AGSO

An inventory of saline water disposal basins, Murray Basin

Volume 3

Additional basins in South Australia, Victoria and New South Wales 1998

By Heather Sedgmen

RECORD 1999/21

AGSO

AUSTRALIAN
GEOLOGICAL SURVEY
ORGANISATION

AN INVENTORY OF SALINE WATER DISPOSAL BASINS, MURRAY BASIN

Volume 3

ADDITIONAL BASINS IN SOUTH AUSTRALIA, VICTORIA AND NEW SOUTH WALES 1998

Record 1999/21

By Heather Sedgmen

Prepared as a contribution to NRMS Project M4042
Managing disposal basins to maximise their usefulness for salt storage

AUSTRALIAN GEOLOGICAL SURVEY ORGANISATION

Department of Industry, Science and Resources

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Parliamentary Secretary: The Hon. Warren Entsch, MP
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Australian Geological Survey Organisation

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Preface

Evaporation basins have been used in the Murray Basin for most of the twentieth century to dispose of saline groundwater and irrigation excess. However, little is known about these basins or what effect they may be having on their surrounds. An inventory of disposal basins has been compiled to assist in the evaluation of known disposal basins and to identify deficiencies in information to assist in the prioritisation of further data collection work. The inventory integrates individual State inventories and databases.

The inventory comprises three volumes describing over 150 disposal basins with information in a standardised format on location, operating conditions, engineering, site geology and hydrodynamics for each basin. The first two volumes of the inventory, written by Stephen Hostetler and Bruce Radke, were released in the beginning of 1995 as AGSO Record 1995/4. This third volume provides the same types of information about additional basins that have since become known by various State agencies.

For the purposes of the inventory, evaporation basins have been defined to include both:

- closed system basins receiving piped irrigation drainage waters or water from interception schemes, and
- backwaters receiving piped irrigation drainage waters.

Closed system basins can be natural depressions, modified natural depressions, or completely engineered structures. Terminal basins rely on either or both evaporation and leakage to dispose of the outfall waters.

A geographic information system (GIS) has been constructed from the inventory and is a component of the Murray-Darling Basin Irrigation Infrastructure GIS (IIGIS) which is a coordinated effort between State and Commonwealth agencies to capture digital information concerning drainage and irrigation infrastructure in the Murray-Darling Basin. This digital resource consists of a number of components:

- A relational database containing key information about the basins
- A GIS coverage storing the disposal basin outlines
- GIS coverages of representative cross sections showing the borehole lithologies and stratigraphy in the vicinity of disposal basins
- Scanned images of aerial photography
- Rectified, digital, aerial photography (River Murray Mapping)
- ArcView interface
- Internet accessible documentation and software downloads

The structure of the GIS is fully documented in AGSO Record 1997/42, written by Stephen Hostetler, Ross Brodie and Bruce Radke. The report also describes the results of preliminary interrogation of the relational database component of the GIS that demonstrates its usefulness in determining a basin's viability.

The inventory was prepared as a contribution to the Murray-Darling Basin NRMS Project M4042 – *Managing disposal basins to maximise their usefulness for salt storage.* This third volume of the inventory has been prepared with the much-appreciated assistance of several AGSO staff, including Stephen Hostetler and Ross Brodie, as well as the following State agencies:

NSW Department of Land and Water Conservation
Victorian Department of Natural Resources and Environment
South Australian Department of Transport, Urban Planning and the Arts

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Volume 1 (AGSO Record 1995/4)

South Australia

New South Wales

Volume 2 (AGSO Record 1995/4)

Victoria

Volume 3

New South Wales

Victoria

South Australia

(No new disposal basins since 1994)

<Site Name> Confined Basin Lake Wyangan
<Synonyms>

Spatial

<Location description> Crown land lease Portion 257 in the Parish of Wyangan, 8 kilometres north of Griffith and 1.2 kilometres east of Lake Wyangan. 37 kilometres north of the Murrumbidgee River.

<Located in the Murray Trench> No

<Location 1:250 000> Narrandera

<Location 1:100 000> Griffith 8129

<Zone> 55

<Coordinates easting (AMG)> 411500

<Coordinates northing (AMG)> 6213000

<State> NSW

General

<Year begun operation>

<Active/inactive> Active

<Full surface area (ha)> 40.0

<Volume capacity (ML)>200.0

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 117 (Woolley 1991)

<Groundwater seepage/discharge>

<Average annual evaporation> 1850 mm/yr (Class A pan) (NATMAP 1970)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)> minimum 7,400 mg/L TDS (Realica & Williams 1995)

<Range of salinity in basin (EC)> minimum 14,400 mg/L TDS (Realica & Williams 1995)

<Sources of water to be disposed> Tile drainage – irrigation run off

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Confined Basin Lake Wyangan
<Synonyms>

Engineering/Admin

<Public or private operation> Public

<Agency responsible> NSW Department of Land & Water Conservation

<Project name>

<Natural, modified natural or constructed> Natural

<Modification type and degree> Outlet/inlet

Geological

<Site description and Geomorphology> This basin is situated approximately 1400 metres east of Lake Wyangan among scattered forest on dune deposits of varying sands, clays and lateritic soils and irregular deposits of aeolian sands. The surrounding area consists of flat to gently undulating plains with a similar composition and also with lateritic soils (Pogson 1974 & Wynn 1962, NATMAP 1970).

<Subsurface investigations at site>

<Structural setting> The gently dipping Griffith Syncline, which is part of the greater Darling Depression, occurs in the pre-Cainozoic basement and lies approx 4 kilometres to the east. The Cainozoic sediments are undisturbed (Pogson 1974 & Wynn 1962).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (unknown thickness) which is underlain by undifferentiated Cainozoic sediments (up to 80m) (Pogson 1974).

<Host formation> Woorinen Formation

<Host lithofacies> Dune deposits of red and brown clayey sand, loam and lateritic soils with irregular deposits of aeolian sand (Pogson 1974 & Wynn 1962).

<Aquitard>

<Aquitard lithofacies>

<Aquifer>

<Aquifer lithofacies>

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 37 kilometres to the Murrumbidgee River

<Head between basin and river/tributary> 4 metres (Murrumbidgee River)

<Direction of groundwater flow in regional aquifer>

<Site Name> Confined Basin Lake Wyangan
<Synonyms>

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer>

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer>

<Hydraulic linkage to surface runoff>

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References

(NATMAP 1970) Griffith Topographic Map Sheet 8129 (1:100,000 scale) Edition 1, Division of National Mapping, 1970.

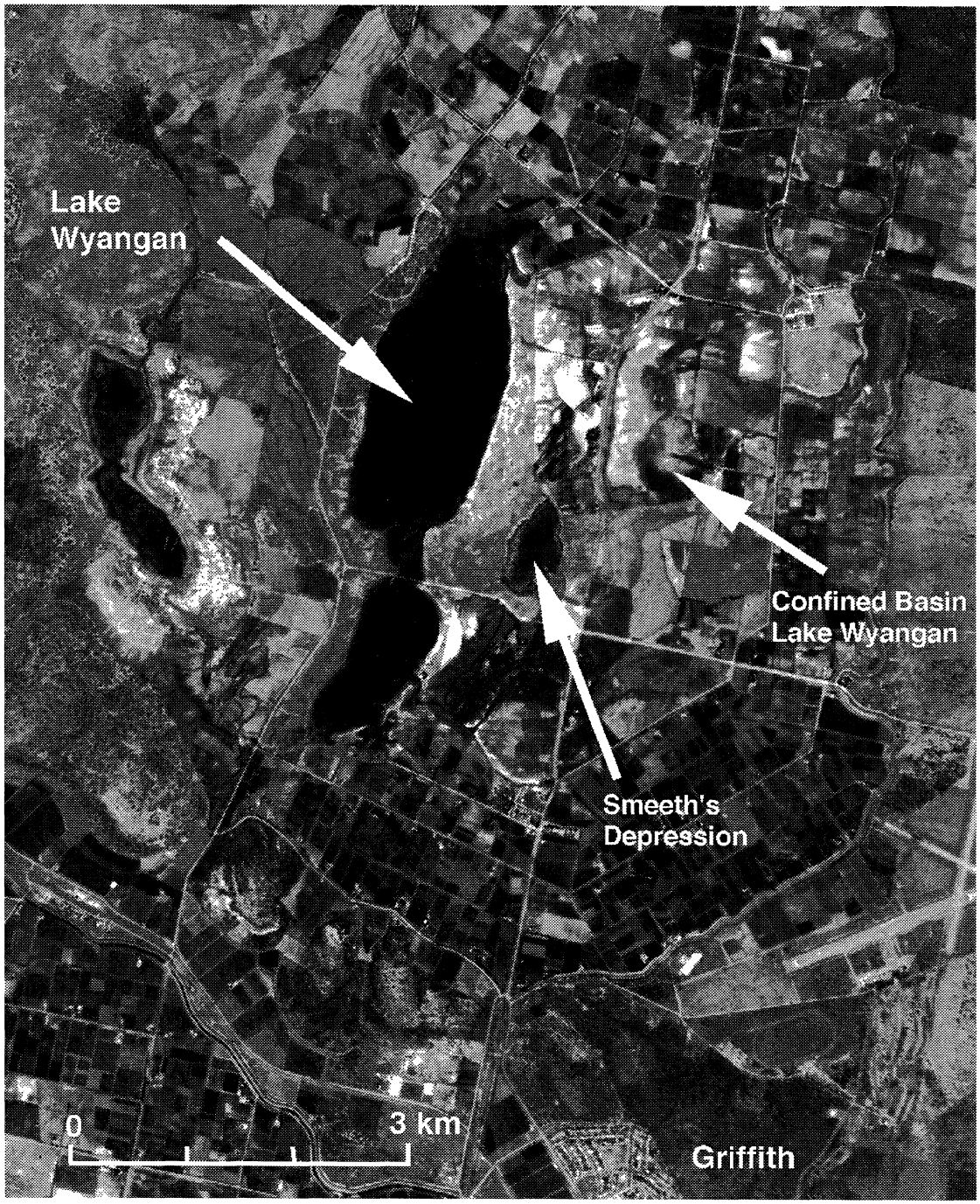
Pogson D J, 1974, Narrandera 1: 250,000 Geological Sheet. Geological Survey of NSW, Sydney.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Wynn, D.W., 1962, Narrandera- 4 mile Geological Series., The Geological Survey of New South Wales, Sheet I55/10 Zone 7, Australian National Grid.

Woolley, D., (Department of Water Resources, NSW), 1991, Narrandera Hydrogeological Map (1:250,000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

<Site Name> Confined Basin Lake Wyangan
<Synonyms>



<Site Name> Green Gully
<Synonyms>

Spatial

<Location description> Portions 2,3,4,46,51,53,54 & 55 in the Yarraman Parish, Cadell County - 200 metres off Moama Barham Road, near "Kowarra", and halfway between Meares and Yarraman Lanes. Deniboota Irrigation District.

<Located in the Murray Trench> No

<Location 1:250 000> Deniliquin

<Location 1:100 000> Mathoura 7826

<Zone> 55

<Coordinates easting (AMG)> 275400

<Coordinates northing (AMG)> 6036000

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)> 10.0

<Volume capacity (ML)>

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 81 (Williams & Woolley 1992)

<Groundwater seepage/discharge>

<Average annual evaporation> 1730 mm/yr (Average (Class A pan)) (NATMAP 1983)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)> 24,000 mg/L TDS in host sequence (Realica & Williams 1995).

