PHANEROZOIC

CAINOZOIC — QUATERNARY

Qlc Lacustrine clay, silt, and sand in large, nonvegetated claypans; rarely with vegetated, gilgai (crabhole) surface
Qls Mixed lacustrine and eolian deposits; clay, silt, and sand
Qaa Alluvium — undivided clay, silt, sand, and gravel in rivers and creeks
Qaas Unconsolidated sand, silt, and gravel in discrete channel beds
Qao Overbank deposits — alluvial sand, silt, and clay on floodplains adjacent to main drainage channels
Qaob Alluvial clay and silt deposits on floodplains with gilgai (crabhole) surface in areas of expansive clay
Qaoc Alluvial sand, silt, and clay; mixed floodplain deposits (Qao) characterized by numerous small claypans
Qag Pebbly silt and sand on alluvial fans

Qw Low-gradient sheetwash deposits — silt, sand, and pebbles on distal fans; no defined drainage
Qwg Sheetwash sand and quartz pebbles overlying and derived from granitoid rocks
Qc Colluvium — sand, silt, and gravel on outwash fans; scree and talus; proximal mass-wasting deposits
Qcq Quartz debris adjacent to large quartz veins
Qcp Colluvium and eluvium derived from weathered **PATERSON FORMATION:** scattered boulders, cobbles, and pebbles in clay and silt matrix
Qrg Quartzofeldspathic eluvial sand, with quartz and rock fragments; overlying and derived from granitoid rock
Qs Eolian sand — light- to dark-red sand in sheets, and longitudinal (seif) and chain dunes; quartz pebble, ironstone pebble, or rock-fragment veneer on some sheets and in interdunal areas
Qsg Mixed eolian and eluvial sand — red-brown quartz sand in sheets; overlying and derived from granitoid rock

Czos **OAKOVER FORMATION:** upper unit; vuggy, white to grey opaline silica; silicified carbonate, and minor calcareous sandstone
Czoc **OAKOVER FORMATION:** lower unit; blue, grey, and fawn limestone and calcareous sandstone
Czaa Consolidated alluvial clay, silt, and sand; dissected
Czag Consolidated alluvial gravel, sand, and silt; local carbonate cement; dissected
Czak Calcrete; massive, nodular, and cavernous limestone, variably silicified; dissected valley calcrete
Czap Pisolitic, ferruginous channel deposits; limonite, goethite, and hematite deposits; dissected old drainage lines
Czaz Silicified and ferruginized channel deposits; cemented chert and banded iron-formation clasts in conglomerate; dissected old drainage lines
Czc Colluvium — consolidated clay, silt, and sand deposits; derived from adjacent rock outcrop; dissected
Czcf Consolidated ferruginous colluvium; recemented fragmented laterite, ironstone pebbles, clay, silt, and sand; canga deposits, derived from adjacent banded iron-formation; dissected
Czcg Consolidated pebble, sand, and silt deposits; dissected scree and outwash-fan deposits
Czrf Ferruginous duricrust; includes massive, pisolitic, and nodular laterite
Czrz Siliceous duricrust; includes silcrete
Czrk Calcrete; massive, nodular, and cavernous limestone; variably silicified; residual origin

MESOZOIC — CRETACEOUS

Kf **FREZIER SANDSTONE:** poorly sorted, coarse-grained, partly bioturbated sandstone, conglomerate, and minor siltstone; fluvial to deltaic deposits

Kp **PARDA FORMATION:** white, thin-bedded, massive mudstone and claystone, with minor lenses of fine-grained sandstone; macrofossils; shallow marine deposit

JURASSIC–CRETACEOUS

JKc **CALLAWA FORMATION:** very fine to coarse grained sandstone, ferruginous towards base, with siltstone and conglomerate interbeds; plant and trace fossils; mainly fluvial deposits

Jr **JARLEMAI SILTSTONE:** mudstone and minor sandstone lenses; shallow marine deposit (subsurface only)

Jl **WALLAL SANDSTONE:** fine- to very coarse-grained sandstone and conglomerate; continental to marginal marine deposits (subsurface only)

