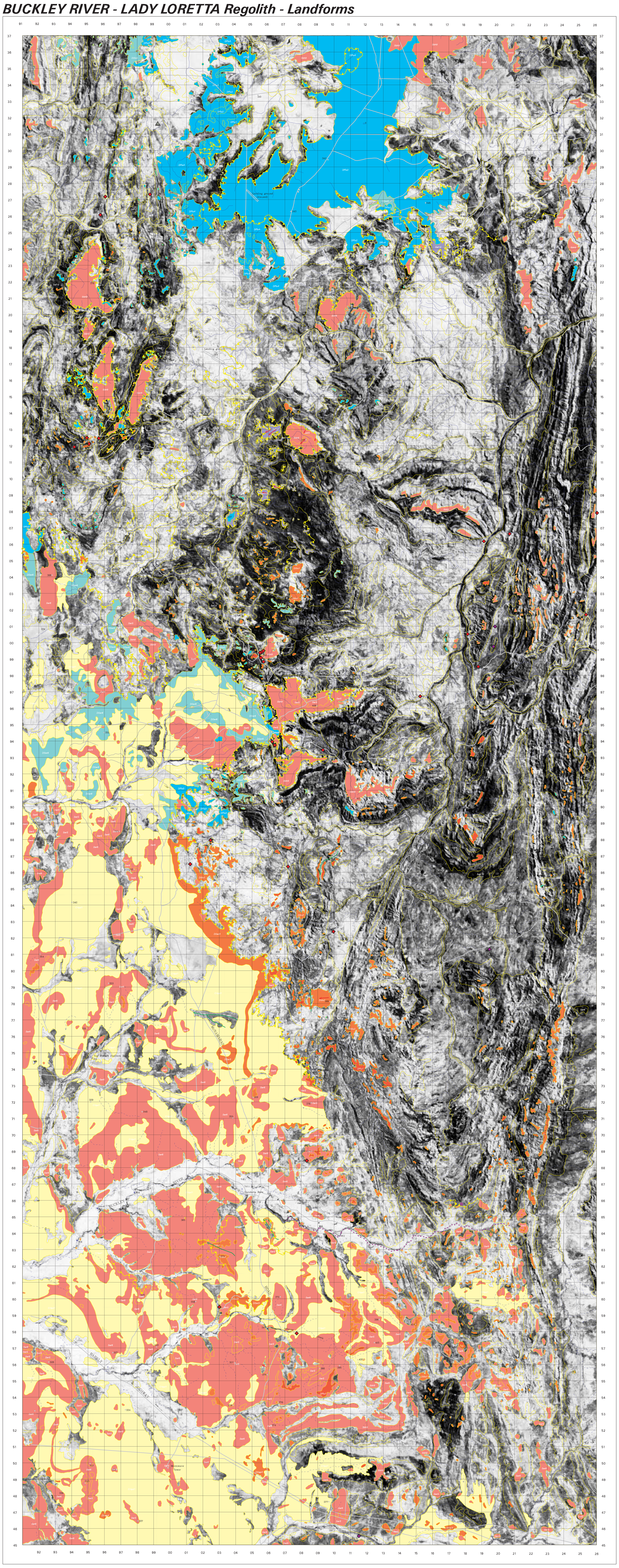
Palaeo surfaces and highly weathered regolith over Landsat TM (band 5)

