SOUTHERN ESTUARY SUMMARIES

These present:

data sumaries

catchment maps

geological/geomorphological maps of the estuary surroundings (Treloar)

They give the following information:

Catchment areas - estimated by planimeter for total catchment.

River flow - estimated for the total catchment from the nearest WAWA gauging station records; station locations and numbers are shown on catchment maps.

Runoff - estimated from nearest gauging station records.

Salinity - from nearest gauging station records.

Rainfall - data from nearest Meteorological Bureau stations; names on catchment maps.

Estuary size - measured from maps.

Estuary type - principal relavent features.

Bar - height from measurements or observations; **width** from maps.

Bar sand type - analyses by Geography Dept. UWA.

Salinity - from CSIRO Fisheries, WA Fisheries, EPH data.

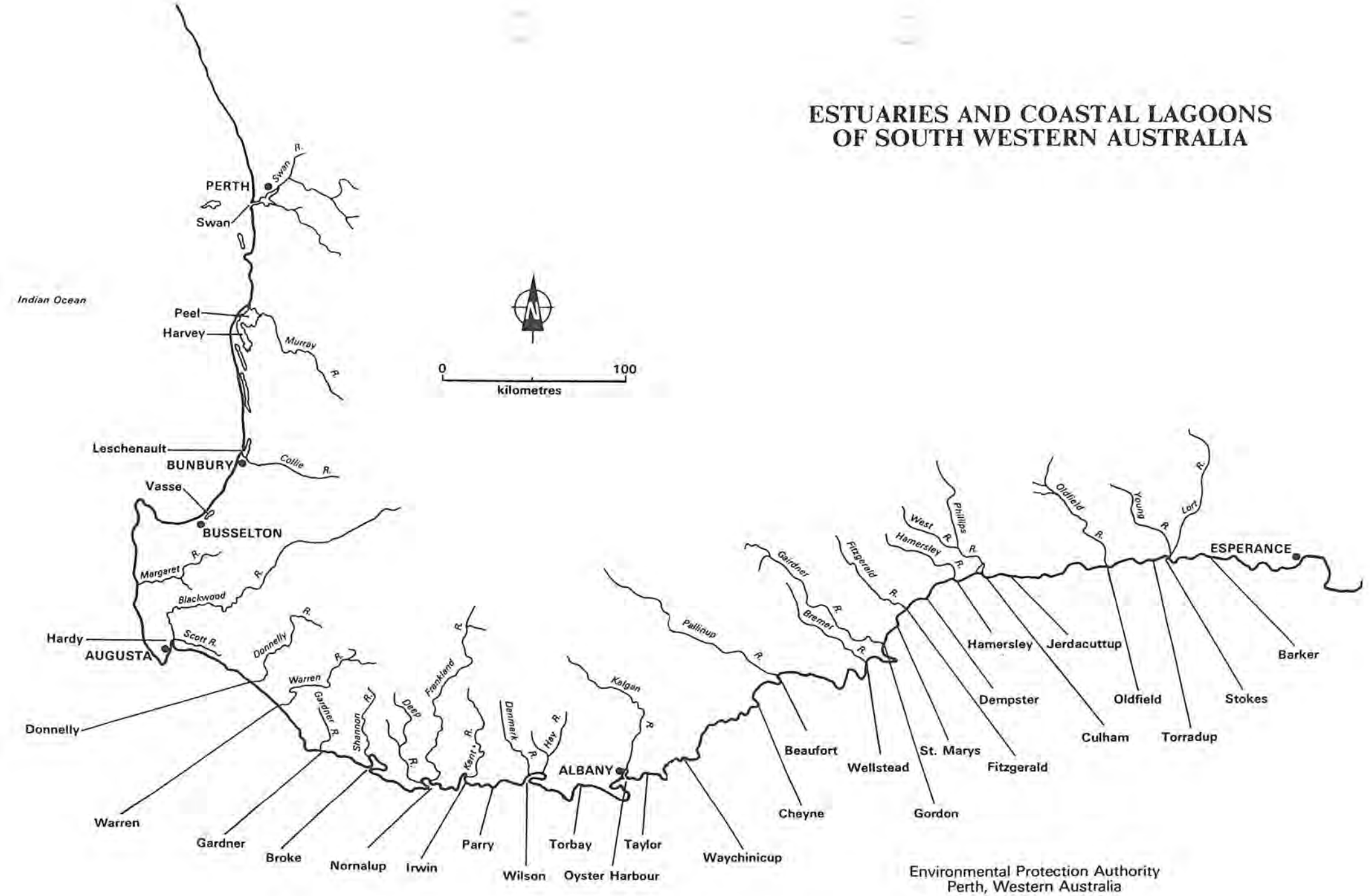
Management - This lists the principal factors which may affect management and known or forseen problems known to EPH.

This material should not be used for publication without reference to me

Ernest P. Hodgkin

14 August 1987

ESTUARIES AND COASTAL LAGOONS OF SOUTH WESTERN AUSTRALIA



Environmental Protection Authority
Perth, Western Australia

Estuarine Studies Series

DONNELLY RIVER ESTUARY

RIVERS - DONNELLY

Catchment area: 1545 km^2, 19% cleared (1968).

Total flow - **mean**: 345 x 10^6 m^3 **median**: 344 x 10^6 m^3

Runoff - **overall**: 223 mm

upper catchment: 176 mm (gauging station 608 151)

lower catchment: 358 mm (Stn. 608 171)

Salinity - **mean**: 222 mg/l TSS (83-522) (Stn. 608 151)

RAINFALL - **Inland** - Yornup: 878 mm

Coast - Springfields: 1446 mm

ESTUARY - **Area**: 0.4 km^2 **length**: 15 km

Type: seasonally open, riverine through swamps and high coastal dunes.

Bar - **height**: 2 m above AHD **width**: 800 m

sand type: medium to fine sand

Depth - **average**: 1.5 m **max**: 10 m at 2 km.

Salinity - **range**: surface 0-1 ppt benthic 0-30 ppt

Adjacent land use - D'Entrecasteaux National Park

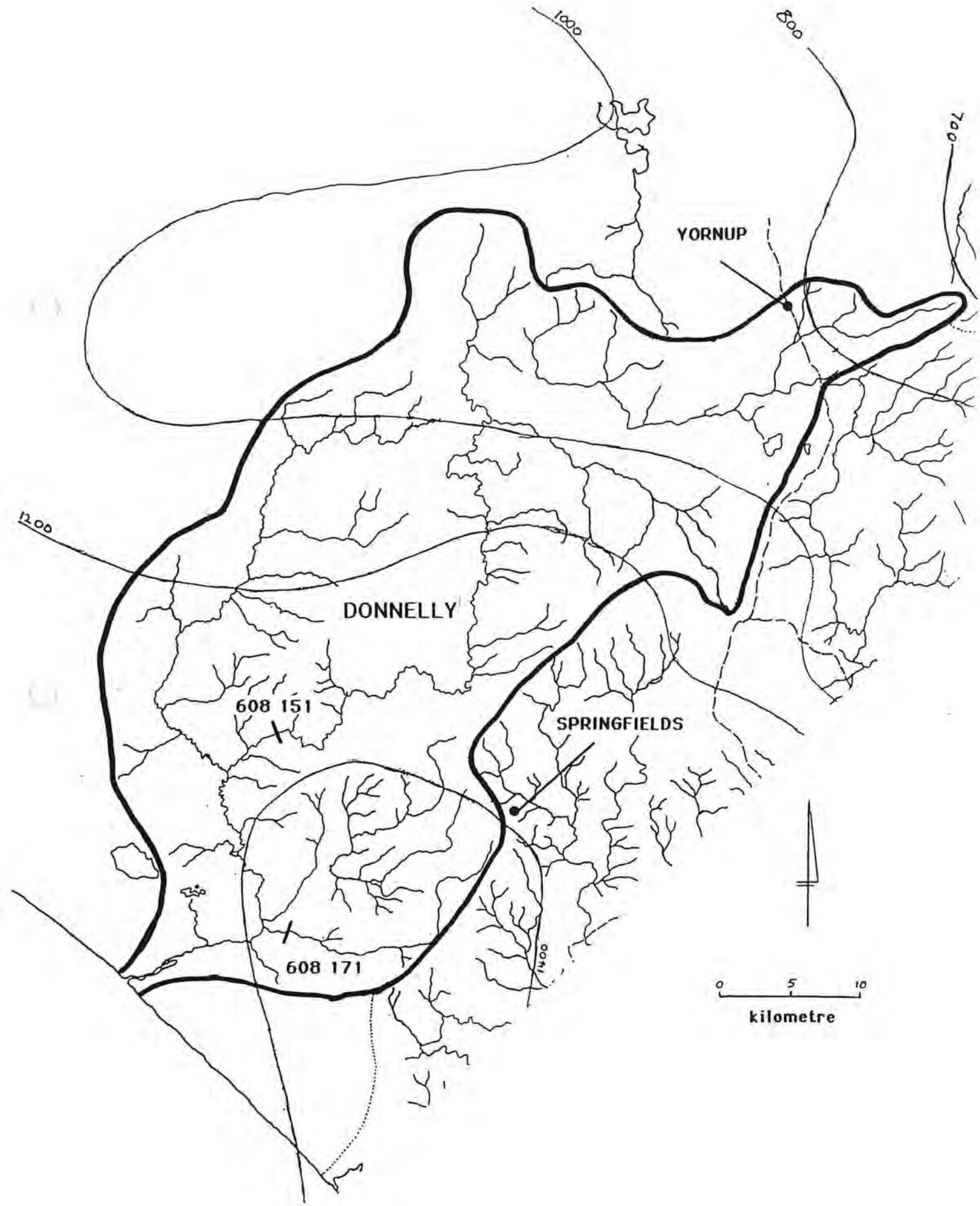
MANAGEMENT

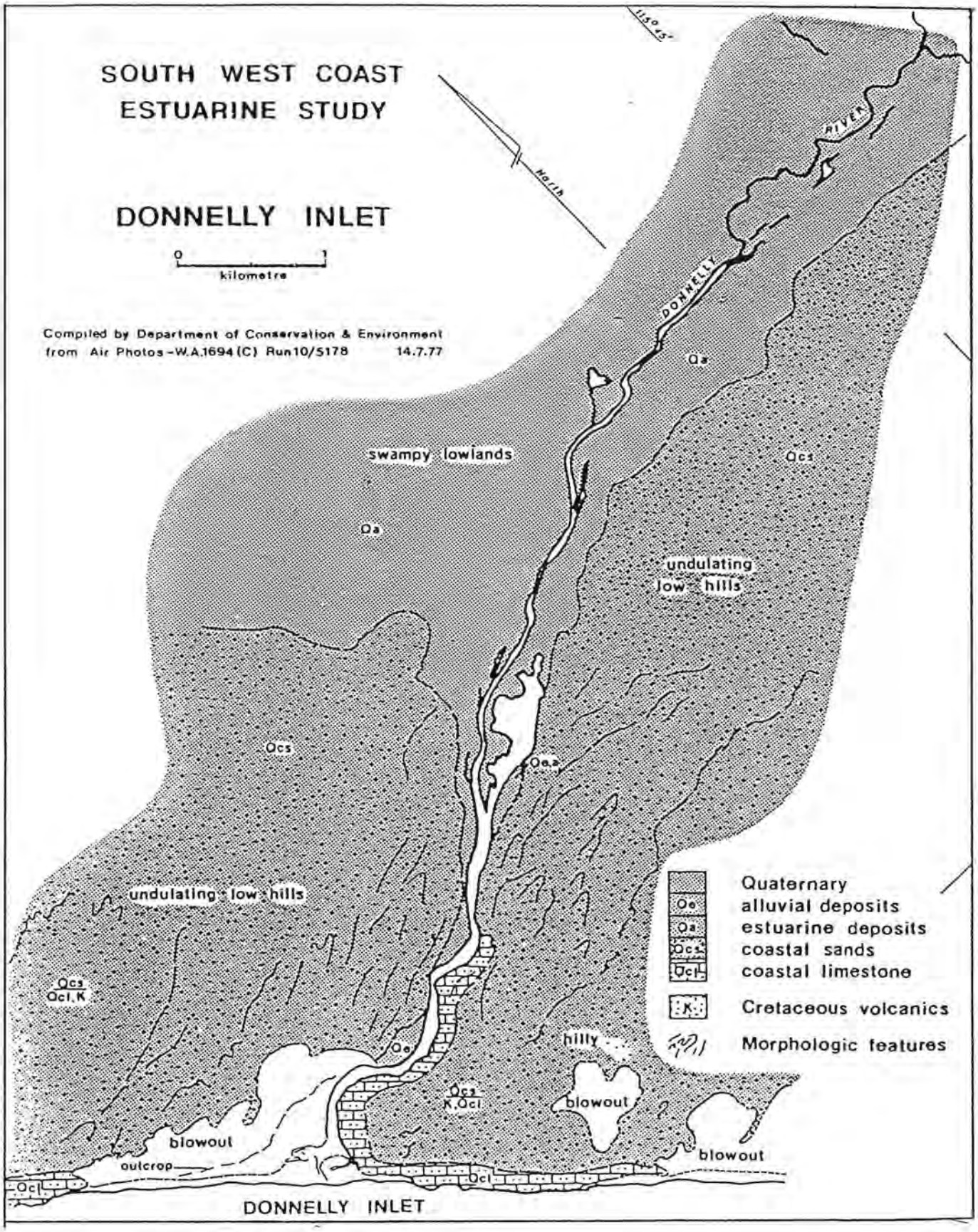
About 30 houses/shacks line the shores to 3 km (licenced by National Parks).

There is only one record of it being broken artificially.

Mobile dunes adjacent to western shore need further stabilisation.

DONNELLY RIVER CATCHMENT




SOUTH WEST COAST
ESTUARINE STUDY
DONNELLY INLET
0
kilometre
Compiled by Department of Conservation & Environment
from Air Photos - W.A.1694 (C) Run10/5178 14.7.77
115°45'
NORTH
DONNELLY RIVER
Qa
swampy lowlands
Qa
Qcs
undulating low hills
Qcs
Qe,a
undulating low hills
Qcs
Qcl, K
Qe
hilly
blowout
Qcs
K, Qcl
blowout
blowout
outcrop
Qcl
Qcl
DONNELLY INLET
Quaternary
alluvial deposits
estuarine deposits
coastal sands
coastal limestone
Qe
Qa
Qcs
Qcl
K
Cretaceous volcanics
Morphologic features

WARREN RIVER ESTUARY

RIVERS – WARREN

Catchment area: 4174 km^2 35% cleared (1982)

Total flow – **mean:** 310 x 10^6 m^3 **median:** 321 x 10^6 m^3

Runoff – **overall:** 74 mm

upper catchment: 20 mm (gauging station 607 007)

lower catchment: 387 mm (Stn. 607 155)

Salinity – **mean:** 189 mg/l TSS (77-1446) (Stn. 607 155)

RAINFALL – **Inland** – Boyup Brook (Westbourne): 705 mm

Coast – Northcliffe (Strathylbyn): 1379 mm

ESTUARY – **Area:** 0.35 km^2 **length:** 6 km

Type: Seasonally open, riverine in a winding channel through high dunes.

Bar – River water flows over the beach in various directions.

width: 1 km

sand type: not known

Depth – **average:** shallow

Salinity – surface fresh, waves may introduce saline bottom water

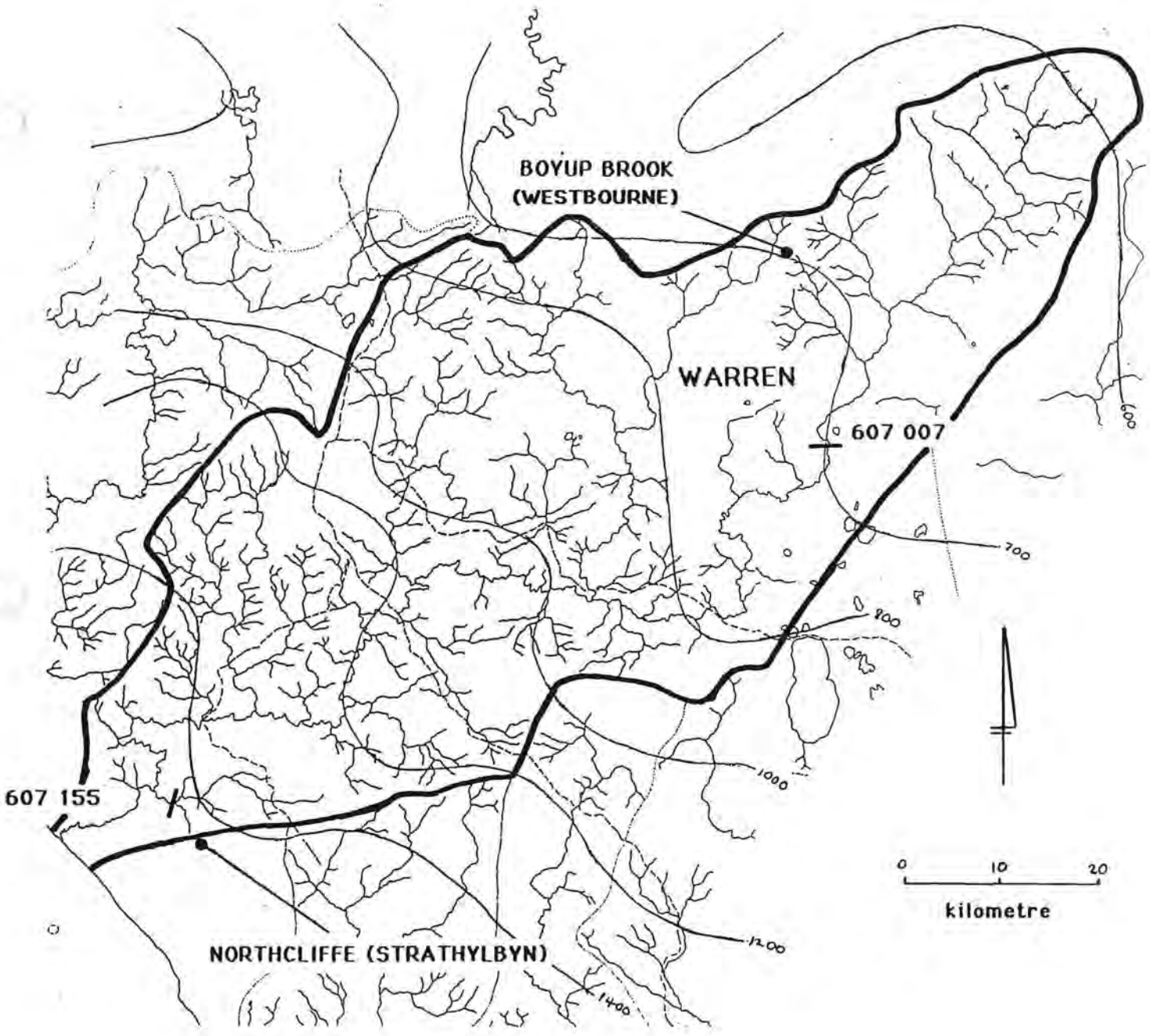
MANAGEMENT

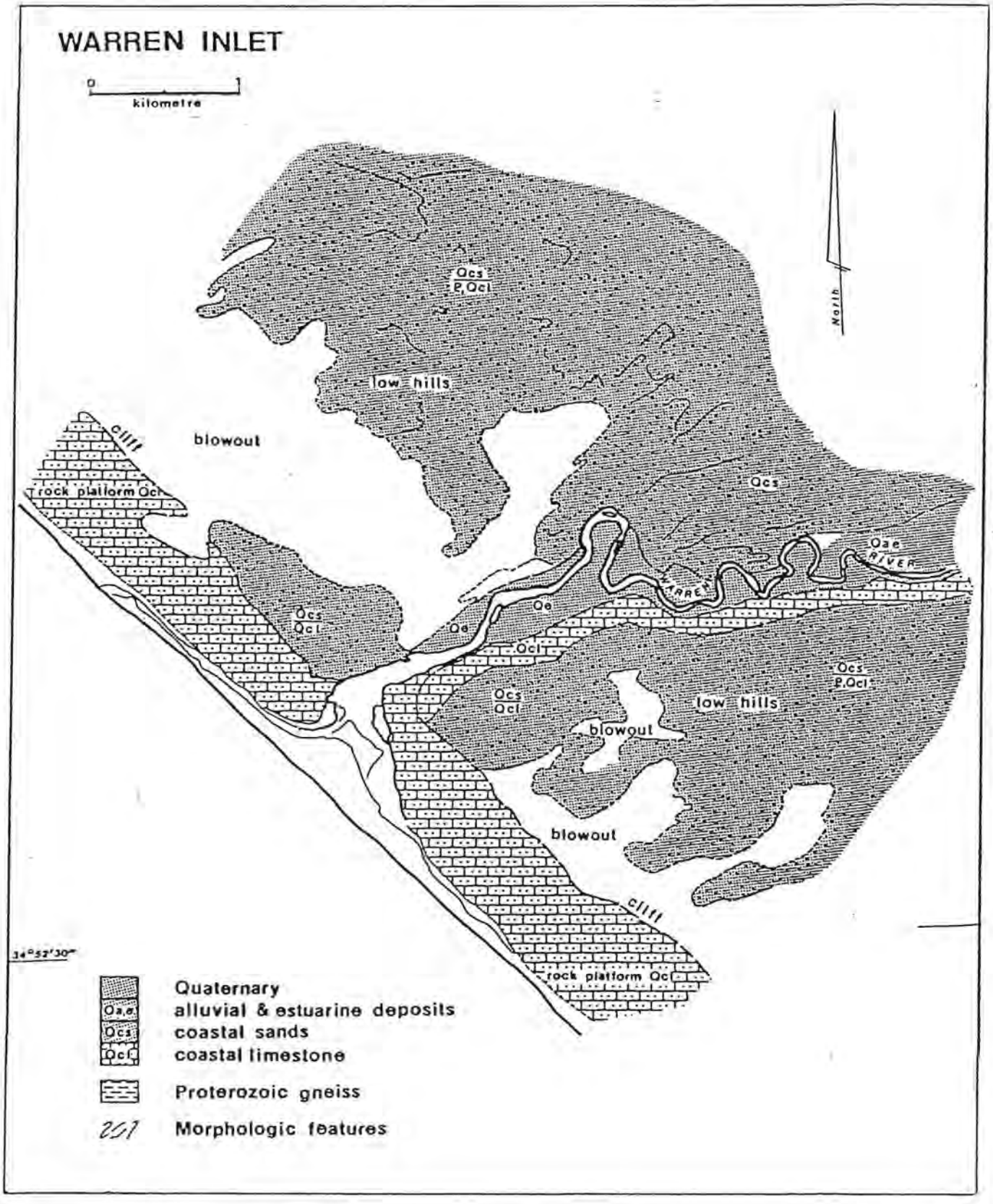
The estuary is in the D'Entrecasteaux National Park and access is difficult down, and up, a 200 m high dune from Callcup Hill (4 km east). Nevertheless the beach is popular with fishermen and there is pressure to improve the track.

There are two fishermen's shacks near the mouth.

Meanders of the river are cutting into the dunes resulting in steep landslides into its channel.

WARREN RIVER CATCHMENT




WARREN INLET
0
1
kilometre
North
Qcs
P,Qcl
low hills
blowout
cliff
rock platform Qcl
Qcs
Qcl
Qe
Qae
RIVER
WARREN
Qcl
Qcs
P,Qcl
Qcs
Qcl
low hills
blowout
blowout
cliff
rock platform Qcl
34°52'30"
Quaternary
Qa,e
alluvial & estuarine deposits
Qcs
coastal sands
Qcl
coastal limestone
Proterozoic gneiss
201
Morphologic features

GARDNER RIVER ESTUARY

RIVERS – GARDNER

Catchment area: 607 km^2, 30% cleared (1968)

Total flow – mean: 177 x 10^6 m^3 **median:** 185 x 10^6 m^3

Runoff – overall: 291 mm (gauging station 606 218)

Salinity – mean: 181 mg/l TSS (78-495) (Stn. 606 218)

RAINFALL – **Overall** – Northcliffe Post Office: 1383 mm

ESTUARY – **Area:** 0.35 km^2 **length:** 5 km.

Type: Permanently open, with rock in the shallow bar; riverine through low dunes and swamps

Bar – width: 100 m

sand type: not known

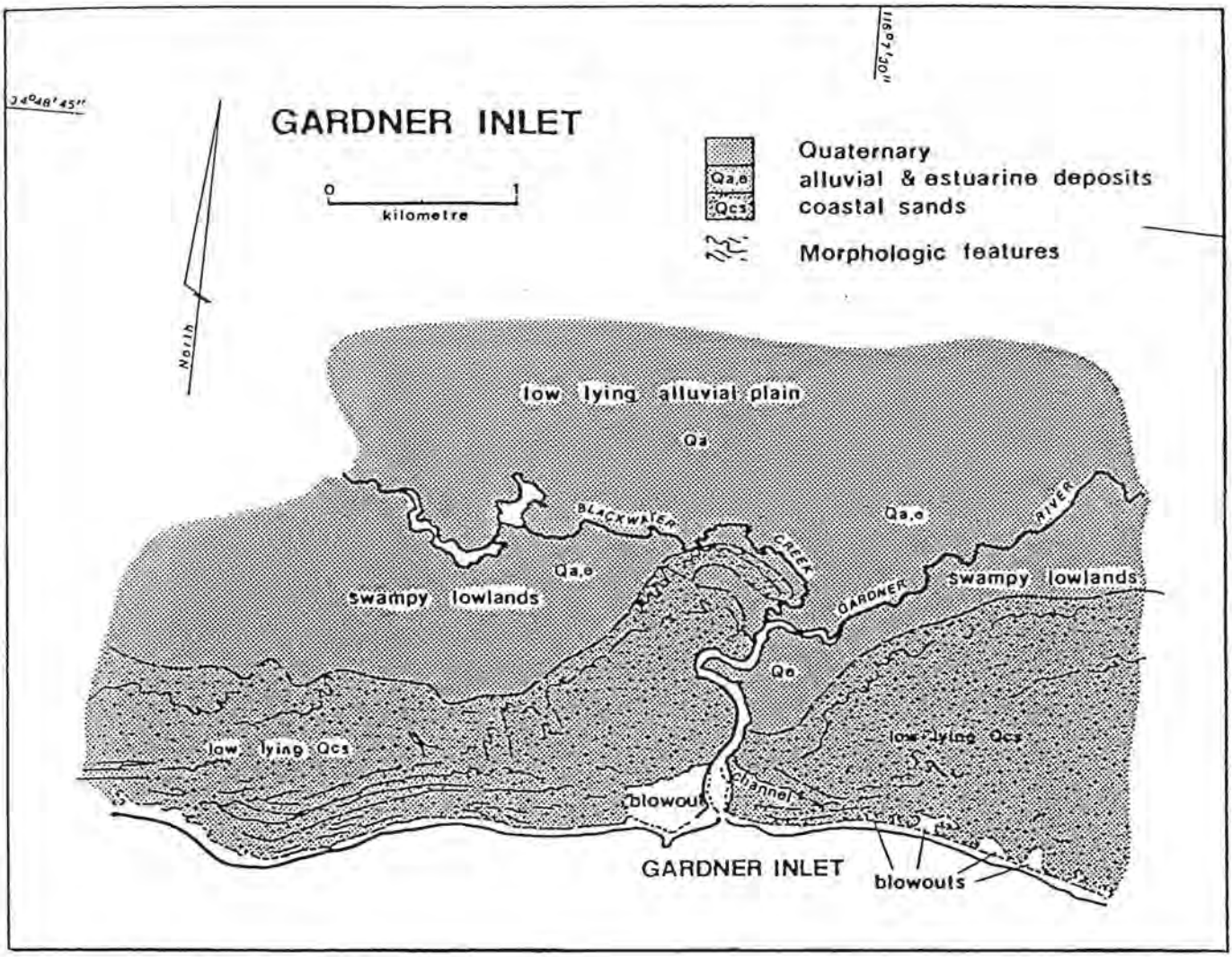
Depth: up to 1.8 m

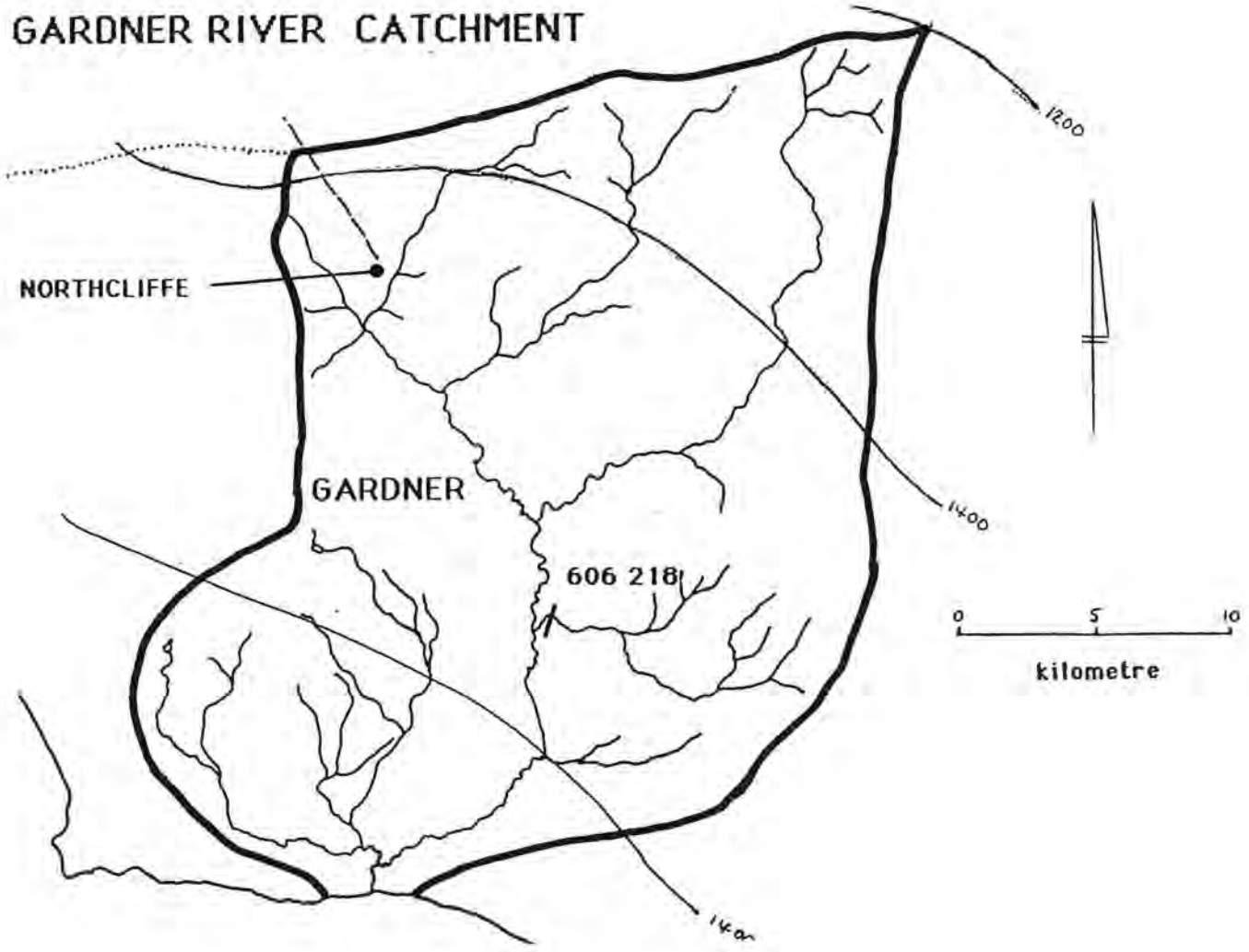
Salinity: surface fresh, deep probably saline

MANAGEMENT

The estuary lies in the D'Entrecasteaux National Park through which there are numerous bush tracks, mainly used by marron fishermen.

There is a fisherman's shack and a small camping area near the mouth.