CANNING and NORTHERN CARNARVON BASINS — WESTRALIAN SUPERBASIN

PALAEOZOIC — PERMIAN

PL **Liveringa Group:** sandstone and siltstone; fluvial deposit (subsurface only)

Pp **POOLE SANDSTONE:** fine- to coarse-grained sandstone, with siltstone interbeds; minor mudstone; trace fossils; shallow marine or lagoonal deposits

Pa **PATERSON FORMATION:** diamictite, mudstone, siltstone, sandstone, and minor conglomerate; fluvioglacial deposit

PG **Grant Group:** sandstone, siltstone, and claystone; in part glacigene (subsurface only)

CANNING BASIN

d Dolerite dykes, various ages; interpreted from aeromagnetic data where dashed
q Quartz veins, various ages

Paterson Orogeny (*c.* 550 Ma)

Ꝑd Dolerite dykes and sills

Ꝑde Fine- to medium-grained dolerite and quartz dolerite sills and dykes restricted to **EEL CREEK FORMATION**

NEOPROTEROZOIC — *c.* 800 Ma[1]

Tarcunyah Group

ꝐUw **WAROONGUNYAH FORMATION:** interbedded dolomite, sandstone, siltstone, and shale
ꝐUwd Bedded to laminated dolomite and stromatolitic dolomite
ꝐUws Fine- to medium-grained sandstone and siltstone

ꝐUe **EEL CREEK FORMATION:** black, blue, green, and grey mudstone, shale, siltstone, and thin-bedded sandstone; minor glauconitic and tuffaceous sandstone, and rhyolite tuff
ꝐUeh Basal, hematite-clast conglomerate; includes ferruginous shale
ꝐUeq Grey, cream to red, fine- to coarse-grained sandstone, quartz arenite, and minor siltstone; halite pseudomorphs in fine-grained sandstone

ꝐUg **GOOGHENAMA FORMATION:** medium- to coarse-grained sandstone, quartz wacke, and thin beds of pebble to cobble conglomerate

OFFICER BASIN

Miles Orogeny (> 800 Ma)

PROTEROZOIC

ꝐL **Lamil Group:** unassigned (subsurface only)

Yeneena Supergroup — Throssell Group

ꝐT **Throssell Group:** unassigned (subsurface only)

ꝐTb **BROADHURST FORMATION:** shale, siltstone, mudstone, and fine- to medium-grained sandstone
ꝐTbd Massive to thin-bedded dolomite and limestone; minor interbedded shale and siltstone
ꝐTbt Chert, silicified dolomite, and silicified stromatolitic dolomite

< 1060 Ma[2] ꝐTc **COOLBRO SANDSTONE:** fine- to coarse-grained sandstone; pyrite nodules common

YENEENA BASIN

PALAEOPROTEROZOIC

Ꝑph Hornblende–feldspar–biotite porphyry dykes; trachyandesite and lamprophyre related to Ꝑgh; correlated to Bridget Suite
Ꝑgh Hornblende monzogranite and granodiorite; in small plutons; correlated to Bridget Suite

Ꝑcb **PINJIAN CHERT BRECCIA:** chert breccia and poorly bedded chert

ARCHAEAN

Hamersley Group

c. 2541 Ma[3] AHc **CARAWINE DOLOMITE:** massive to well-bedded, recrystallized dolomite and stromatolitic dolomite; minor chert

Ad Medium- to coarse-grained dolerite sills and dykes; weakly metamorphosed

Mount Bruce Supergroup — Fortescue Group

AF **Fortescue Group:** unassigned (subsurface only)

c. 2687 Ma[4] AFj **JEERINAH FORMATION:** mixed sedimentary rocks; shale, siltstone, sandstone, and local microbanded chert; minor accretionary lapilli

AFji **Isabella Member:** fine-grained, massive rhyolite; quartz or carbonate amygdales; possible intrusion