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Green Gully
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree> Banks and outlet/inlet; drainage line and block bank

Geological

<Site description and Geomorphology> This basin is situated amongst scattered forest on an extensive, flat plain. The surrounding farmlands are subject to inundation and are primarily used for growing rice (NATMAP 1983).

<Subsurface investigations at site>

<Structural setting>

<Stratigraphic setting> The basin is floored by the Shepparton Formation (up to 75m) which is underlain by Calivil Formation (up to 25m) and then the Olney Formation (part of the Renmark Group, unknown thickness) (Brown & Stephenson 1991).

<Host formation> Shepparton Formation

<Host lithofacies> Flood plains of black and red clayey silt, sand and gravel (Pogson 1974 & Wynn 1962).

<Aquitard>

<Aquitard lithofacies>

<Aquifer> Shepparton Formation (partial aquifer) with the deeper Pliocene Sands (Calivil Fm) and Upper Renmark Group (Olney Fm) aquifers.

<Aquifer lithofacies> 1. Shepparton, as above; 2. Pliocene Sands (Calivil Fm) - Poorly consolidated, pale grey, poorly sorted, coarse to granular quartz sand, conglomerate with while kaolinitic matrix; as a sand sheet deposited in valley fill, alluvial fan and fluvio-lacustrine and braided channel environments; 3. Upper Renmark Group (Olney Fm) - Unconsolidated/poorly consolidated, thinly bedded, dark brown, grey, black, carbonaceous silt, sand, clay, brown coal, peat; commonly micaceous, pyritic, ferruginised; deposited in fluvio-lacustrine, meandering channel, swamp and floodplain environments. (Brown & Stephenson 1991)

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 12.5 kilometres to the River Murray

<Site Name> Green Gully
<Synonyms>

<Head between basin and river/tributary>

<Direction of groundwater flow in regional aquifer> North north-west

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer> Shepparton Formation – 24,000 mg/L TDS (Realica & Williams 1995)

<Porosity of aquifer>

<Thickness of aquifer> 75 metres of Shepparton Formation and 25 metres of Pliocene Sands (unknown thickness of Upper Renmark Group) (Williams & Woolley 1992).

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer>

<Hydraulic linkage to surface runoff> Surrounding area is subject to inundation.

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1274mm/yr (Average rainfall of 456mm and average evaporation of 1730mm/yr.)

Interpretive 2

<Ranking of sustainability>

References

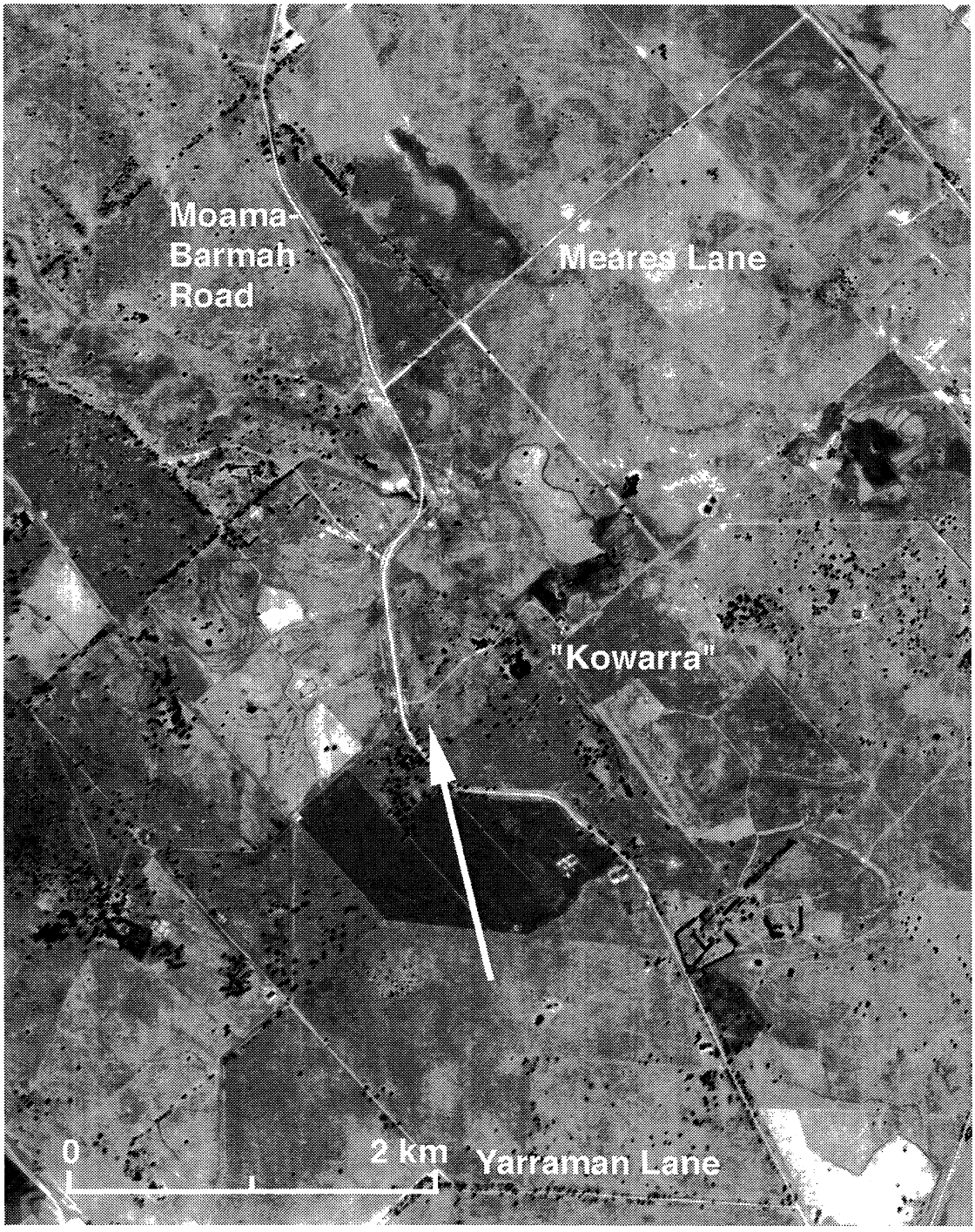
Brown, C.M., and Stephenson, A.E., 1991, Geology of the Murray Basin, South Eastern Australia., Bureau of Mineral Resources, Geology and Geophysics, BMR Bulletin 235, (Australian Government Publishing Services, Canberra)

(NATMAP 1983) Mathoura Topographic Map Sheet 7826 (1:100,000 scale) Edition 1, Division of National Mapping, 1983.

<Site Name> Green Gully
<Synonyms>

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Williams, R.M. and Woolley, D. (Department of Water Resources), 1992, Deniliquin Hydrogeological Map (1:250 000 scale), Australian Geological Survey Organisation, Canberra, Australia



<Site Name> John's Depression
<Synonyms>

Spatial

<Location description> In the Parish of Wyangan, 25 kilometres west north west of Griffith. 36 kilometres north of the Murrumbidgee River and 5 kilometres west of Mirrool Creek.

<Located in the Murray Trench> No

<Location 1:250 000> Narrandera

<Location 1:100 000> Kooroongal 8029

<Zone> 55

<Coordinates easting (AMG)> 390500

<Coordinates northing (AMG)> 6212000

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)>

<Volume capacity (ML)>

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 112 (Woolley 1991)

<Groundwater seepage/discharge>

<Average annual evaporation> 1850 mm/yr (Class A pan) (NATMAP 1970)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> John's Depression
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Natural

<Modification type and degree>

Geological

<Site description and Geomorphology> This basin lies on the Shepparton Formation which is characteristically found on extensive, flat alluvial floodplains. This area may have originally been traversed by meandering channels of the River Murray (Pogson 1974 & Wynn 1962, NATMAP 1972).

<Subsurface investigations at site>

<Structural setting>

<Stratigraphic setting> The basin is floored by the Shepparton Formation (up to 75m) which is underlain by undifferentiated Cainozoic sediments (up to 80m) (Pogson 1974 & Wynn 1962a).

<Host formation> Shepparton Formation

<Host lithofacies> Flood plains of black and red clayey silt, sand and gravel (Pogson 1974 & Wynn 1962).

<Aquitard>

<Aquitard lithofacies>

<Aquifer> Shepparton Formation (partial aquifer)

<Aquifer lithofacies> As for host

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 36 kilometres to the Murrumbidgee River

<Head between basin and river/tributary> 5 metres (Murrumbidgee River)

<Direction of groundwater flow in regional aquifer> NW (Woolley 1991)

<kv of artificial floor>

<Site Name> John's Depression
<Synonyms>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer>

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer>

<Hydraulic linkage to surface runoff>

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References

(NATMAP 1970) Griffith Topographic Map Sheet 8129 (1:100,000 scale) Edition 1, Division of National Mapping, 1970.

Pogson D J, 1974, Narrandera 1: 250,000 Geological Sheet. Geological Survey of NSW, Sydney.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Woolley, D., (Department of Water Resources, NSW), 1991, Narrandera Hydrogeological Map (1:250,000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

<Site Name> John's Depression
<Synonyms>

Wynn, D.W., 1962a, Narrandera - 4 mile Geological Series., The Geological Survey of New South Wales, Sheet I55/10 Zone 7, Australian National Grid.

<Site Name> Lake Cargelligo Golf Course
<Synonyms>

Spatial

<Location description> Lake Cargelligo Golf Course just south of the Lake Cargelligo Township in the Lachlan Council area; two kilometres south of Lake Cargelligo and 38 kilometres north of the Murrumbidgee River.

<Located in the Murray Trench> No

<Location 1:250 000> Cargelligo

<Location 1:100 000> Cargelligo 8131

<Zone> 55

<Coordinates easting (AMG)> 441000

<Coordinates northing (AMG)> 6313500

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)> 1.0

<Volume capacity (ML)>

<Full surface level (m AHD)>

<Groundwater level (m AHD)>

<Groundwater seepage/discharge>

<Average annual evaporation> 1900 mm/yr (NATMAP 1970)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)> 5200 – 30770 mg/L TDS (Realica & Williams 1995)

<Range of salinity in basin (EC)>

<Sources of water to be disposed> Groundwater from the Lake Cargelligo Golf Course.

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base> Clay

<Site Name> Lake Cargelligo Golf Course
<Synonyms>

Engineering/Admin

<Public or private operation> Public

<Agency responsible> Lachlan Council

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree> Artificial clay floor

Geological

<Site description and Geomorphology> The basin is situated in cleared and gently undulating plains approximately 10 kilometres from the Lachlan River and 2 kilometres from the southern foreshore of Lake Cargelligo (NATMAP 1984). It lies amongst sediments of the Yamba formation, which is characterised by aeolian modified gypsite flats, lateritic soils and dune deposits, and is surrounded by small rises of residual pre-Cainozoic rocks (Pogson 1967).

<Subsurface investigations at site>

<Structural setting>

<Stratigraphic setting> The basin is floored by Quaternary lacustrine deposits (Pogson 1967, Woolley & Williams 1994).

<Host formation> Quaternary lacustrine deposits

<Host lithofacies> Friable to plastic, finely laminated, grey silty clay, clay pellet aggregates, gypseous clay pellets, pale grey gypsite (Brown & Stephenson 1991).

<Aquitard>

<Aquitard lithofacies>

<Aquifer>

<Aquifer lithofacies>

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 38 kilometres to the Murrumbidgee River

<Head between basin and river/tributary>

<Direction of groundwater flow in regional aquifer> North (Woolley & Williams 1994)

<Site Name> Lake Cargelligo Golf Course
<Synonyms>

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer>

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer>

<Hydraulic linkage to surface runoff> Excess surface water moves from south to north towards the Lake Cargelligo township and Lake Cargelligo itself.

