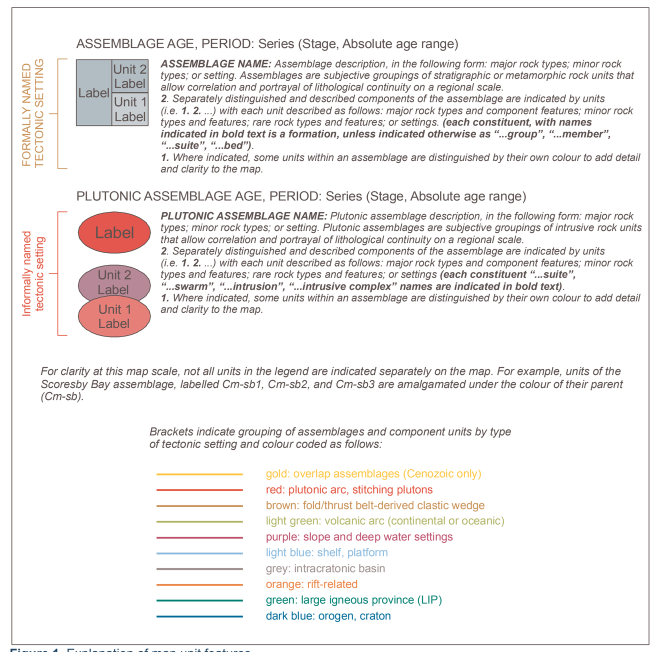
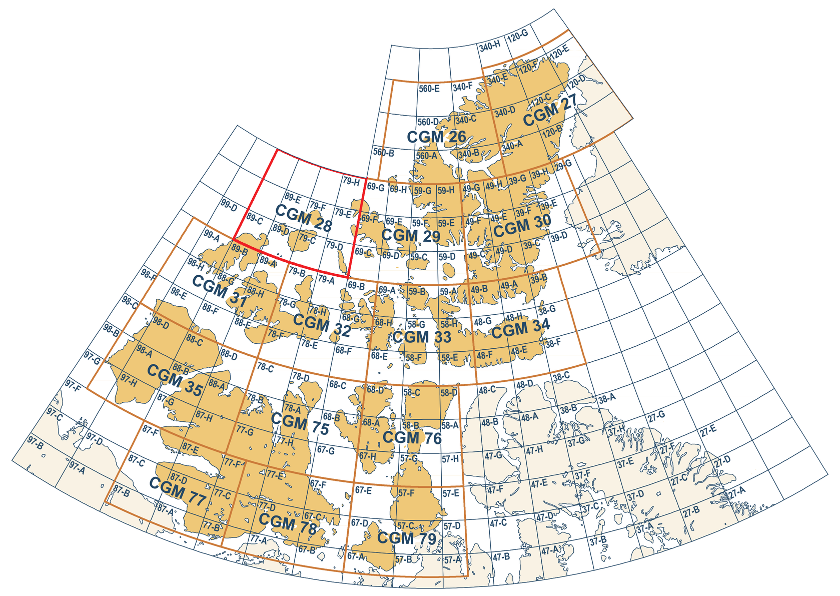


Figure 1. Explanation of map unit features.



National Topographic System reference and index to adjoining published Geological Survey of Canada maps

Abstract

This map and the related geodatabase illustrate the bedrock geology of the Sverdrup Islands including Brock, Borden, and Mackenzie King islands, Lougheed Island, the northern part of Prince Patrick Island, and a small portion of Ellef Ringnes Island. Major features of the area include little-deformed Triassic and younger strata of the western Sverdrup Basin, and unconformable cover of unconsolidated post-tectonic Neogene sediments.

Résumé

Cette carte et la géodatabase qui s'y rapporte documentent la géologie du substratum rocheux dans les parties suivantes des îles Sverdrup : les îles Brock, Borden et Mackenzie King, l'île Lougheed, la partie nord de l'île Prince Patrick et une petite partie de l'île Ellef Ringnes. Les principales entités géologiques de la région comprennent des strates triasiques et plus récentes peu déformées du bassin de Sverdrup occidental, et une couverture discordante de sédiments post-tectoniques néogènes non consolidés.