AFjv **Baramine Volcanic Member:** coarse- to fine-grained mafic tuff, with local accretionary lapilli, and volcanic agglomerate; thin basalt and andesitic basalt flows

AFmk **Kuruna Member:** bedded lapilli, vitric, crystal, and lithic tuff, tuffaceous siltstone, and fine-grained tuffaceous sandstone

c. 2717 Ma[5] AFm **MADDINA FORMATION:** massive, vesicular, and amygdaloidal basalt and andesite, with silicified flowtops

c. 2719 Ma[4] AFt **TUMBIANA FORMATION:** carbonate rock, and tuffaceous shale, siltstone, and sandstone, and minor pisolitic tuff

AFtc **Meentheena Carbonate Member:** banded dark-grey siliceous dolomite, limestone, stromatolitic dolomite, and tuffaceous shale and siltstone

AFtt **Mingah Tuff Member:** pisolitic tuff, and tuffaceous siltstone and sandstone, and minor basalt and thin carbonate units

c. 2741 Ma[6] AFk **KYLENA FORMATION:** massive, vesicular, and amygdaloidal basalt and andesite
AFka Basaltic agglomerate
AFkc Grey carbonate rock; thin, discontinuous, silicified microbial laminations and stromatolites

AFhu, AFha **HARDEY FORMATION**
Tuffaceous sandstone, siltstone, and shale, accretionary lapilli and felsic tuff, and some feldspathic sandstone, pebbly sandstone, and conglomerate; thin carbonate units
Medium- to very coarse-grained feldspathic sandstone, pebbly sandstone, and conglomerate; minor fine-grained sandstone and siltstone

AFh **HARDEY FORMATION:** sandstone, commonly feldspathic and locally tuffaceous, and siltstone, shale, conglomerate, and wacke; Gregory Range area

AFhos **Warroo Hill Member**
Metasandstone, quartzite, and metasiltstone; Gregory Range area

c. 2756 Ma[4] AFhb **Bamboo Creek Member:** massive and flow-banded felsic porphyry, porphyry breccia, bedded tuffaceous rock, and quartz–feldspar and feldspar porphyry subvolcanic intrusions
c. 2758 Ma[7] Aph Quartz–feldspar porphyry; spherulitic textured, in dykes

c. 2764 Ma[4] AFhi **Koongaling Volcanic Member:** porphyritic and fine-grained felsic lavas; dacite, rhyodacite, and rhyolite; Gregory Range area
AFhim Metarhyolite, metadacite, and quartz–feldspar–mica schist; Gregory Range area

GREGORY GRANITIC COMPLEX
c. 2757 Ma[8] AgGyr Seriate to porphyritic, coarse-grained syenogranite, rapakivi texture; sheared and foliated
c. 2763 Ma[8] AgGyy Granophyre; cataclastically deformed
c. 2761 Ma[7 8] AgGyf Sheared and foliated, fine- to coarse-grained syenogranite; cataclastically deformed

AFhc Polymictic, matrix-supported cobble to boulder congloerate, sandstone, siltstone, and wacke

AFr, AFrk, AFra, AFrs
AFr **MOUNT ROE BASALT:** massive, porphyritic, vesicular, and amygdaloidal basalt and basaltic andesite; some pillow basalt
AFrk Laminated dark-grey siliceous limestone and dolomite
AFra Basaltic agglomerate with a pale-coloured tuffaceous matrix
AFrs Basal polymictic pebble conglomerate and sandstone

AFdb **Black Range Dolerite suite:** dolerite and medium- to coarse-grained gabbro dykes; weakly metamorphosed (*c.* 2772 Ma[9])

HAMERSLEY BASIN — PILBARA CRATON

Apa Aegirine-bearing sodic porphyry dykes
Ape Rhyolite and spherulitic-textured felsite dykes
Apff Fluorite-bearing quartz porphyry; in dykes and small intrusions

Shay Intrusion
AaYo Metamorphosed gabbro, epidotized gabbro, and quartz gabbro
AaYn Metamorphosed gabbronorite, norite, and pyroxenite