GARDNER INLET
0
1
kilometre
North
Quaternary
alluvial & estuarine deposits
coastal sands
Morphologic features
low lying alluvial plain
Qa
Qa,e
BLACKWATER
CREEK
GARDNER
RIVER
swampy lowlands
swampy lowlands
Qa,e
Qe
low lying Qcs
low lying Qcs
blowout
channel
GARDNER INLET
blowouts


GARDNER RIVER CATCHMENT
1200
NORTHCLIFFE
GARDNER
606 218
1400
1400
0
5
10
kilometre

BROKE INLET

RIVERS – SHANNON

Catchment area: 840 km^2, 0.7% cleared(1968), 5% cleared(1981)

Total flow – mean: 157 x 10^6 m^3 (gauging station 606 185)

Runoff – overall: 187 mm (Stn. 606 185)

Salinity – mean: 203 mg/l TSS (95-401)(Stn. 606 185)

RAINFALL – **Inland** – Northcliffe (Shannon River): 1153 mm

Coast – Walpole Post Office: 1363 mm

ESTUARY – **Area:** 43.5 km^2 **length:** Shannon 3 km

Type: Seasonally-closed; 5 km river, lagoon, 3 km long channel

Bar – height: 1 m above AHD

width: 800 m

sand type: clean white moderately well sorted, medium to coarse quartz sand with minor shell material.

Depth – average: 3 m **max:** 7 m, extensive shallows

Salinity – surface 6-20 ppt, deep 6-35 ppt, marine near bar when open

MANAGEMENT

The bar usually breaks or is broken annually when the water tops it, between July and October, and stays open until November or December. Did not break in 1969 and 1986.

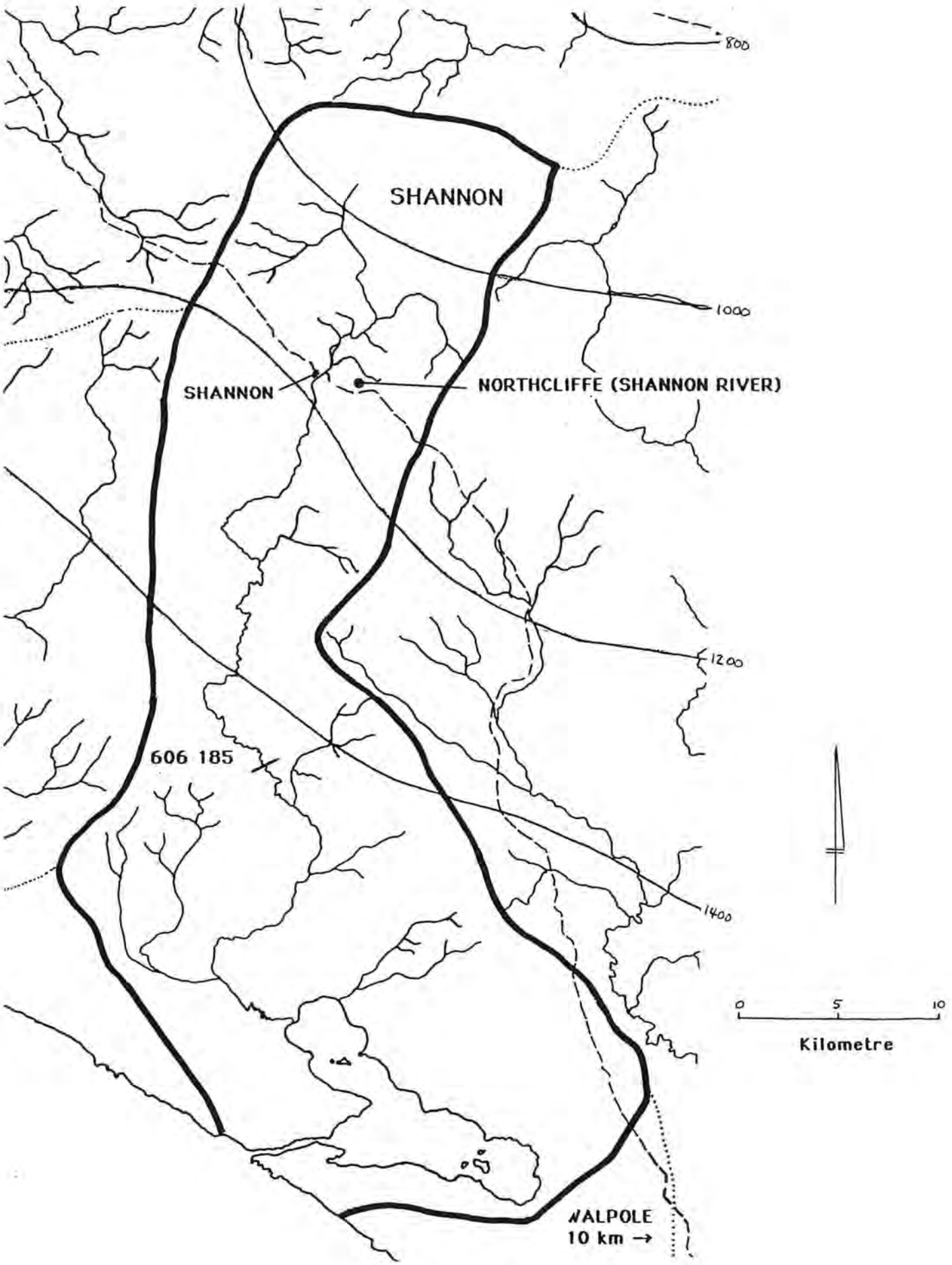
Water level is reported to vary by nearly 3 m when the bar is closed.

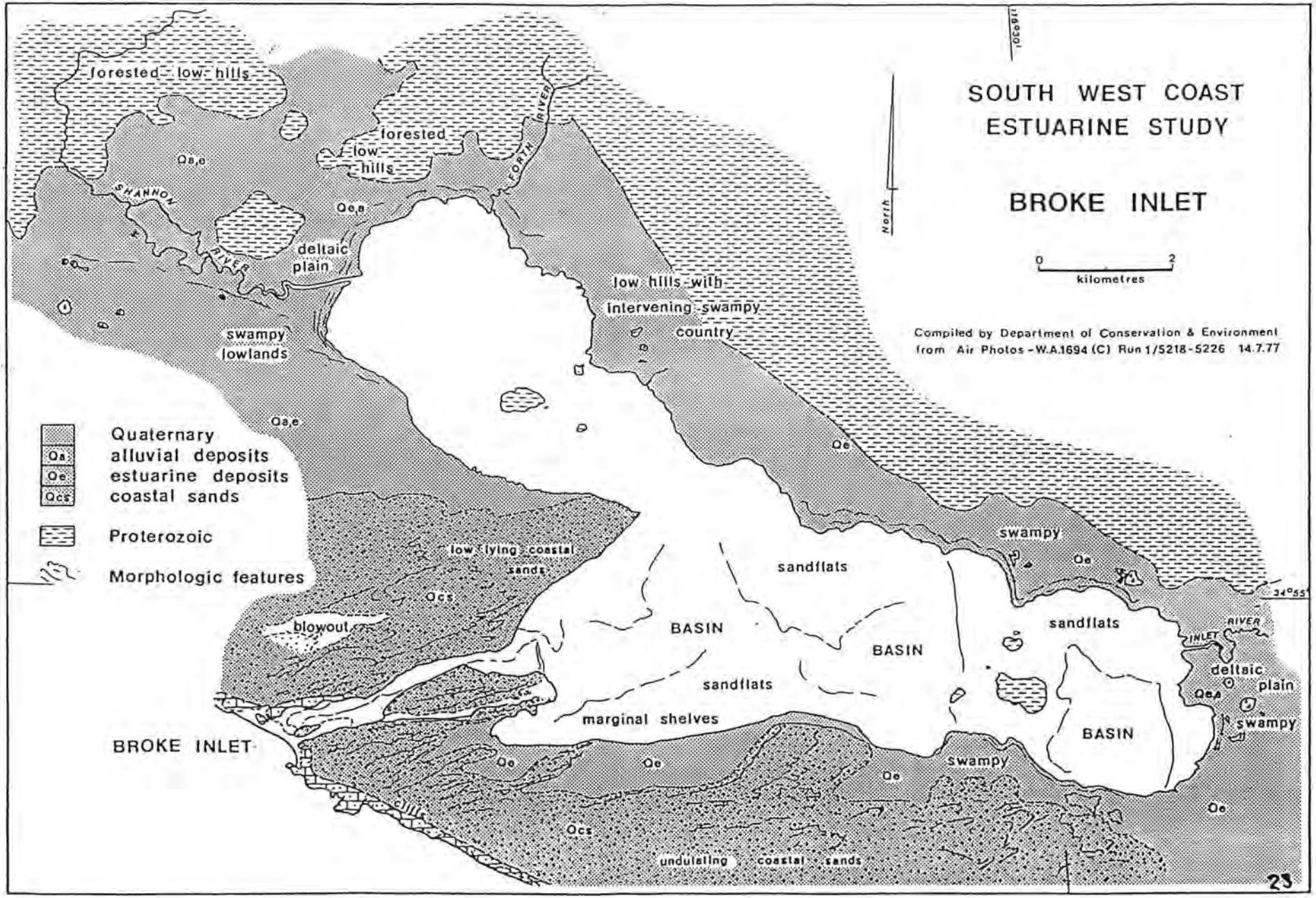
There is only a small net fishery in the estuary, mainly for yellow-eye mullet.

The estuary is in the D'Entrecasteaux National Park. There a number of fishermen's shacks on the north shore and one permanently occupied residence.

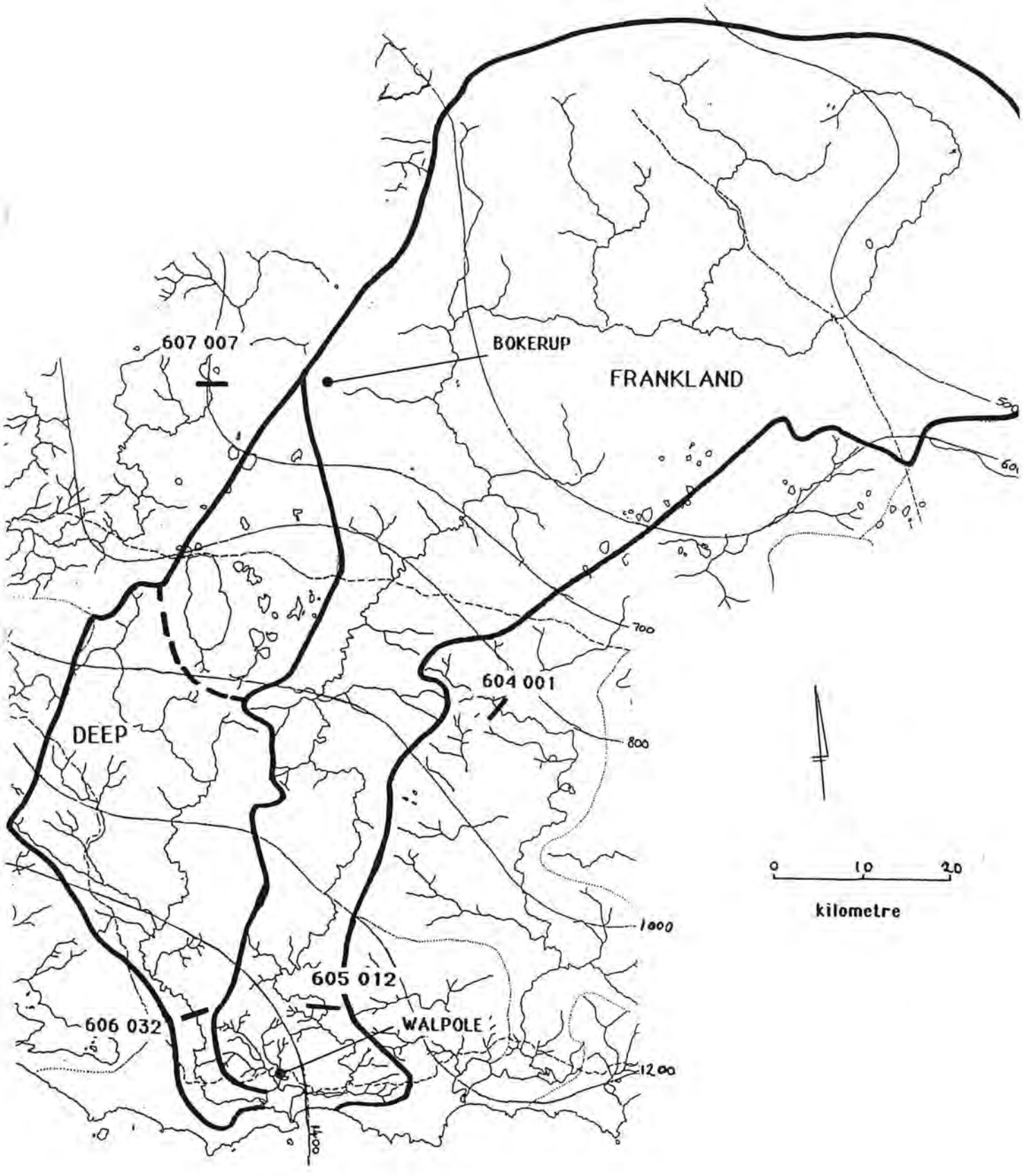
Forest clearing for woodchipping may increase sediment load in the Shannon.

BROKE INLET CATCHMENT




SOUTH WEST COAST
ESTUARINE STUDY
BROKE INLET
0
2
kilometres
North
Compiled by Department of Conservation & Environment
from Air Photos - W.A.1694 (C) Run 1/5218-5226 14.7.77
forested low hills
forested low hills
SHANNON RIVER
FORTH RIVER
deltaic plain
swampy lowlands
low hills with intervening swampy country
Qa,e
Qe,a
Qe
Quaternary
alluvial deposits
estuarine deposits
coastal sands
Proterozoic
Morphologic features
low lying coastal sands
Ocs
blowout
BASIN
BASIN
BASIN
sandflats
sandflats
sandflats
marginal shelves
swampy
swampy
swampy
34°55'
INLET
RIVER
deltaic plain
BROKE INLET
cliffs
undulating coastal sands
23

NORNALUP-WALPOLE CATCHMENT



NORNALUP-WALPOLE ESTUARY

RIVERS - DEEP

Catchment area: 1070 km^2 (excluding 390 km^2 Lake Muir catchment)
very little cleared (1968)

Total flow - mean: 202 x 10^6 m^3

Runoff - overall: 189 mm (gauging station 606 032)

Salinity - mean: 247 mg/l TSS (123-600) (Stn. 606 032)

FRANKLAND

Catchment area: 4895 km^2, 80% cleared, most before 1930.

Total flow - mean: 357 x 10^6 m^3

Runoff - overall: 73 mm (Stn. 605 012)

upper catchment: 18 mm (Stns. 604 001, 607 007)

lower catchment: 189 mm (Stn.606 032)

Salinity - mean: 1167 mg/l TSS (193-5964) (Stn. 606 012)

RAINFALL - **Inland** - Bokerup: 595 mm

Coast - Walpole Post Office: 1363 mm

ESTUARY - **Area:** 12.6 km^2 **length:** Frankland 12 km, Deep 6 km

Type: Permanently open, lagoon and two tidal rivers

Bar - width: 500 m

sand type: well-sorted fine sand

Depth - average: 2-5 m **Max:** 7 m

Salinity: surface 10-35ppt, bottom 28-35ppt, rivers fresh in winter

MANAGEMENT

Most of the estuary is surrounded by the Walpole-Nornalup National Park, with the tourist town of Walpole on the north shore of Walpole Inlet and camping and caravan parks on the west shore of Walpole Inlet and north shore of Nornalup Inlet.

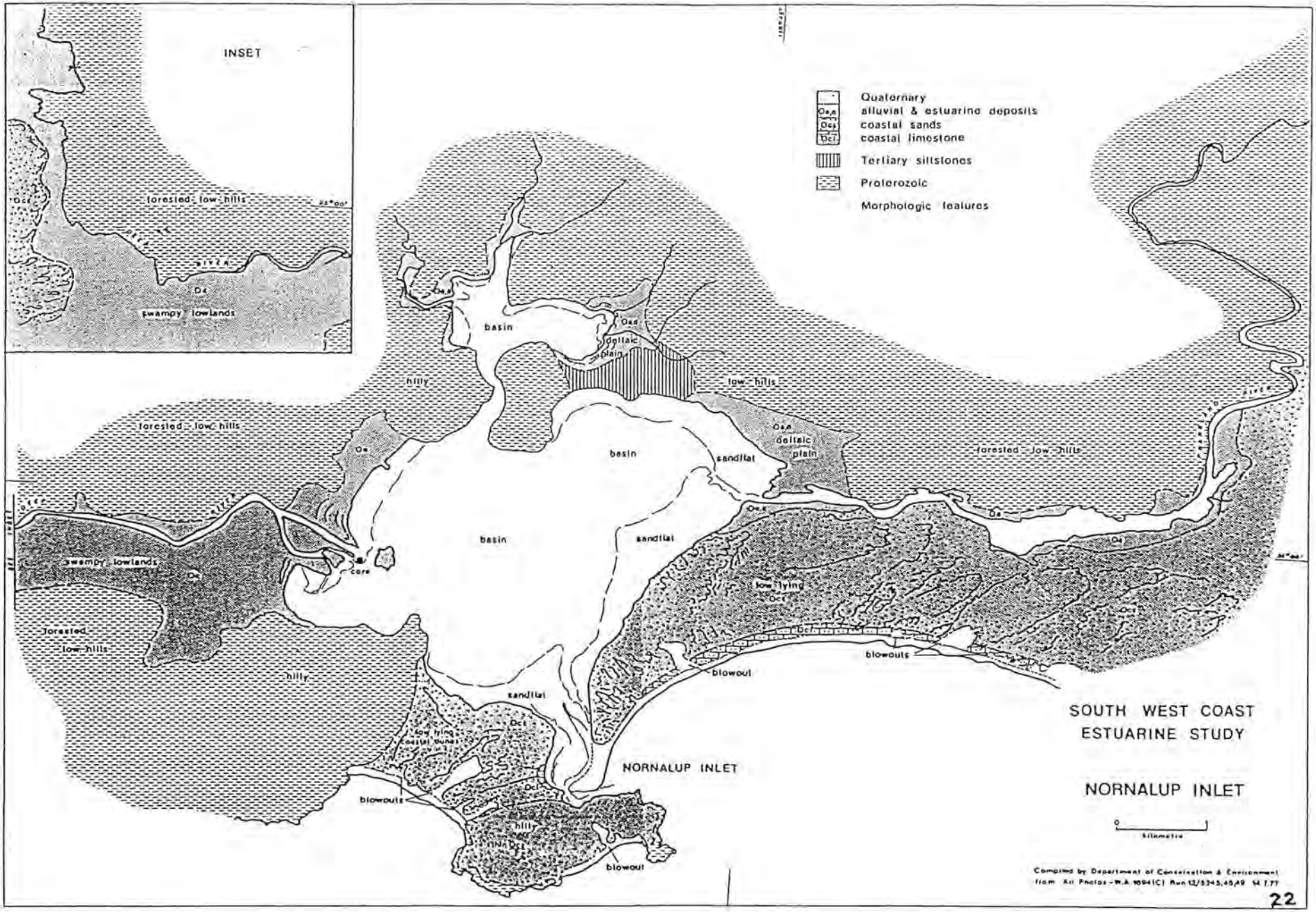
A yacht club operates from the north shore of Nornalup Inlet.

Net fishing is prohibited in the Inlets and rivers.

Nutrients released from cleared land in the upper Frankland River catchment are probably so greatly diluted by the greater runoff from the forested catchment as to be insignificant. There is a small area of grazing land in the lower catchment.

Periodic dredging is required to maintain navigation channels in the lower Deep and Frankland Rivers and deltas and in Walpole Inlet.

The ocean entrance is shallow and dangerous and there have been serious accidents to boats.


INSET
forested low hills
swampy lowlands
Qa
Qcl
Quaternary
alluvial & estuarine deposits
coastal sands
coastal limestone
Tertiary siltstones
Proterozoic
Morphologic features
basin
deltaic plain
hilly
low hills
forested low hills
sandflat
swampy lowlands
core
low lying coastal dunes
blowouts
blowout
NORNALUP INLET
SOUTH WEST COAST
ESTUARINE STUDY
NORNALUP INLET
kilometre
Compiled by Department of Conservation & Environment
from Air Photos - W.A. 1094 (C) Run 12/5345,46,49 M 7.77
22

IRWIN INLET ESTUARY

RIVERS – BOW

Catchment area: 550 km^2, 39% cleared (1968)

Total flow – **mean:** 43 x 10^6 m^3

Runoff – **overall:** >78 mm (gauging station 604 010)

KENT

Catchment area: 1950 km^2, 39% cleared (1968)

Total flow – **mean:** 129 x 10^6 m^3

Runoff – **overall:** 66 mm (Stn. 604 010)

upper catchment: 18 mm (Stn. 604 001)

lower catchment: 78 mm (Stn. 604 053, Stn. 604 010)

Salinity – **mean:** 508 mg/l TSS (134-1146) (Stn. 604 010)

RAINFALL – **Inland** – Mount Barker (Kojaneerup): 468 mm

Coast – Denmark (Wattlegrove): 1186 mm

ESTUARY – **Area:** 10.2 km^2 **length:** Bow 4 km, Kent 6 km

Type: Seasonally open, may stay open for several seasons; a lagoon, a 1.7 km long channel to the sea, and two tidal rivers

Bar – **width:** 500 m **height:** low

sand type: Moderately well sorted, fine to coarse sand, 90% quartzose

Depth – **average:** 2.5 m **Max:** 6 m

Salinity: Fresh to marine seasonally

MANAGEMENT

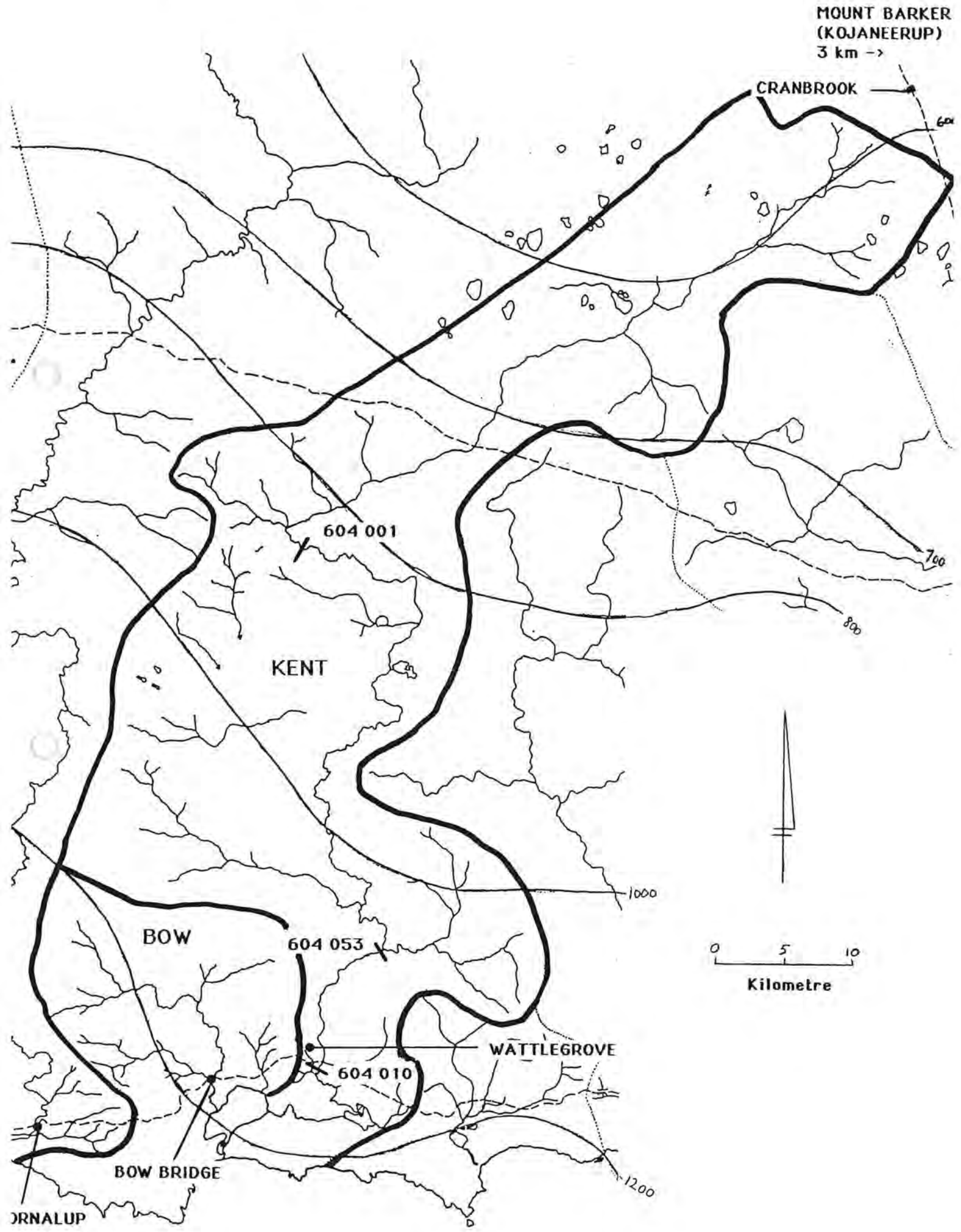
There are conflicts of interest with respect to management of the bar. Estuary fishermen want it open to allow replenishment of stocks and to prevent the water becoming too fresh in winter or evaporation lowering water level in summer, so exposing the productive shallows; both cause high mortality of benthic invertebrates and death of the seagrasses (as in the 1986-87 summer when the bar was closed). Beach fishermen and tourists want the bar closed to give vehicle access to the beach east of the mouth from Peaceful Bay. The Peaceful Bay road can be flooded when the bar is closed in winter.

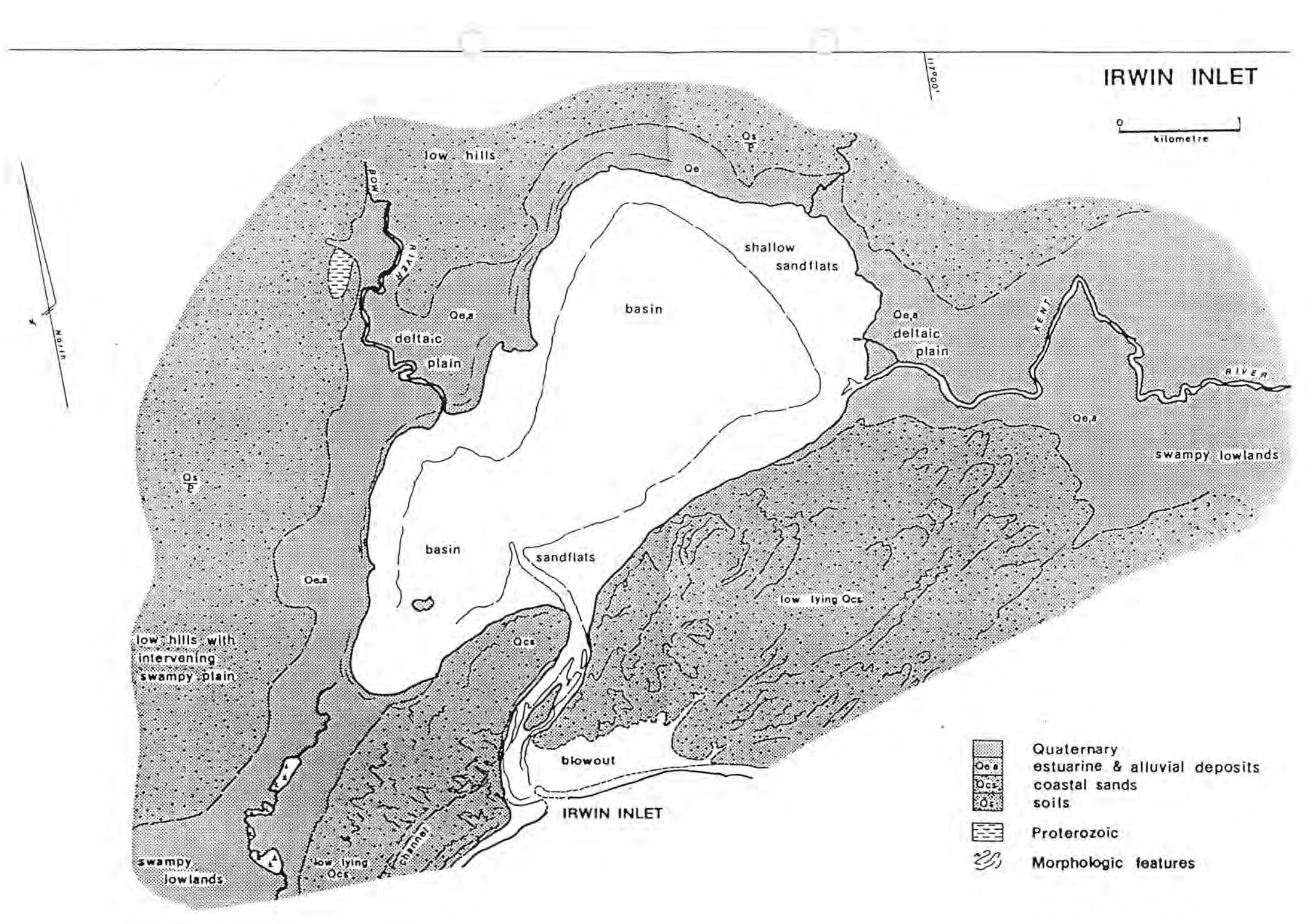
The estuary fishery is very productive, but there have been unexplained changes in catch, black bream were abundant in the 1940s but no longer are; mud oysters have also disappeared.

There is the common disagreement as to where the bar should be opened.

Development of Owingup Swamp is controversial. Hay River water is saline and 'burns' potatoes and maize. Heavy use of fertilizers could cause eutrophication of Inlet water, especially when the bar is closed.

IRWIN INLET CATCHMENT




IRWIN INLET
0
kilometre
low hills
Qe
Qs/P
BOW RIVER
shallow sandflats
basin
Qe,s
deltaic plain
Qe,s
deltaic plain
KENT RIVER
Qe,s
swampy lowlands
Qs/P
basin
sandflats
Qe,s
low lying Qcs
low hills with intervening swampy plain
Qcs
blowout
IRWIN INLET
swampy lowlands
low lying Qcs
channel
Quaternary
Qe,s estuarine & alluvial deposits
Qcs coastal sands
Qs soils
Proterozoic
Morphologic features

PARRY INLET

RIVERS – KORDABUP

Catchment area: 170 km^2, 68% cleared (1968)

Approximate flow – 13 x 10^6 m^3

Runoff overall: >78 mm (Gauging station 604 010)

RAINFALL – **Overall** – Denmark (Wattlegrove): 1186 mm

ESTUARY – **Area:** 1.4 km^2 **length:** Kordabup 400 m

Type: Bar opens once or twice a year for short periods; shallow, dries out. The small lagoon has a narrow, 2 km long channel to the beach.