BUCKLEY RIVER - LADY LORETTA Regolith - Landforms



SCALE 1 : 85,000

0.85 0 0.85 1.7 2.55 3.4 4.25 5.1 5.95 6.8 7.65 8.5 Kilometres

UNIVERSAL TRANSVERSE MERCATOR

REGOLITH TYPES

Major bedrock type	Code	Description
		Duricrust
		Proterozoic bedrock
		Ferruginous
Proterozoic bedrock	DFls1	Massive and in places slabby Fe duricrust or collapsed ferruginous saprolite over mottled and bleached saprolite. Lags of ferruginous lithic fragments, Fe duricrust gravels and pisoliths. Pods of Fe segregations in the mottled zone. Silicification of the saprolite is common and typically extends into the bleached zone beneath the mottled zone. Plateaux, mesas and local rises.
		Siliceous
	DSls1	Silcrete common as indurated pavements or pods. Silicified and ferruginised saprolite overlying mottled and bleached saprolite. Ferruginous saprolite partly covered by lithosols and gravel lags. Mesas, minor rises and bevelled hill tops.
	DSls2	Silicified Proterozoic saprolite which is in places overlain by silicified Mesozoic sediments. Massive and columnar silcrete, silicified saprolite. In places silcrete contains quartz gravels and pebbles. Silcrete typically stained and mottled with iron. Plateaux, mesas and buttes.
	DSer3	Fe stained silcrete and silicified saprolite forming massive pavements. Lags and lithosols consist of silcrete pods, silicified saprolite gravels, ferruginous saprolite and minor ferruginous granules. Silcrete overlies mottled and bleached saprolite at depth. Rises (9-30 m relief).
	DSep4	Fe stained silcrete and silicified saprolite forming massive pavements which are mostly covered by sheet wash sands, gravels and lags. Lags of silcrete pods, silicified saprolite and minor Fe gravels. Silcrete overlies mottled and bleached saprolite at depth. Erosional plain (< 9m relief).
		Post-Proterozoic bedrock
		Ferruginous
Mesozoic sediments	DFls2	Massive and nodular Fe duricrust over highly ferruginous, mottled saprolite and in places bleached saprolite. Minor slabby Fe duricrust. Saprolite partly silicified. In places silcreted caps rather than Fe duricrusts have developed. Pods of Fe segregations in the mottled zone. The underlying Proterozoic and Cambrian bedrock is typically mottled, bleached and silicified. Plateau surfaces are mantled by red sandy loams, cemented Fe pavements. Lags of Fe duricrust gravels/nodules. Plateaux
	DFls3	Massive Fe duricrust and highly ferruginous saprolite over mottled (irregular to mega sub-circular) and in places bleached bedrock. Saprolite partly silicified. In places silcreted caps rather than Fe duricrusts have developed. Pods of Fe segregations in the mottled zone in places extends into Proterozoic saprolite which is typically mottled, bleached and in places silicified. Duricrust partly covered by Fe duricrust fragments and ferruginous saprolite gravel lags. Plateaux, mesas and minor erosional plains.
	DFls4	Ferruginous saprolite with patches of massive Fe duricrust over mottled (irregular to mega sub-circular) and in places bleached bedrock. In places silcreted caps rather than Fe duricrusts have developed. Underlying Proterozoic rocks are typically mottled, bleached and in places silicified. Local accumulations of colluvium and alluvium in valleys. Dissected plateaux, mesas and buttes.
		Siliceous
	DSls5	Silcrete, silicified saprolite and Fe-stained sediments over kaolinised and ferruginous Proterozoic bedrock. Silcrete pods and columnar jointing common. Silicification typically extends into the underlying saprolite. In places Fe duricrust rather than silcrete have developed. Plateaux, mesas and buttes.
	DSer6	Patchy veneer of silicified Mesozoic sediments over silicified Proterozoic saprolite. Saprolite partly covered by gravel lags of ferruginous lithic, silcrete, quartz pebbles and silicified saprolite gravels. Veneers of sheet wash sand, minor clays and Fe pisoliths. Fe stained silcrete common, forming massive micro-crystalline pavements. Narrow tracts of alluvium. Underlying Proterozoic saprolite typically intensely mottled and bleached. Rises (9-30m relief), minor erosional plains (<9m relief).
		Saprolite
		Proterozoic bedrock
Proterozoic bedrock	Sep1	Ferruginous saprolite over bleached saprolite which is in places silicified. Saprolite is mostly covered by lithosols, sheet wash gravels and lags. Local pockets of deep weathering and Fe duricrust typically on argillaceous lithologies. Lags consist of lithic, ferruginous saprolite, bleached saprolite, Fe duricrusts fragments and minor Fe pisoliths. Narrow corridors of alluvial gravels and sand. Erosional plains, minor pediments (<9m relief)
	Sep2	Ferruginous and in places silicified Proterozoic sediments. Saprolite partly covered by a veneer of sheet wash gravels, residual gravelly earths, lithosols and lags. Lags of lithic fragments, quartz, Fe duricrust fragments, ferruginous saprolite and minor Fe pisoliths. Erosional plains (< 9m relief).
	Sei3	Ferruginous and mottled mainly Proterozoic saprolite largely covered sheet flow colluvial and minor alluvial deposits forming a veneer (generally < 1m thick) of sand, clay and gravel. Gravelly lags of ferruginous saprolite, Fe duricrust fragments, quartz and lithic fragments. Minor alluvial sediments consists of sand and gravel. Pediments and minor erosional plain (< 9m relief).