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References

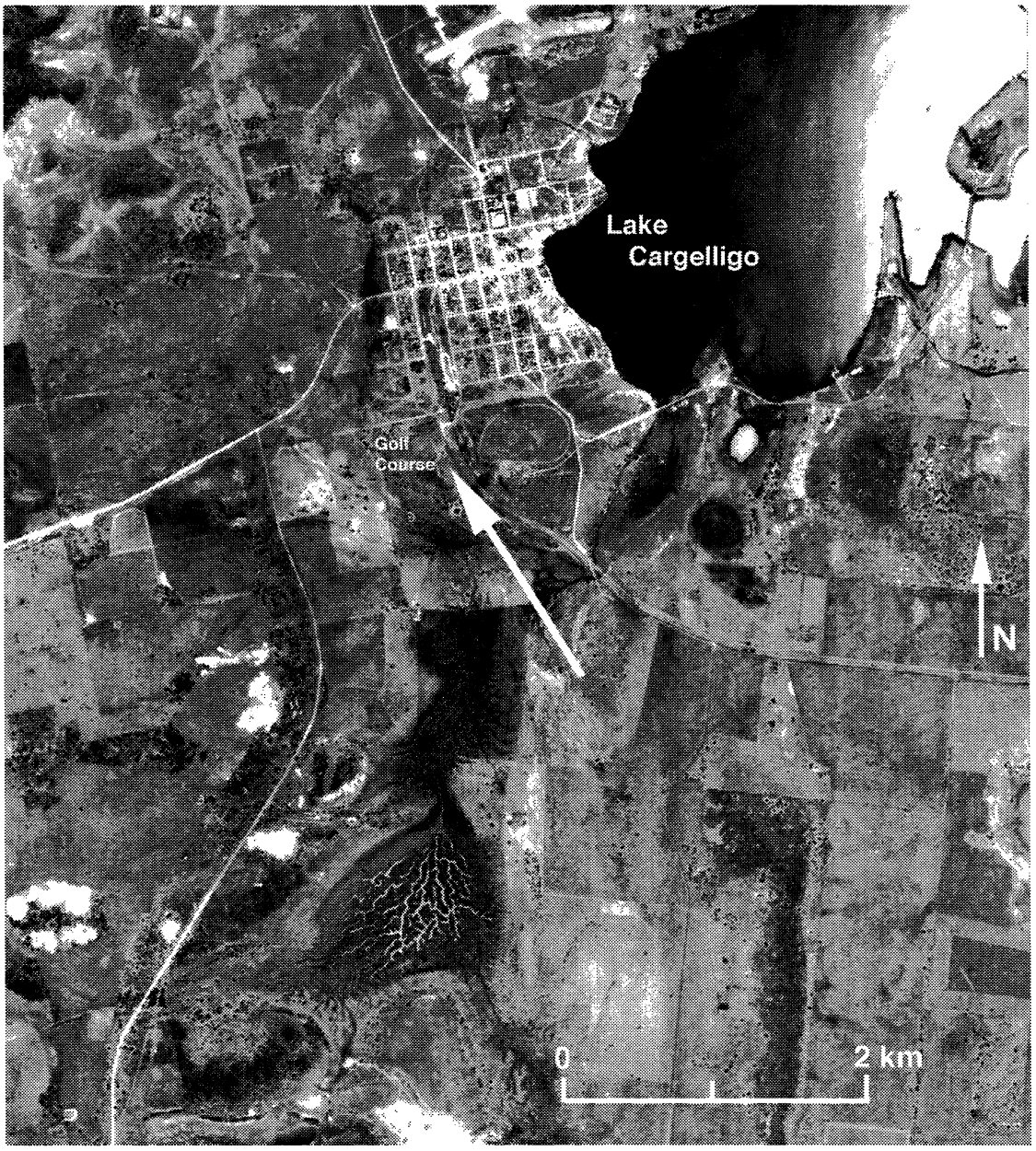
Brown, C.M., and Stephenson, A.E., 1991, Geology of the Murray Basin, South Eastern Australia., Bureau of Mineral Resources, Geology and Geophysics, BMR Bulletin 235, (Australian Government Publishing Services, Canberra)

(NATMAP 1984) Cargelligo Topographic Map Sheet 8131 (1:100,000 scale) Edition 1, Division of National Mapping, 1984.

Pogson D J, 1967, Cargelligo 1: 250,000 Geological Sheet Explanatory Notes 2nd Edition, Geological Survey of NSW.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

<Site Name> Lake Cargelligo Golf Course
<Synonyms>



<Site Name> Lake Wyangan
<Synonyms>

Spatial

<Location description> Lake Wyangan in the Parish of Wyangan, 9 kilometres north of Griffith.

<Located in the Murray Trench> No

<Location 1:250 000> Narrandera

<Location 1:100 000> Griffith 8129

<Zone> 55

<Coordinates easting (AMG)> 409750

<Coordinates northing (AMG)> 6213000

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)> 265.0 (approximate from digital AUSLIG data)

<Volume capacity (ML)>

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 117 (Woolley 1991)

<Groundwater seepage/discharge>

<Average annual evaporation>

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Lake Wyangan
<Synonyms>

Engineering/Admin

<Public or private operation> Public

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Natural

<Modification type and degree>

Geological

<Site description and Geomorphology> Lake Wyangan is underlain by black and grey silty clay and silt and surrounded by dune deposits and lateritic soils, and irregular deposits of aeolian sand. The lake sits in a slight depression that is part of the Griffith Syncline, the axis of which is approximately 6 kilometres to the east. The surrounding area consists of flat to gently undulating plains with hills of residual pre-Cainozoic rocks. Just south of the lake heavy clay has been mined, where gypsum and Tertiary coal deposits have been found (Pogson 1974 & Wynn 1962, NATMAP 1970).

<Subsurface investigations at site>

<Structural setting> The gently dipping Griffith Syncline, which is part of the greater Darling Depression, occurs in the pre-Cainozoic basement. The axis lies approx 6 kilometres to the east. The Cainozoic sediments are undisturbed (Pogson 1974 & Wynn 1962).

<Stratigraphic setting> The basin is floored by the Yamba Formation (unknown thickness) which is underlain by undifferentiated Cainozoic sediments (up to 80m) (Pogson 1974).

<Host formation> Yamba Formation

<Host lithofacies> Playas, clay pans and lakes of black and grey silty clay and silt with ephemeral salt crusts of gypsum, halite and other salts; saline lake deposit (Wynn 162; Brown & Stephenson 1991).

<Aquitard>

<Aquitard lithofacies>

<Aquifer>

<Aquifer lithofacies>

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 38 kilometres to the Murrumbidgee River

<Head between basin and river/tributary> 4 metres (Murrumbidgee River)

<Site Name> Lake Wyangan
<Synonyms>

<Direction of groundwater flow in regional aquifer>

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer>

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer>

<Hydraulic linkage to surface runoff>

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References

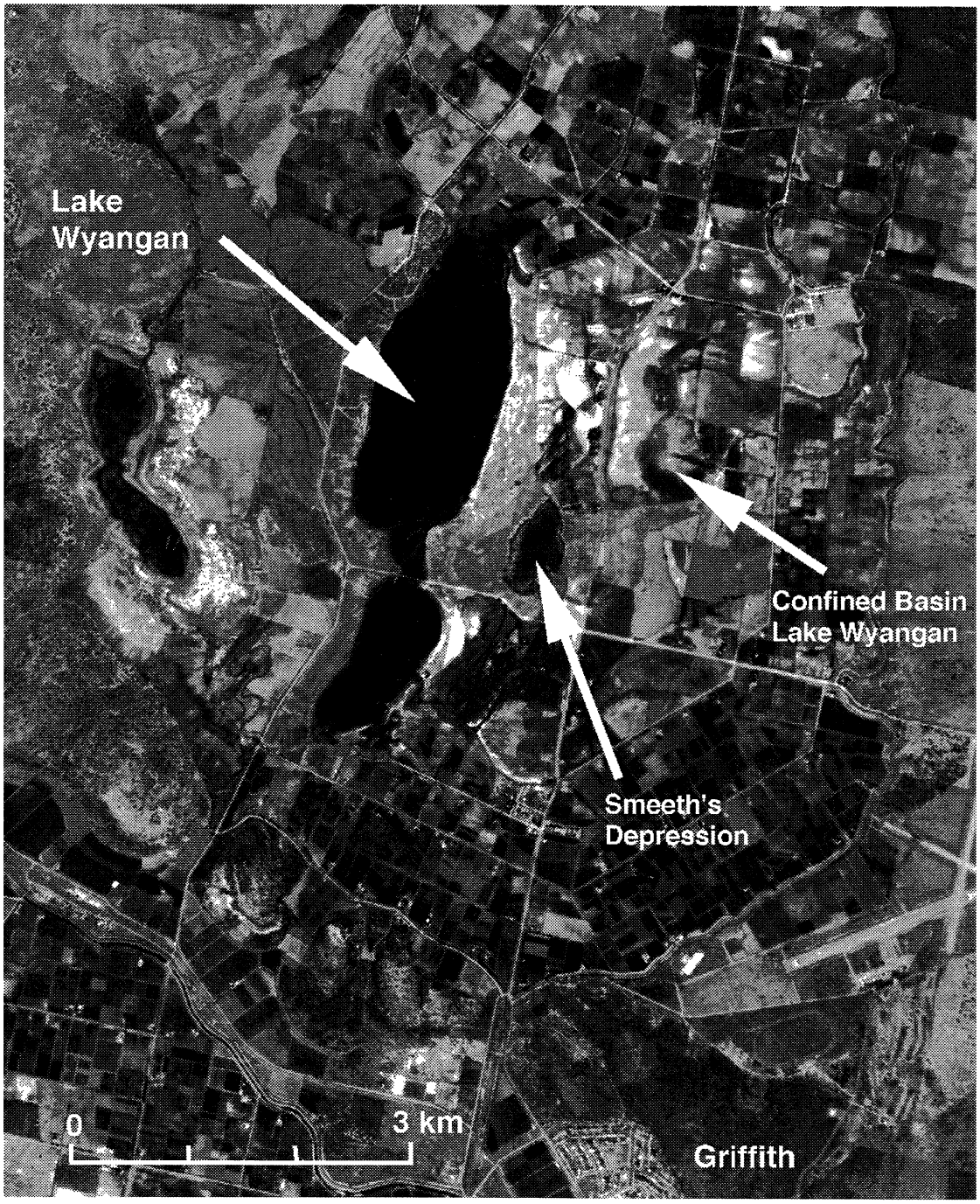
(NATMAP 1970) Griffith Topographic Map Sheet 8129 (1:100,000 scale) Edition 1, Division of National Mapping, 1970.

Pogson D J, 1974, Narrandera 1: 250,000 Geological Sheet. Geological Survey of NSW, Sydney.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Woolley, D., (Department of Water Resources, NSW), 1991, Narrandera Hydrogeological Map (1:250,000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

Wynn, D.W., 1962, Narrandera - 4 mile Geological Series., The Geological Survey of New South Wales, Sheet I55/10 Zone 7, Australian National Grid.



<Site Name> Mirrool Farm 2598
<Synonyms>

Spatial

<Location description> 6 kilometres west of Griffith and 500 metres southeast of the Main Drain off Mirrool Creek; 35 kilometres north of the Murrumbidgee River.