Bar – **height:** 1 m above AHD **width:** 100 m

sand type: fine white sand

Depth – **average:** 0.5 m **Max:** 2.5 m

Salinity: fresh to hypersaline, spring: 0-14 ppt, summer: >40 ppt

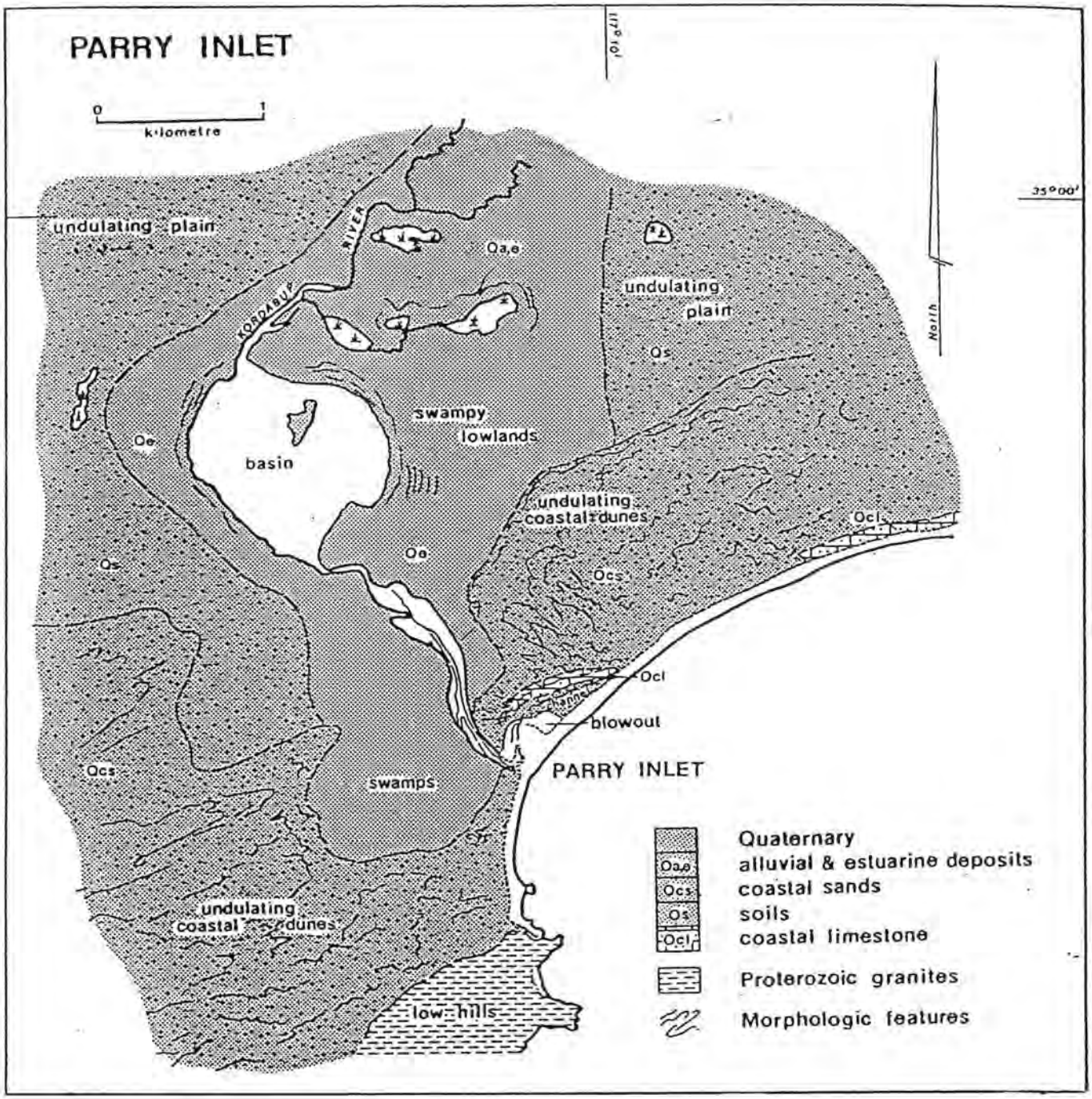
MANAGEMENT

The catchment of this small shallow estuary is too small and river flow too low for flow, or tidal exchange, to keep the bar open long enough to ensure continuity of the aquatic ecosystem.

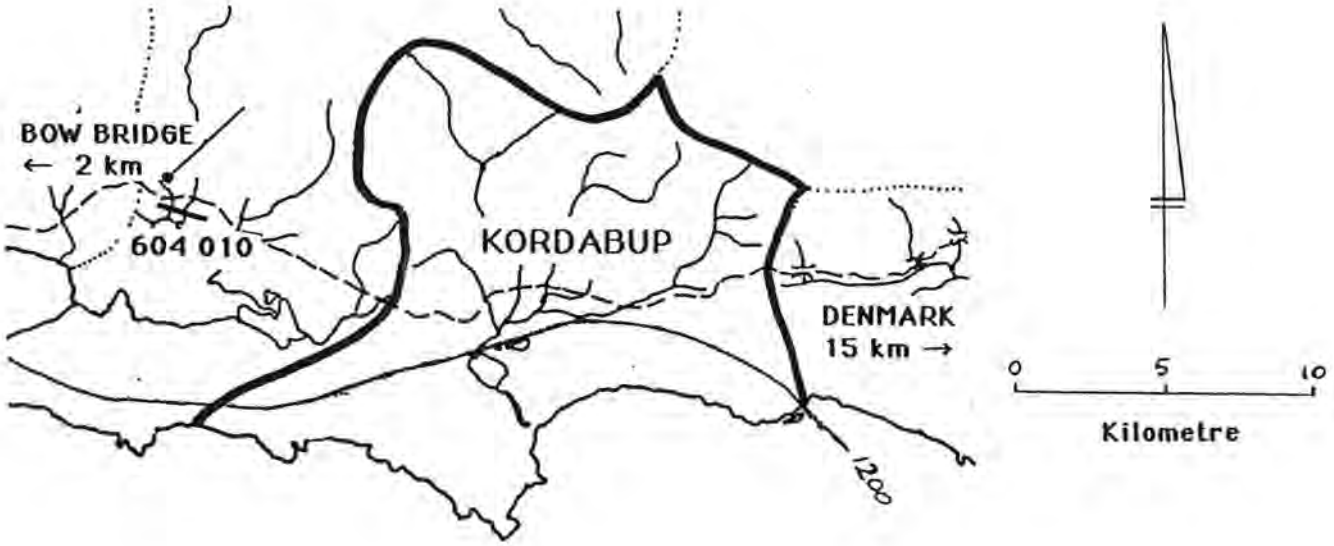
When flooded it does have an aquatic flora and fauna and it is fished from time to time, though catches are small.

There is no rock near the bar which consequently has no fixed place to break.

Parry Inlet will slowly die as an estuary unless the bar can be made to open more frequently and stay open for longer - which would be a costly undertaking and probably unpopular with people wishing to drive along the beach.



PARRY INLET CATCHMENT



WILSON INLET

RIVERS – DENMARK

Catchment area: 708 km^2, ~33% cleared (1968)

Total flow – **mean:** 55 x 10^6 m^3 (gauging station 604 014)

Runoff – **overall:** 78 mm (Stn. 604 014)

upper catchment: 49 mm (Stn.603 003)

middle catchment: 72 mm (Stns. 603 003, 603 136)

lower catchment: 92 mm (Stns.603 003, 604 014)

Salinity – **mean:** 450 mg/l TSS (135-870) (Stn. 603 014)

HAY

Catchment area: 1301 km^2, 78% cleared (1968)

Total flow – **mean:** 99 x 10^6 m^3

Runoff – **overall:** 76 mm

Salinity – 500-3000 mg/l TSS (Humphries 1982: map 15)

LITTLE, SLEEMAN AND LAKE SADIE

Catchment area: 225 km^2, 100% cleared (1968)

Salinity – < 500 mg/l TSS (Humphries 1982: map 15)

RAINFALL – **Inland** – Mount Barker Post Office: 751 mm

Coast – Denmark Post Office: 1120 mm

ESTUARY – **Area:** 48 km^2 **length:** Denmark 3 km, Hay 5 km

Type: Seasonally-closed. A much attenuated tide when open and a water level variation of about 1m when closed.

Bar – **height:** the bar builds up to 1.3 m above AHD, but is breached when water level in the Inlet reaches 1.0 m, usually in July or August.

width: 800 m

sand type: moderately sorted, medium to coarse sand; 65% quartz.

Depth – **average:** 2-3 m **Max:** 6 m

Salinity: 12-32 ppt

MANAGEMENT see page 2

MANAGEMENT

There has been controversy over when, where and at what level the bar should be breached ever since the railway line was built in 1929. The various factions, fishermen, potato growers, residents, have different vested interests, and strong views, and are never likely to agree.

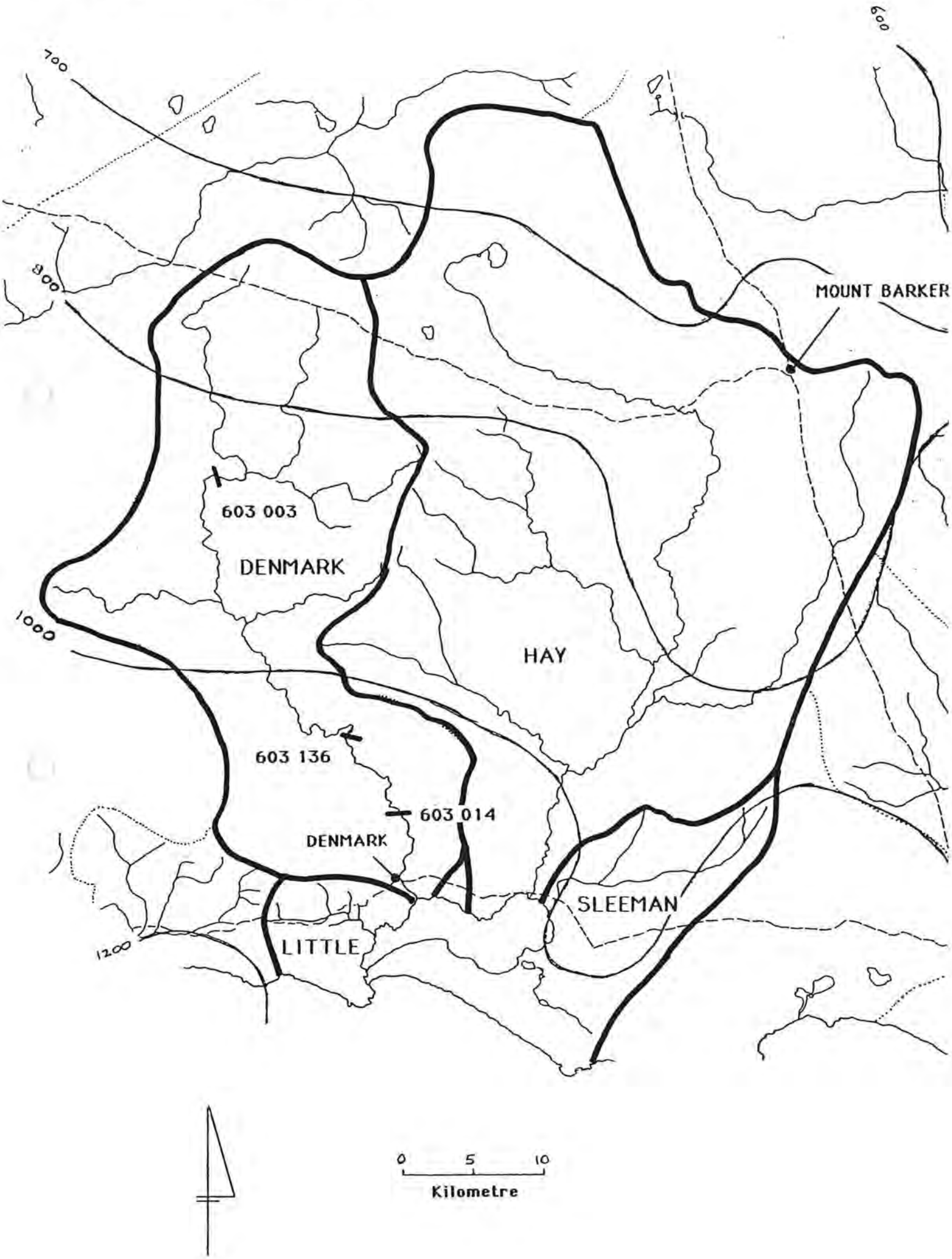
The bar is now opened by the Shire at a time decided by the Water Authority designed to give the maximum scour and a height intended to prevent flooding of the Lake Sadie potato fields.

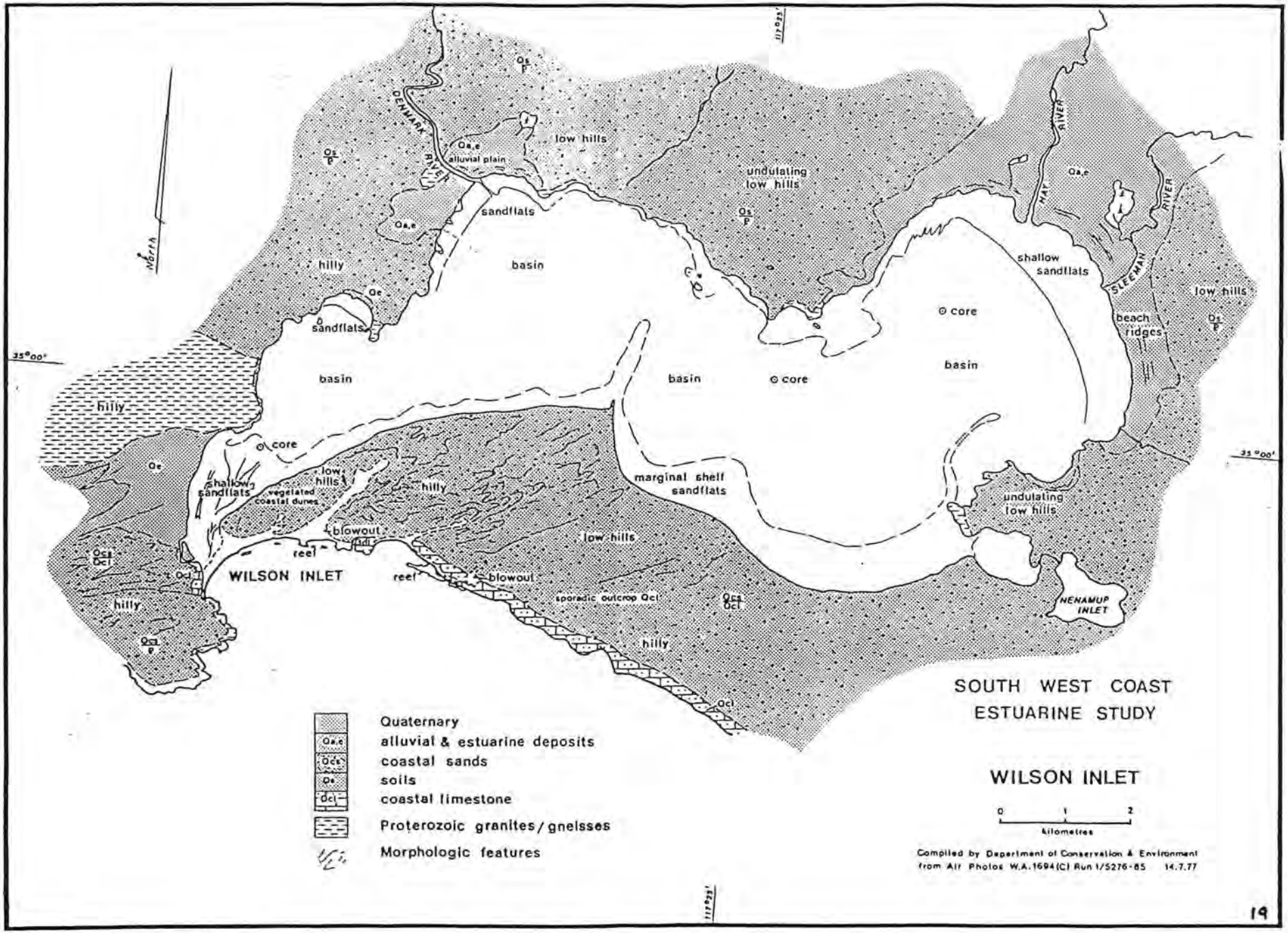
There is a massive tidal delta with shallow mobile channels through it and the premature bar opening, and consequent less scouring, is blamed for an alleged increase in its size. (EPH is not aware of any hard data to support this view). However distribution of the delta sediment and location of the channels has undoubtedly changed greatly.

The massive growth of Ruppia is regarded as a problem, apparently mainly because it fouls propellors and is seen as evidence of eutrophication, but locals say such growth is not new, and it probably favours the fishery by protecting juvenile fish from predation. Obviously there is the potential for eutrophication in this seasonally closed system with drainage from fertilized agricultural land (Lukatelich et al, 1987, Est. Coast. Shelf Sci. **24**, 141-165).

With the great increase in population aesthetic and recreational considerations become 'problems', such as seasonal changes of water level and the growth and accumulation of weed.

WILSON INLET CATCHMENT




DENMARK RIVER
low hills
alluvial plain
undulating low hills
sandflats
basin
hilly
shallow sandflats
core
beach ridges
MAR RIVER
SLEEMAN RIVER
35°00'
marginal shelf sandflats
vegetated coastal dunes
blowout
reef
WILSON INLET
sporadic outcrop Qcl
NENAMUP INLET
Quaternary
alluvial & estuarine deposits
coastal sands
soils
coastal limestone
Proterozoic granites / gneisses
Morphologic features
SOUTH WEST COAST
ESTUARINE STUDY
WILSON INLET
0 1 2
kilometres
Compiled by Department of Conservation & Environment
from Air Photos W.A.1694(C) Run 1/5276-85 14.7.77

TORBAY INLET

RIVERS – MARBELUP

Catchment area: 170 km^2, 65% cleared (1982)

Total flow – **mean:** 18 x 10^6 m^3 (603 001)

Runoff – **overall:** 107 mm (603 001)

Salinity – **mean:** 459 mg/l TSS (142-908)(stn. 603 001)

RAINFALL – **Overall** – Albany (Barrett Meadows): 1045 mm

ESTUARY – **Area:** Torbay Inlet 0.7 km^2 + upper basin 2 km^2 **length:** 2.5 km

Type: opens and closes several times a year

Bar – **height:** low **width:** 500-600 m

sand type: medium to fine grained sand

Salinity: 2 - 6 ppt (surface)

MANAGEMENT

Most of the catchment is cleared for agriculture and nutrient levels may be high; algae are reported to be abundant in Torbay Inlet in spring and summer.

Estuary water is excluded from the Lake Powell drainage system by a barrage. Water level builds up behind the ocean bar and WAWA breaks the bar several times a year to prevent saline water flooding back into the potato fields.

The bar may stay open for a couple of months in winter, but only briefly at other times; it is a low part of the beach. The 1 km long channel from the bar to Torbay Inlet appears to be about 2 m deep. A barrage built across it in 1905 (?) was never successful in keeping saline water out and was recently blown up.

Torbay Inlet is shallow and the upper basin is so shallow that it dries out in summer.

OYSTER HARBOUR

RIVERS – KALGAN

Catchment area: 3000 km^2, 98% cleared (1968)
Total flow – **mean:** 58 x 10^6 m^3
Runoff – **overall:** 19 mm (602 004, 602 005)
upper catchment: 13 mm (above 602 004)
lower catchment: 92 mm (below 602 004)
Salinity – **mean:** 3253 mg/l TSS (465-8927)(stn. 602 004)

KING

Catchment area: ~350 km^2, 98% cleared (1968)
Total flow – **mean:** 30 x 10^6 m^3
Runoff – **overall:** 72 mm (603 136, 603 003)
Salinity: fresh (no data)

RAINFALL – **Inland** – Mount Barker (Kojaneerup): 468 mm
Coast – Albany (Kalgan River): 794 mm

ESTUARY – **Type:** Permanently open
Mouth – **depth:** 11 m **width:** 200 m

Oyster Harbour – **Area:** 16.3 km^2
Depth – wide marginal shallows, basin 4^+ m to max of 12.7 m
Salinity: 15-40 ppt, lower following floods

King R. length: 8 km; **Depth** 2 m, bar <1 m
Salinity: 0-35 ppt, often stratified

Kalgan R. length: 10 km; **Depth** 3 m, rock bar at 8 km, pool at head 5 m.
Salinity: 2-36 ppt, often stratified

MANAGEMENT

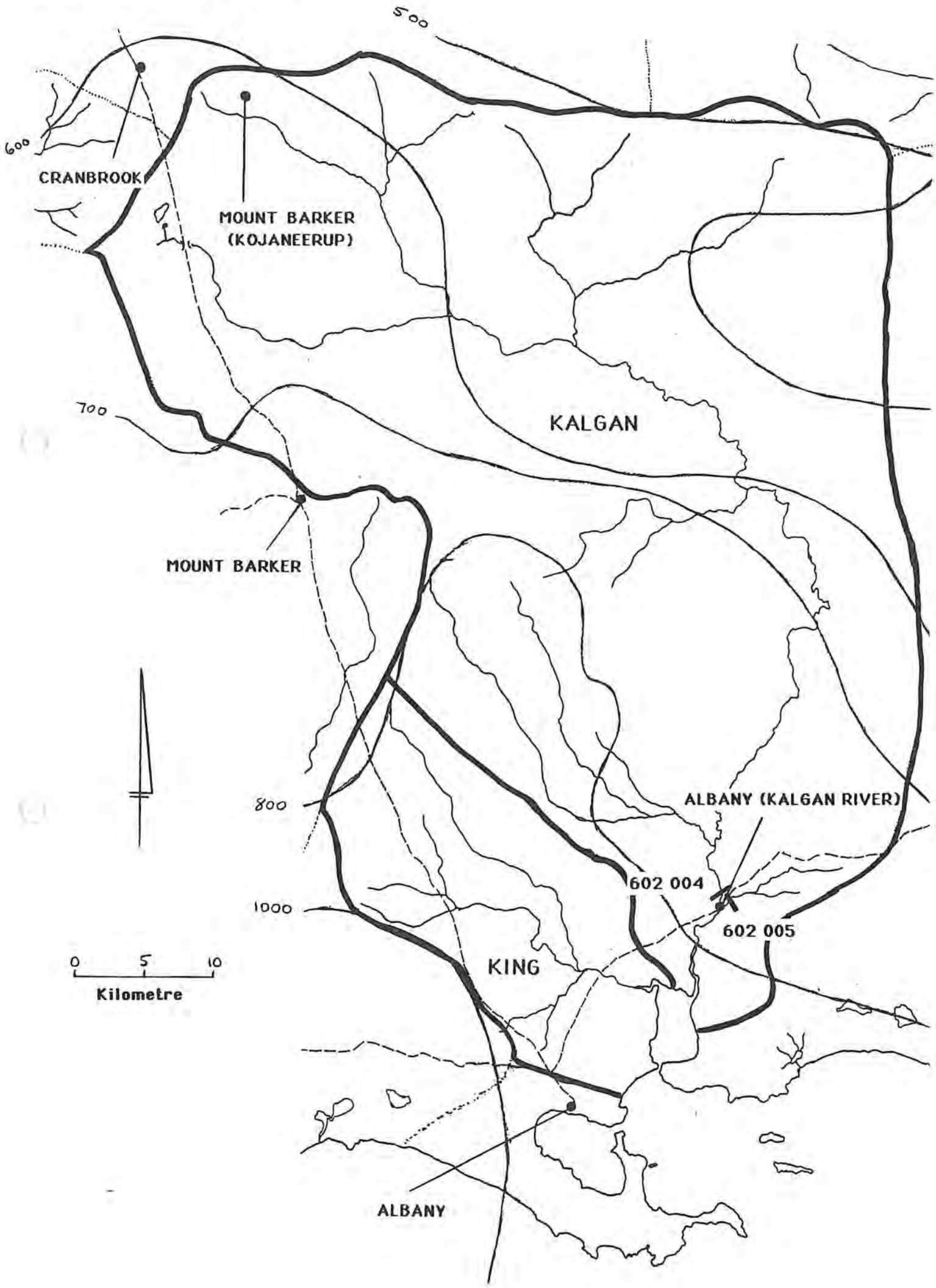
Oyster Harbour has a diverse marine fauna, especially near the mouth. Floods, such as those of 1984, are reported to have killed many euryhaline marine species such as Katelysia and Pinna in shallow water, but populations recover. Posidonia is also said to have been killed by floods 20+ years ago, with little subsequent recovery.

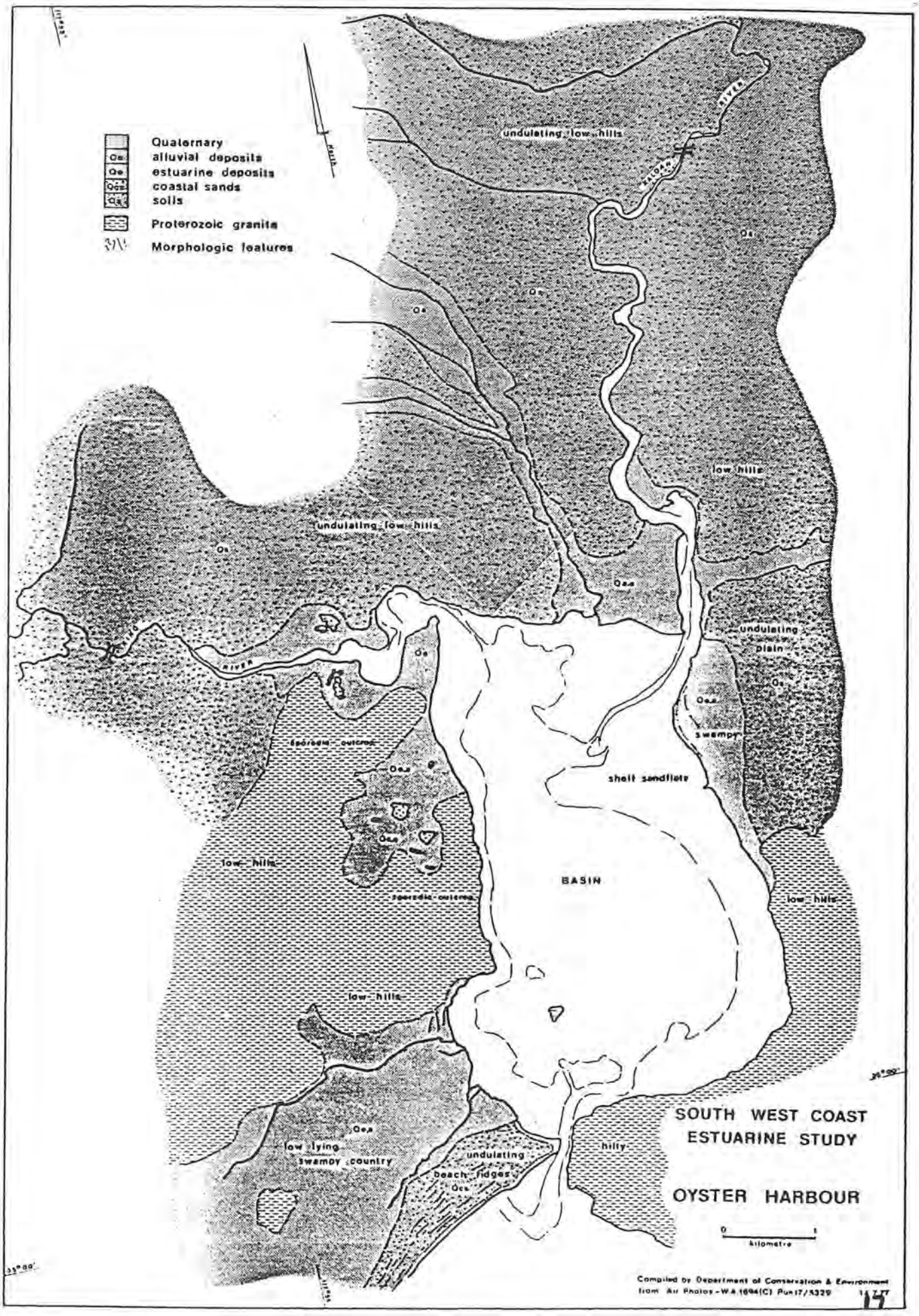
The bar at the mouth of the Kalgan river is also said to have shallowed with sediment brought down from the catchment.

Housing development on the north and west shores of Oyster Harbour, Holiday cottages and caravan parks on the King River, and the large marina at Emu Point all present potential problems for management.

There must be significant nutrient input from the catchment, but tidal exchange makes for much better flushing than in other south coast estuaries.

OYSTER HARBOUR CATCHMENT




Quaternary
alluvial deposits
estuarine deposits
coastal sands
soils
Proterozoic granite
Morphologic features
undulating low hills
low hills
undulating plain
swamp
shell sandflats
BASIN
low hills
low hills
low hills
low lying swampy country
undulating beach ridges
hilly
SOUTH WEST COAST ESTUARINE STUDY
OYSTER HARBOUR
0
1
kilometre
Compiled by Department of Conservation & Environment from Air Photos - W.A. 1694(C) Run 17/5329

TAYLOR INLET

RIVERS –

Catchment area: 15 km^2, 33% cleared (1974)
Total flow – **mean:** 1 x 10^6 m^3
Runoff – **overall:** 67 mm
Salinity – saline, no data

RAINFALL – **Overall** – Albany (Jerendine): 771 mm

ESTUARY – **Area:** 0.47 km^2 **length:** 2 km
Type: Bar is broken frequently, rarely naturally
Bar – **height:** 1 m above AHD **width:** 100 m
sand type: poorly sorted coarse to fine sand
Depth – **average:** 2-3 m **Max:** 5 m
Salinity: saline (23 ppt on 23.3.87)

MANAGEMENT

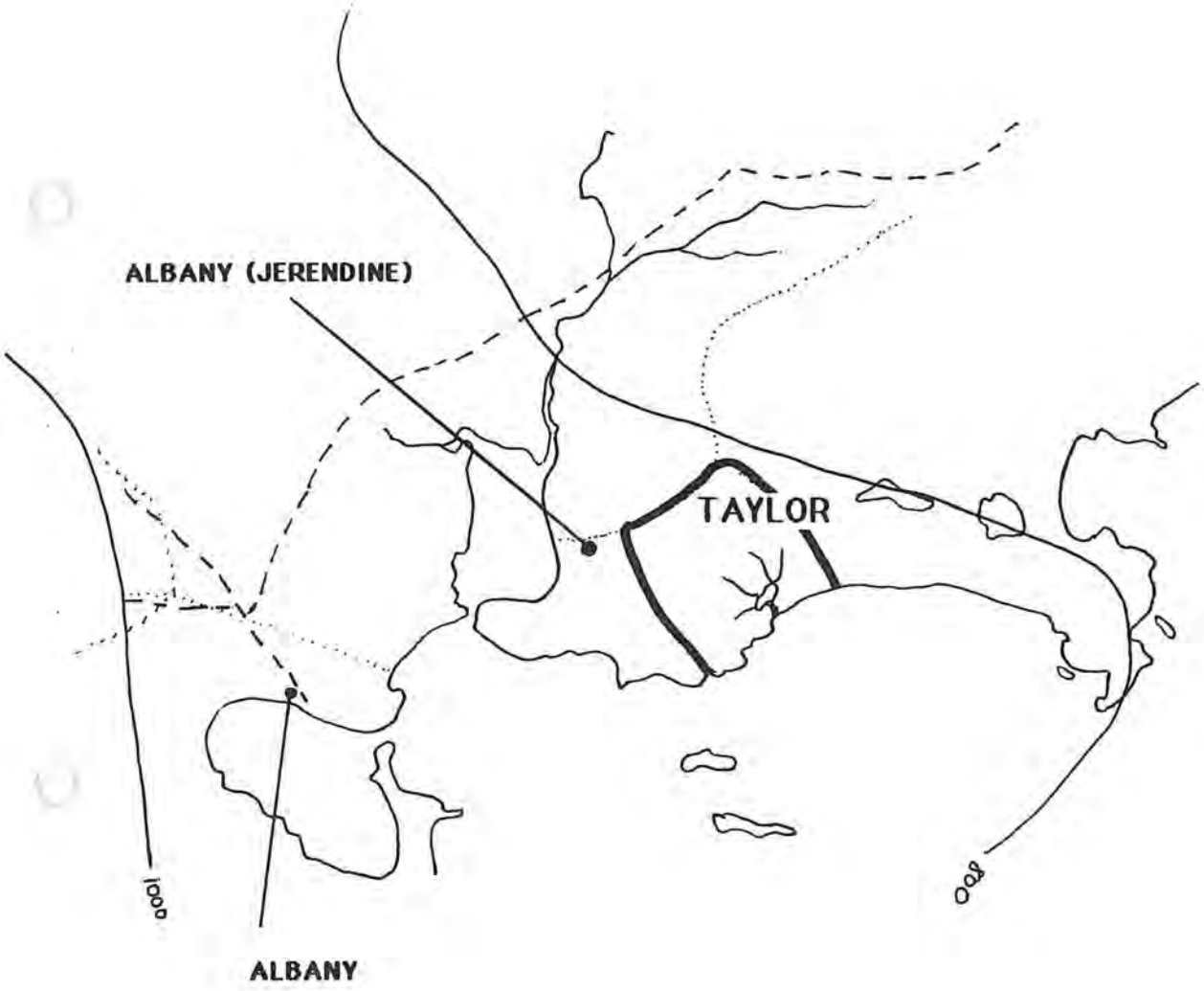
There are conflicts of interest over management of the bar, the responsibility for which lies with the Albany Shire, but fishermen also open it without permission. Farmers want it closed in summer to keep the water level high in their bores; fishermen (? only one), open it to keep the water level low so that they can drive along the western shore to get access to the beach; in a wet winter it is opened to prevent flooding of the road along the eastern shore.