	Sei4	Mottled and bleached mainly Proterozoic sediments. Saprolite is in places silicified and largely covered by a veneer of sheet wash gravels, lithosols and lags. Lags and sheet wash consist of mainly bleached lithic fragments together with quartz, Fe duricrust fragments, ferruginous saprolite and minor Fe pisoliths. Rises (9-30m relief) minor pediments.
	Ser5	Highly ferruginous saprolite with pockets of Fe duricrust and collapsed lateritic gravels over mottled saprolite. Saprolite partly covered lithosols and gravel lags consisting of Fe duricrust fragments, ferruginous saprolite, Fe nodules and pisoliths. Rises (9-30m relief).
	Ser6	Ferruginous, silicified and mottled saprolite largely covered by lithosols, gravel lags, residual sands and clays. In places bleached saprolite exposed. Silcrete pavements and pods common. Lags and lithosols consist of ferruginous lithic gravels, silcrete pods and gravels, silicified saprolite and Fe duricrust gravels. Rises and erosional plains
	Ser7	Bleached and ferruginous saprolite. In places silicified saprolite. Saprolite partly covered by lithosols, shallow earths and gravel lags. Local scree and colluvial gravels flanking steeper slopes. Bedrock structure and fabric generally poorly preserved. Local pockets of deep weathering and Fe duricrust typically on argillaceous lithologies. Lags of lithic, ferruginous saprolite, bleached saprolite, Fe duricrusts fragments and minor Fe pisoliths. Minor alluvial gravels and sand. Rises (9-30m relief).
	Ser8	Ferruginous, mottled and bleached mainly Proterozoic sediments. Saprolite is in places silicified and largely covered by a veneer of sheet wash gravels, residual gravelly earths, lithosols and lags. Lags of lithic fragments, quartz, Fe duricrust fragments, ferruginous saprolite and minor Fe pisoliths. Saprock exposed on steeper slopes. Minor Fe or silicified duricrusts. Rises (9-30m relief) and local mesas.
	Sbh9	Ferruginised saprolite overlying mottled and bleached saprolite. In places silicified saprolite and minor silcrete. Saprolite partly covered by lithosols and gravel lags. Bevelled hill tops minor mesas.
	Sel10	Ferruginous and mottled saprolite, in places silicified. On steeper slopes saprock partly covered by lithosols, shallow earths and gravel lags. Local scree and colluvium flanking hills. Local pockets of deep weathering and Fe duricrust typically on argillaceous lithologies. Lags of lithic, ferruginous saprolite, Fe duricrusts fragments and minor Fe pisoliths. Narrow corridors of alluvial sands and gravels. Low hills (30-90m relief) and local mesas
	See11	Saprolite (mainly Proterozoic) partly covered by scree and lithosols. Weathering variable including; ferruginous, bleached and silicified saprolite and minor saprock. Escarpment.
	Seh12	Ferruginous saprolite and saprock partly covered by lithosols and colluvium flanking steep hill slopes. Bedrock structure and fabric well preserved. Local pockets of deep weathering typically on argillaceous lithologies. Narrow corridors of alluvial sands and gravels. Hills (90-120m relief).
		Post-Proterozoic bedrock
Cambrian sediments	Sel13	Highly ferruginous saprolite consisting of sandstone and cherty breccia and siltstone. Pockets of Fe duricrust. Manganese staining common. Saprolite typically mottled and bleached at depth. Underlying Proterozoic rocks are typically mottled and silicified. Soils consist of thin reddish brown earths and lithosols. Local pockets of Fe duricrusts. Plateau surfaces.
	Sep14	Ferruginous, mottled and bleached bedrock over mainly Cambrian sediments. Saprolite is covered by an extensive but thin blanket of earths and lithosols. Local pockets of ferruginous saprolite, cherty breccia and chert. Quartz and lithic pebbles common as scattered float. Brown calcareous earths overlie mottled and typically bleached saprolite. Minor scattered Fe nodules and travertine. Manganese staining common. Erosional plains (<9 m relief).
	Sei15	Highly Ferruginous sheet flow, alluvial channel and residual deposits consisting of various proportions of clay, sand and gravel. Typically less than < 1.5m thick and overlie very highly weathered and mottled Cambrian saprolite. Manganese staining common. Lags of ferruginous saprolite, Fe duricrust fragments and lithic fragments (shale and chert), with minor Fe pisoliths. Minor alluvium. Pediments, minor erosional plains (< 9 m relief).
	Ser16	Ferruginous, manganiferous, mottled and bleached mainly Cambrian sediments. Saprolite is partly covered by residual gravelly brown earths with chert breccia fragments, calcareous brown earths and red sands. Lags of well rounded to angular quartz, sandstone and chert, pebbles and cobbles. Minor scattered Fe nodules and travertine. Minor alluvial clay and gravel. Rises (9-30 m relief)
	See17	Saprolite (mainly Cambrian) partly covered by lithosols, ferruginous and manganiferous saprolite, cherty gravel scree and thin brown stoney earths. Saprolite is typically ferruginous and mottled. Escarpment.