Pilbara Supergroup — De Grey Group

< 3048 Ma[7] ADo **COORAGOORA FORMATION:** fine- to coarse-grained sandstone, siltstone, shale, conglomerate, and feldspathic and lithic wacke; weakly metamorphosed

ADa **CATTLE WELL FORMATION:** interbedded dacite tuff, welded tuff, tuffaceous siltstone and shale, and thin-bedded sandstone, siltstone, wacke, and carbonate rock; silicified stromatolites; weakly metamorphosed

Gorge Creek Group

AGd Fine- to coarse-grained metadolerite sills intruded into **Gorge Creek Group**

AGo **COONIEENA BASALT:** pillowed and massive basalt, hyaloclastic breccia, and silicified basaltic andesite; metamorphosed

AGu **CUNDALINE FORMATION:** weathered brown, grey-green shale, siltstone, lithic wacke, sandstone, and pebble conglomerate; local polymictic, matrix-supported conglomerate; metamorphosed

<3235 Ma[10] AGn **NIMINGARRA IRON FORMATION:** banded iron-formation, jaspilite, banded and ferruginous chert, and black carbonaceous shale; metamorphosed

AGng Basal pebble- to cobble-conglomerate, sandstone, siltstone, and shale; metamorphosed

c. 3317 Ma[11] Apd Quartz–feldspar porphyry, dacite and rhyodacite; metamorphosed

AgL **CARLINDIE GRANITOID COMPLEX:** unassigned (subsurface only)

3460–3241 Ma[5 6 7 11 12 13]

MOUNT EDGAR GRANITOID COMPLEX
AgEch **CHIMINGADGI TRONDHJEMITE:** massive, even-grained, grey-white biotite trondhjemite
AgEchx Hybrid amphibolite-rich granitoid rock with mafic and ultramafic xenoliths
c. 3314 Ma[12] AgEco **COPPIN GAP GRANODIORITE:** massive to seriate, cream to pinkish biotite granodiorite, and tonalite; weakly foliated
AgEcox Granitoid rock with mafic and ultramafic xenoliths
AgEml **MULLUGUNYA GRANODIORITE:** medium-grained, grey biotite–hornblende granodiorite; weakly foliated
AgEmu **MUNGANBRINA MONZOGRANITE:** banded, medium- to coarse-grained monzogranite; locally seriate to porphyritic; foliated

3470–3244 Ma[5 8]
3252–3244 Ma[5]
c. 3303 Ma[5]
c. 3313 Ma[5]
c. 3438 Ma[5]
c. 3470–3443 Ma[4 8]

MUCCAN GRANITOID COMPLEX
AgMwo **WOLLINE MONZOGRANITE:** porphyritic and seriate monzogranite and syenogranite; pink-grey, medium- to coarse-grained
AgMmt Magnetite-bearing monzogranite; cream to white-grey and fine- to medium-grained
AgMmy Granophyric monzogranite; leucocratic and fine-grained
AgMmc Medium- to coarse-grained monzogranite and syenogranite; pink-grey to cream; weak metamorphic foliation
AgMgt Granodiorite, quartz diorite, and tonalite; grey-white and medium- to coarse-grained; foliated
AgMgn Mixed granitoid rock; fine- to coarse-grained; well foliated to gneissic, minor banded granitoid gneiss
AgMnx Foliated to gneissic granitoid rock with mafic and ultramafic xenoliths

3655–3242 Ma[5 7]
c. 3242 Ma[7]
c. 3303 Ma[7]
c. 3313 Ma[5]
3655–3576 Ma[6]

WARRAWAGINE GRANITOID COMPLEX
AgWtg Grey-white, medium- to coarse-grained tonalite and granodiorite; hornblende bearing
AgWmp Seriate and porphyritic, pink-grey, medium- to coarse-grained monzogranite and granodiorite
AgWmc Pink-grey to cream, medium- to coarse-grained monzogranite, syenogranite, and granodiorite; metamorphosed
AgWgn Mixed granitoid rock; fine- to coarse-grained, well foliated to gneissic, minor banded granitoid gneiss (3655–3410 Ma[8])
AgWnx Foliated to gneissic granitoid rock with mafic and ultramafic xenoliths