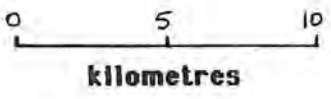
The mouth is through dunes, there is no rock at the mouth, and the 1984 storm cut back the dunes on the west. The western shore of the channel was eroded as the result of the storm and by the traffic along its beach. There is probably also damage to the dune on the east by traffic from the road to the beach.

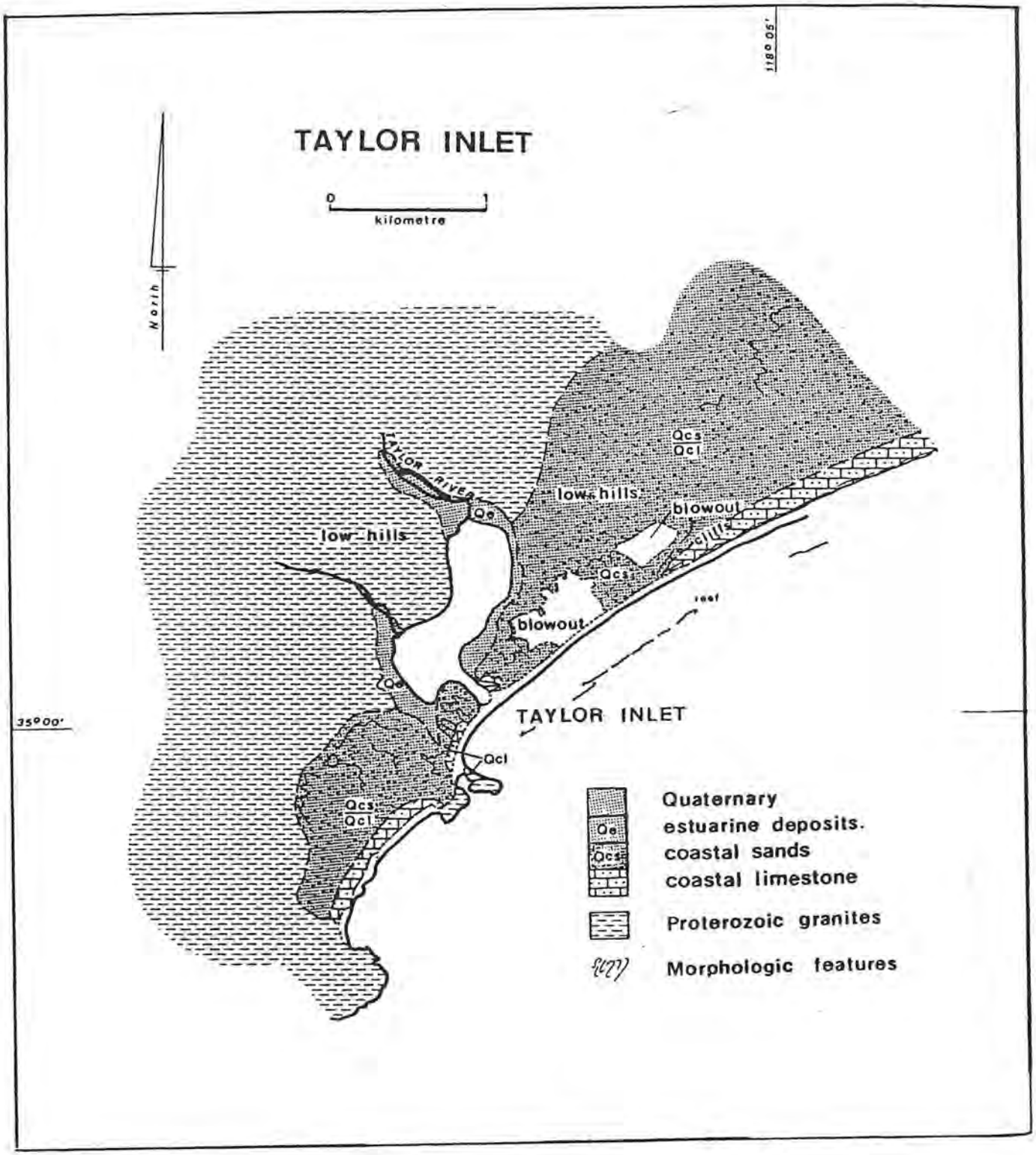
Sand from the beach is blocking the channel, reportedly at an increasing rate as the result of the frequent artificial opening of the bar.

The beach is a popular picnic spot for Albany residents and there is a small shop and a few cottages at the end of the road.

TAYLOR INLET CATCHMENT






TAYLOR INLET
0
kilometre
North
118° 05'
35° 00'
TAYLOR RIVER
low hills
low hills
blowout
blowout
cliffs
reef
TAYLOR INLET
Qcs
Qcl
Qe
Qcs
Qcl
Qcl
Qcs
Qcl
Quaternary
estuarine deposits.
coastal sands
coastal limestone
Proterozoic granites
Morphologic features

WAYCHINICUP INLET

RIVERS – WAYCHINICUP

Catchment area: 160 km^2, 45% cleared (1982)

Total flow – mean: 9.6 x 10^6 m^3 (Gauging station: 602 031)

Runoff – overall: 60 mm (Stn. 602 031)

RAINFALL – **Overall** – Albany (Waychinicup Downs): 693 mm

ESTUARY – **Area:** 0.25 km^2 **length:** 1 km

Type: permanently open, in a rocky (granite) gorge and cliffs

Bar – none

Depth – probably deep

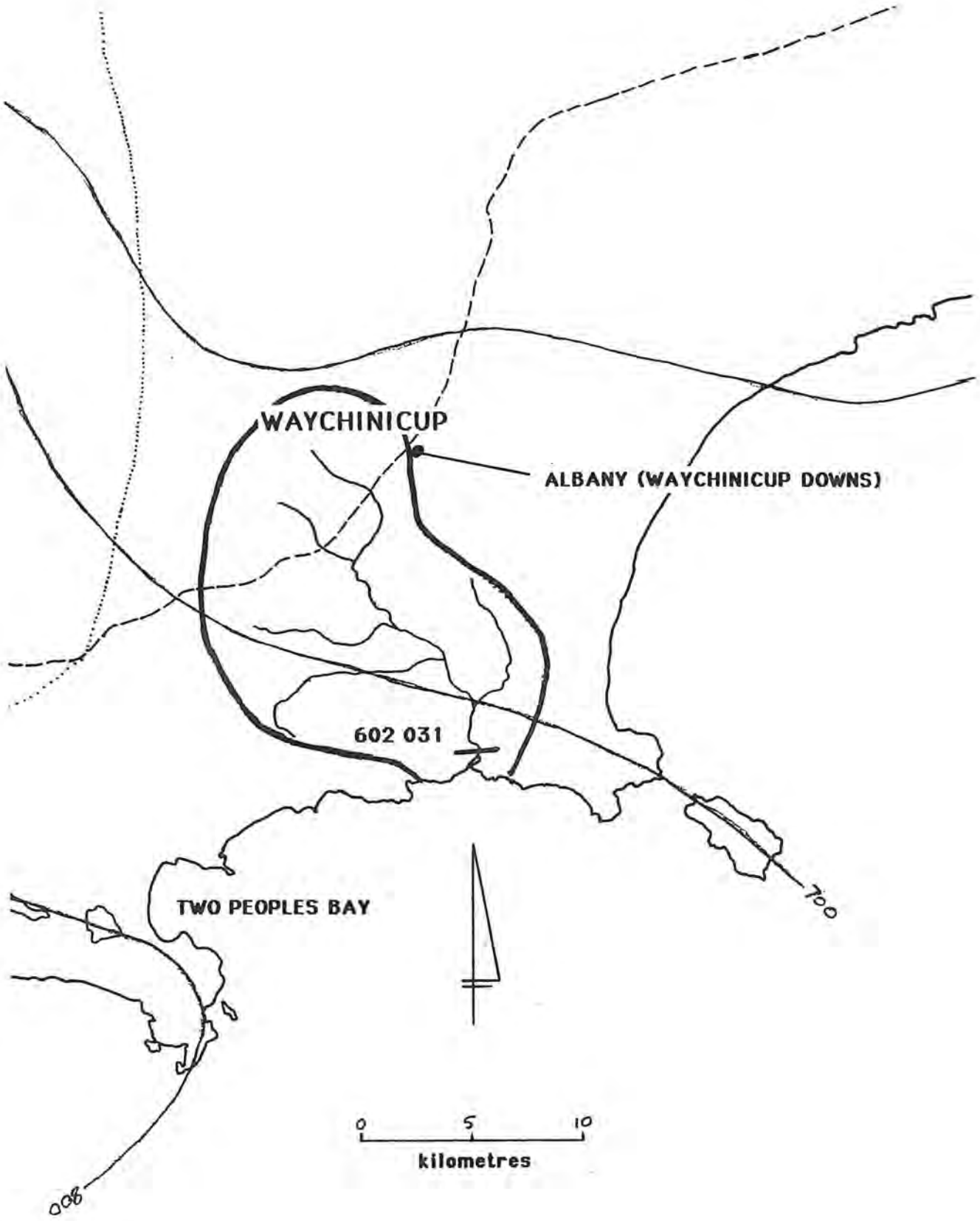
Salinity – marine except when the stream is flowing strongly

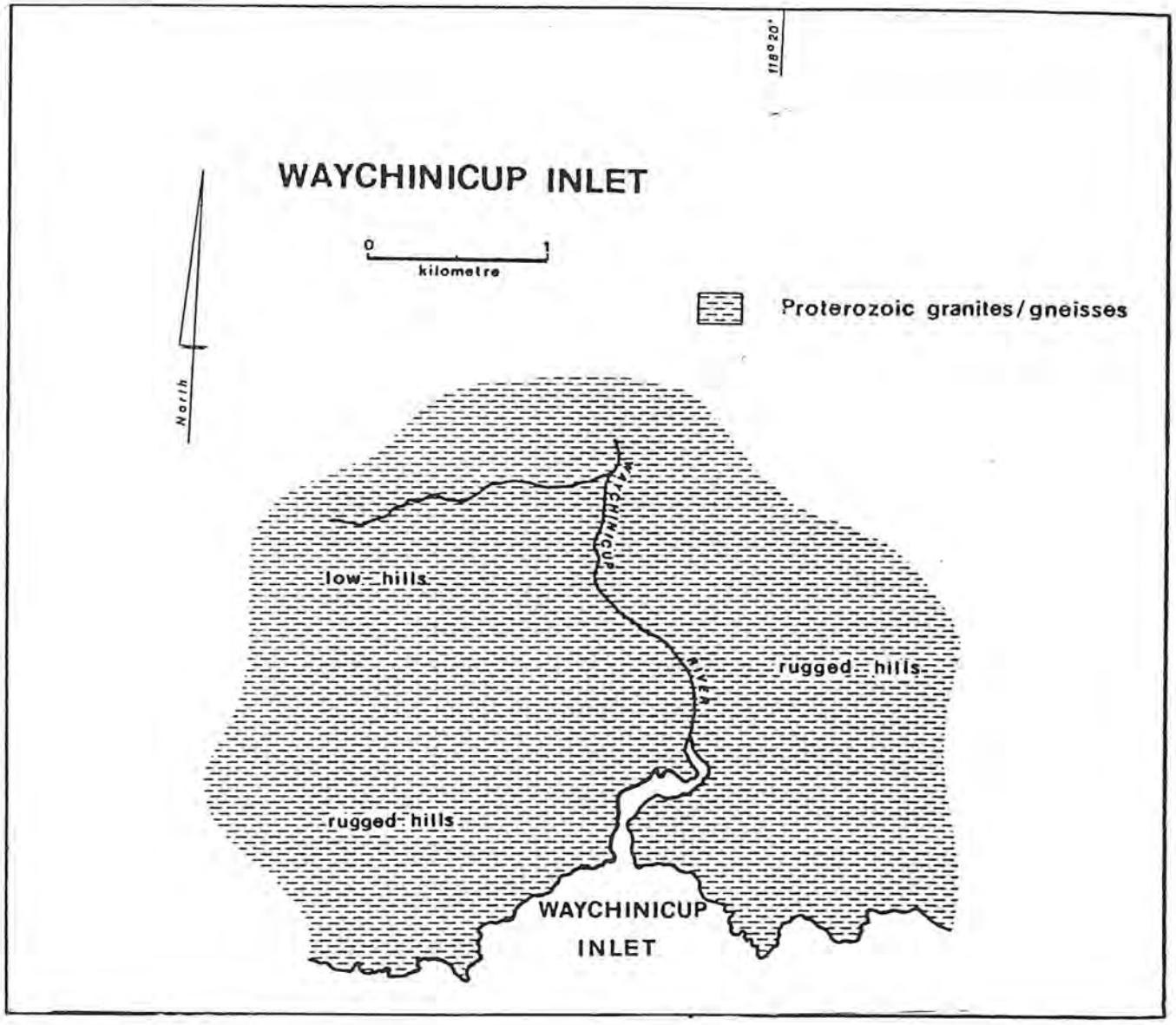
MANAGEMENT

The estuary is unique, there is nothing like it anywhere else in Western Australia. Located on a rocky coastline, it winds through a gorge between steep granite slopes to the water with typical coastal scrub. With only a small stream flowing into it there is sea water throughout it for most of the year.

The Inlet is in the proposed Waychinicup National Park and is managed by CALM. A fisherman has lived in a shack on the western shore near the head of the Inlet for many years. Access is via a gravel track which at present limits traffic, but the estuary is likely to attract many more visitors as it becomes better known, with the danger of further damage to the environment.

WAYCHINICUP RIVER CATCHMENT




118° 20'
WAYCHINICUP INLET
0
1
kilometre
Proterozoic granites/gneisses
North
WAYCHINICUP
RIVER
low hills
rugged hills
rugged hills
WAYCHINICUP
INLET

CHEYNE INLET

RIVERS – EYRE

Catchment area: 80 km^2, 32% cleared (1983)

Total flow – **mean:** 4 x 10^6 m^3 (estimate from gauging station 602 031)

Runoff – **overall:** ~ 49 mm (stn. 602 031)

Salinity – no data

RAINFALL – **Overall** – Albany (Cape Riche): 571 mm

ESTUARY – **Area:** 0.3 km^2 **length:** 1 km

Type: normally closed

Bar – **height:** 1.5 m above AHD **width:** 50 m

sand type: well sorted fine white sand

Depth – **average:** 1.5 m

Salinity: ? -44 ppt

MANAGEMENT

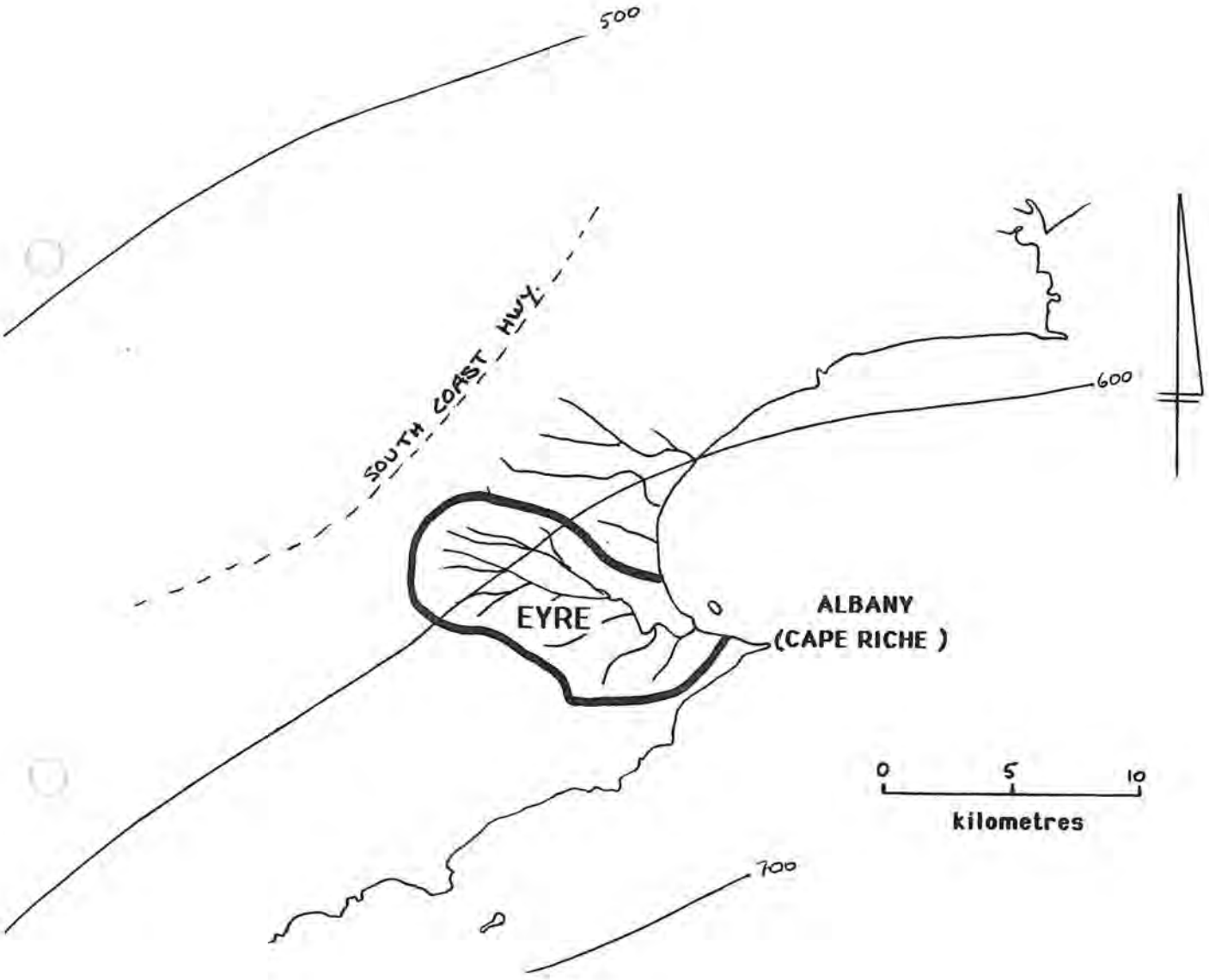
The estuary is surrounded by cleared grazing land to the south (farmed since 1841) and a small holiday settlement on the north side.

The bar used to open naturally most winters until the late 1940s and stayed open for 18 months, but since then has seldom opened naturally and has remained closed for up to 9 years. The bar has sometimes been broken when water level was high. There is now a massive quantity of fine beach sand blocking the mouth that only a major flood would break through and even that could not be expected to scour the channel.

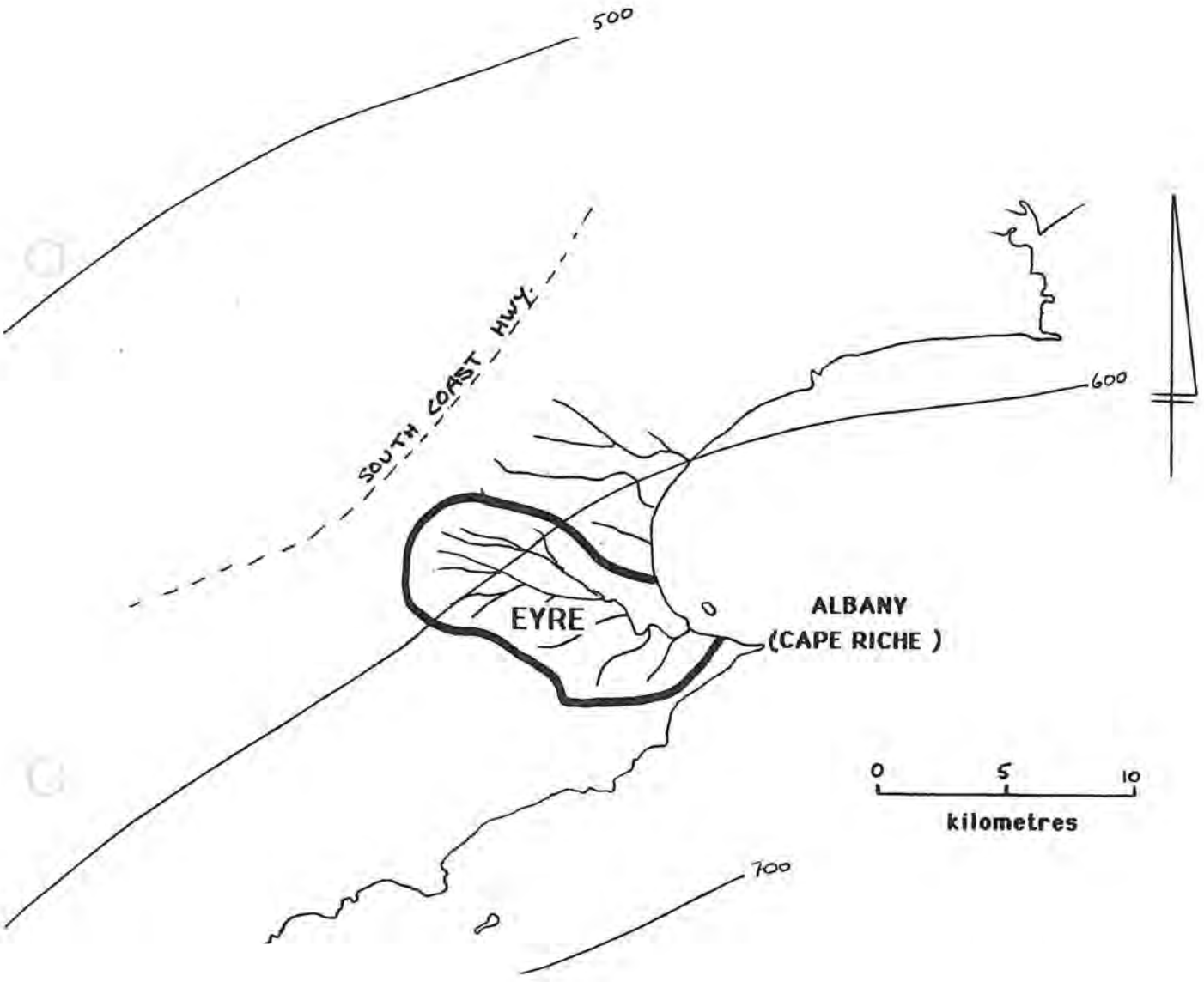
Sadly, the estuary appears to be dying.

There is a small Mettler Lake Nature Reserve at the head of the catchment.

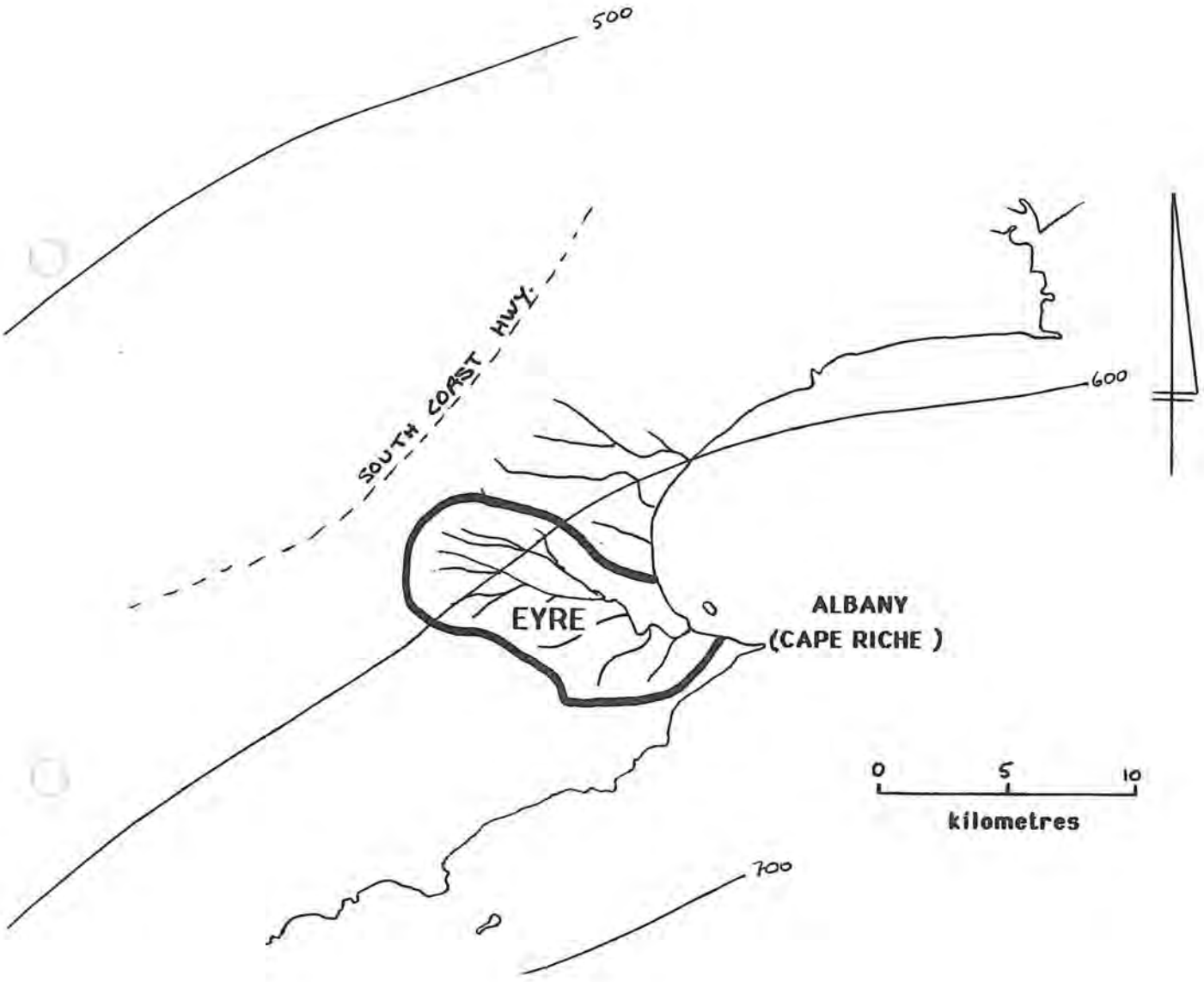
CHEYNE INLET CATCHMENT



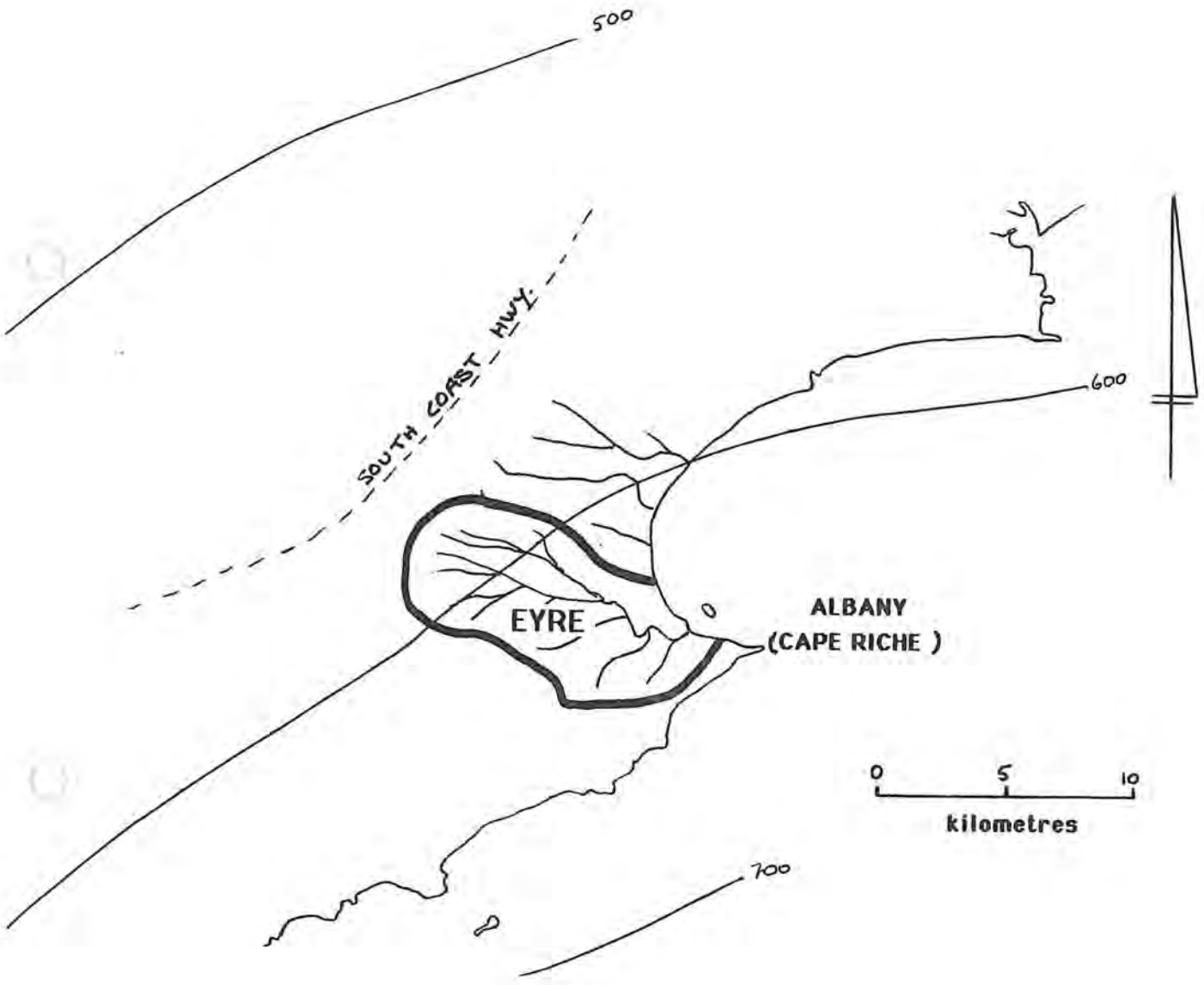
CHEYNE INLET CATCHMENT

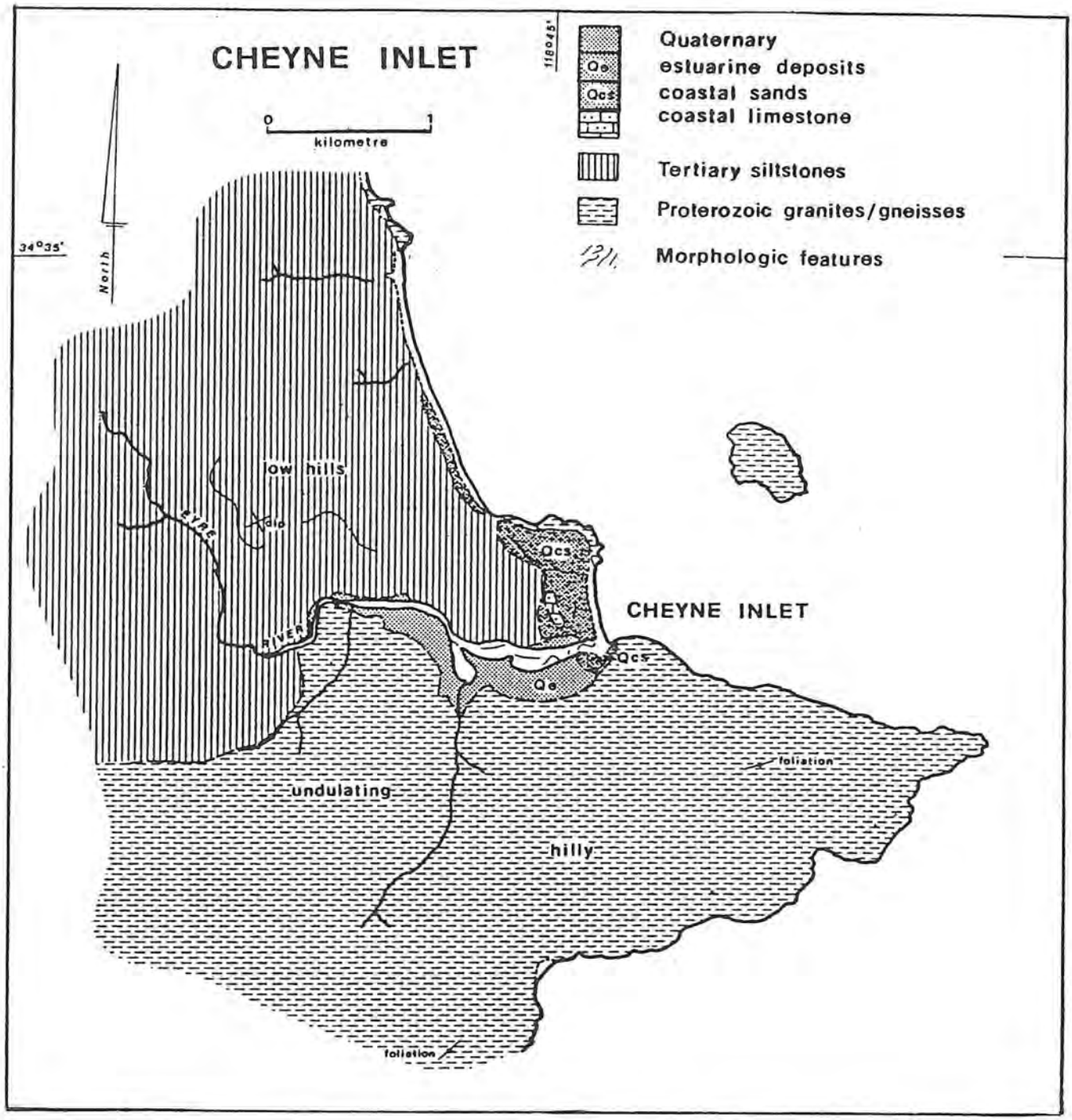


CHEYNE INLET CATCHMENT



CHEYNE INLET CATCHMENT




CHEYNE INLET
0
1
kilometre
North
34°35'
116°45'
Quaternary
estuarine deposits
coastal sands
coastal limestone
Tertiary siltstones
Proterozoic granites/gneisses
Morphologic features
low hills
EYRE
RIVER
Qcs
Qe
CHEYNE INLET
foliation
undulating
hilly
foliation

BEAUFORT INLET

RIVERS - PALLINUP

Catchment area: 4775 km^2, 70% cleared (1982)

Total flow - **mean:** 23.75 x 10^6 m^3 (Gauging station 602 001)

Runoff - **overall:** 5 mm (Stn. 602 001)

Salinity - **mean:** 23396 mg/l TSS (715-58488) (Stn. 602 001)

RAINFALL - **Inland** - Gnowangerup Post Office: 407 mm

Coast - Albany (Cape Riche): 571 mm

ESTUARY - **Area:** 4.6 km^2 **length:** 14 km

Type: Normally closed

Bar - **height:** 3.0-3.5 m above AHD **width:** 500 m

sand type: Poorly sorted coarse to medium grained quartz (80%) and shell (10%) sand.