Mesozoic sediments	Ser18	Ferruginous and diffusely mottled Mesozoic sediments. In places islands of mottled and bleached Proterozoic saprolite protrude through the sediments. Saprolite partly silicified and covered by gravel lags of, Fe duricrust fragments, ferruginous saprolite, quartz, minor Fe pisoliths and nodules. Soil are usually thin (< 1m) and consist of lithosols; sheet wash clays and sands. Locally developed Fe duricrusts and Fe segregations in the mottled zone. Rises (9-30m relief), minor plateaus.
	Sep19	Mainly Mesozoic sediments covered by extensive veneers of gravel lags including ferruginous lithic, silcrete and quartz pebbles. Ferruginous and silicified saprolite overlies mottled and bleached bedrock at depth. Narrow tracts of alluvium along stream channels, thin cover of sheet flow sands, minor clays. Erosional plains (< 9 metres relief), minor rises (9-30m relief).
	See20	Saprolite (mainly Mesozoic) partly covered by Fe gravel scree, colluvial clays, sand and gravel from adjacent plateau edge. Mottled, bleached and in places silicified saprolite. Escarpment.
		Alluvial sediments
	Aaf	Alluvial channel, overbank and terrace sediments consisting of various proportions of clay, sand, gravel and minor cobbles. In places partly cemented by clay, Fe or Si. Overbank and terrace sediments are typically finer textured consisting mainly of clay and sand. Soils consist of reddish orange, brown and grey earths and duplex soils. Minor pebble silcrete. Flood plains, alluvial terraces and channel floors.
	Aap	Alluvial and lacustrine clays and silts. Massive cracking olive green, grey-brown smectitic clay soils over mottled saprolite. Forms treeless plains with gilgai micro-relief. Clays generally thin (< 2 m) with islands of residual clays and gravel lags. Pedogenic calcrete and 'heaved' saprolite fragments as scattered float. Alluvial plains and lacustrine plains.
	ACer1	Silicified alluvial and colluvial sands and gravels forming silcrete. Minor quartz pebbles (generally 1-4cm). Silcrete pods and silicified sandstones fragments as float. Underlying saprolite typically bleached and silicified . Silcrete commonly diffusely stained and mottled with Fe. Rises (9-30m relief), erosional plains (<9m relief) and local mesas.
		Colluvial sediments
	CHpd1	Colluvial sheet flow deposits. Sediments typically > 1.5 metres thick include silty clay loam, clay, sand, gravels and minor Fe pisoliths. Sediments overlie mottled and typically silicified saprolite. Local cracking clay soils. Extensive lags of ferruginous and siliceous saprolite, lithic fragments, ferruginous granules, quartz and silcrete gravels with minor Fe duricrust and pisoliths. Siliceous hardpan common at about 60cm depth. Minor alluvium and residual soils. Depositional plains minor erosional plains (<9m relief).
	CHpd2	Colluvial sheet flow, residual and minor alluvial deposits consisting of variable proportions of sand, clay and gravel (generally < 2 m thick). Ferruginous sand and gravels overlie mottled and bleached saprolite. Soils consist of lithosols and gravelly earths. Extensive lags of Fe duricrust fragments, lithic fragments, quartz and ferruginous saprolite gravels. Minor alluvial sand and gravel. Depositional and erosion plains (<9m relief).
	CHpd3	Colluvial sheet flow and residual Fe stained quartzose sands and minor clays over mottled saprolite. Light reddish brown sandy earths and uniform textured sands. Fe nodules common and minor ferruginous gravel lags. Sheet flow deposits cover Cambrian and Proterozoic sediments. Depositional plains minor erosional plains (< 9 m relief).
	CHpd4	Highly ferruginous sheet flow and residual sands overlying mainly Cambrian saprolite. In places islands of highly ferruginous and mottled saprolite protude through the sandy cover. Minor clays and alluvial sediments. Minor lithic and quartz pebble lags. Depositional plains minor erosional plains (<9m relief).
	CFpd1	Weakly consolidated gravel and cobble conglomerate partly cemented by Fe oxides and clay. Sandy ferruginous soils with minor Fe duricrust fragments and pebble lags. In places alluvial gravels are silicified to form silcrete. In fills valleys between Mesozoic plateaus (> 10 m deep in places). Depositional plain and colluvial footslopes.
	CFfc1	Colluvial footslopes consisting of quartz, ferruginous saprolite, Fe duricrust and lithic fragments in a coarse poorly sorted sandy to gravelly earthy matrix. Footslopes.
	CFfc2	Indurated colluvium forming partly dissected benches; consist of sandstone, chert, silcrete conglomerates and ferruginous lithic gravels cemented by Si and Fe oxides. Clasts are poorly sorted and overlie mottled Proterozoic saprolite. Colluvium forms down slope and adjacent to highly weathered and ferruginised bedrock. Footslopes.
	CFfc3	Colluvium consisting of quartzose sands, gravels of Fe duricrust fragments and ferruginous saprolite in a reddish orange earthy matrix. Occurs down slope and adjacent to duricrust capping Mesozoic Plateaux. Minor sheetwash gravels and sand. Footslopes.