<Located in the Murray Trench> No

<Location 1:250 000> Narrandera

<Location 1:100 000> Kooroongal 8029

<Zone> 55

<Coordinates easting (AMG)> 404500

<Coordinates northing (AMG)> 6208500

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)> 10.0

<Volume capacity (ML)> 50.0

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 115 (Woolley 1991)

<Groundwater seepage/discharge>

<Average annual evaporation> 1850 mm/yr (Average (Class A pan)) (NATMAP 1972)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed> Highly saline water from a shallow watertable.

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Mirrool Farm 2598
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree> Standard evaporation pond

Geological

<Site description and Geomorphology> The basin is situated within an extensive network of irrigation channels/drains feeding farm land used for growing rice, grapes and orchard produce and other associated crops (NATMAP 1972). The surrounding area consists of gently sloping plains with small hills of residual pre-Cainozoic rocks (Pogson 1974 & Wynn 1962).

<Subsurface investigations at site>

<Structural setting>

<Stratigraphic setting> The basin is floored by Shepparton Formation (unknown thickness, probably approximately 75 metres) which is underlain by undifferentiated Cainozoic sediments (80m) (Pogson 1974) , probably Pliocene Sands (Brown & Stephenson 1991).

<Host formation> Shepparton Formation

<Host lithofacies> Flood plains of black and red clayey silt, sand and gravel. (Pogson 1974 & Wynn 1962).

<Aquitard>

<Aquitard lithofacies>

<Aquifer> As for host

<Aquifer lithofacies> As for host

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 35 kilometres to the Murrumbidgee River

<Head between basin and river/tributary> 3 metres (Murrumbidgee River)

<Direction of groundwater flow in regional aquifer> North west (Woolley 1991)

<Site Name> Mirrool Farm 2598
<Synonyms>

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer>

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> The basin host is directly underlain by Pliocene Sands aquifer (Brown & Stephenson 1991).

<Hydraulic linkage to surface runoff>

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References Cited

(NATMAP 1972) Kooroongal Topographic Map Sheet 8029 (1:100,000 scale) Edition 1, Division of National Mapping, 1972.

Pogson D J, 1974, Narrandera 1: 250,000 Geological Sheet. Geological Survey of NSW, Sydney.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Woolley, D., (Department of Water Resources, NSW), 1991, Narrandera Hydrogeological Map (1:250,000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

<Site Name> Mirrool Farm 2598
<Synonyms>

Wynn, D.W., 1962, Narrandera- 4 mile Geological Series., The Geological Survey of New South Wales, Sheet I55/10 Zone 7 (Notes), Australian National Grid.

<Site Name> Smeeth's Depression
<Synonyms>

Spatial

<Location description> Portion 407? In the Parish of Wyangan, 7 kilometres north of Griffith and 600 metres east of Lake Wyangan.

<Located in the Murray Trench> No

<Location 1:250 000> Narrandera

<Location 1:100 000> Griffith 8129

<Zone> 55

<Coordinates easting (AMG)> 410 500

<Coordinates northing (AMG)> 6212000

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)> 10.0

<Volume capacity (ML)> 50.0

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 117 (Woolley 1991)

<Groundwater seepage/discharge>

<Average annual evaporation> 1850 mm/yr (Average (Class A pan)) (NATMAP 1970)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Smeeth's Depression
<Synonyms>

Engineering/Admin

<Public or private operation> Public

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Natural

<Modification type and degree>

Geological

<Site description and Geomorphology> This basin is situated 600 metres east of Lake Wyangan among scattered forest on dune deposits of varying sands, clays and lateritic soils and irregular deposits of aeolian sands. The surrounding area consists of flat to gently undulating plains with a similar composition and also with lateritic soils (Pogson 1974 & Wynn 1962, NATMAP 1970).

<Subsurface investigations at site>

<Structural setting> The gently dipping Griffith Syncline, which is part of the greater Darling Depression, occurs in the pre-Cainozoic basement and lies approx 5 kilometres to the east. The Cainozoic sediments are undisturbed (Pogson 1974 & Wynn 1962).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (unknown thickness) which is underlain by undifferentiated Cainozoic sediments (up to 80m) (Pogson 1974), probably Pliocene Sands (Brown & Stephenson).

<Host formation> Woorinen Formation

<Host lithofacies> Dune deposits of red and brown clayey sand, loam and lateritic soils with irregular deposits of aeolian sand (Wynn 1962).

<Aquitard>

<Aquitard lithofacies>

<Aquifer> As for Host

<Aquifer lithofacies>

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 38 kilometres to the Murrumbidgee River

<Head between basin and river/tributary> 4 metres (Murrumbidgee River)

<Direction of groundwater flow in regional aquifer>

<Site Name> Smeeth's Depression
<Synonyms>

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer>

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> The basin host is directly underlain by Pliocene Sands aquifer (Brown & Stephenson 1991).

<Hydraulic linkage to surface runoff>

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References Cited

(NATMAP 1970) Griffith Topographic Map Sheet 8129 (1:100,000 scale) Edition 1, Division of National Mapping, 1970.

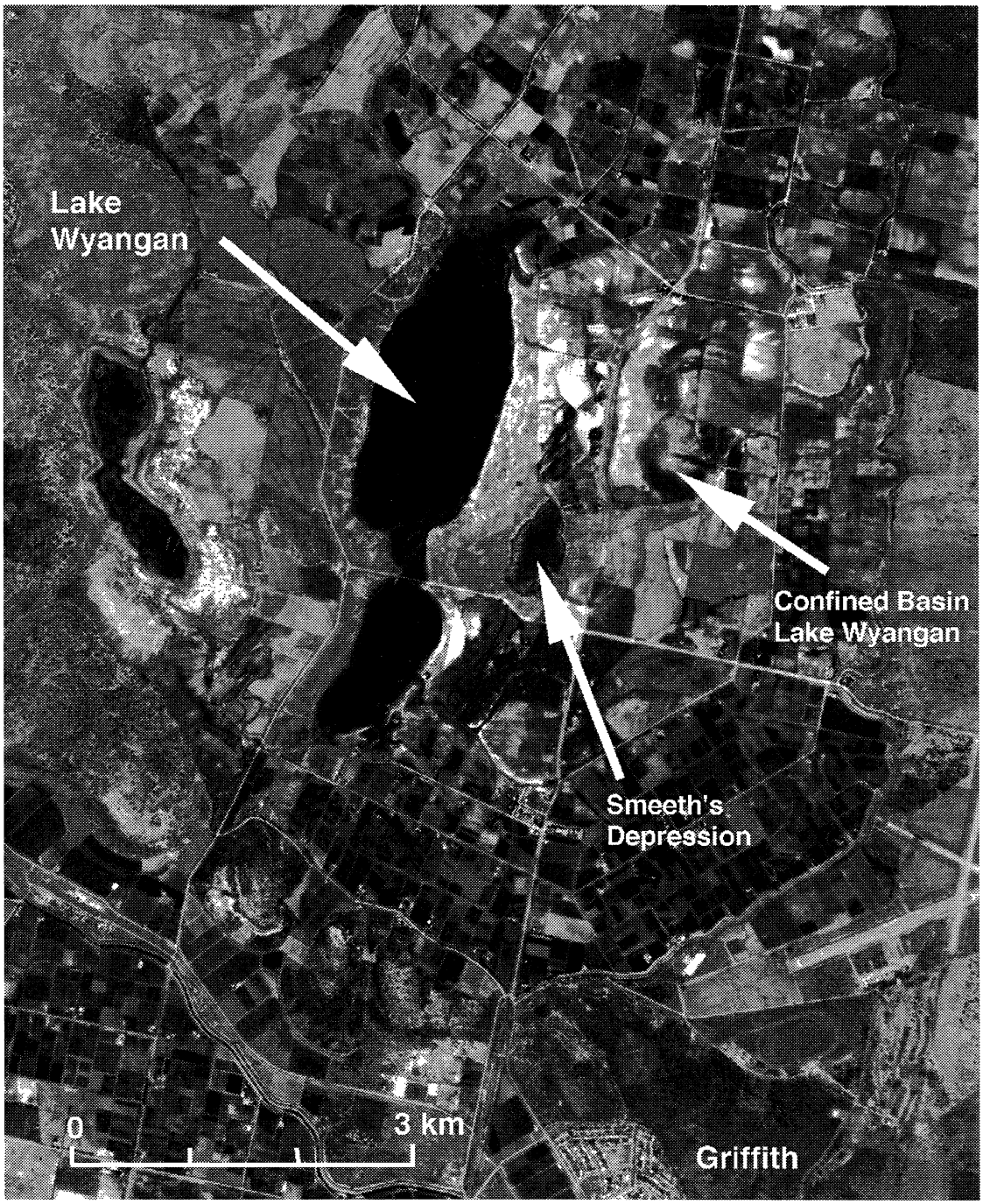
Pogson D J, 1974, Narrandera 1: 250,000 Geological Sheet. Geological Survey of NSW, Sydney.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Woolley, D., (Department of Water Resources, NSW), 1991, Narrandera Hydrogeological Map (1:250,000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

<Site Name> Smeeth's Depression
<Synonyms>

Wynn, D.W., 1962, Narrandera- 4 mile Geological Series., The Geological Survey of New South Wales, Sheet I55/10 Zone 7 (Notes), Australian National Grid.



<Site Name> Warburn Swamp
<Synonyms>

Spatial

<Location description> Crown land set aside as farm drainage basin in an intermittent swamp area, 12 kilometres north-west of Griffith. 37 kilometres north of the Murrumbidgee River.

<Located in the Murray Trench> No

<Location 1:250 000> Narrandera

<Location 1:100 000> Kooroongal 8029

<Zone> 55

<Coordinates easting (AMG)> 401000

<Coordinates northing (AMG)> 6214000

<State> NSW

General

<Year begun operation>

<Active/inactive>

<Full surface area (ha)> 200.0

<Volume capacity (ML)> 3000.0

<Full surface level (m AHD)>

<Groundwater level (m AHD)> 113 (Woolley 1991)

<Groundwater seepage/discharge>

<Average annual evaporation> 1850 mm/yr (Average (class A pan)) (NATMAP 1972)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)> minimum of 2,000 mg/L TDS (Realica & Williams 1995)

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Warburn Swamp
<Synonyms>

Engineering/Admin

<Public or private operation> Public

<Agency responsible> NSW Department of Land & Water Conservation

<Project name>

<Natural, modified natural or constructed> Natural

<Modification type and degree>

Geological

<Site description and Geomorphology> The basin lies within older (Quaternary) lake deposits that now exist as an intermittent swamp. The depression, about 4km wide by 6km long, is caused by a local anticline-syncline-anticline system, running the length of the area in a roughly north-south direction (Pogson 1974 & Wynn 1962). To the east of the basin is a lunette structure, remnant of the older lake system. The surrounding area consists of flat to gently undulating plains with small hills of residual pre-Cainozoic rocks (NATMAP 1972).

<Subsurface investigations at site>

<Structural setting> From west to east, a local anticline-syncline-anticline system occurs in the pre-Cainozoic basement forming a slight depression. The Cainozoic sediments are undisturbed (Pogson 1974).

<Stratigraphic setting> The basin is floored by Yamba Formation (unknown thickness) which is underlain by Shepparton Formation (80m) (Pogson 1974).

<Host formation> Yamba Formation

<Host lithofacies> Playas, clay pans and lakes of black and grey silty clay and silt (Pogson 1974 & Wynn 1962).