Depth - **average:** 1.3 m **Max:** 3 m in basin, 8 m in river

Salinity: 18-65 ppt, floods probably bring less saline water

MANAGEMENT

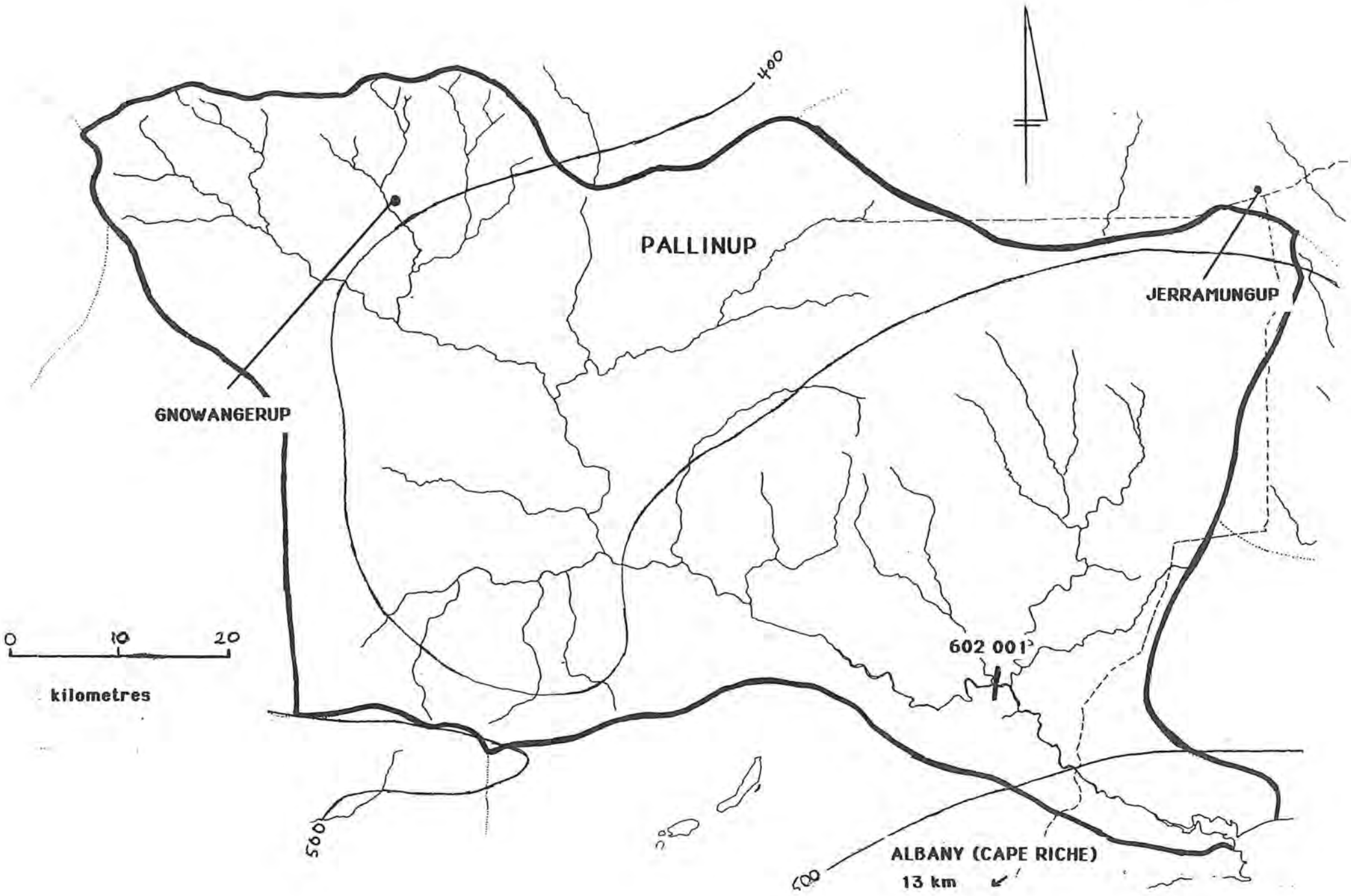
The estuary is surrounded by uncleared reserve land with various vestings (see attachment). Jerramungup Shire is responsible for management of the estuary. The Shire has a Ranger at Millers Point and there are a several fishermens' shacks there.

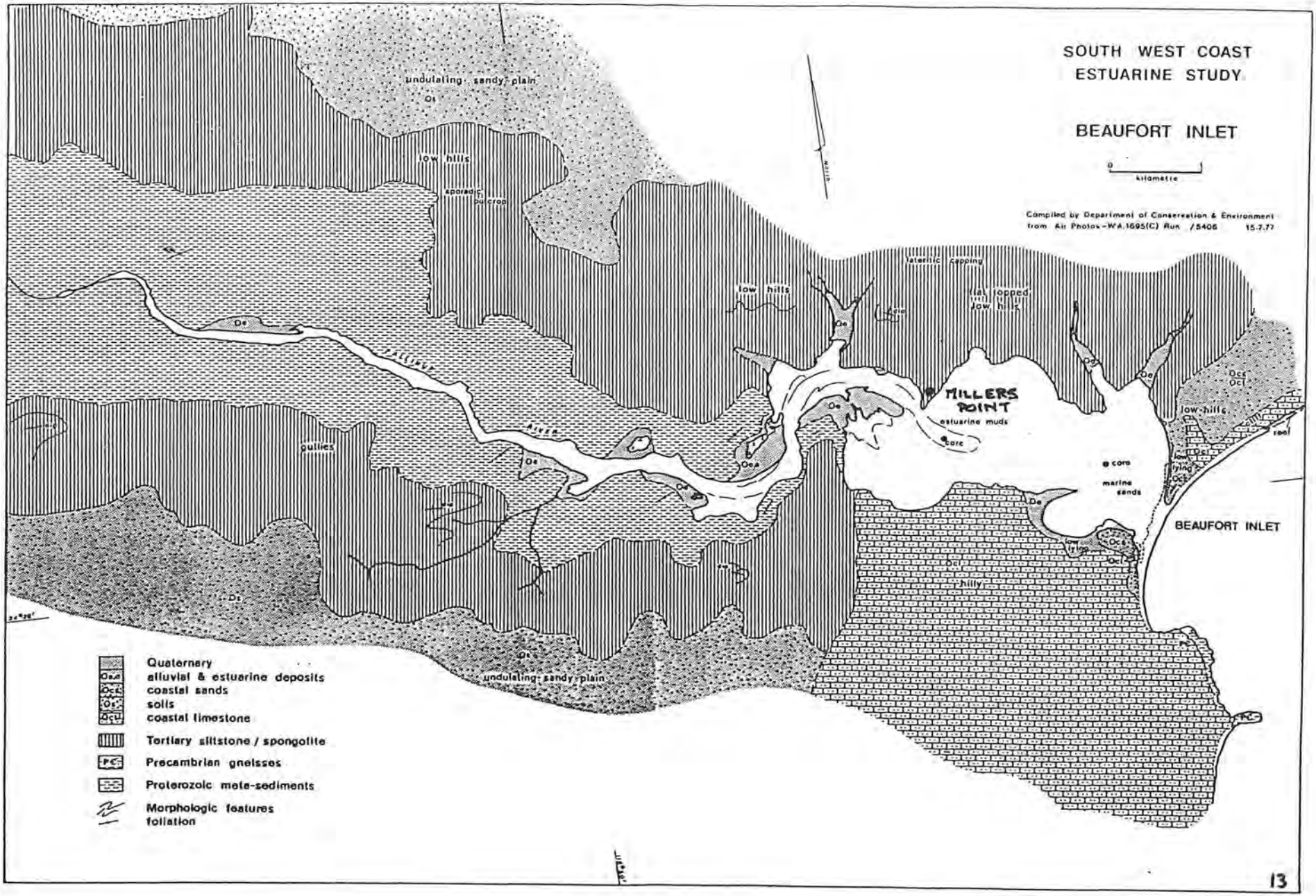
The main access to the estuary is by a gravel road to Millers Point, and there are a number of tracks to other points along both sides of the estuary.

The bar usually opens, naturally, every 3-4 years but has remained closed for 12 years. It usually only stays open for a few weeks, against the western shore.

When the bar is closed water level in the Inlet varies by about 3.5 m, to below sea level.

BEAUFORT INLET CATCHMENT




SOUTH WEST COAST
ESTUARINE STUDY
BEAUFORT INLET
kilometre
Compiled by Department of Conservation & Environment
from Air Photos - WA 1695(C) Run /5406 15.7.77
undulating sandy plain
low hills
sporadic outcrop
lateritic capping
flat topped low hills
MILLERS POINT
estuarine muds
core
marine sands
BEAUFORT INLET
gullies
hilly
Quaternary
alluvial & estuarine deposits
coastal sands
soils
coastal limestone
Tertiary siltstone / spongolite
Precambrian gneisses
Proterozoic meta-sediments
Morphologic features
foliation

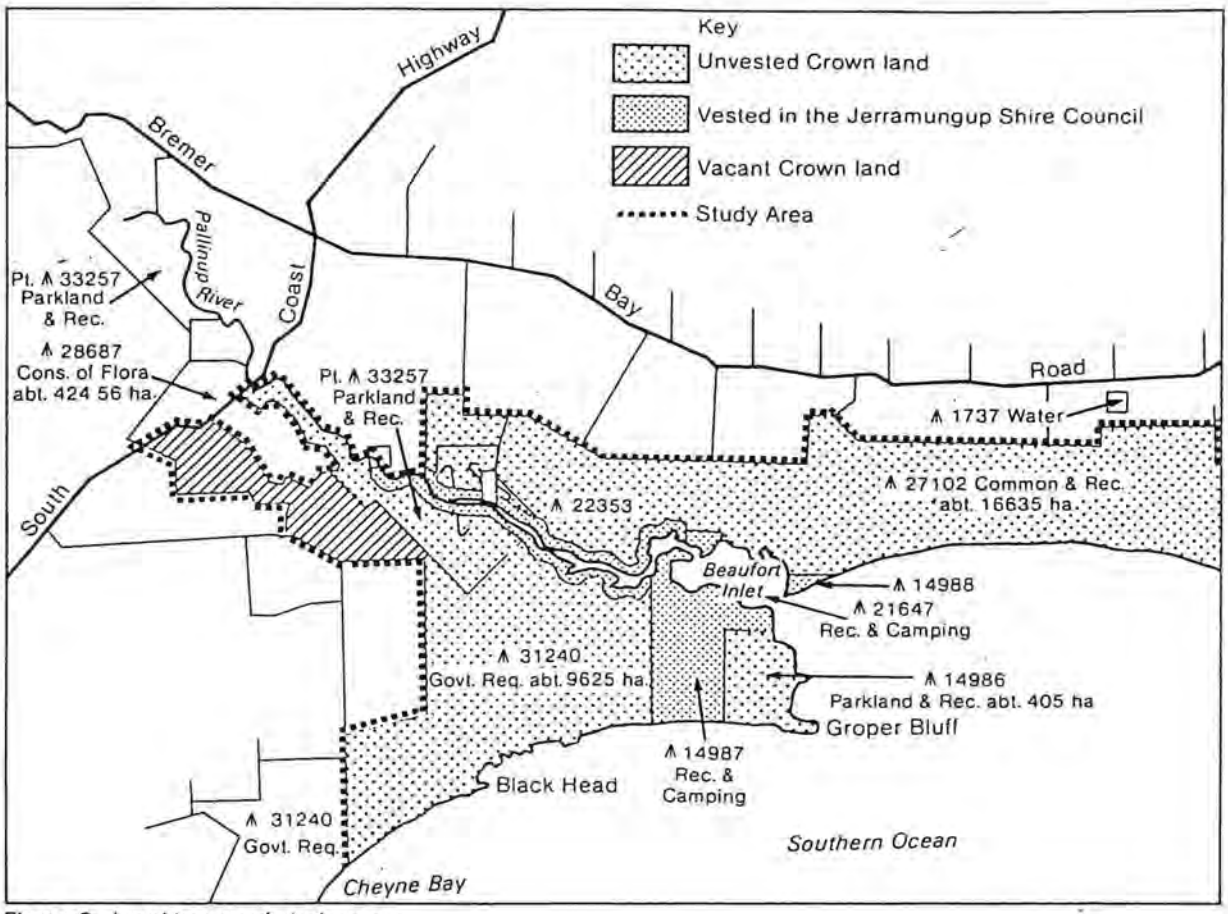


Figure 2. Land tenure of study area

WELLSTEAD ESTUARY

RIVERS – BREMER

Catchment area: 695 km^2, 50% cleared (1968)

Total flow – **mean:** 2.64 x 10^6 m^3 (estimate)

Runoff – **overall:** 3.8 mm

Salinity – ~4 ppt when flowing

RAINFALL – **Inland** – Jerramungup (Gairdner): 451 mm

Coast – Bremer Bay Post Office: 626 mm

ESTUARY – **Area:** 2.5 km^2 **length:** 13 km

Type: normally closed, opens every 2-3 years, sometimes for 2-3 years.

Bar – **height:** 1.5 m above AHD **width:** 300 m

sand type: white, moderately well sorted fine quartz sand with 10-15% shell material.

Depth – **average:** 1 m **max:** 5 m in river channel

Salinity: 36 ppt (12-80 ppt)

MANAGEMENT

Wellstead Estuary is in the Shire of Jerramungup, which is responsible for its management.

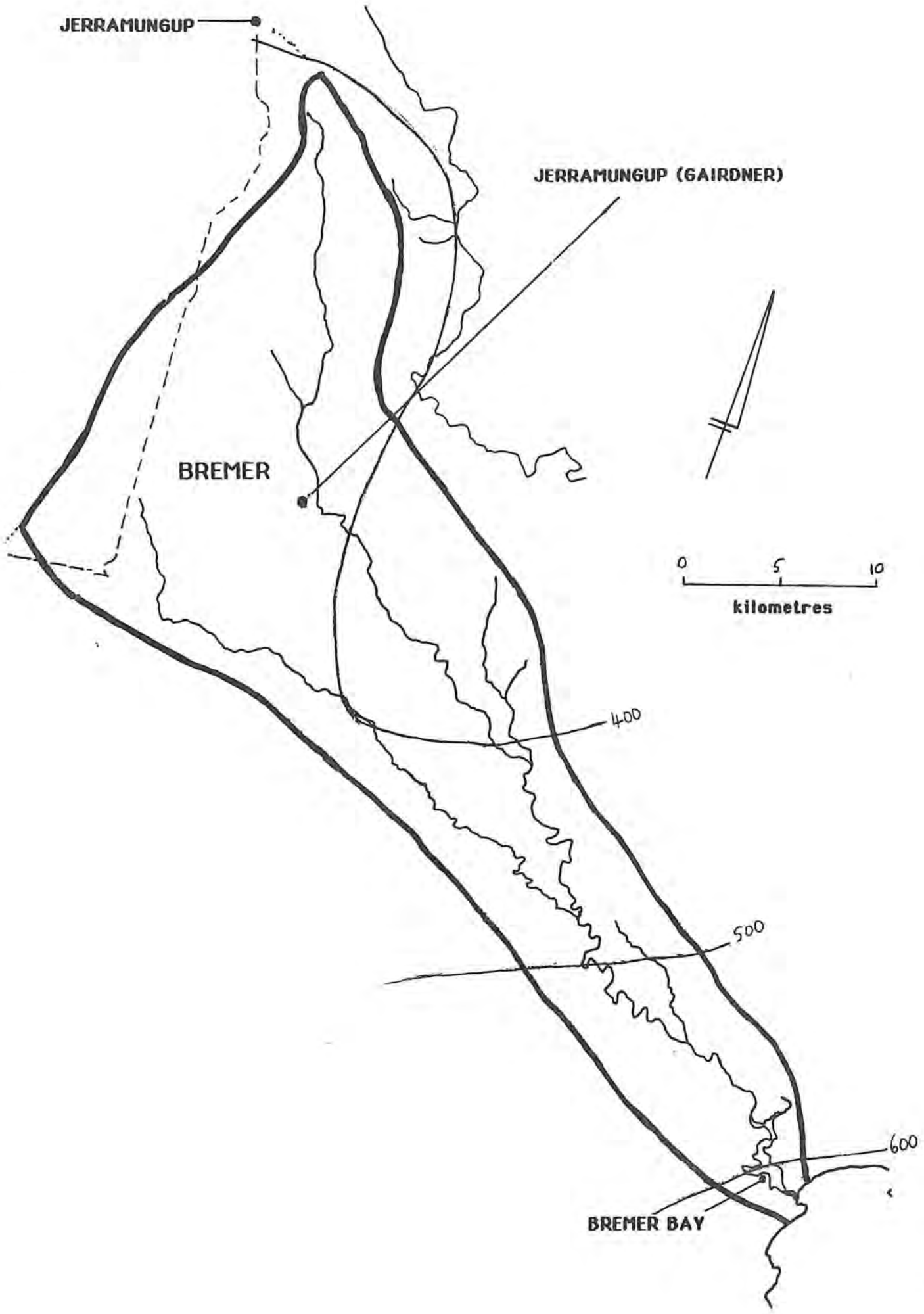
Bremer Bay is a popular holiday resort, probably more for the beach than for the estuary, nevertheless the estuary is the focus for the town. It is a beautiful body of water and with proper management it could be a healthier and more attractive focus for visitors and residents alike.

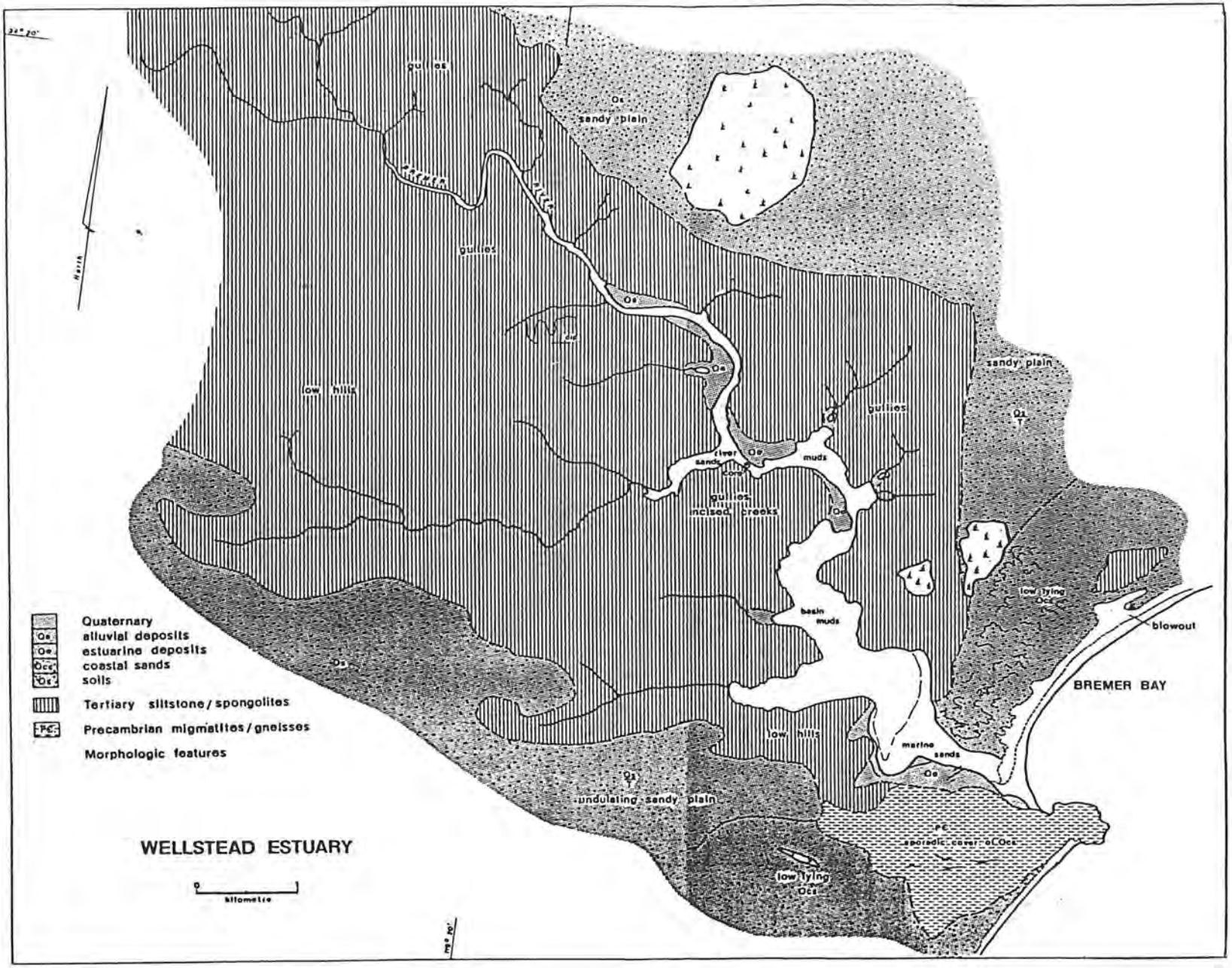
With prolonged closure of the bar water level falls in the shallow basin, it is difficult to launch boats into the estuary, marginal shallows become exposed, stranded weed decomposes and stinks, the water becomes hypersaline, and there is no recruitment to marine fish populations.

Deterioration of the estuary is due to natural causes and there is no evidence that it has been greatly accelerated by human activities, nevertheless if the estuary is to continue to be a viable system some action will have to be taken before long.

The entrance is blocked by an immense bar and tidal delta through which neither tidal exchange nor the normally small and infrequent river flows can long maintain a channel. Mangement of the bar is crucial to survival of the estuary. Engineering measures to ensure adequate exchange between estuary and ocean would certainly be costly, beyond the funds of the Shire, but the estuary is a national asset and a full investigation should be made into how this can be achieved.

WELLSTEAD ESTUARY CATCHMENT




gullies
Qs
sandy plain
gullies
low hills
Qs
Qs
Qs
sandy plain
Qt
gullies
river sands
Qe
muds
gullies incised creeks
Qe
low lying Qcs
basin muds
blowout
BREMER BAY
Qs
low hills
marine sands
Qe
Qt
undulating sandy plain
PC sporadic cover of Qcs
low lying Qcs
Quaternary
alluvial deposits
estuarine deposits
coastal sands
soils
Tertiary siltstone / spongolites
Precambrian migmatites / gneisses
Morphologic features
WELLSTEAD ESTUARY
0
kilometre

GORDON INLET

RIVERS – GAIRDNER

Catchment area: 3050km^2, 34% cleared (1968), 50% cleared (1982)

Total flow – **mean:** 10×10^6 m^3 (estimate)

Runoff – **overall:** 3.3 mm

upper catchment: 3.0 mm

lower catchment: 3.8 mm

Salinity – **mean:** saline

RAINFALL – **Inland** – Jerramungup (Gairdner): 451 mm

Coast – Bremer Bay Post Office: 626 mm

ESTUARY – **Area:** 3.1 km^2 **length:** 12 km

Type: Opens every 3-5 years

Bar – **height:** 1.5 m above AHD **width:** 800 m

sand type: Medium to very fine quartz (95%) sand.

Depth – **average:** 1.0 m, deeper in river reaches.

Salinity – 28 ppt to brine

MANAGEMENT

The estuary is in the Fitzgerald River National Park. Access is by Park tracks that deteriorate badly in wet weather. There is some attractive cliffed scenery in the Pallinup Siltstone of the riverine reaches.

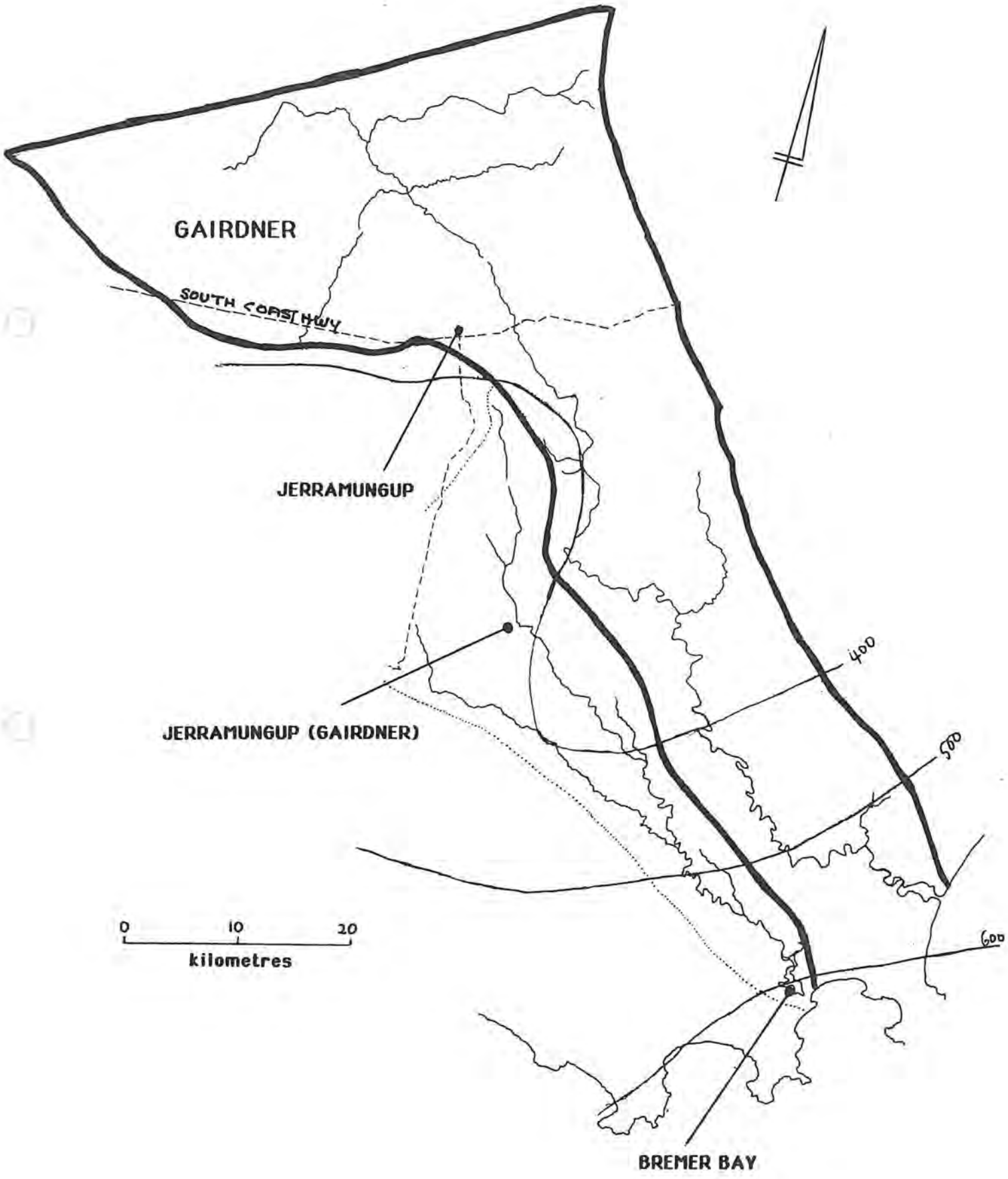
The upper reaches of the river are in recently cleared grazing land north of South Coast Highway: sediment transport, salinity and nutrients have probably all increased as the result, but there are no data.