Catalogue No. M183-1/28-2013E-PDF
ISBN 978-1-100-22344-5
doi:10.4095/292823

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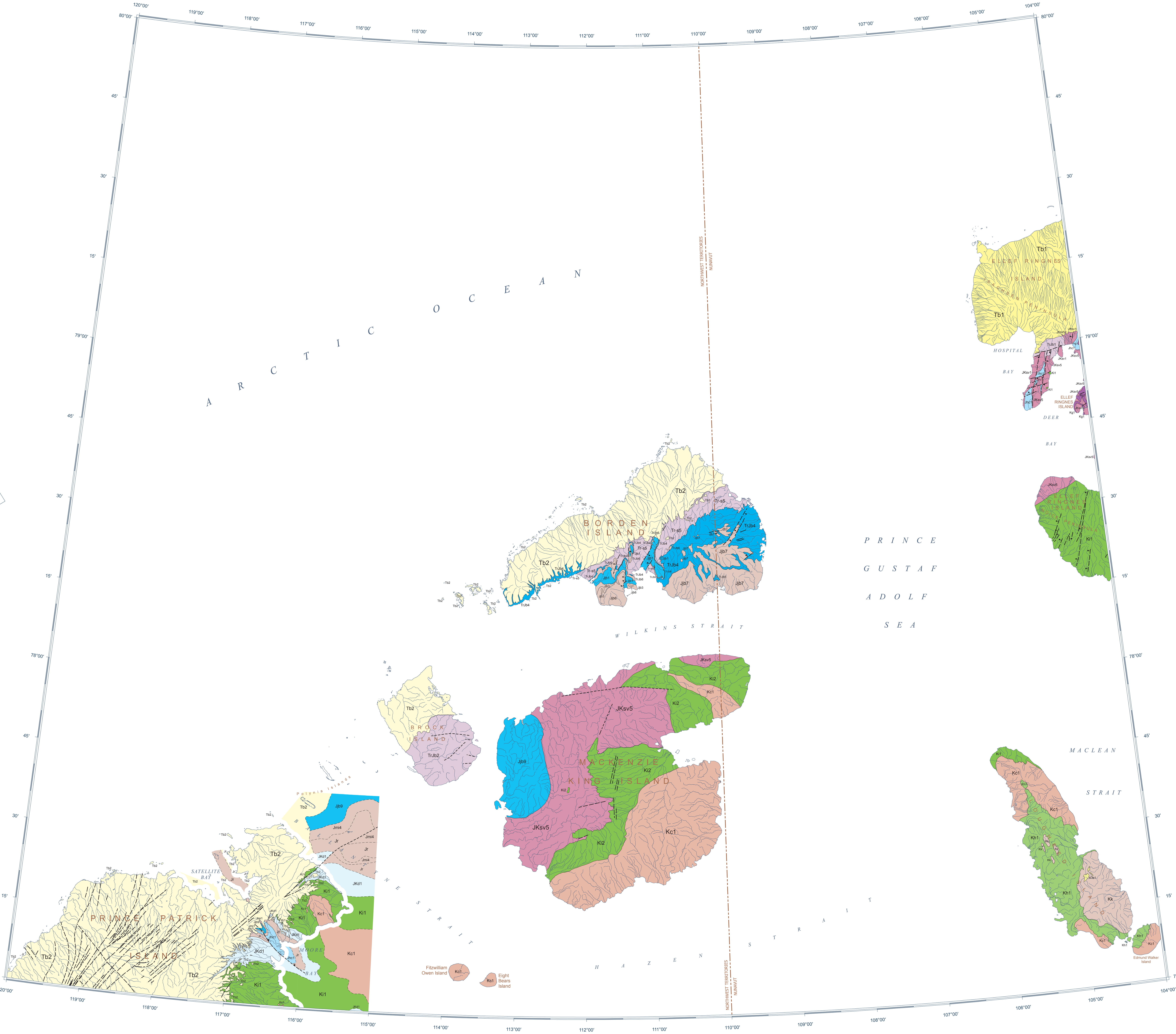
CANADIAN GEOSCIENCE MAP 28