<Aquitard>

<Aquitard lithofacies>

<Aquifer> Shepparton Formation

<Aquifer lithofacies> Flood plains of black and red clayey silt, sand and gravel (Pogson 1974 & Wynn 1962).

<Comments> A coal bore drilled 300 metres south of this basin pre-1960 was successful in finding groundwater. It was drilled 163 metres, bottoming out in Tertiary sediments (Wynn 1962).

<Site Name> Warburn Swamp
<Synonyms>

Summary of Hydrodynamics

<Distance to Murray or tributary> 37 kilometres to the Murrumbidgee River

<Head between basin and river/tributary> 6 metres (Murrumbidgee River)

<Direction of groundwater flow in regional aquifer> North west (Woolley 1991)

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard>

<kv and kh of aquifer>

<EC of aquifer> 2300 mg/L TDS (Realica & Williams 1995)

<Porosity of aquifer>

<Thickness of aquifer> 80 metres of Shepparton Formation

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer>

<Hydraulic linkage to surface runoff> The basin lies within a small depression that is classed as an intermittent swamp. The surrounding area slopes (<1%) into this basin (NATMAP 1972).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1469mm/yr (Average rainfall of <381mm and average evaporation of 1850mm/yr.)

Interpretive 2

<Ranking of sustainability>

References

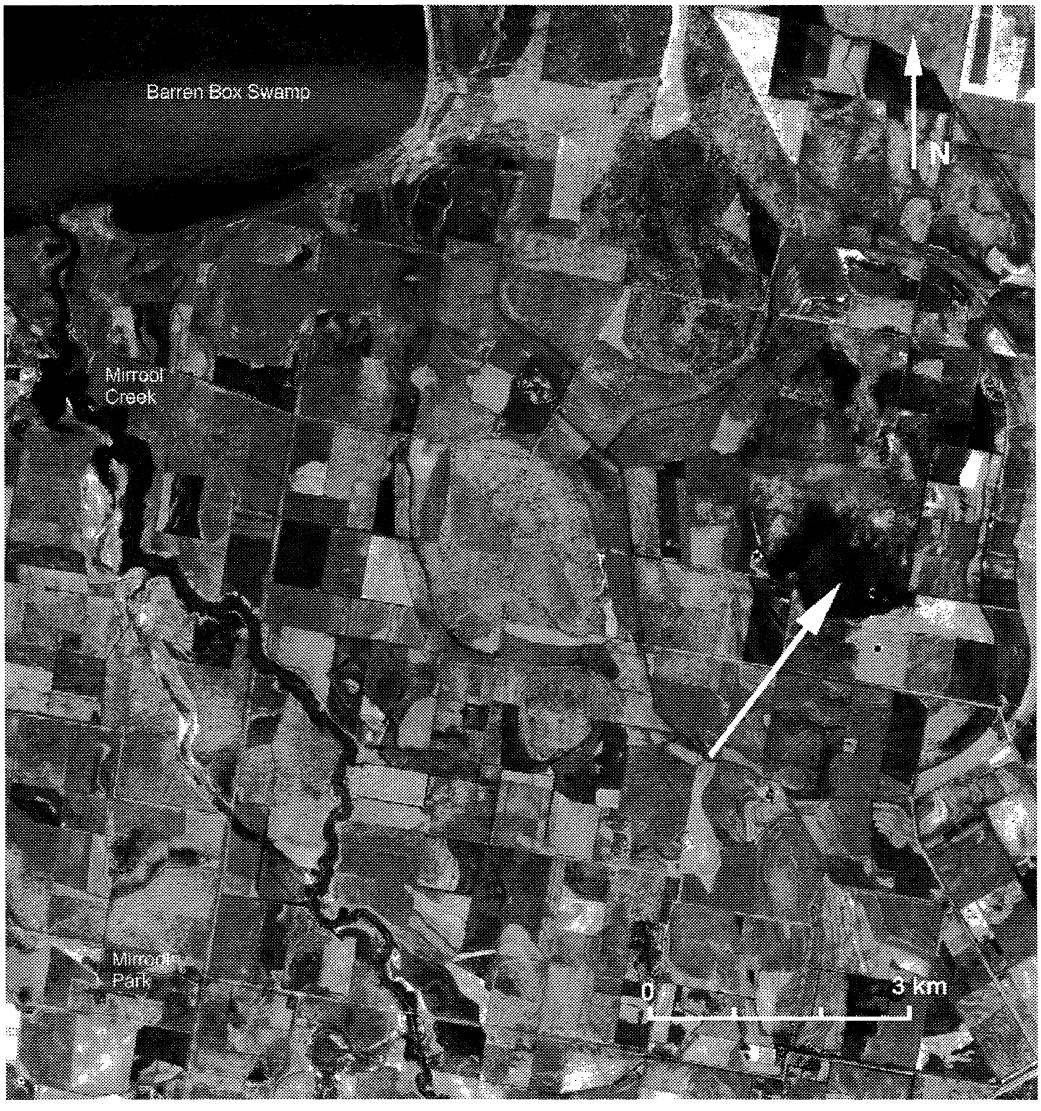
(NATMAP 1972) Kooroongal Topographic Map Sheet 8029 (1:100,000 scale) Edition 1, Division of National Mapping, 1972.

Pogson D J, 1974, Narrandera 1: 250,000 Geological Sheet. Geological Survey of NSW, Sydney.

Realica S A & Williams R M, 1995, Evaluation of Disposal Basins by Ranking in NSW 1994-95 Program, Hydrogeology Unit, NSW Department of Land and Water Conservation, Technical Services Division.

Woolley, D., (Department of Water Resources, NSW), 1991, Narrandera Hydrogeological Map (1:250,000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

Wynn, D.W., 1962, Narrandera- 4 mile Geological Series., The Geological Survey of New South Wales, Sheet I55/10 Zone 7 (Notes), Australian National Grid.



<Site Name> Chislett
<Synonyms>

Spatial

<Location description> In the Narrung district 700 metres east of the Murray Valley Highway on the southern side of the River Murray.

<Located in the Murray Trench> Yes

<Location 1:250 000> Balranald

<Location 1:100 000> Weimby 7528

<Zone> 54

<Coordinates easting (AMG)> 699300

<Coordinates northing (AMG)> 6155800

<State> Victoria

General

<Year begun operation> 1991

<Active/inactive> Active

<Full surface area (ha)> 0.4

<Volume capacity (ML)> 1.2

<Full surface level (m AHD)> 59

<Groundwater level (m AHD)> 49 (SKM 1998)

<Groundwater seepage/discharge>

<Average annual evaporation> 2000 mm/yr (AUSMAP 1990a)

<Volume disposed annually (ML/yr)> 6

<Salinity of water disposed (EC)> 1600 (SKM 1996)

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Chislett
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree>

Geological

<Site description and Geomorphology> The basin is surrounded by gently sloping to flat land which is subject to inundation. To the south the land is used for growing grapes, orchard fruits and associated crops. Here, the Murray Trench forms a valley incised into and underlain by Blanchetown Clay. The basin lies on the southern edge of the Channel Sands shallow aquifer that is laterally confined by the Blanchetown Clay. The Rufus Terrace is extensively developed in this area but is being eroded by the River Murray. This is mantled by the Woorinen Formation, with extensive sand dunes up to 10m high to the south. 300 metres to the north, the contemporary River Murray flows within the sediments of the older Kotupna and Green Gully systems (Thorne et al. 1990).

<Subsurface investigations at site>

<Structural setting> Local upwarping of the Trench is indicated to the south of Boundary Bend, approximately 3km to the west. This ridge may be a spur of the Iona Ridge in NSW (Thorne et al 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (up to 5m), and underlain by Channel Sands (5m), Blanchetown Clay (10 m), Parilla Sands (45m) and then the Bookpurnong Beds (unknown thickness) (Thorne et al 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east west (Brown & Stephenson 1991).

<Aquitard> Blanchetown Clay

<Aquitard lithofacies> Alteration of clays of low to high plasticity, generally silty or sandy with interbedded silty or clayey fine sands; minor clayey silts; grey or mottled grey and brown (Thorne et al. 1990).

<Aquifer> 1. Channel Sands (Monoman Formation) and 2. Parilla Sand

<Aquifer lithofacies> 1. Medium to coarse grained, grading up to fine sand (Thorne et al. 1990); and 2. Typically fine to medium sandy clay which may become sandier with depth (Thorne et al. 1990).

<Comments>

<Site Name> Chislett
<Synonyms>

Summary of Hydrodynamics

<Distance to Murray or tributary> 300 metres to the River Murray

<Head between basin and river/tributary> +0.5 metres (River Murray)

<Direction of groundwater flow in regional aquifer> Laterally confined by Blanchetown Clay but flow is down-valley, following trend of the Murray Trench. Groundwater discharge from the aquifer to the river occurs during low flow, but is reversed at higher flows.

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard> 10 metres

<kv and kh of aquifer> 1 to 100 metres/day (Kellet 1994)

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer> 45 metres

<kv and kh of alluvial aquifer> 1 to 100 metres/day (Kellet 1994)

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Basin host is directly underlain by Channel Sands aquifer, however, the Parilla Sands is isolated from the Channel Sands by 10 metres of Blanchetown Clay. A confined standing watertable exists at approximately 10 metres (Thorne et al. 1990).

<Hydraulic linkage to surface runoff> Basin lies in a flat plain in close proximity to the main channel of the River Murray that is subject to inundation, however, a flood rating is given at > 100 (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation> There is no direct connection between the river and the Parilla Sand at this point (Thorne et al. 1990).

<Evaporation surplus> 1680 mm/yr (Average rainfall of 320mm and average evaporation of 2000mm/yr.)

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998).