- Regolith landform unit boundary
- Erosional scarp
- Palaeo-drainage
- Palaeo-landform slope
- Superimposed drainage
- Drainage
- Roads, vehicle tracks
- River capture
- Lake

Proterozoic sediments:	Siltstone, quartzite, stromatolitic dolomitic siltstone, shale, chert, meta-basalt, feldspathic quartzite and laminated and dolomitic siltstone.
Mesozoic sediments:	Sandstone, siltstone, mudstone and conglomerate.
Cambrian sediments:	Siltstone, sandstone, limestone, chert, cherty breccia, silicified shale, conglomerate, phosphorite and phosphatic siltstone.

MINERAL OCCURRENCES (DEPOSITS)*

- Zinc (Zn)
- Uranium (U)
- Copper (Cu)
- Lead (Pb), Zinc (Zn) and Silver (Ag)
- Barium (Ba)
- Phosphate (Ph)

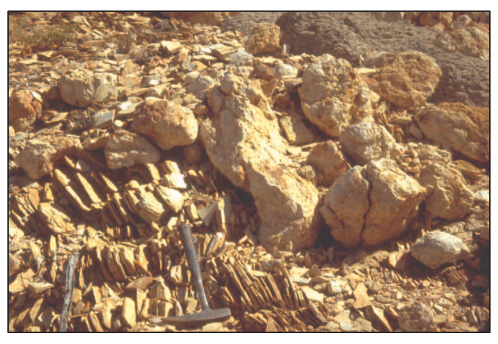
REGOLITH CODES

DF	Ferruginous duricrust
DS	Siliceous duricrust
S	Saprolite
AC	Channel deposits
A	Alluvial sediments
CH	Sheet flow sediments
CF	Footslope deposits