Gap Intrusion
AaGus Serpentinite; after peridotite and dunite
AaGx Metapyroxenite

AaWu **Nob Well Intrusion:** coarse-grained serpentinite (after peridotite) and metapyroxenite

AaT **Strutton Intrusion:** metagabbro, metapyroxenite, and serpentinite (after peridotite)

Warrawoona Group — Unassigned

Aba, Auc, Aus, Aut, Aux
Aba Hornblende–plagioclase schist; after basalt and dolerite
Auc Carbonate–tremolite–chlorite–talc schist
Aus Serpentinite; after peridotite
Aut Tremolite–serpentine–chlorite(–talc) schist
Aux Metapyroxenite, commonly schistose

AW(oa), AW(ba), AW(bo)
AW(oa) Anorthositic metagabbro
AW(ba) Fine- to medium-grained amphibolite, and mafic hornfels; after basalt
AW(bo) Chlorite–tremolite(–quartz) schist; after pillowed, ocelli-textured, high-Mg basalt

AW(uc), AW(us), AW(ut)
AW(uc) Carbonate–tremolite–chlorite rock
AW(us) Serpentinite; after peridotite
AW(ut) Tremolite–serpentine–chlorite(–talc) rock; schistose

Kelly Subgroup

AWe, AWec, AWea, AWesq, AWeu, AWes
AWe **EURO BASALT:** basalt, pillow basalt, high-Mg basalt, and intercalated thin-bedded chert; metamorphosed
AWec Thin-bedded chert, ferruginous chert, and banded chert; metamorphosed
AWea Sandstone, siltstone, shale, and tuffaceous sandstone; metamorphosed
AWesq Quartzite, green fuchsitic quartzite, chert, banded chert, and intercalated ultramafic schist
AWeu Talc–chlorite schist (mylonitic fabric), pods of altered komatiitic basalt (spinifex texture locally), and carbonate–talc–fuchsite rock
AWes Serpentinite (after peridotite) and tremolite–chlorite–serpentine–carbonate rock (after komatiite); sheared

Salgash Subgroup

3458–3426 Ma[14 15] AWp, AWpc
AWp **PANORAMA FORMATION:** felsic volcanic rocks; mainly rhyolite, quartz–feldspar porphyry, and felsic tuff; metamorphosed
AWpc Thin-bedded chert, banded chert, and interlayered felsic tuff; metamorphosed

AWa, AWac, AWaf, AWau
AWa **APEX BASALT:** mixed massive and pillowed basalt, high-Mg basalt, and thinly intercalated chert; metamorphosed
AWac Grey-white banded chert and green-grey fuchsitic quartzite; metamorphosed
AWaf Felsic volcanic flows and tuff; mainly rhyolite; metamorphosed
AWau Tremolite–serpentine–talc–carbonate rock; after peridotite and komatiite

AW(oh) Hornblende–plagioclase schist; after dolerite intrusions; restricted to **DUFFER FORMATION**

Talga Talga Subgroup

c. 3471–3465 Ma[14] AWd, AWda
AWd **DUFFER FORMATION:** dacitic, rhyodacitic, and andesitic lava, tuff, and agglomerate; metamorphosed
AWda Fine-grained amphibolite; after basalt and dolerite; metamorphosed

c. 3469 Ma[7] AWm, AWmc, AWmu
AWm **MOUNT ADA BASALT:** fine-grained amphibolite (after basalt) and siliceous metabasalt; minor metachert and ultramafic rock
AWmc Green and blue-grey metachert
AWmu Serpentine–talc–chlorite rock; after ultramafic rock

East Pilbara Granite–Greenstone Terrane — PILBARA CRATON

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Mineralization and rock commodity information from non-confidential data held in the WAMIN database, GSWA, at 28 August 2003. Data points filtered for clarity on the plotted product; full set of data points available in digital data

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Metres

CLIVE BROW
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