<Site Name> Chislett
<Synonyms>

References

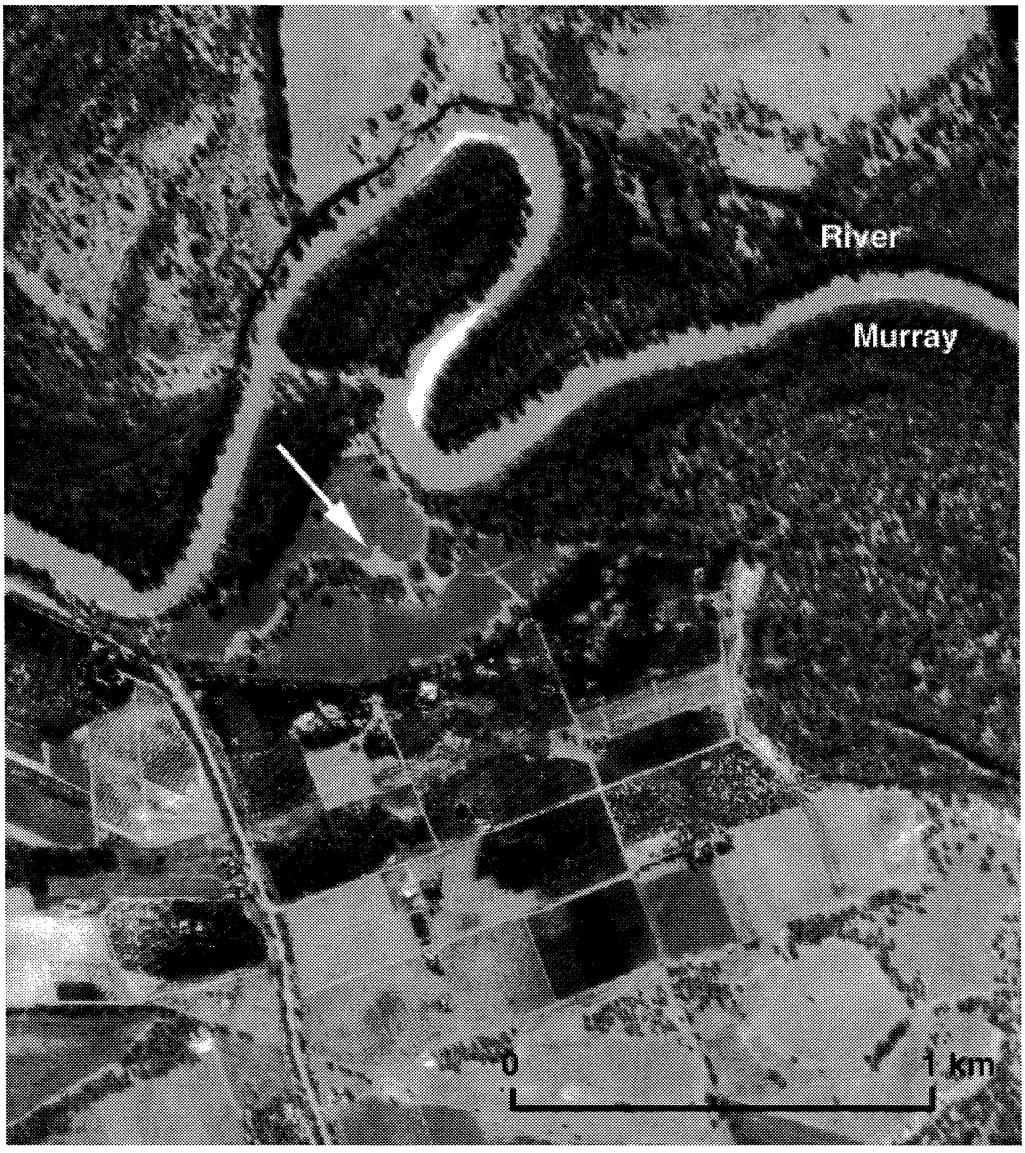
Kellet J R (AGSO) 1994, Balranald Hydrogeological Map (1:250,000 scale), Australian Geological Survey Organisation, Canberra.

Thorne, R., Hoxley, G., and Chaplin, H., 1990, Nyah to the South Australian border hydrogeological project volumes 1 and 2, Investigations branch report 1988/5, Rural Water Commission of Victoria, v 1 (text) 372 pp., v 2 (maps) 63 pp.

Sinclair Knight Merz, 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Sinclair Knight Merz, April 1998, Disposal Basin Database: Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.

(AUSMAP 1990a) Weimby Topographic Map Sheet 7528 (1:100,000 scale) Edition 2, Australian Surveying and Land Information Group, Canberra 1990.



<Site Name> Contis
<Synonyms>

Spatial

<Location description> Lot 1, Ca 11 in the Parish of Tol Tol; 400 metres west of Bonyaricall Creek, 1.4 kilometres off the Murray Valley Highway and 14km southeast of Robinvale.

<Located in the Murray Trench> No

<Location 1:250 000> Balranald

<Location 1:100 000> Robinvale 7428

<Zone> 54

<Coordinates easting (AMG)> 670800

<Coordinates northing (AMG)> 6161000

<State> Victoria

General

<Year begun operation>

<Active/inactive> Active

<Full surface area (ha)> 0.4

<Volume capacity (ML)>

<Full surface level (m AHD)> 60

<Groundwater level (m AHD)> 46 (SKM 1998)

<Groundwater seepage/discharge>

<Average annual evaporation> 2000 mm/yr (AUSMAP 1990b)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Contis
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree> Artificial clay floor

Geological

<Site description and Geomorphology> The basin is situated on the outside edge of the Murray Trench. The surrounding area is flat and subject to inundation.

<Subsurface investigations at site>

<Structural setting> 6 km east of the Tyrrell Fault, 3 km west of the axis of the Tyrrell Trough (Thorne et al 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (up to 8m), and underlain by Blanchetown Clay (up to 30m), Parilla Sands (up to 100m), the Geera Clay Equivalent (75m), the Geera Clay (120 m) and then the Lower Olney Formation of the Renmark Group (75m) (Thorne et al 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east-west (Brown & Stephenson 1991).

<Aquitard> Blanchetown Clay

<Aquitard lithofacies> Alteration of clays of low to high plasticity, generally silty or sandy with interbedded silty or clayey fine sands; minor clayey silts; grey or mottled grey and brown (Thorne et al. 1990).

<Aquifer> Parilla Sand

<Aquifer lithofacies> Typically fine to medium sandy clay which may become sandier with depth (Thorne et al. 1990).

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 850 metres to River Murray

<Head between basin and river/tributary> +0.5 metres (River Murray)

<Site Name> Contis
<Synonyms>

<Direction of groundwater flow in regional aquifer> SE-NW oriented groundwater mound extending from Tol Tol to Robinvale induces a SW flow in the Parilla Sand. Standing water level confined by Blanchetown Clay aquitard (Thorne et al. 1990).

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard> Up to 30 metres

<kv and kh of aquifer>

<EC of aquifer> 14,000 to 35,000 mg/L TDS

<Porosity of aquifer>

<Thickness of aquifer> Up to 100 metres

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Basin isolated from regional aquifers by up to 30 metres of Blanchetown Clay (Thorne et al. 1990).

<Hydraulic linkage to surface runoff> Flat plain in an area subject to inundation. Flood rating given at < 1974/75 flood (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1591mm/yr (Average rainfall of 409mm and average evaporation of 2000mm/yr.)

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998).

<Site Name> Contis
<Synonyms>

References

(AUSMAP 1990b) Robinvale Topographic Map Sheet 7428 (1:100,000 scale) Edition 2, Australian Surveying and Land Information Group, Canberra 1990.

Kellet J R (AGSO) 1994, Balranald Hydrogeological Map (1:250,000 scale), Australian Geological Survey Organisation, Canberra.

Sinclair Knight Merz, 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Sinclair Knight Merz, April 1998, Disposal Basin Database, Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.

Thorne, R., Hoxley, G., and Chaplin, H., 1990, Nyah to the South Australian border hydrogeological project volumes 1 and 2, Investigations branch report 1988/5, Rural Water Commission of Victoria, v 1 (text) 372 pp., v 2 (maps) 63 pp.

<Site Name> Enfield
<Synonyms>

Spatial

<Location description> 500 metres north of the Hattah Robinvale Road, approximately half way between Hattah and Robinvale near the property "Liparoo" and 1.7 kilometres south of the River Murray.

<Located in the Murray Trench> Yes

<Location 1:250 000> Balranald

<Location 1:100 000> Robinvale 7428

<Zone> 54

<Coordinates easting (AMG)> 642000

<Coordinates northing (AMG)> 6149000

<State> Victoria

General

<Year begun operation>

<Active/inactive> Active

<Full surface area (ha)> 20.0

<Volume capacity (ML)>

<Full surface level (m AHD)> 60

<Groundwater level (m AHD)> 40 (SKM 1998)

<Groundwater seepage/discharge>

<Average annual evaporation> 2000 mm/yr (AUSMAP 1990b)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed>

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Enfield
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Modified natural

<Modification type and degree> Banking

Geological

<Site description and Geomorphology> The basin is situated on cleared farmland in a slight depression between higher topography to the north and south. The area between the basin and the main channel of the River Murray is subject to inundation and is covered by moderately dense forest (AUSMAP 1990b). The basin lies just outside the River Murray's flood plain sediments, and at this location, the river has cut into the Mallee plain by more than 15 metres (Thorne et al 1990). East west orientated parallel dunes that are characteristic of the basin's host unit the Woorinen Formation, can be seen just south of the basin (Lawrence 1974, Brown & Stephenson 1991).

<Subsurface investigations at site>

<Structural setting> A buried anticlinal warp of the Kulkyne Ridge 3 km to west; the Wemen Trough 5 km to east; the Wemen Fault 7 km to the east; the surface of Parilla Sand significantly modified by tectonic movements (Thorne et al 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (3m) and underlain by the Blanchetown Clay (12m), the Parilla Sands (40m), the Geera Clay Equivalent (40m), the Geera Clay (50m), the Winnambool Formation (25m), the Murray Group Limestone (50m) and then another section of Geera Clay (15m) (Kellet 1994 & Thorne et al. 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east-west. (Lawrence 1974; Brown & Stephenson 1991)

<Aquitard> Blanchetown Clay

<Aquitard lithofacies> Poorly consolidated to friable, grey, brown, reddish brown, greenish grey clay; locally mottled, micaceous, silty, sand, slickensided (Thorne et al. 1990).

<Aquifer> Parilla Sand

<Aquifer lithofacies> Typically clayey sand of fine or fine to medium grain size, passing down to clean fine sands, occasionally fine to coarse grained, of a littoral marine environment (Thorne et al. 1990).

<Comments>

<Site Name> Enfield
<Synonyms>

Summary of Hydrodynamics

<Distance to Murray or tributary> 1.7 kilometres to the River Murray

<Head between basin and river/tributary> +1 metre

<Direction of groundwater flow in regional aquifer> Westerly groundwater flow (ie. down-valley) in the Parilla Sand aquifer.

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard> 12 metres

<kv and kh of aquifer>

<EC of aquifer> 14,000 to 35,000 mg/L TDS (SKM 1996)

<Porosity of aquifer>

<Thickness of aquifer> 40 metres

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Basin isolated from regional aquifer by up to 12 metres of Blanchetown Clay. An unconfined standing water level exists at -10 metres.

<Hydraulic linkage to surface runoff> The area between the main channel of the River Murray and the basin is subject to inundation. Flood rating given at > 100 (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1591 mm/yr (Average rainfall of 409 mm and average evaporation of 2000 mm/yr.)

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998).

<Site Name> Enfield
<Synonyms>

References

Lawrence, C.R., and Macumber, P.G., 1974, Geology of part of Balranald and Deniliquin (1:250,000 scale), Geological Survey of Victoria

Brown, C.M., and Stephenson, A.E., 1991, Geology of the Murray Basin, South Eastern Australia, Bureau of Mineral Resources, Geology and Geophysics, BMR Bulletin 235, (Australian Government Publishing Services, Canberra)

(AUSMAP 1990b) Robinvale Topographic Map Sheet 7428 (1:100,000 scale) Edition 2, Australian Surveying and Land Information Group, Canberra 1990.