LANDFORM CODES

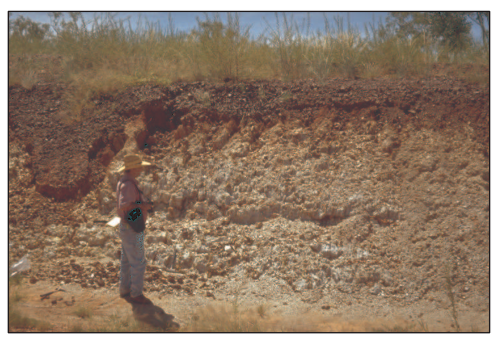
ls	Plateau
ei	Pediments
ep	Erosional plain (<9m relief)
er	Rises (9-30m relief)
el	Low hills (30-90m relief)
eh	Hills (90-300m relief)
ee	Escarpment
bh	Bevelled hill
af	Floodplain
ao	Floodout, overbank plain
ol	Alluvial terrace
fc	Colluvial fan
pd	Depositional plain
ap	Alluvial plain

(* Data provided by Bureau of Resource Science from the minloc database)



Silicified alluvial and colluvial gravels over bleached and partly silicified Proterozoic shales. Forms inversion of relief (305685E, 7756112N).

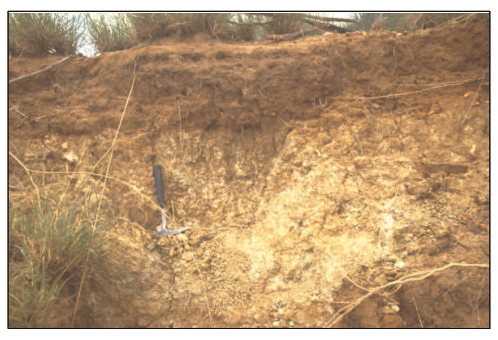
Pre-Cretaceous concordant summits forming mesas and plateau surfaces. Proterozoic sediments are capped by either siliceous or furruginous duricrusts which overlie very highly weathered bleached saprolite Looking west from 305764E, 7798698N.



Fe duricrust gravels formed from Fe segregation in the mottled zone over highly weathered Proterozoic saprolite (320691E, 7745974N).

Massive Fe duricrust and highly ferruginous saprolite forming local mesas over mottled and bleached bedrock (30721E, 7756167N).

Sheet flow deposits and pediments over very highly weathered saprolite. Lags consist of ferruginous lithic, quartz and Fe duricrust fragments (324605E, 7755409N).