GEOLOGY

TECTONIC ASSEMBLAGE MAP OF SVERDRUP ISLANDS AREA

Northwest Territories-Nunavut

1:500 000



NEOGENE

MIOCENE AND PLIOCENE

Eurekan orogen cover

Tb2, Tb1 — **BEAUFORT:** Sand, gravel, minor peat; mostly fluvial braidplain.
2. Sand, unconsolidated, fine-grained, quartzose, pale yellowish orange, cross-stratified; wood; peat; minor gravel, mud; fluvial braidplain and overbank **(Beaufort)**.
1. Sand, unconsolidated, fine-grained, quartzose, pale yellowish orange, cross-stratified; wood; peat; minor gravel, mud; fluvial braidplain and overbank **(Ballast Brook, Beaufort)**.

CRETACEOUS AND PALEOGENE

LATE CRETACEOUS AND PALEOGENE (Campanian to Selandian)

SVERDRUP BASIN, BANKS-EGLINTON BASIN, HIGH ARCTIC LARGE IGNEOUS PROVINCE

KTe1 — **EXPEDITION:** Quartz sandstone, coal; minor siltstone, shale; fluvial, deltaic, nearshore marine.
1. Quartz sandstone, very fine- to medium-grained, planar and cross-stratified, burrowed, minor siltstone, shale, coal; arranged in coarsening upward cycles; deltaic, nearshore marine **(Expedition)**.

CRETACEOUS

LATE CRETACEOUS (Cenomanian to Campanian)

Kk — **KANGUK:** Shale, grey to dark greenish grey weathering, variably silty; bituminous shale in the lower part, siliceous shale in the upper part; bentonite; minor tuff, local sandstone in the southern and western Arctic Islands, rare pebble conglomerate (Eglinton Island); outer shelf, sediment starved, initially anoxic **(Kanguk)**; may locally include other Cretaceous, Paleogene and Pliocene strata.

EARLY AND LATE CRETACEOUS (Albian to Cenomanian)

Kh1 — **HASSEL:** Sandstone, siltstone, minor shale, basalt; fluvial delta plain and delta front, local extrusive flows.
1. Sandstone, quartzose, fine- to coarse-grained, pale olive grey and yellowish grey weathering, bioturbated, variably pebbly and carbonaceous, mostly unconsolidated; siltstone, minor shale; coarsening-upward cycles; local mafic volcanic flows (Amund Ringnes Island); fluvial delta plain and delta front **(Hassel)**.

EARLY CRETACEOUS (Aptian and Albian)

Kc1 — **CHRISTOPHER:** Shale, siltstone, minor sandstone; local carbonate, tuff, bentonite; cool climate offshore shelf, distant volcanic activity.
1. Shale, dark grey, brownish grey and brownish black weathering; siltstone; minor very fine sandstone; scattered chert pebbles; mudstone and siltstone concretions, locally abundant bivalves; local methogenic carbonate mounds, tuff, bentonite; cool climate, deep outer shelf **(Christopher)**; may locally include younger Cretaceous, Paleogene, and Pliocene strata.

EARLY CRETACEOUS (Valanginian to Aptian)

Ki — **ISACHSEN:** Quartz sandstone, siltstone, shale; minor conglomerate, coal; local basalt; temperate climate, deltaic, fluvial channel and overbank deposits, local extrusive flows.
2. Quartz sandstone, fine- to coarse-grained, in part pebbly, brownish grey to yellowish brown, planar and cross-stratified, burrowed and bioturbated in the lower part, minor iinterbedded shale and coal; cyclical interbedding; deltaic, fluvial channel and overbank deposits **(Paterson Island member)**.
1. Quartz sandstone, fine- to coarse-grained; white, light yellowish brown and grey weathering; cross-stratified; plant fragments and plant fossils; siltstone and shale, dark grey; minor conglomerate, ironstone, coal, local mafic volcanic flows (Axel Heiberg, northern Ellesmere islands); temperate climate, deltaic, fluvial channel and overbank deposits **(Isachsen)**; may locally include younger Cretaceous strata.