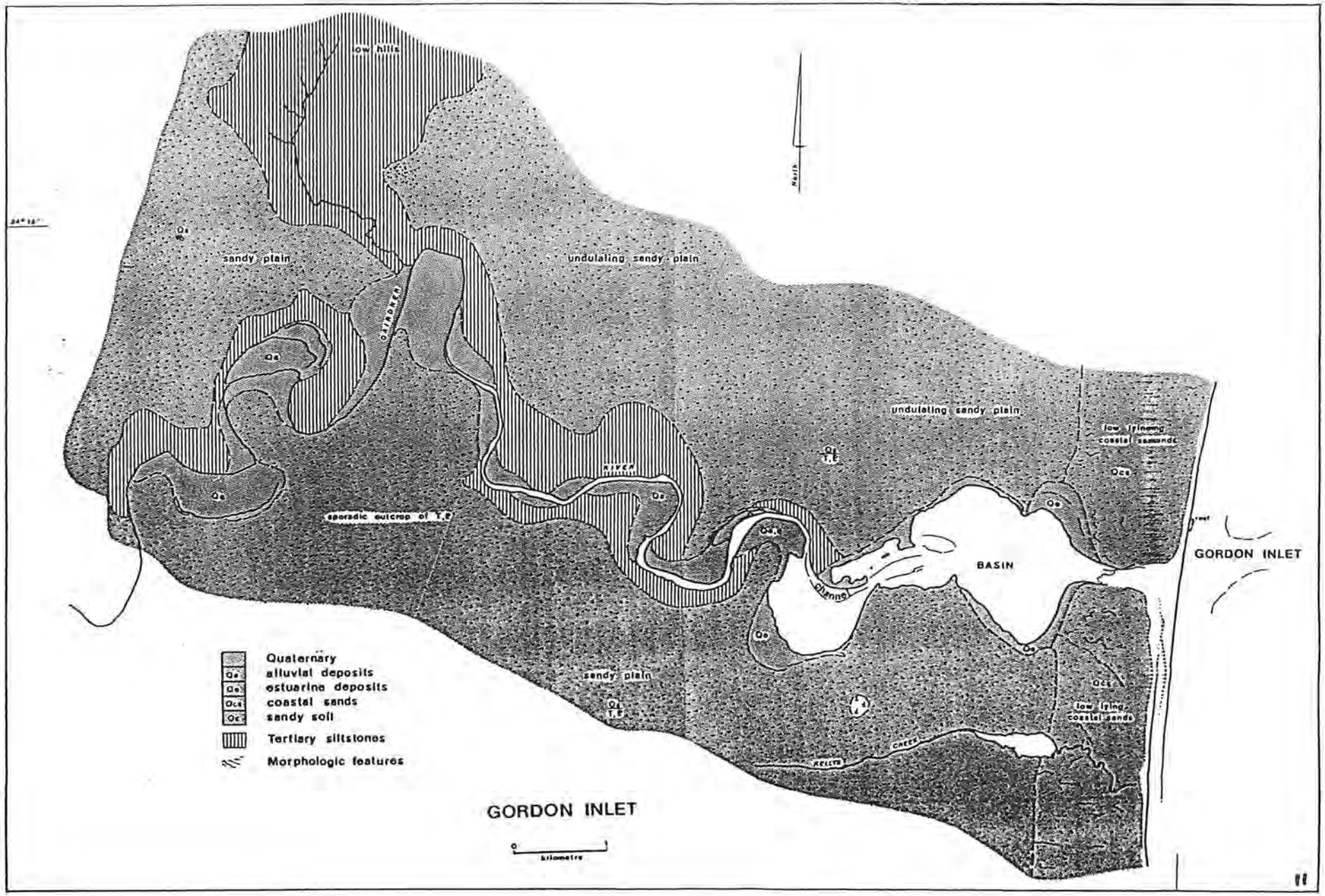
Evaporation from the shallow basin can leave most of it without water. The riverine reaches have stretches of deep water.

When the bar breaks there is be recruitment to the fish and invertebrate fauna and aquatic vegetation recovers and persists until the water again becomes too hypersaline.

Sometimes storms and high tides break the bar without heavy rains.

GORDON INLET CATCHMENT




low hills
sandy plain
undulating sandy plain
undulating sandy plain
low lying coastal sands
sporadic outcrop of T.F
BASIN
Channel
GORDON INLET
sandy plain
low lying coastal sands
Quaternary
alluvial deposits
estuarine deposits
coastal sands
sandy soil
Tertiary siltstones
Morphologic features
GORDON INLET
kilometre

ST MARY INLET

RIVERS – ST MARY

Catchment area: 115 km^2, no clearing (1968)

Total flow – **mean:** 0.4 x 10^6 m^3 (estimate)

Runoff – **overall:** 3.8 mm

Salinity – probably fresh

RAINFALL – **Overall** – Bremer Bay Post Office: 626 mm

ESTUARY – **Area:** 0.4 km^2 **length:** 2.2 km

Type: normally closed

Bar – **height:** low **width:** 50 m

sand type: no data

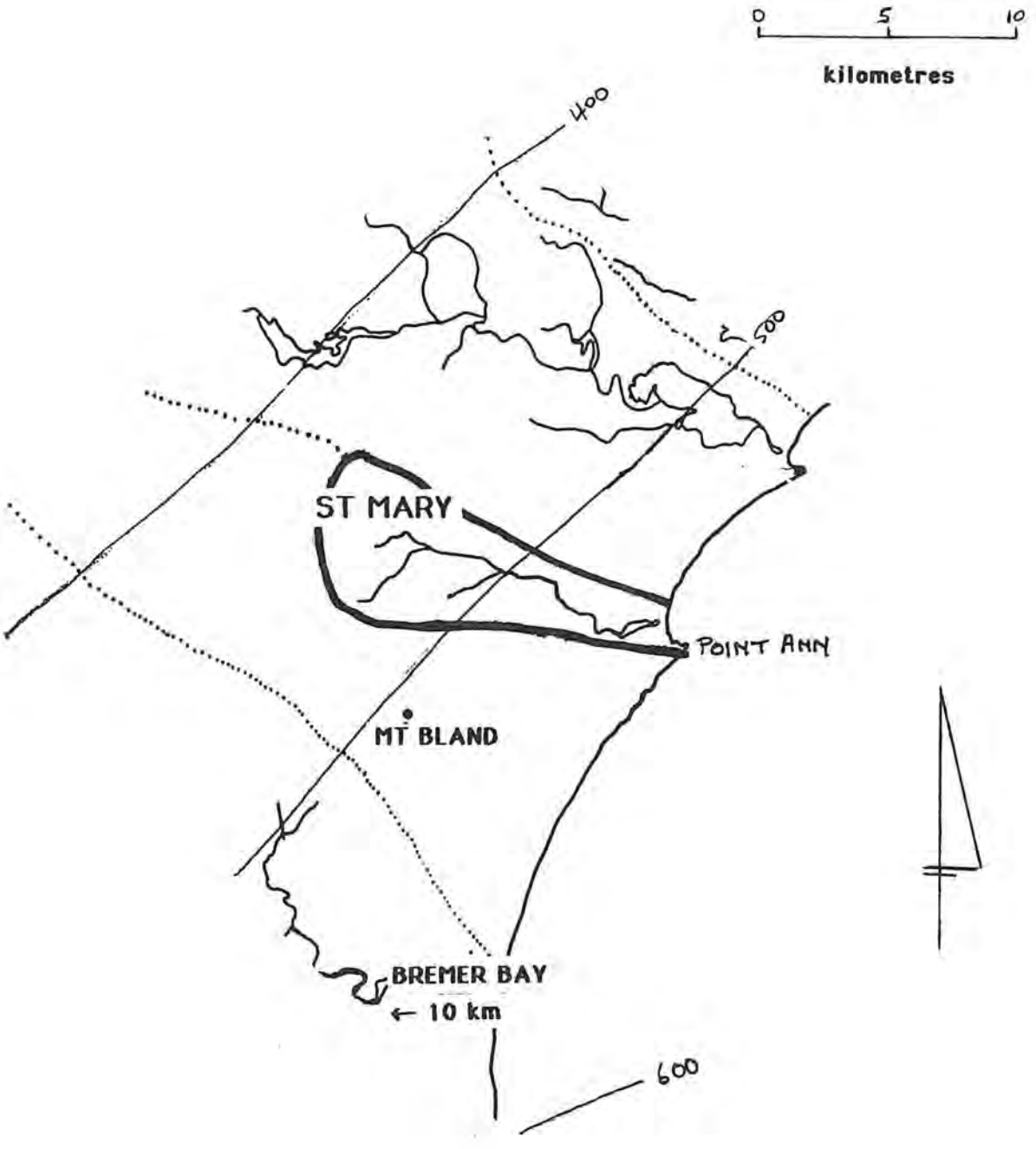
Depth – shallow, dries out

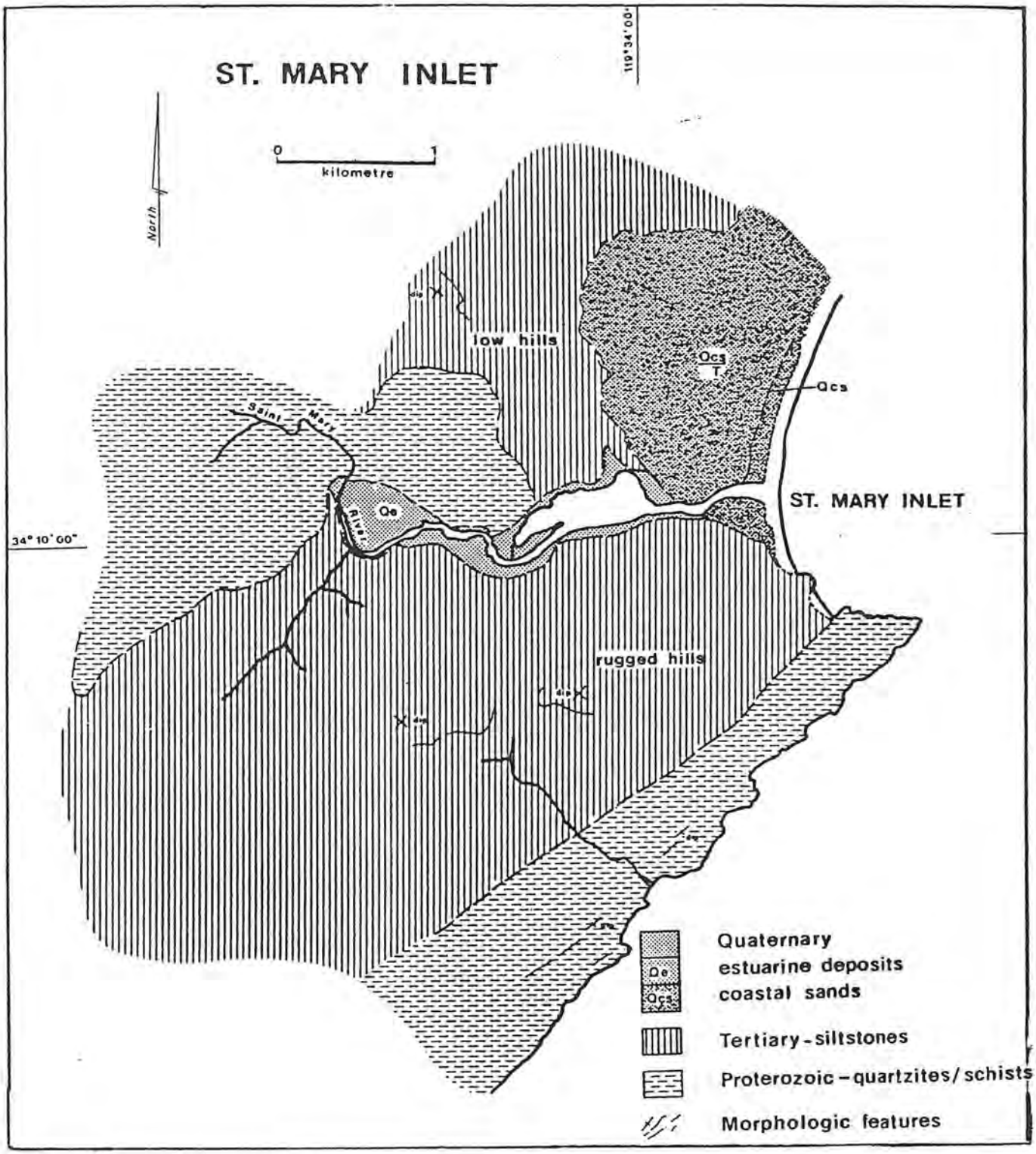
Salinity: ? to brine

MANAGEMENT

The estuary and catchment are in the Fitzgerald River National Park.

ST MARY INLET CATCHMENT




ST. MARY INLET
119°34'00"
0
1
kilometre
North
low hills
Qcs
T
Qcs
Saint Mary River
Qe
ST. MARY INLET
34° 10' 00"
rugged hills
Quaternary
estuarine deposits
coastal sands
Qe
Qcs
Tertiary - siltstones
Proterozoic – quartzites/ schists
Morphologic features

FITZGERALD INLET

RIVERS – FITZGERALD

Catchment area: 1625 km^2, 25% cleared (1968), 40% cleared(1982)

Total flow – **mean:** 10.9×10^6 m^3

Runoff – **overall:** 6.7 mm (Gauging station 602 002)

upper catchment: 5.8 mm (stn. 602 002)

lower catchment: 7 mm (stn. 602 002)

Salinity – **mean:** 13450 mg/l TSS (5660-30162)

RAINFALL – **Inland** – Jerramungup (Kattaganna): 395 mm

Coast – Hopetoun Post Office: 504 mm

ESTUARY – **Area:** 7.6 km^2 **length:** 10.5 km

Type: normally closed, opens every 3-5 years

Bar – **height:** 1 m above AHD **width:** 6-700 m

sand type: fine white sand, also quicksand

Depth – **average:** 1 m **max:** 3 m

Salinity – ? to brine

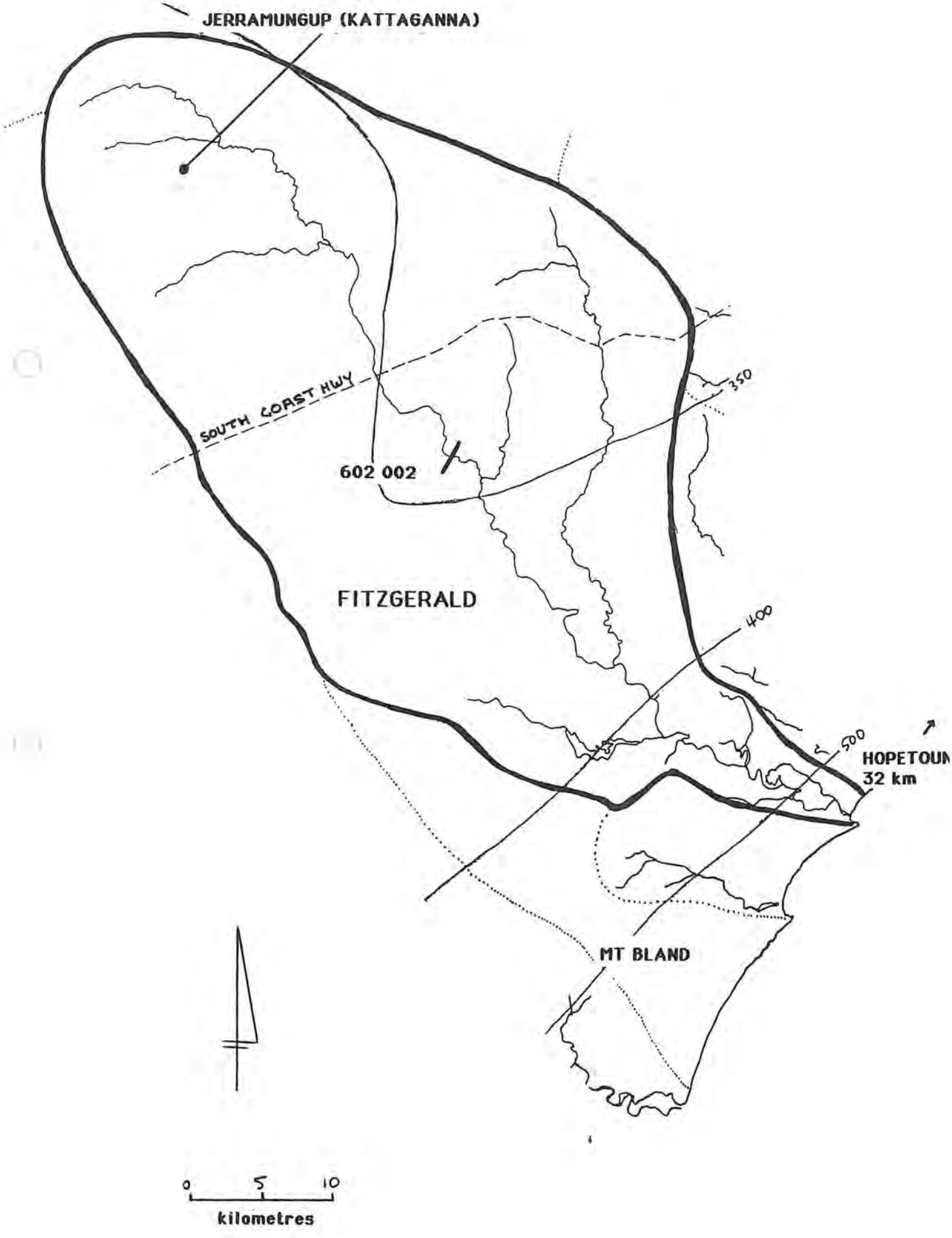
MANAGEMENT

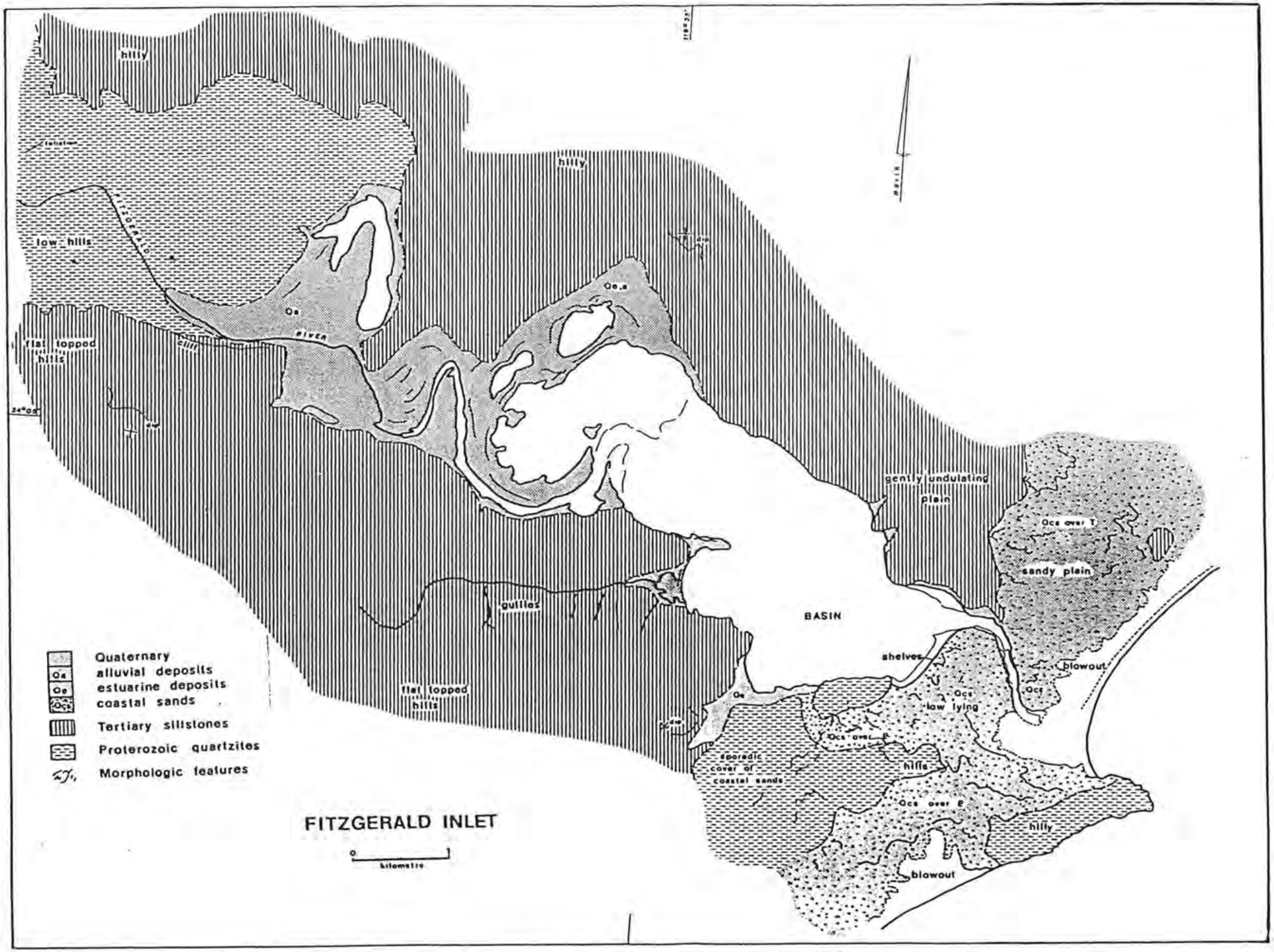
The estuary is in the Fitzgerald River National Park. Access is by Park tracks which are in poor condition and are sometimes closed because of dieback. There is some spectacular scenery along the riverine reaches, with cliffs and bluffs in Pallinup Siltstone.

The upper reaches of the river are in recently cleared grazing land: salinity, sediment transport and nutrients have probably all increased as the result, but there are no data.

There is dangerous quicksand near the bar.

FITZGERALD RIVER CATCHMENT




hilly
hilly
low hills
flat topped hills
RIVER
cliff
Qa
Qe,a
gently undulating plain
Qcs over T
sandy plain
gullies
BASIN
shelves
blowout
Qcs
Qcs low lying
Qe
Qcs over E
hills
sporadic cover of coastal sands
Qcs over E
hilly
blowout
flat topped hills
Quaternary
alluvial deposits
estuarine deposits
coastal sands
Tertiary siltstones
Proterozoic quartzites
Morphologic features
FITZGERALD INLET
0
1
kilometre

DEMPSTER INLET

RIVERS – COPPER MINE CREEK

Catchment area: 300 km^2, no clearing (1968)

Total flow – **mean:** 2.1 x 10^6 m^3

Runoff – **overall:** 7 mm

Salinity – no data

RAINFALL – **Inland** – Ravensthorpe (Wooganup Heights): 425 mm

Coast – Hopetoun Post Office: 504 mm

ESTUARY – **Area:** 2.5 km^2 **length:** 5.5 km

Type: normally closed, opens every few years

Bar – **height:** low **width:**

sand type:

Depth: shallow dries

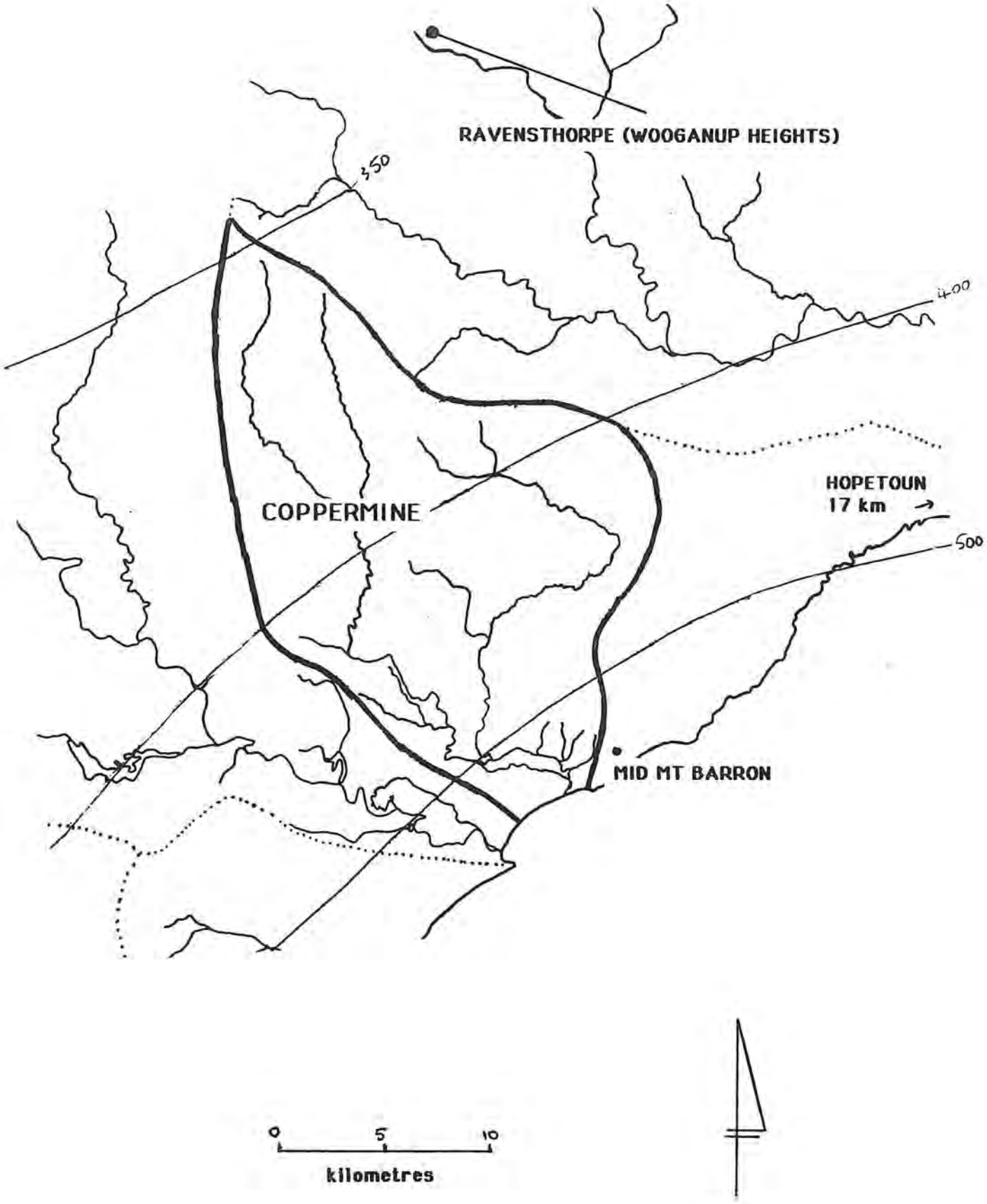
Salinity: sea water to brine, no data

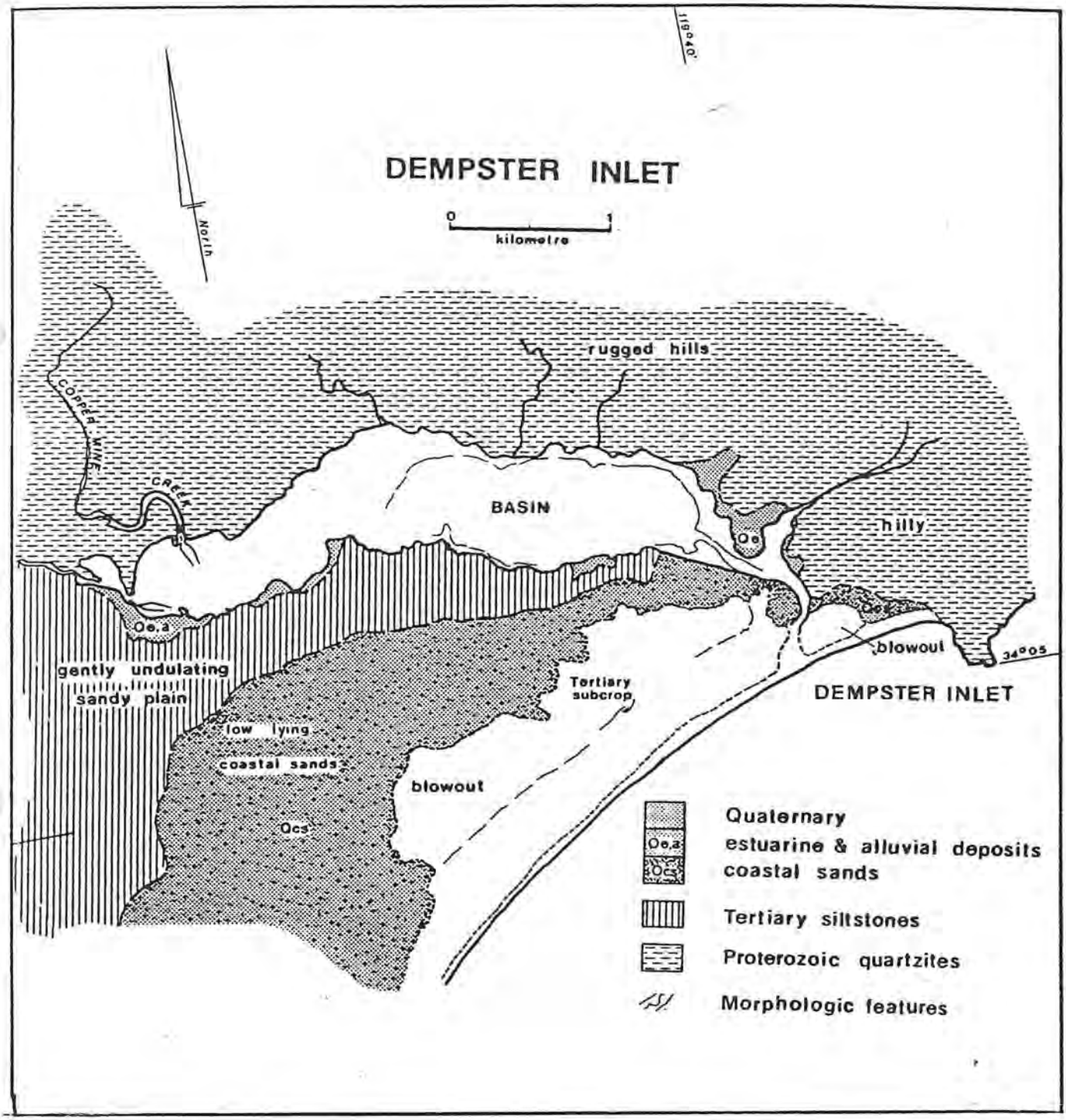
MANAGEMENT

Estuary and catchment are in the Fitzgerald River National Park.

The basin dries, but water may persist in the inlet channel. No data.

DEMPSTER INLET CATCHMENT




DEMPSTER INLET
0
1
kilometre
North
110°40'
rugged hills
COPPER WIRE CREEK
BASIN
hilly
Qe
Qe,a
Qcs
blowout
34°05
DEMPSTER INLET
gently undulating
sandy plain
Tertiary
subcrop
low lying
coastal sands
blowout
Qcs
Quaternary
estuarine & alluvial deposits
coastal sands
Tertiary siltstones
Proterozoic quartzites
Morphologic features

HAMERSLEY INLET

RIVERS – HAMERSLEY

Catchment area: 900 km^2, 11% cleared (1968)

Total flow – **mean:** 6.3 x 10^6 m^3

Runoff – **overall:** 7 mm

Salinity – about 4ppt when flowing, river pools become highly saline

RAINFALL – **Inland** – Ravensthorpe (Wooganup Heights): 425 mm

Coast – Hopetoun Post Office: 504 mm

ESTUARY – **Area:** 2.5 km^2 **length:** 3.5 km

Type: normally closed, opens every 3 - 5 years

Bar – **height:** 2 m above AHD **width:** 250 m

sand type: medium to fine quartz (80%) and shell (15%) sand.