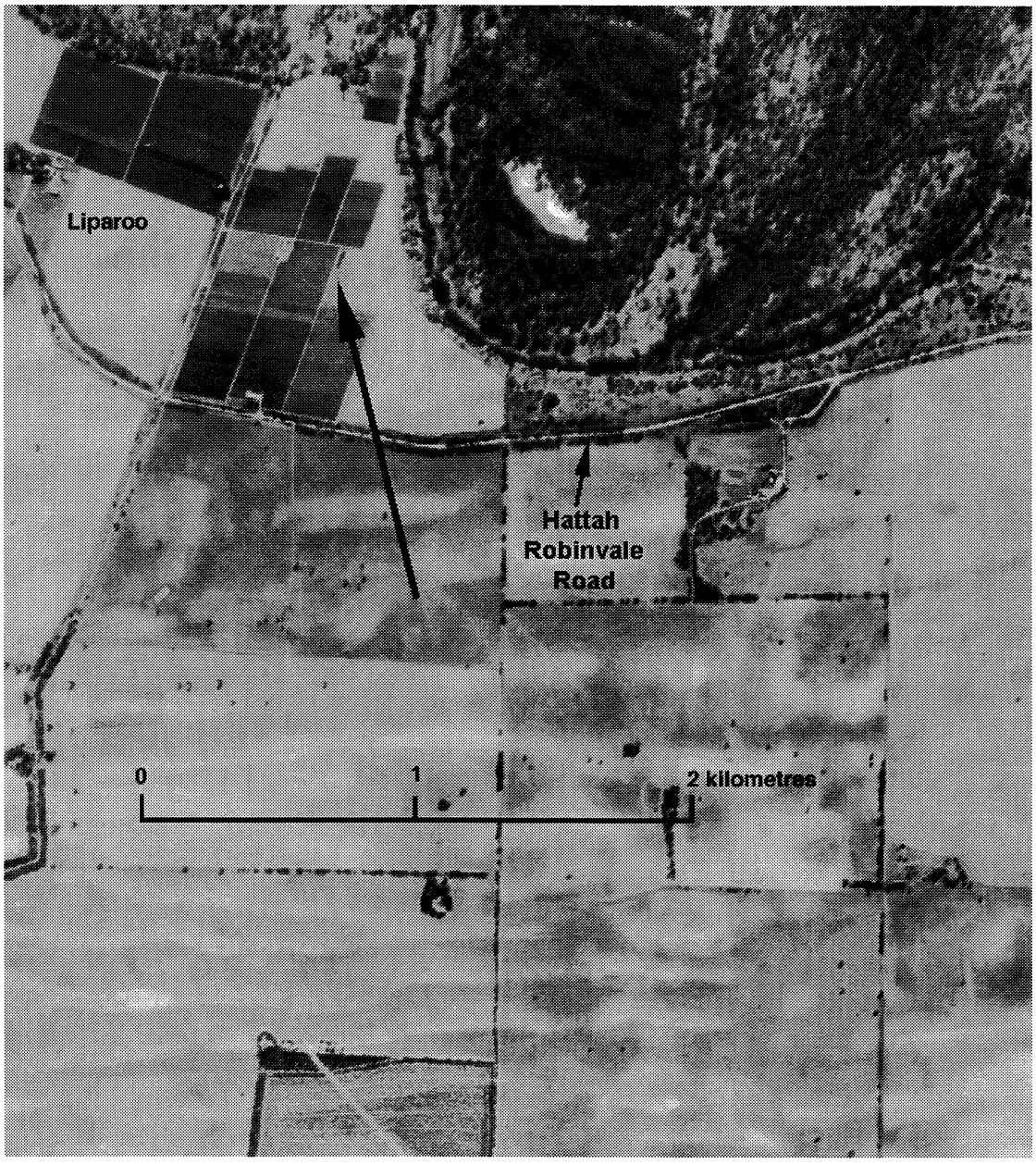
Sinclair Knight Merz, 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Thorne, R., Hoxley, G., and Chaplin, H., 1990, Nyah to the South Australian border hydrogeological project volumes 1 and 2, Investigations branch report 1988/5, Rural Water Commission of Victoria, v 1 (text) 372 pp., v 2 (maps) 63 pp.

Kellet J R (AGSO) 1994, Balranald Hydrogeological Map (1:250,000 scale), Australian Geological Survey Organisation, Canberra.

Sinclair Knight Merz, April 1998, Disposal Basin Database: Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.

<Site Name> Enfield
<Synonyms>



<Site Name> Fisher
<Synonyms>

Spatial

<Location description> In the Narringa district 700 metres east of the Murray Valley Highway on the southern side of the River Murray.

<Located in the Murray Trench> Yes

<Location 1:250 000> Balranald

<Location 1:100 000> Weimby 7528

<Zone> 54

<Coordinates easting (AMG)> 706300

<Coordinates northing (AMG)> 6148000

<State> Victoria

General

<Year begun operation>

<Active/inactive> Active

<Full surface area (ha)> 35.0

<Volume capacity (ML)>

<Full surface level (m AHD)> 60

<Groundwater level (m AHD)> 49 (SKM 1998)

<Groundwater seepage/discharge> Seepage or discharge

<Average annual evaporation> 2000 mm/yr (AUSMAP 1990a)

<Volume disposed annually (ML/yr)> 13.0

<Salinity of water disposed (EC)> minimum of 400

<Range of salinity in basin (EC)> 300 – 500 (Grower has salinity data on basin)

<Sources of water to be disposed> 6.5ha of property drains into the lagoon and then recycled.

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Fisher
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Natural

<Modification type and degree>

Geological

<Site description and Geomorphology> The basin is sited between the main channel of the River Murray and a 2 km-long crescent-shaped wetland that trends north-south. The area is covered with moderately dense forest that is subject to inundation. The basin lies on the quaternary alluvial sediments of the River Murray (the Coonambidgal Formation) which show some signs of soil development. Also evident are deposits of playas in the form of terraces with scroll patterns or plains with a network of channels. To the south, the extensive sand dunes of the Woorinen Formation dominate the landscape (Lawrence 1974, Brown & Stephenson 1991, AUSMAP 1990a).

<Subsurface investigations at site>

<Structural setting> The Nyah (Iona Ridge) 10 km to the east (Thorne et al 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (5m) and underlain by the Blanchetown Clay (7m), the Channel Sands (8m), the Blanchetown Clay (11m), the Parilla Sand (45m) and the Bookpurnong Beds (unknown thickness) (Lawrence 1974, Thorne et al 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east west (Lawrence 1974; Brown & Stephenson 1991).

<Aquitard> Blanchetown Clay

<Aquitard lithofacies> Predominantly a grey sequence comprising an upper unit which is characterised by a high gamma count (the Devil's Elbow Member), with sand lenses occurring at the top of the lower unit which is characterised by a low gamma count (Thorne et al. 1990).

<Aquifer> Channel Sands and Parilla Sand

<Aquifer lithofacies> Channels Sands (Monoman Fm) - fine to medium grained, occasionally coarser, and grading upwards to fine sand (Thorne et al. 1990); Parilla Sand - typically clayey sand of fine or fine to medium grain size, passing down to clean fine sands, occasionally fine to coarse grained, of a littoral marine environment (Thorne et al. 1990).

<Comments>

<Site Name> Fisher
<Synonyms>

Summary of Hydrodynamics

<Distance to Murray or tributary> 1.2 kilometres to River Murray

<Head between basin and river/tributary> 0 metres (River Murray)

<Direction of groundwater flow in regional aquifer> Groundwater flow of the Channel Sands aquifer is down-valley under confined conditions and follows the trend of the Murray Trench. To the west of the river there is separation of the Channel Sands and Parilla Sand aquifers by Blanchetown Clay and upper Parilla Sand. Zones of recharge and discharge exist that are seasonally affected by river levels (Thorne et al 1990).

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard> 7 metres

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer> 8 metres of Channel Sands and 45 metres of Parilla Sand

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Basin is isolated from region aquifers by 7 metres of Blanchetown Clay. Watertable confined at 5 metres within the Channel Sands aquifer by the Blanchetown Clay (Thorne et al 1990).

<Hydraulic linkage to surface runoff> Basin lies in a flat plain between the main channel of the River Murray and an ox bow lake. This area is subject to inundation, however, a flood rating is given at > 100 (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1680mm/yr (Average rainfall of 320mm and average evaporation of 2000mm/yr.)

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998)

<Site Name> Fisher
<Synonyms>

References

(AUSMAP 1990a) Weimby Topographic Map Sheet 7528 (1:100,000 scale) Edition 2, Australian Surveying and Land Information Group, Canberra 1990.

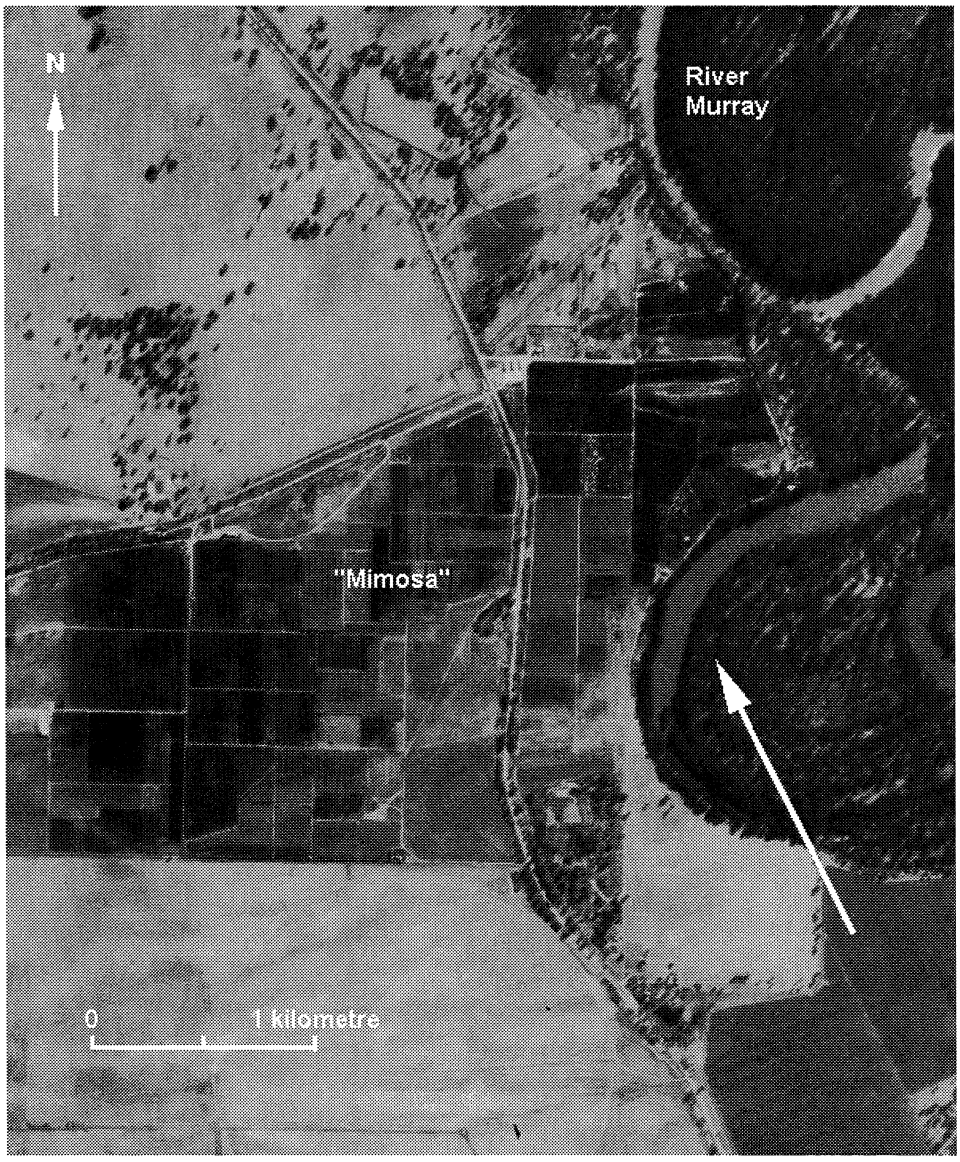
Brown, C.M., and Stephenson, A.E., 1991- Geology of the Murray Basin, South Eastern Australia., Bureau of Mineral Resources, Geology and Geophysics, BMR Bulletin 235, (Australian Government Publishing Services, Canberra)

Kellet J R (AGSO) 1994, Balranald Hydrogeological Map (1:250,000 scale), Australian Geological Survey Organisation, Canberra.