EARLY AND LATE CRETACEOUS (Barremian to Cenomanian; 130 to 95 Ma)

Kg1 — **QUEEN ELIZABETH plutonic assemblage**: gabbro, diabase; minor granophyre; LIP intrusives, olivine tholeiite association.
1. Gabbro and diabase, fine- to coarse-grained, subophitic textures; minor chill margin facies; local pegmatitic and cumulate layering facies in sills; local amygdules in subvolcanic dykes; olivine tholeiite association **(Queen Elizabeth swarm)**.

JURASSIC AND CRETACEOUS

LATE JURASSIC AND EARLY CRETACEOUS (Kimmeridgian to Valanginian)

SVERDRUP BASIN, BANKS-EGLINTON BASIN

JKd1 — **DEER BAY:** Sandstone, siltstone, shale; shallow to deep outer shelf.
1. Sandstone, very fine- to fine-grained, burrowed; siltstone; shale; light to dark grey and greenish grey weathering; common bivalves, gastropods and other shelly macrofauna, locally common sideritic concretions; arranged in numerous coarsening-upward cycles; shallow to deep outer shelf **(Deer Bay)**.

JURASSIC

LATE JURASSIC (Oxfordian and Kimmeridgian)

Sverdrup shelf, SVERDRUP BASIN, BANKS-EGLINTON BASIN

Jr — **RINGNES:** Shale, dark grey to brown and black weathering, bituminous; thin-bedded siltstone; minor fine-grained thin-bedded sandstone; common dolomitic and sideritic concretions; outer shelf, anoxic **(Ringnes)**.

MIDDLE JURASSIC (Bathonian and Callovian)

Jhc1 — **HICCLES COVE:** Quartz sandstone, ironstone; minor siltstone, shale; nearshore marine.
1. Sandstone, quartzose; very fine- to medium-grained; light brown, orange; calcite cemented or weakly consolidated; ironstone; minor siltstone, shale; phosphatic nodules, inoceramids, ammonites; nearshore marine; may include McConnell Island formation at the base **(Hiccles Cove)**.

MIDDLE JURASSIC (Bajocian to Callovian)

Jmi — **McCONNELL ISLAND:** Shale, siltstone, ironstone; minor sandstone; deep offshore shelf.
4. McConnell Island, Hiccles Cove, undivided.
1. Shale, brown to grey weathering; siltstone, ironstone; minor sandstone, very fine-grained; ammonoids, belemnites, bivalves; deep offshore shelf **(McConnell Island)**; locally also younger Jurassic strata.

EARLY AND MIDDLE JURASSIC (Pliensbachian to Aalenian)

Sverdrup shelf, SVERDRUP BASIN

Jjb9, Jjb7, Jjb6, Jjb3, Jjb1 — **JAMESON BAY:** Shale, glauconitic sandstone, ironstone; minor quartz sandstone; outer shelf.
9. Jameson Bay, Sandy Point, undivided.
7. Cape Canning member, Snowpatch member, undivided
6. Shale, light to medium grey and greenish grey, glauconitic; quartzose sandstone, fine-grained, weakly consolidated or calcite cemented; ironstone, oolitic; local pebble conglomerate; ammonoids, belemnites, silicified wood, phosphatic nodules; outer shelf **(Snowpatch member)**; friable quartzose sandstone high in the map unit is assigned to the Sandy Point formation.
3. Shale, light to medium grey and greenish grey, glauconitic; quartzose sandstone, fine-grained, weakly consolidated or calcite cemented; ironstone, oolitic; local pebble conglomerate; ammonoids, belemnites, silicified wood, phosphatic nodules; outer shelf **(Cape Canning member)**.
1. Sandstone, very fine-grained, glauconitic, ferruginous, phosphatic, burrowed, locally fossiliferous; shale and siltstone, medium grey; offshore shelf, periodically sediment starved **(Intrepid Inlet member)**.

LATE JURASSIC AND EARLY CRETACEOUS (Kimmeridgian to Valanginian)

Sverdrup deep water basin

JKsv — **SAVIK:** Shale, siltstone, glauconitic sandstone, ironstone; minor quartz sandstone; outer shelf.
5. Shale, medium to dark grey; siltstone, light to medium grey; ferruginous calcareous mudstone concretions in mid-section; sparse marine macro fossils; minor sandstone, fine- to very fine-grained; offshore marine, periodically sediment starved **(Mackenzie King)**.
1. Shale, dark grey to greyish black, minor sideritic ironstone, siltstone, argillaceous limestone; bivalves, inoceramids and ammonites; marine offshore shelf and basin slope, periodically sediment starved **(Savik group)**.