Depth – **average:** 2 m **max:** 3.5 m in river reaches

Salinity: 4 ppt to brine

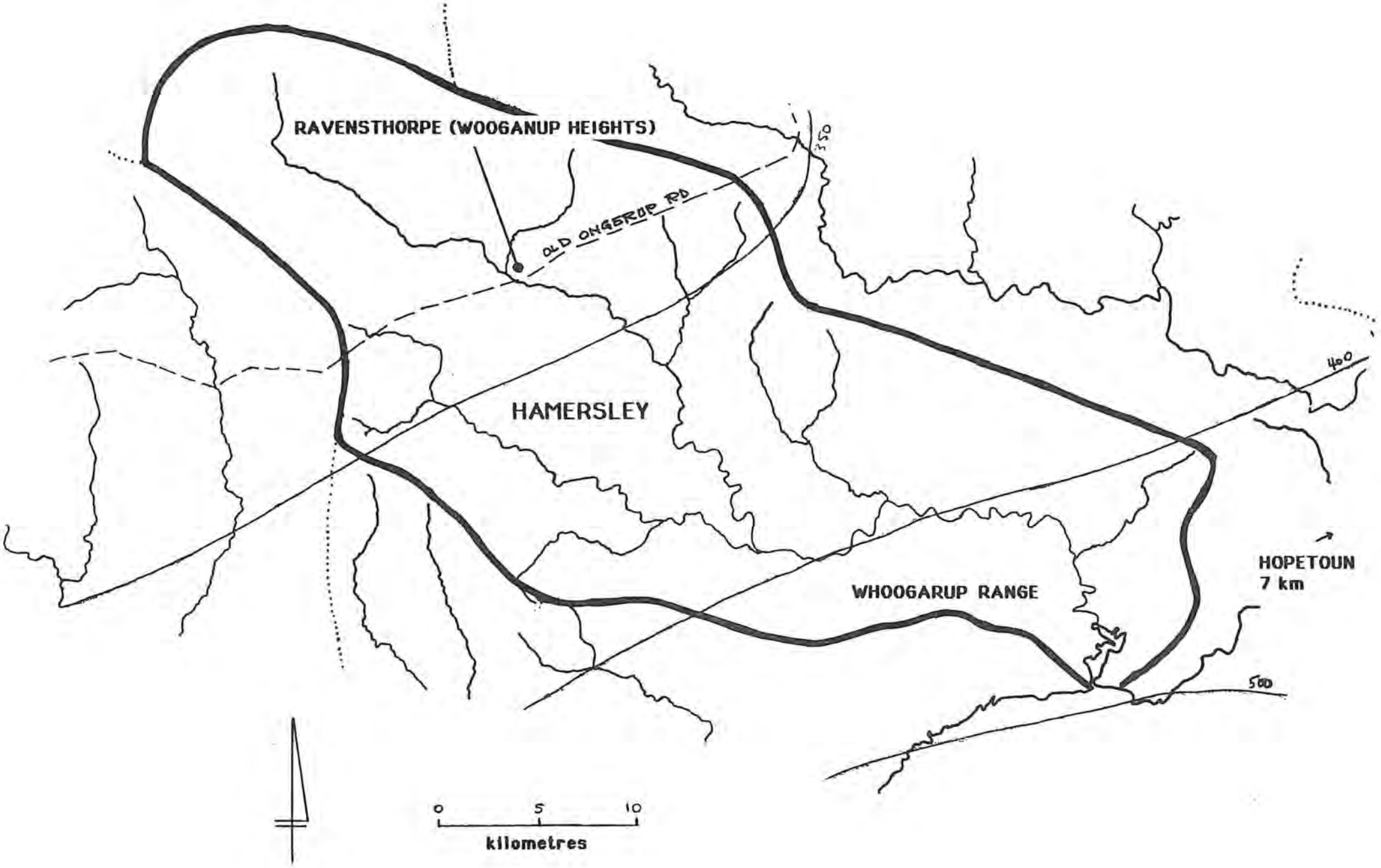
MANAGEMENT

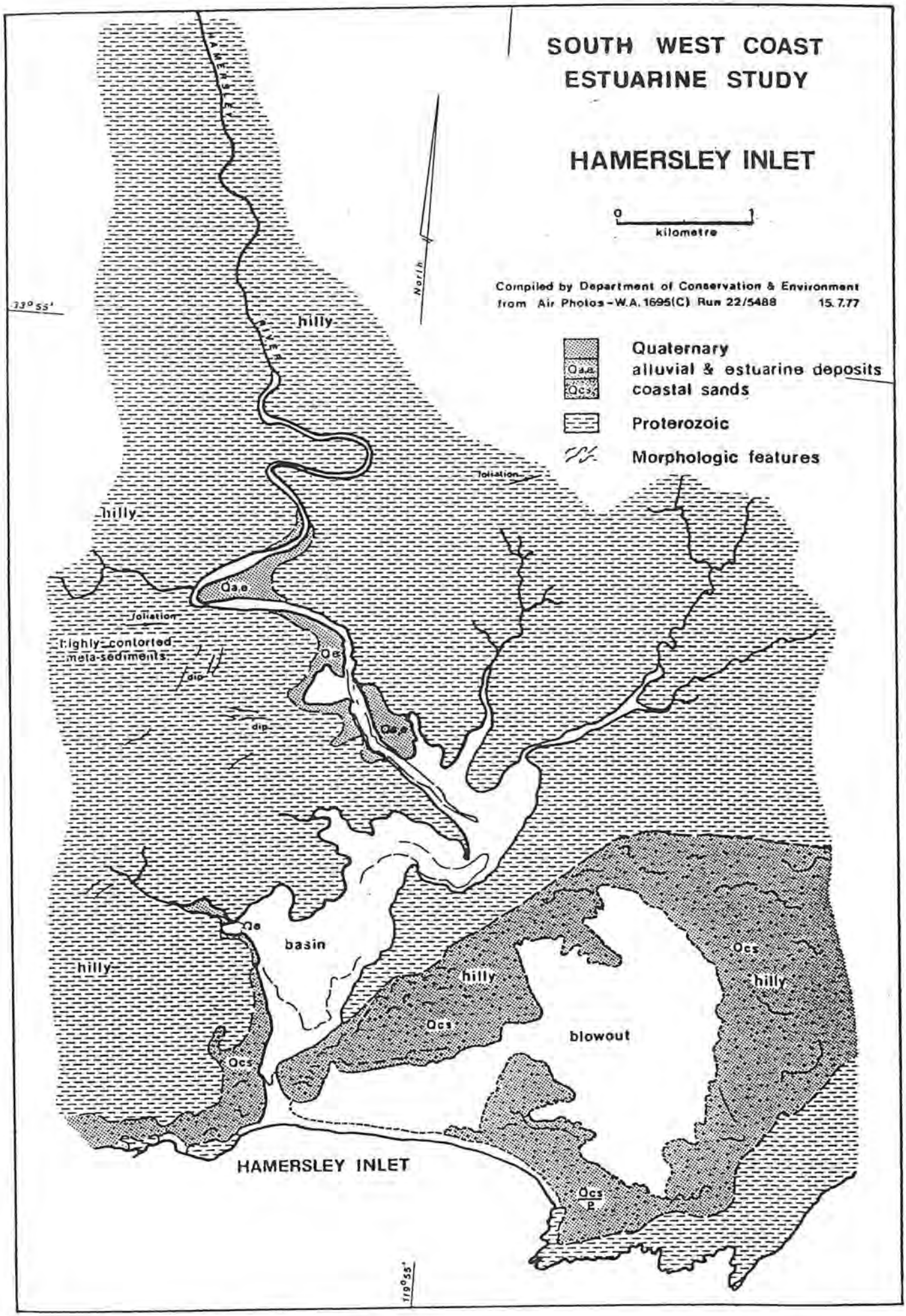
The estuary is situated in the eastern section of the Fitzgerald River National Park. Access is via a sandy track off Hamersley Drive from Hopetoun. The river reaches are in a gorge with cliffs. Upstream of the estuary there are a string of permanent pools in the river.

The only cleared land in the catchment is north of the Old Ongerup Road and a small area to the north-east of the Inlet.

The basin oscillates between being full of water and only pools of brine. When full it has an abundance of fish and other fauna.

HAMERSLEY INLET CATCHMENT




SOUTH WEST COAST
ESTUARINE STUDY
HAMERSLEY INLET
0
kilometre
North
Compiled by Department of Conservation & Environment
from Air Photos - W.A. 1695(C) Run 22/5488 15.7.77
Quaternary
alluvial & estuarine deposits
coastal sands
Proterozoic
Morphologic features
Qa,e
Qcs
Qe
P
hilly
foliation
highly-contorted
mela-sediments
dip
basin
blowout
HAMERSLEY INLET
RIVER
33°55'
119°55'

CULHAM INLET

RIVERS – PHILLIPS

Catchment area: 2100 km^2, 20% cleared (1968)

Total flow – **mean:** 2.3 x 10^6 m^3 (estimate)

Runoff – **overall:** 1.1 mm

Salinity – **mean:** 4-65 ppt

STEERE

Catchment area: 485 km^2, 23% cleared (1968)

Total flow – **mean:** 0.7 x 10^6 m^3 (estimate)

Runoff – **overall:** 1.4 mm

Salinity – **mean:** 3-125 ppt

RAINFALL – **Inland** – Ravensthorpe Post Office: 423 mm

Coast – Hopetoun Post Office: 504 mm

INLET – **Area:** 11.3 km^2 **length:** Steere 1 km

Phillips 6 km

Type: Permanently closed

Bar – **height:** 6+m above AHD, vegetated and with a road along it.

sand type: not known

Depth – **average:** ~1 m below AHD; basin shallow throughout, deeper water in riverine reaches.

Salinity **mean:** 14 ppt to brine

MANAGEMENT

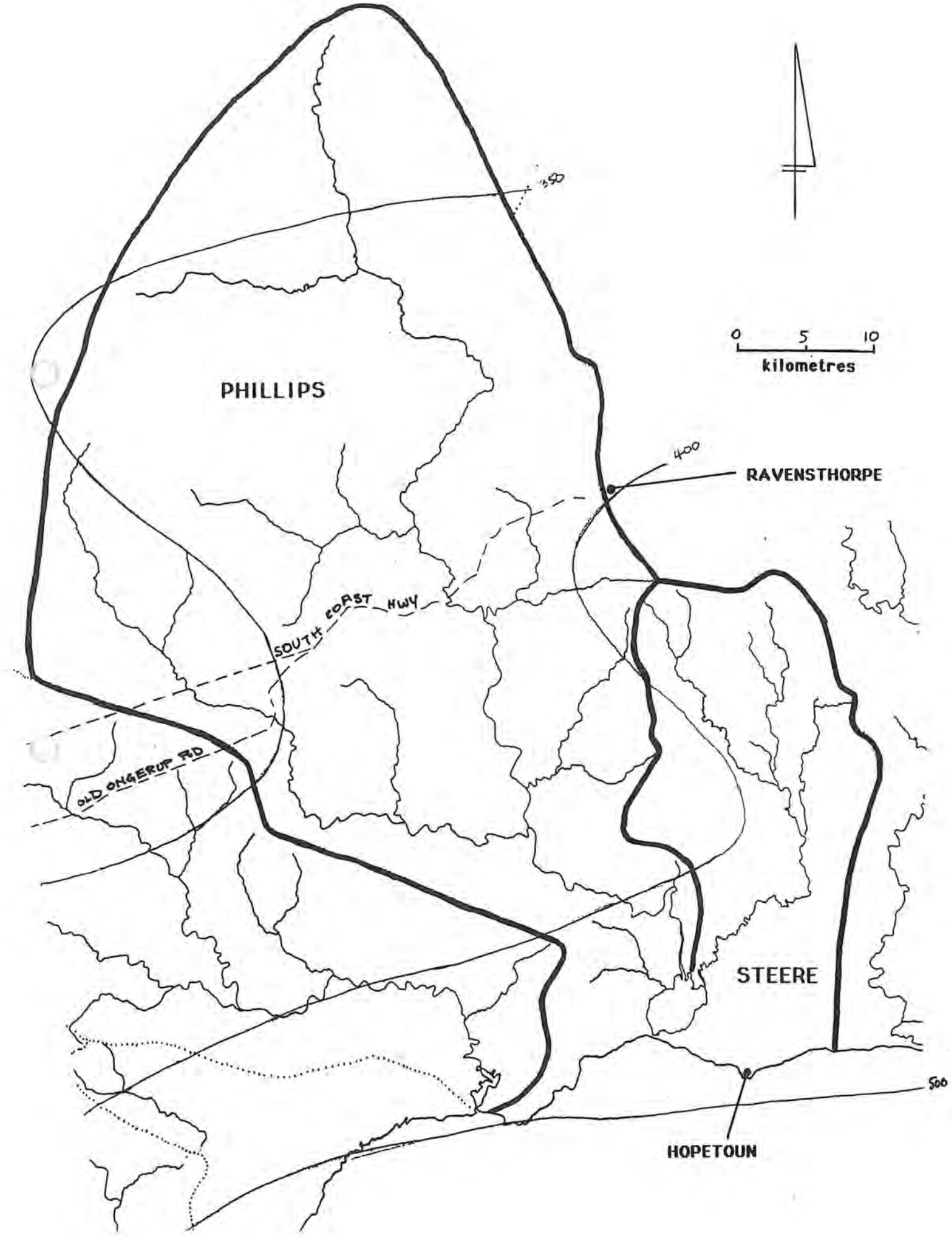
The western shore of the Inlet, the greater part of the catchments of the Phillips River and its tributary the West River are in the Fitzgerald River National Park, with cleared land mainly north of South Coast Highway. The north eastern shore of the Inlet and eastern parts of the Steere River catchment have been cleared for grazing.

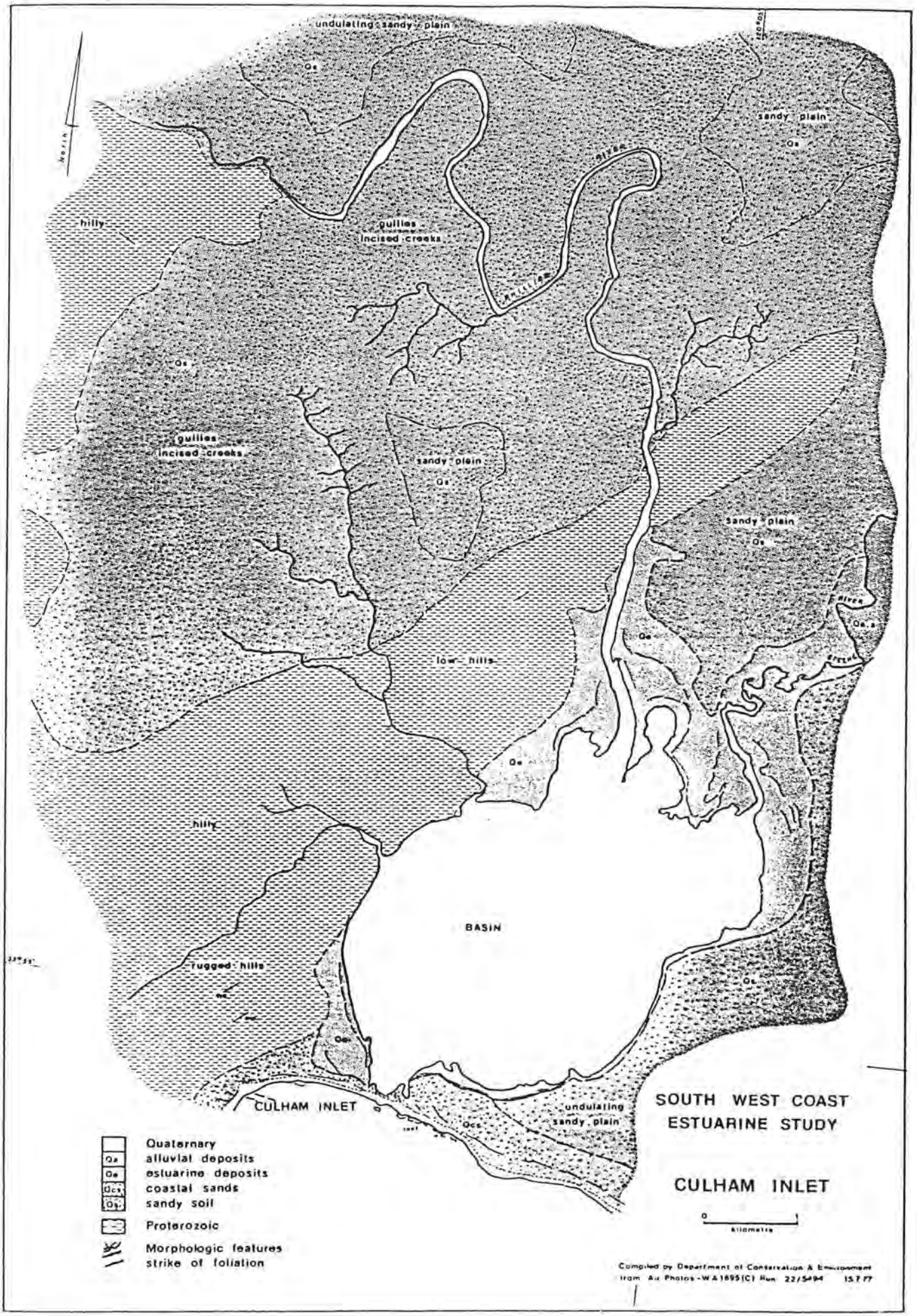
Culham Inlet is no longer an estuary, in the usual meaning of the word, though it must have been one in recent times as evidenced by the abundant Holocene shell fauna (~4000 years B.P.).

The only record of the massive bar breaking naturally since settlement is for April 1849, when it flowed out strongly for three days. Reports variously claim the bar broke or was broken in 1919 (following 4 years of above average rainfall and very heavy rain in April). A recent local proposal was to open the bar and make a harbour in the Inlet.

Following heavy rain the Inlet fills, sometimes to the level of the road, at other times there is little or no water, it is below sea level and sea water seeps in through the bar.

CULHAM INLET CATCHMENT




undulating sandy plain
Qs
sandy plain
Qs
hilly
gullies
incised creeks
River
Qs
gullies
incised creeks
sandy plain
Qs
sandy plain
Qs
Qe
low hills
Qe
hilly
BASIN
rugged hills
Qe
CULHAM INLET
Qcs
undulating
sandy plain
Qs
Quaternary
alluvial deposits
estuarine deposits
coastal sands
sandy soil
Proterozoic
Morphologic features
strike of foliation
SOUTH WEST COAST
ESTUARINE STUDY
CULHAM INLET
0
kilometre
Compiled by Department of Conservation & Environment
from Air Photos - WA 1695 (C) Run 22/5494 15.7.77

JERDACUTTUP LAKES

RIVERS – JERDACUTTUP

Catchment area: 1340 km^2, 11% cleared (1968)

Total flow – **mean:** 1.5 x 10^6 m^3

Runoff – **overall:** 1.1 mm (Gauging stations 601 001, 601 004)

Salinity – 6.6 ppt (3.6–15 ppt)

RAINFALL – **Inland** – Ravensthorpe Post Office: 423 mm

Coast – Hopetoun Post Office: 504 mm

LAKE – **Area:** 3.3 km^2 **length:** 4 km

Type: Permanently closed lake system.

Bar – **height:** 6+ m above AHD and densely vegetated

sand type: Dune ridges up to 500 m dune over wide coastal limestone.

Depth – can have 2+ m, river pools to 3m

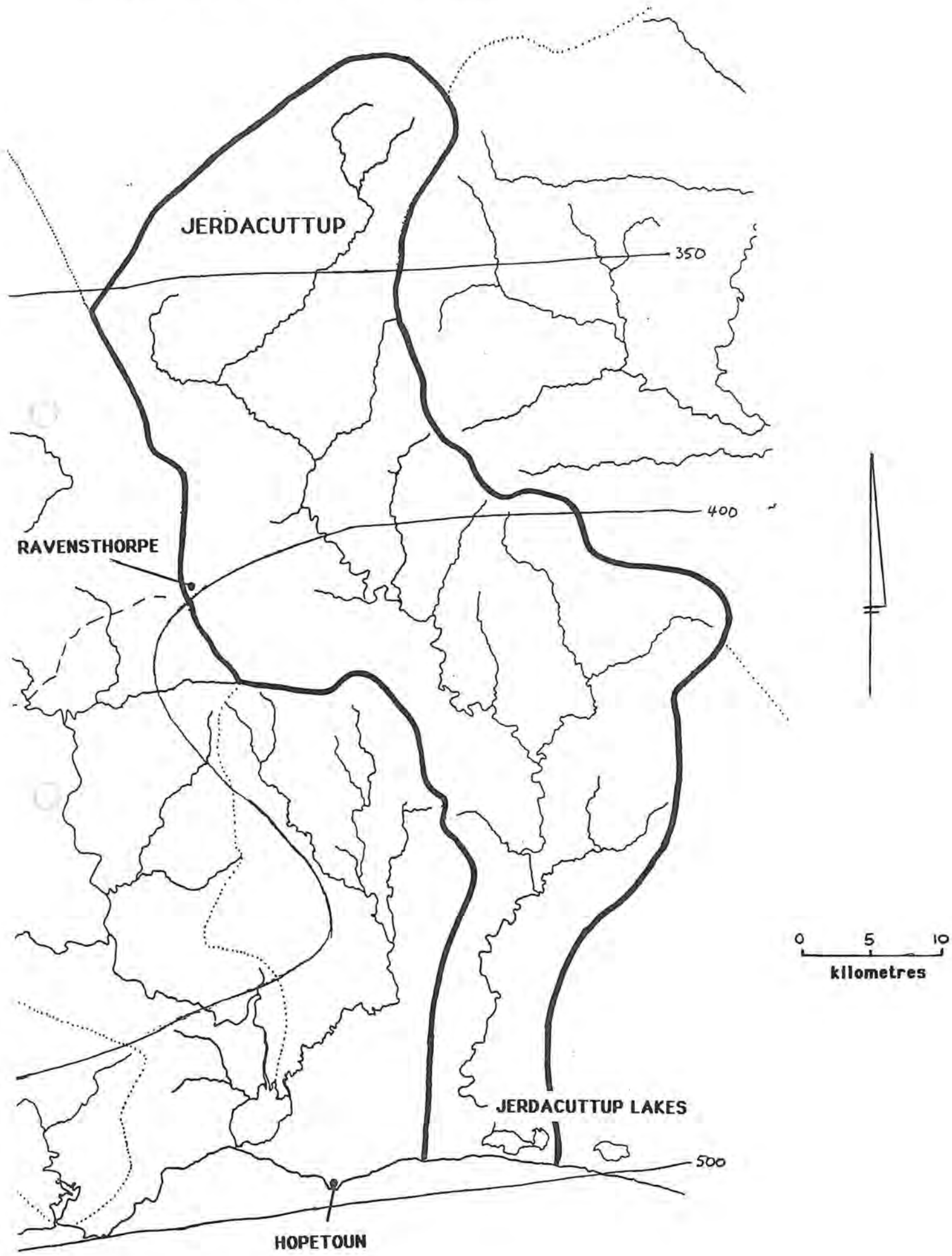
Salinity: 25–44 ppt

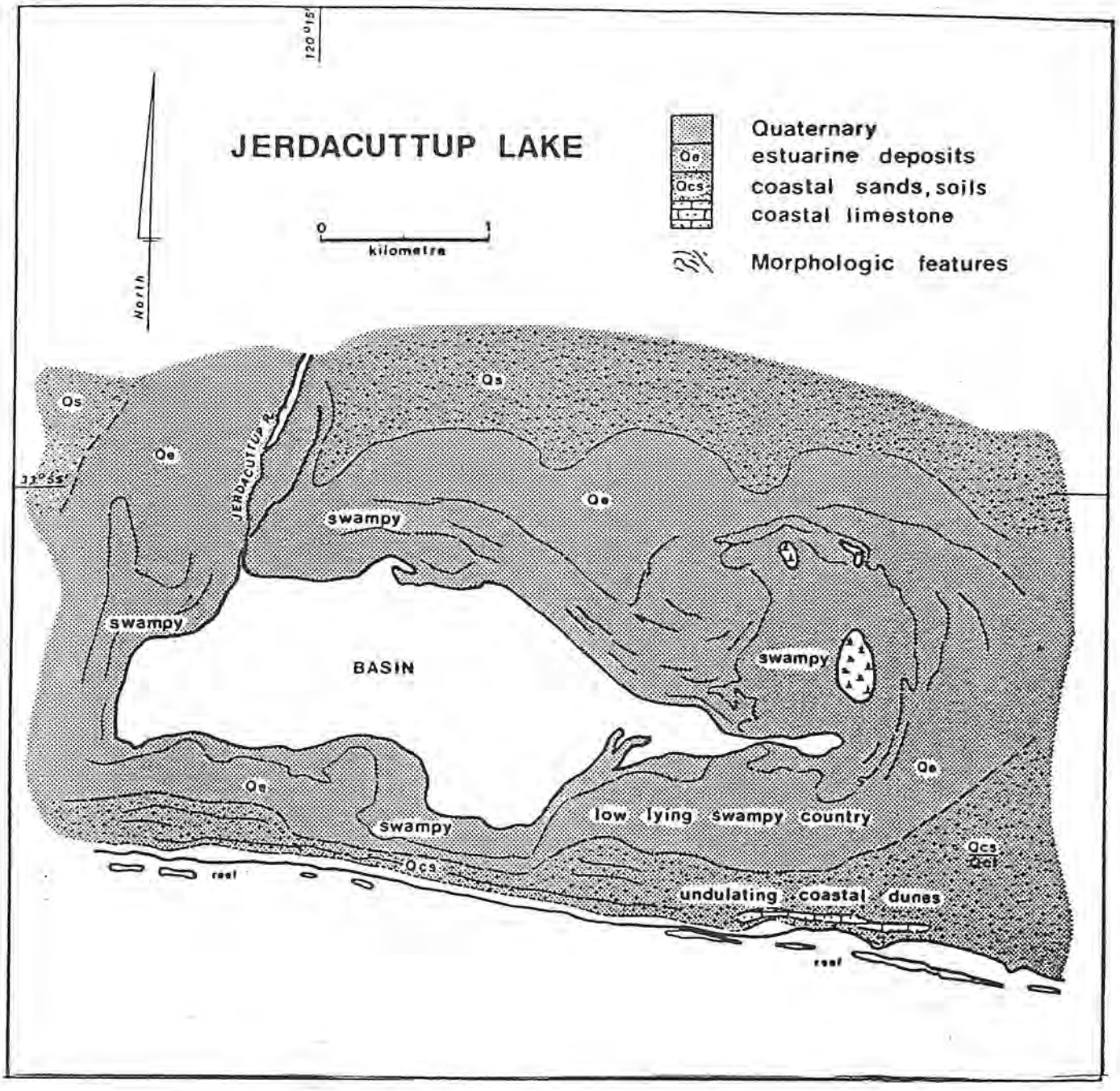
MANAGEMENT

Jerdacuttup is a saline lake system, it is no longer estuarine and there is no evidence that it has been open to the sea during the Holocene. A high dune and road separate it from the sea.

The western half of the lake and 2 km of river is in the Jerdacuttup River Nature Reserve. Upper catchment – Kundip Nature Reserve.

JERDACUTTUP RIVER CATCHMENT




120°15'
JERDACUTTUP LAKE
0
1
kilometre
North
Quaternary
estuarine deposits
coastal sands, soils
coastal limestone
Morphologic features
Qe
Qcs
Qs
Qe
JERDACUTTUP R.
33°55'
swampy
swampy
BASIN
swampy
Qe
swampy
low lying swampy country
Qcs
Qcl
reef
Qcs
undulating coastal dunes
reef

OLDFIELD INLET

RIVERS – OLDFIELD

Catchment area: 2645 km^2, 15% cleared (1968), more now

Total flow – mean: 2.9 x 10^6 m^3 (estimate)

Runoff – overall: 1.1 mm (Gauging stations 601 001, 601 004)

Salinity – 1-26 ppt

RAINFALL – **Overall** – Munglinup (Balga): 483 mm

ESTUARY – **Area:** 1.0 km^2 **length:** 4 km + 4 km of narrow riverine reach

Type: normally closed, opens every 3-4 years.

Bar – height: 3+ m above AHD **width:** 200 m

sand type: medium to coarse sand, quartz (85%) shell (10%).

Depth – no data, probably ~1 m below AHD

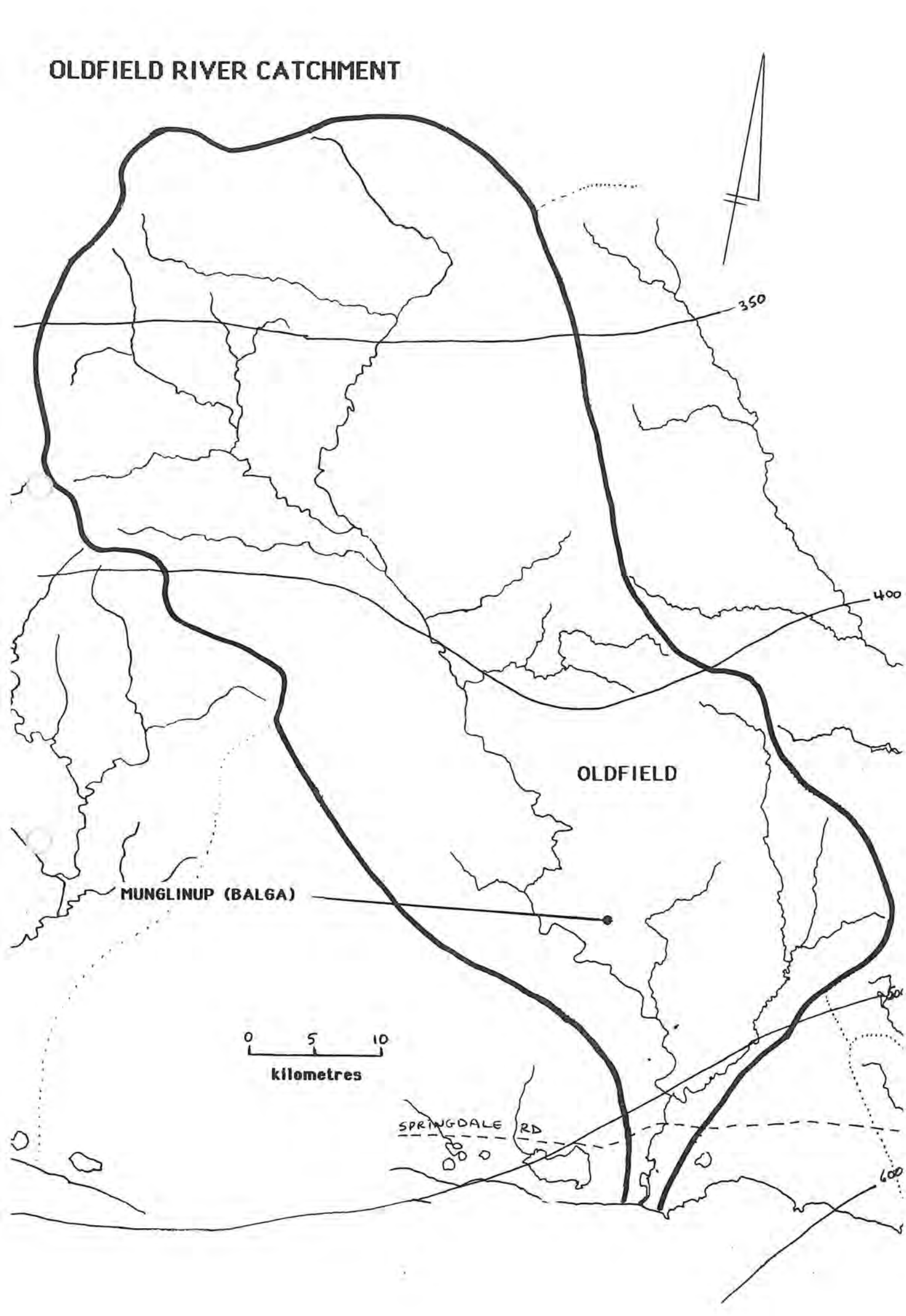
Salinity: 3-67 ppt

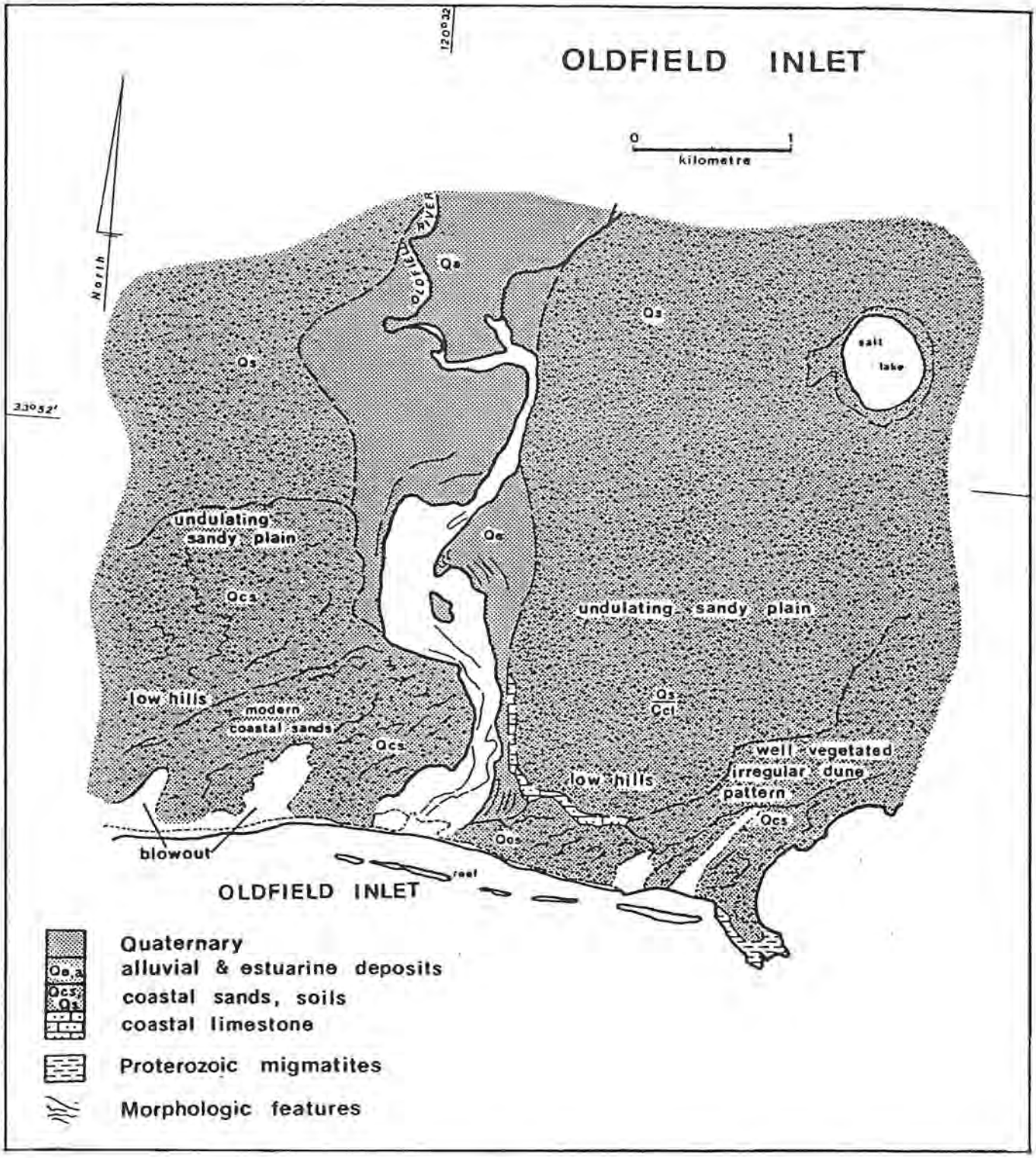
MANAGEMENT

The estuary is in the Ravensthorpe Shire. It is bordered by coastal scrub on both sides (? reserve). Lake Shaster Nature Reserve lies to the west, between Springdale Road and the sea.