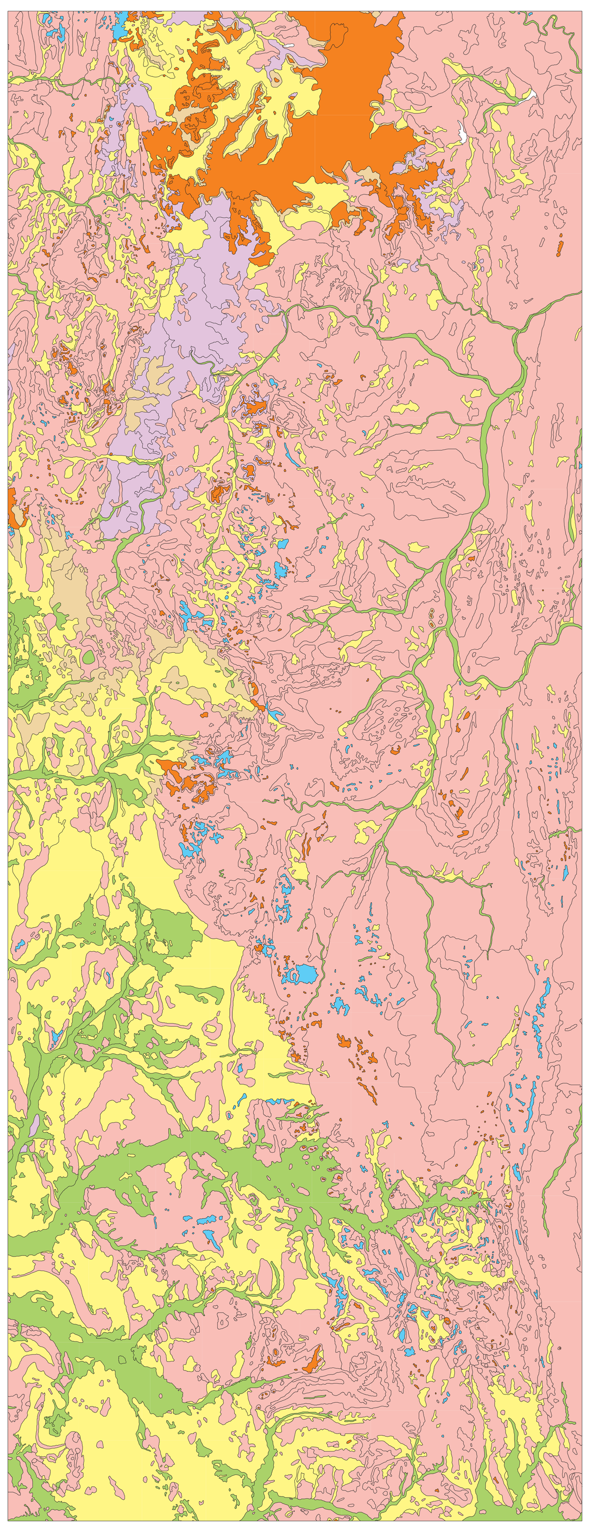


Veneer of sheet flow deposits and residual soil over very highly weathered saprolite (324605E, 7755409N).

LANDSAT TM IMAGE

False colour composite Landsat TM image (30m pixels) showing highly ferruginous saprolite and Fe duricrust in yellow-green; structured saprolite in red, dark green and blue; sheet flow colluvium in pale blue.

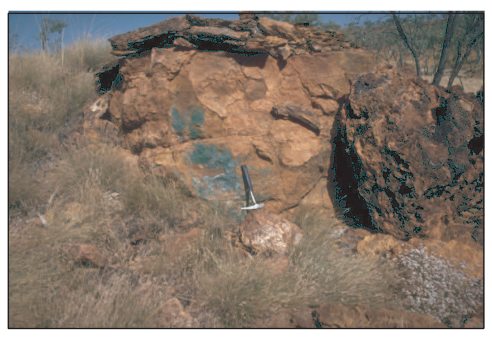
SIMPLIFIED REGOLITH



- Fe duricrust
- Si duricrust
- Proterozoic saprolite
- Cambrian saprolite
- Mesozoic saprolite
- Alluvial and lacustrine sediments
- Colluvial sediments

Sheet flow colluvial gravels over highly weathered and bleached structural saprolite (297142E, 7821720N).

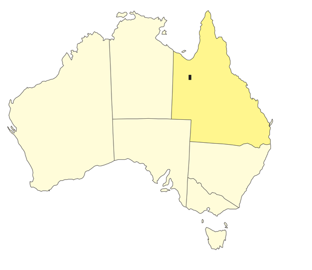
Silcrete and silicified saprolite over very highly weathered bleached Proterozoic shales (306193E, 7793961N).



Ferruginous Mesozoic sandstone with Cu mineralisation over highly weathered Proterozoic sediments (298481E, 7827877N).

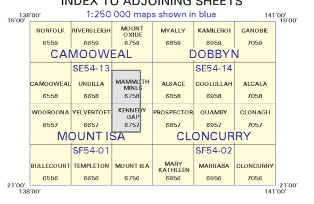
Massive slabby Fe duricrust overlying ferruginous, mottled and bleached Proterozoic shales (303500E, 7759000N).

N



INDEX TO ADJOINING SHEETS

1:250 000 maps shown in blue



Compiled by J.R.Wilford (CRC LEME/AGSO), 1996

Cartography by D.Butrovski, J.R.Wilford, A.Sedgmen and P.Ursem(AGSO), 1996
Geographic Information Systems by D.Butrovski, A.Sedgmen, P.Ursem and J.R.Wilford (AGSO), 1996

It is recommended that this map be referred to as:
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Regolith-Landforms polygons are based on interpretation of 1:25,000 colour airphotos, enhanced Landsat TM imagery, airborne gamma-ray imagery and field observations.

CRC LEME 1996

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