TRIASSIC AND JURASSIC

LATE TRIASSIC AND EARLY JURASSIC (Norian to Pliensbachian)

TrJb6, TrJb5, TrJb4, TrJb2, TrJb1 — **BARROW:** Shale, siltstone, glauconitic sandstone; minor quartz sandstone, coal, ironstone; prodeltaic and nearshore to offshore.
6. Shale, grey-green weathering; siltstone; sandstone, argillaceous and very fine-grained; oolitic ironstone and red-brown shale marker at base; common phosphatic concretions; shelf, nearshore to offshore **(Lougheed Island)**.
5. Maclean Strait, Lougheed Island, Intrepid Inlet member, undivided.
4. Sandstone, variably ferruginous and glauconitic; oil-stained; delta front, nearshore **(Maclean Strait)**.
2. Sandstone, very-fine to fine-grained; interbedded siltstone and shale; arranged in coarsening-upward cycles; prodelta **(Skybattle)**.
1. Quartzose sandstone, very fine- to medium-grained; cyclically interbedded with shale and siltstone, bioturbation, bivalve coquinas in lower part; coal, plant fossils in upper part; shallow nearshore grading upwards to progradational delta complex **(Heiberg group)**.

TRIASSIC

LATE TRIASSIC (Carnian)

Sverdrup shelf, SVERDRUP BASIN

Tr-s5 — **SCHEI POINT:** Sandstone, grainstone; minor shale, siltstone, limestone; prodeltaic, nearshore to offshore marine shelf, periodically sediment starved.
5. Sandstone, fine- to coarse-grained, pale yellowish orange, calcareous and bioclastic, scattered pebbles; limestone including skeletal grainstone; minor red and grey shale, coal; mostly nearshore marine **(Pat Bay)**.

Contacts
- Geological boundary: defined or approximate
- Geological boundary: assumed

Faults
- Fault: approximate
- Fault: assumed
- Fault: approximate, showing downthrown side

Thrust faults
- Thrust fault: approximate, teeth indicate upthrust side
- Thrust fault: assumed, teeth indicate upthrust side

Lineaments
- Structural lineament: approximate

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Recommended citation
Harrison, J.C., Le, M., Balkwill, H.R., Stott, D.F., and Tozer, E.T., 2015. Geology, Tectonic assemblage map of Sverdrup Islands area, Northwest Territories-Nunavut; Geological Survey of Canada, Canadian Geoscience Map 28 (preliminary), scale 1:500 000. doi:10.4095/292823

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Canadian Geoscience Maps

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Initiative of the Geological Survey of Canada, conducted under the auspices of the Tri-Territorial Project as part of Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program.

GEOLOGY

TECTONIC ASSEMBLAGE MAP OF SVERDRUP ISLANDS AREA

Northwest Territories-Nunavut

1:500 000

10 0 10 20 30 40 km

Map projection Lambert Conformal Conic, standard parallels 79°30'N and 77°30'N. North American Datum 1983

Base map at the scale of 1:250 000 from Natural Resources Canada, with modifications.

Proximity to the North Magnetic Pole causes the magnetic compass to be erratic in this area.
Mean magnetic declination 2015, 1°06'E, decreasing 66.8' annually.
Readings vary from 19°01'E in the SW corner to 34°07'W in the NE corner of the map.

This map is not to be used for navigational purposes.

Title photograph: Pliocene Beaufort Formation overlying Jurassic Deer Bay Formation, Prince Patrick Island, Northwest Territories. Photograph by J.C. Harrison. 2013-064

The Geological Survey of Canada welcomes corrections or additional information from users.

Data may include additional observations not portrayed on this map. *See* documentation accompanying the data.

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Preliminary publications in this series have not been scientifically edited.

CANADIAN GEOSCIENCE MAP 28
GEOLOGY
TECTONIC ASSEMBLAGE MAP OF SVERDRUP ISLANDS AREA
Northwest Territories-Nunavut