Much of the river is bordered by a strip of reserve land, but is grazed, and there are a several long, permanent pools of brackish water (10-15ppt). In the upper catchment are Cheadanup Nature Reserve and Munglinup Nature Reserve.

The estuary fills after heavy rain and holds water for much of the time, but dries to shallow pool of hypersaline water.


OLDFIELD RIVER CATCHMENT
350
400
OLDFIELD
MUNGLINUP (BALGA)
0 5 10
kilometres
SPRINGDALE RD
600


OLDFIELD INLET
120°32'
0
1
kilometre
North
OLDFIELD RIVER
Qe
Qs
salt lake
33°52'
undulating sandy plain
Qcs
low hills
modern coastal sands
blowout
reef
OLDFIELD INLET
Qs Qcl
well vegetated irregular dune pattern
Quaternary
alluvial & estuarine deposits
coastal sands, soils
coastal limestone
Proterozoic migmatites
Morphologic features

TORRADUP INLET

RIVERS – TORRADUP

Catchment area: 105 km^2, 71% cleared (1968)

Total flow – mean: 0.15 x 10^6 m^3 (estimate)

Runoff – overall: 1.4 mm (Gauging stations 601 001, 601 004)

Salinity – mean: 40 ppt

RAINFALL – **Overall** – Esperance (Young River): 541 mm

ESTUARY – **Area:** 0.45 km^2 **length:** 3 km

Type: normally closed, probably opens every 2- 3 years

Bar – height: 1.5 m above AHD **width:** 50 m

sand type: Moderately well sorted, coarse to very coarse quartz sand; quartz 85%

Depth – average: 1.5 m

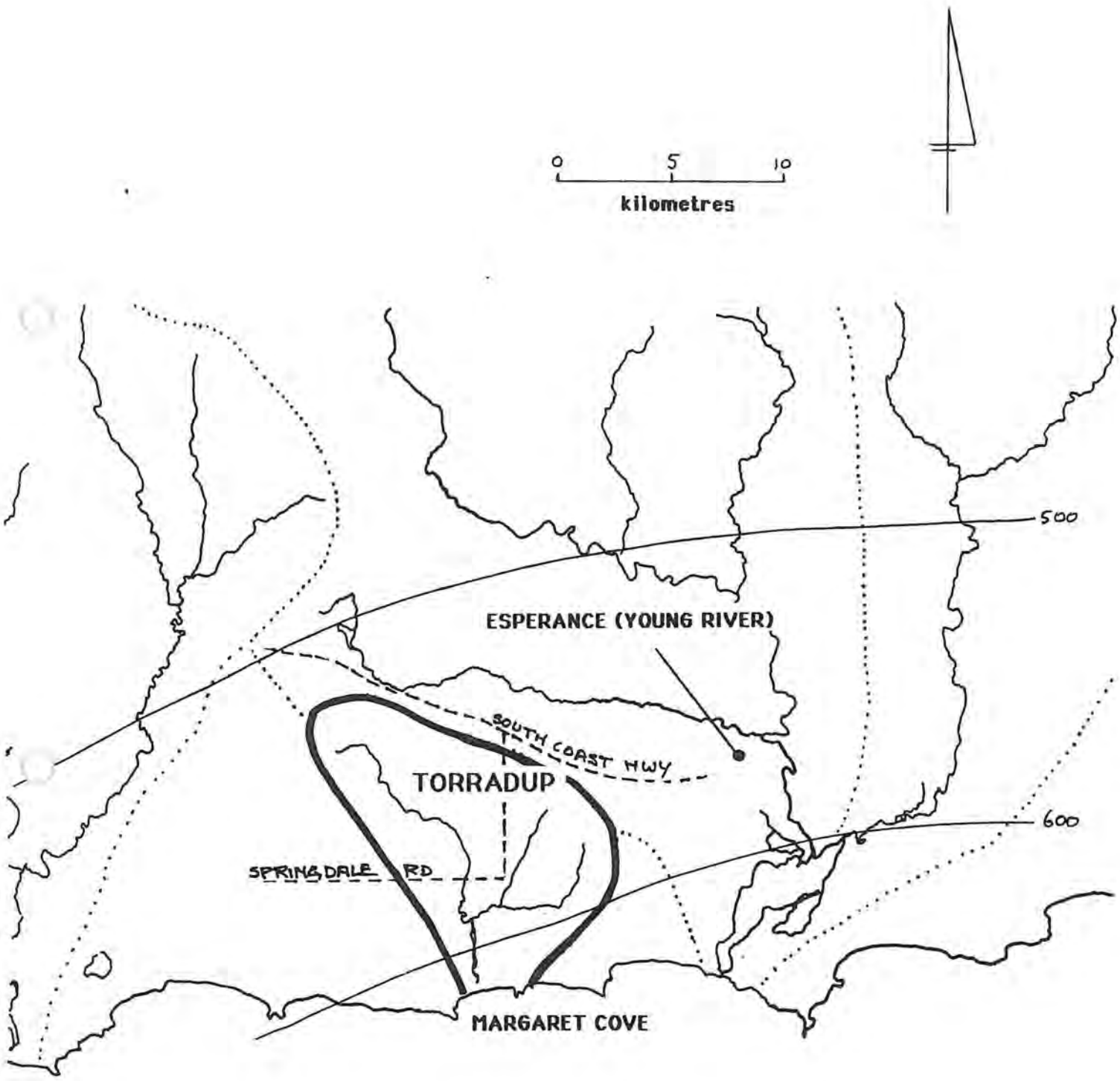
Salinity: 20- 40ppt

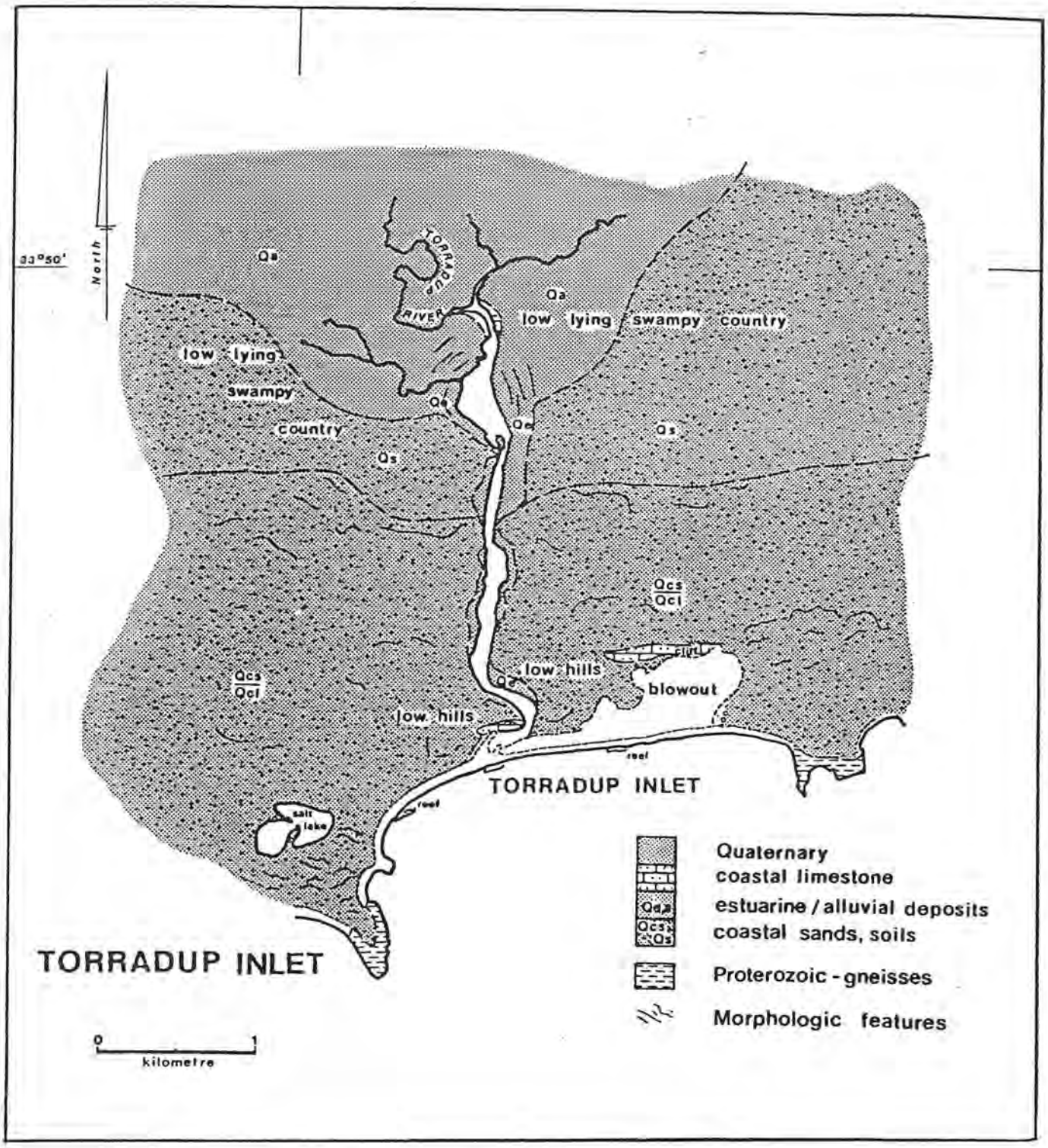
MANAGEMENT

The lower 2.5 km of the estuary is in the Stokes National Park. Access is from the junction of Springdale and Torradup roads along bush tracks.

The estuary has held water on the few occasions visited. It is said to carry good fish, but must go hypersaline at times.

TORRADUP RIVER CATCHMENT




32°50'
North
Qa
TORRADUP RIVER
Qa
low lying swampy country
low lying
swampy
country
Qd
Qe
Qs
Qs
Qcs
Qcl
Qcs
Qcl
low hills
blowout
low hills
reef
TORRADUP INLET
reef
salt lake
TORRADUP INLET
Quaternary
coastal limestone
Qd,Qe
estuarine / alluvial deposits
Qcs, Qcl, Qs
coastal sands, soils
Proterozoic - gneisses
Morphologic features
0
kilometre

STOKES INLET

RIVERS – LORT

Catchment area: 3025 km^2, 60% cleared (1982) above stn. 601 004

Total flow – **mean:** 3.63 x 10^6 m^3

Runoff – **overall:** 1.2 mm

upper catchment: 1.2 mm (Gauging station 601 004)

lower catchment: 1.4 mm

Salinity – **mean:** 21939 mg/l TSS (1290-51562) (stn. 601 004)

YOUNG

Catchment area: 2300 km^2, 75% cleared (1982) above stn. 601 001.

Total flow – **mean:** 2.3 x 10^6 m^3

Runoff – **overall:** 1.0 mm

upper catchment: 0.8 mm (stn. 601 001)

lower catchment: 1.4 mm

Salinity – **mean:** 6885 mg/l TSS (1047-19388) (stn. 601 001)

RAINFALL – **Inland** – Scadden (Lort River): 353 mm

Coast – Esperance (Young River): 541 mm

ESTUARY – **Area:** 10.9 km^2 **length:** Lort 2.5 km, Young 6 km (from basin)

Type: normally closed, open every 3-7 years briefly (weeks)

Bar – **height:** 2+ m above AHD **width:** 200 m

sand type: poorly sorted fine to coarse sand, 65% quartz, 30% shell

Depth – **average:** 2-3 m **Max:** 11 m

Salinity: **mean:** 30-86 ppt

MANAGEMENT

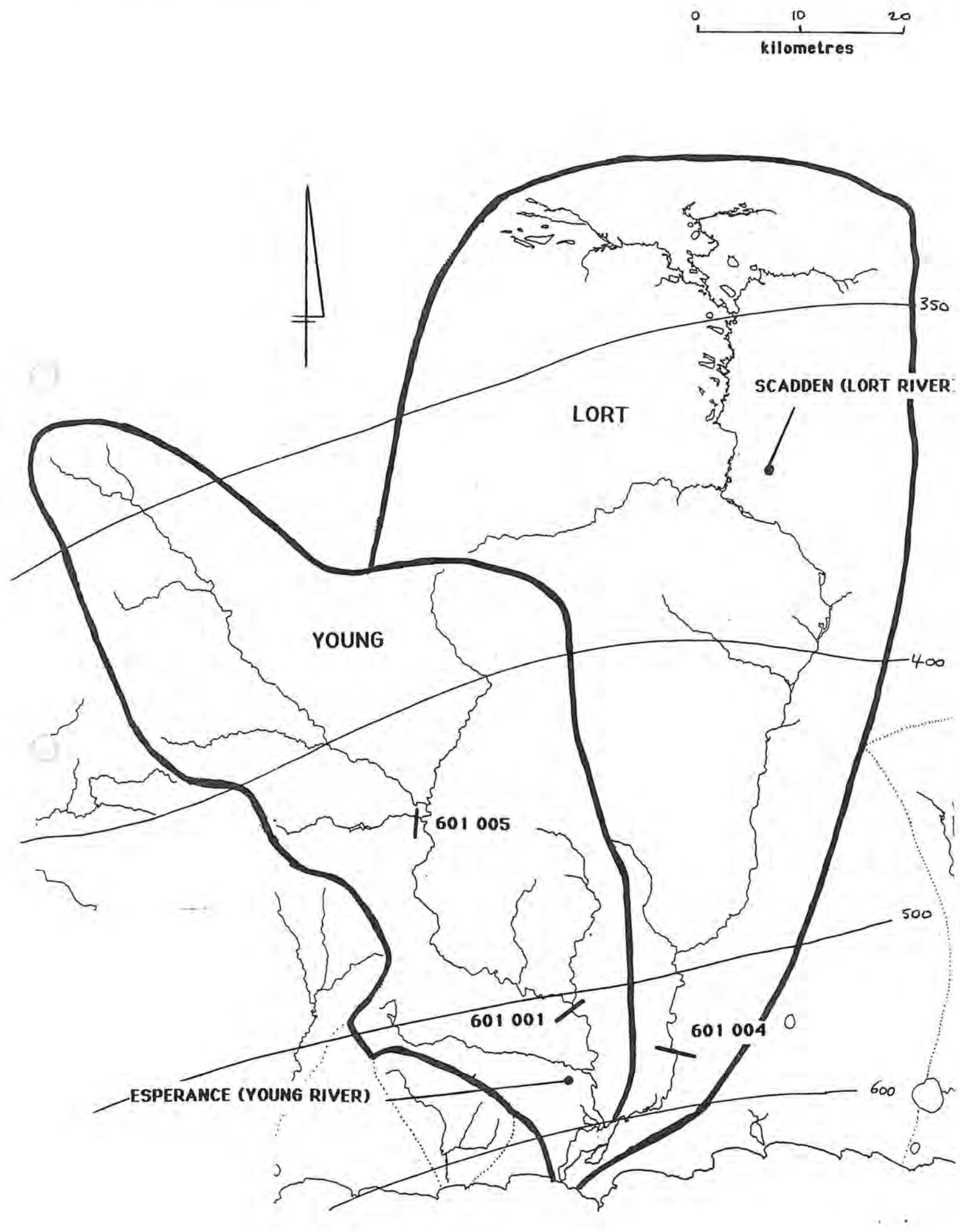
The estuary basin is in Stokes National Park, riverine reaches of the Young River are in Young River Station land. Access is from South Coast Highway 2 km west of Young River bridge.

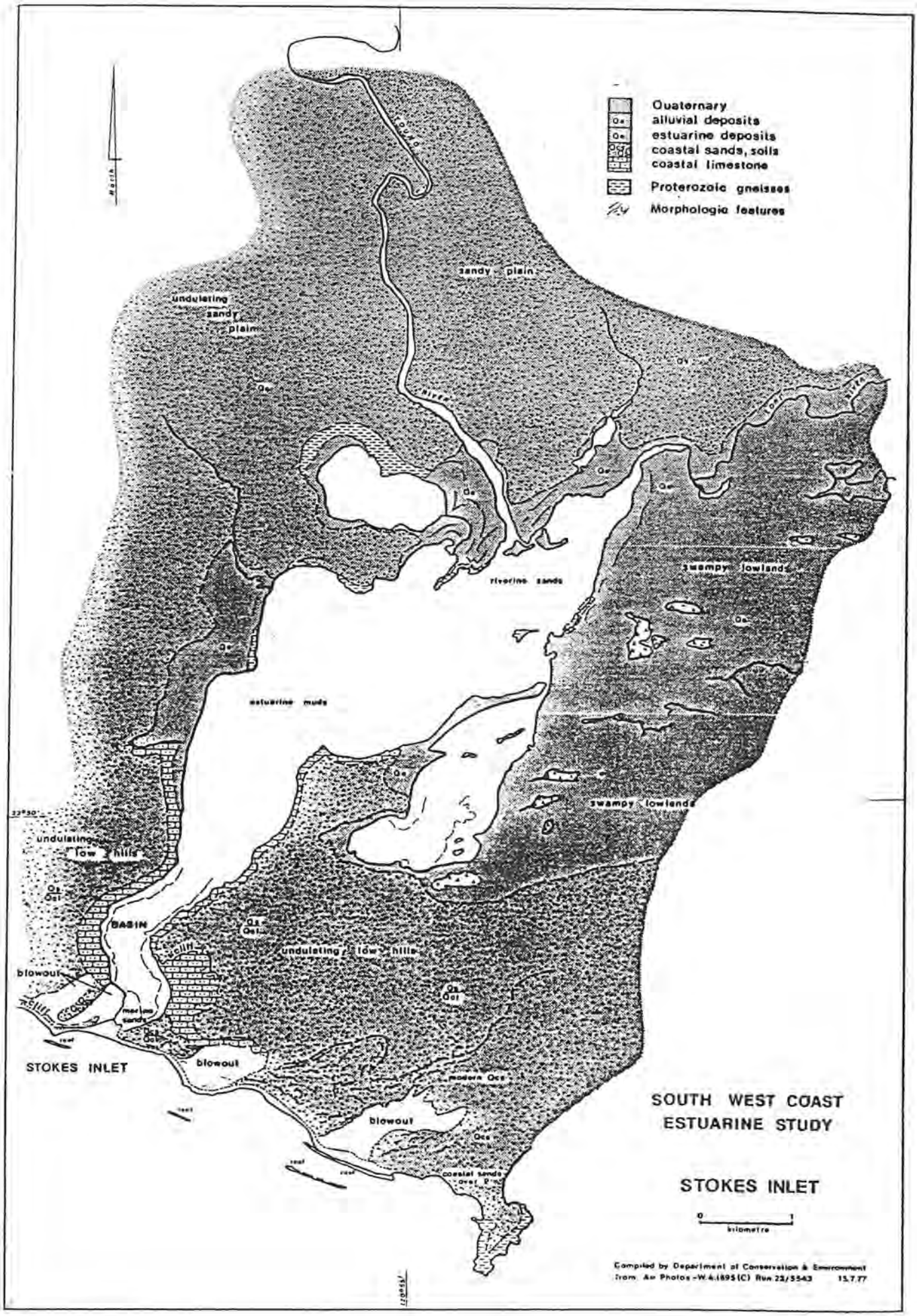
The estuary is exceptional in that the basin is still deep, near the bar.

The river bars are said to have shallowed in recent years separating water in the river reaches from the basin when water level is low.

A large dune to the west of the bar is pouring sand into the estuary and needs to be stabilised.

STOKES INLET CATCHMENT




Quaternary
alluvial deposits
estuarine deposits
coastal sands, soils
coastal limestone
Proterozoic gneisses
Morphologic features
North
sandy plain
undulating sand plain
river
swampy lowlands
riverine sands
estuarine muds
undulating low hills
BASIN
cliff
blowout
marine sands
STOKES INLET
modern Qcs
coastal sands over P
SOUTH WEST COAST
ESTUARINE STUDY
STOKES INLET
kilometre
Compiled by Department of Conservation & Environment
from Air Photos - W.A. 1895 (C) Run 23/5543 15.7.77

BARKER INLET

RIVERS – COOMALBIDGUP

Catchment area: 223 km^2, 76% cleared (1983)

Total flow – mean: 0.3 x 10^6 m^3 (estimate)

Runoff – overall: 1.4 mm

Salinity – no data

RAINFALL – **Overall** – Esperance (Erinair): 528 mm

ESTUARY – **Area:** 1.6 km^2 **length:** 2.0 km

Type: normally closed

Bar – height: not known **width:** not known

sand type: not known

Depth – shallow

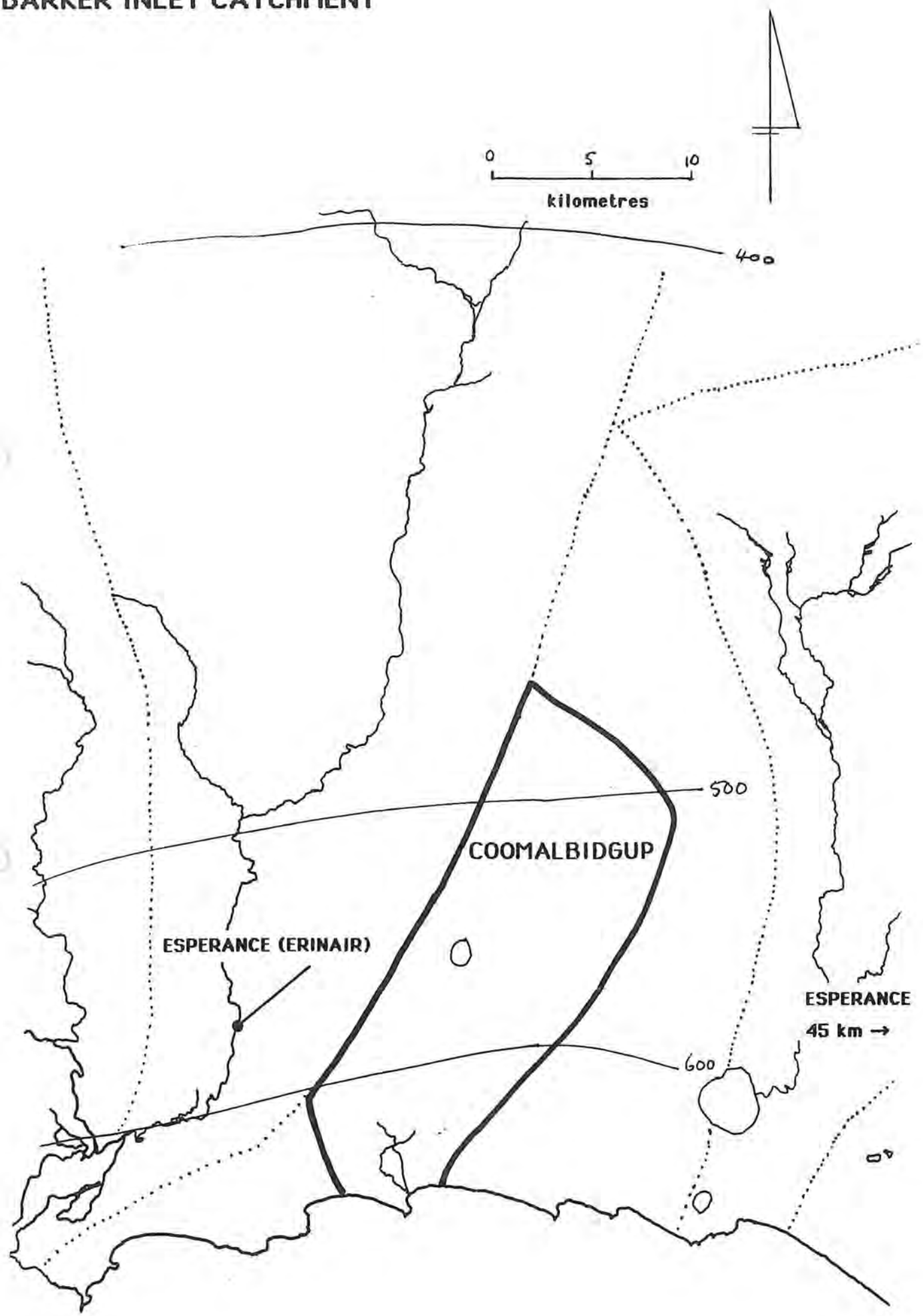
Salinity: no data

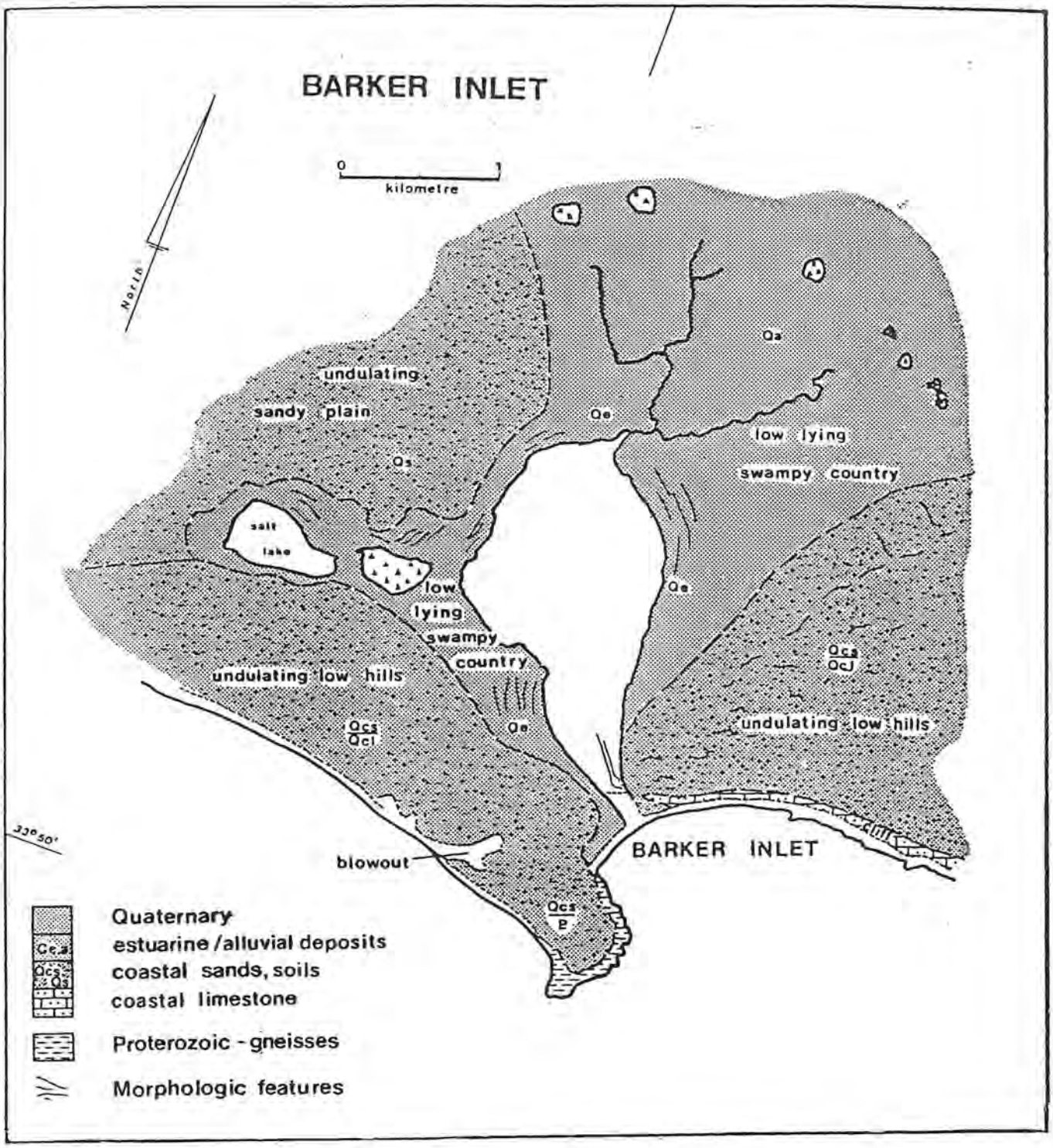
MANAGEMENT

The Inlet is in Butty Nature Reserve. Access is by a bush track from Farrells Road off South Coast Highway. Stream flow to the Inlet appears to be through a swamp in the Reserve.

The Inlet is reported to hold water only briefly.

BARKER INLET CATCHMENT




BARKER INLET
0
kilometre
North
undulating
sandy plain
Qs
Qe
Qa
low lying
swampy country
salt
lake
low
lying
swampy
country
undulating low hills
Qcs
Qcl
Qe
Qcs
Qcl
undulating low hills
33°50'
blowout
BARKER INLET
Qcs
p
Quaternary
estuarine /alluvial deposits
coastal sands, soils
coastal limestone
Proterozoic - gneisses
Morphologic features