Lawrence, C.R., and Macumber, P.G., 1974- Geology of part of Balranald and Deniliquin (1:250,000 scale), Geological Survey of Victoria

Sinclair Knight Merz (SKM), 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Sinclair Knight Merz (SKM), April 1998, Disposal Basin Database: Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.



<Site Name> Katis
<Synonyms>

Spatial

<Location description> Lots 7 & 8 and Portions 10 & 10A in the Parish of Tol Tol; 1.6km off the Murray Valley Highway, 10-30 metres off the Tol Tol Road and 9 kilometres south-east of Robinvale.

<Located in the Murray Trench> Yes

<Location 1:250 000> Balranald

<Location 1:100 000> Robinvale 7428

<Zone> 54

<Coordinates easting (AMG)> 669600

<Coordinates northing (AMG)> 6163100

<State> Victoria

General

<Year begun operation> 1992

<Active/inactive>

<Full surface area (ha)> 2.0

<Volume capacity (ML)>

<Full surface level (m AHD)> 60

<Groundwater level (m AHD)> 47 (SKM 1998)

<Groundwater seepage/discharge> Seepage or discharge

<Average annual evaporation> 2000 mm/yr (AUSMAP 1990b)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed> Surface drainage

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base> Clay

<Site Name> Katis
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree> Artificial clay floor

Geological

<Site description and Geomorphology> The basin is sited within the floodplain of the River Murray. There is extensive development of the Rufus Terrace, inset into the older lacustrine plain by 8 metres, which is mantled by the Woorinen Formation in this area (Thorne et al. 1990). The surrounding landscape is covered by scattered vegetation to the south and farmland to the north, and is subject to inundation (AUSMAP 1990b).

<Subsurface investigations at site>

<Structural setting> 5 km east of the Tyrrell Fault, 4 km west of the axis of the Tyrrell Trough (Thorne et al 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (up to 7m) and underlain by the Channel Sands (up to 7m), the Blanchetown Clay (up to 45m), the Parilla Sand (70m), Geera Clay Equivalent (90m), Geera Clay (up to 125m) and then Lower Olney Formation of the Renmark Group (75m) (Thorne et al 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east-west (Brown & Stephenson 1991).

<Aquitard> Blanchetown Clay

<Aquitard lithofacies> Alteration of clays of low to high plasticity, generally silty or sandy with interbedded silty or clayey fine sands; minor clayey silts; grey or mottled grey and brown (Thorne et al. 1990).

<Aquifer> Channel Sands and Parilla Sand

<Aquifer lithofacies> Channel Sands (Monoman Fm) - Fine to medium grained, occasionally coarser, and grading upwards to fine sand. (Thorne et al. 1990); Parilla Sand - Typically fine to medium sandy clay which may become sandier with depth; oxidised to a reddish brown colour and frequently mottled (Thorne et al. 1990).

<Comments>

<Site Name> Katis
<Synonyms>

Summary of Hydrodynamics

<Distance to Murray or tributary> 1.4 kilometres to River Murray

<Head between basin and river/tributary> 0.5 metres (River Murray)

<Direction of groundwater flow in regional aquifer> The Channel Sands aquifer is laterally confined by Blanchetown Clay and groundwater flow is down-valley, following the trend of the Murray Trench. The SE-NW oriented groundwater mound extending from Tol Tol to Robinvale induces a SW flow in the Parilla Sand (Thorne et al. 1990). Groundwater discharge from the Channel Sands to the river occurs during low flow, but is reversed at higher flows.

<kv of artificial floor>

<kv and kh of host> KH – 26 m/d (Thorne et al. 1990)

<kv and kh of aquitard>

<Thickness of aquitard> 68 metres

<kv and kh of aquifer> KH of Parilla Sand – 5.4 m/d (Thorne et al. 1990)

<EC of aquifer> Parilla Sand – ranges from 10,000 to 15,000 mg/L TDS (SKM 1994)

<Porosity of aquifer>

<Thickness of aquifer> 7 metres of Channel Sands and 10 metres of Parilla Sand

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Basin underlain by 4-7 metres of alluvial aquitard (Woorinen Fm).

<Hydraulic linkage to surface runoff> Flat plain which is subject to inundation. Flood rating given at < 100 (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1591mm/yr (Average rainfall of 409mm and average evaporation of 2000mm/yr.)

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998)

<Site Name> Katis
<Synonyms>

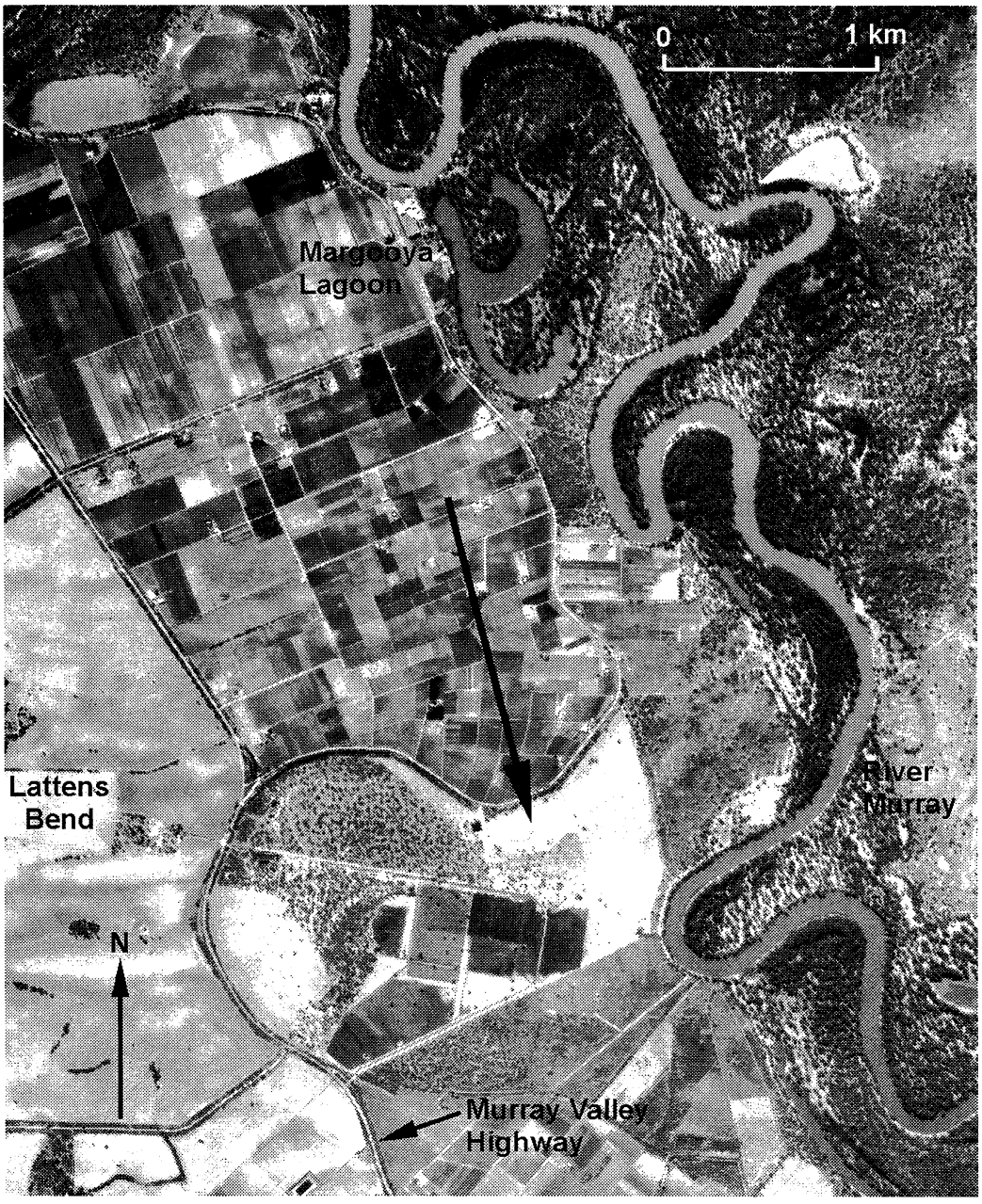
References

(AUSMAP 1990b) Robinvale Topographic Map Sheet 7428 (1:100,000 scale) Edition 2, Australian Surveying and Land Information Group, Canberra 1990.

Kellet J R (AGSO) 1994, Balranald Hydrogeological Map (1:250,000 scale), Australian Geological Survey Organisation, Canberra.

Sinclair Knight Merz (SKM), 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Sinclair Knight Merz (SKM), April 1998, Disposal Basin Database: Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.



<Site Name> Martin
<Synonyms>

Spatial

<Location description> On the Old Wentworth Rd, Yelta. 9 kilometres east south east of Wentworth and 8.5 kilometres north west of Merbein. On the south side of the River Murray across from Lookout Cliffs.

<Located in the Murray Trench> Yes

<Location 1:250 000> Mildura

<Location 1:100 000> Wentworth 7229

<Zone> 54

<Coordinates easting (AMG)> 593000

<Coordinates northing (AMG)> 6223500

<State> Victoria

General

<Year begun operation>

<Active/inactive> Active

<Full surface area (ha)> 0.3

<Volume capacity (ML)> 0.2

<Full surface level (m AHD)> 40

<Groundwater level (m AHD)> 31 (SKM 1998)

<Groundwater seepage/discharge>

<Average annual evaporation> 2200 mm/yr (NATMAP 1977)

<Volume disposed annually (ML/yr)> 20.0

<Salinity of water disposed (EC)> minimum of 700 mg/L TDS (SKM 1996)

<Range of salinity in basin (EC)>

<Sources of water to be disposed> Tile drainage; Prior to reaching the dam, drainage water is run over grass.

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> Martin
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed>

<Modification type and degree>

Geological

<Site description and Geomorphology> The basin is sited in an area subject to inundation and is used for growing grapes, orchard fruit and associated crops (which are irrigated). It lies within the Murray Trench, which incises a thick sequence of Blanchetown Clay, and is close to the River Murray. At this point, the modern river flows largely in a recent channel and has a relatively low sinuosity. The Rufus Terrace is extensively preserved, covered by material of aeolian origin belonging to the Woorinen Formation. The Blanchetown Clay, which is a largely continuous aquitard, separates the shallow Channel Sands and Parilla Sands aquifers. Linear sand dunes and hummocks form the upper Quaternary surface (Thorne et al. 1990, Rural Water Commission 1991, NATMAP 1977).

<Subsurface investigations at site>

<Structural setting> In the Wentworth trough (Thorne et al 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (up to 2m), and underlain by Channel Sands (12m), Blanchetown Clay (10 m), Parilla Sand (20m) and then the Bookpurnong Beds (unknown thickness) (Thorne et al. 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east-west (Lawrence 1972, Brown & Stephenson 1991).

<Aquitard> Blanchetown Clay and Upper Parilla Sand

<Aquitard lithofacies> Blanchetown Clay - Predominantly a grey sequence comprising an upper unit which is characterised by a high gamma count (the Devil's Elbow Member), with sand lenses occurring at the top of the lower unit which is characterised by a low gamma count (Thorne et al. 1990); Upper Parilla Sand - Hard, continuous sheet of ferruginised clays to clayey sands (Thorne et al. 1990).

<Aquifer> Channel Sands and Parilla Sand

<Aquifer lithofacies> Channel Sands - Fine to medium grained, occasionally coarser, and grading upwards to fine sand. (Thorne et al. 1990); Parilla Sand – Typically clayey sand of fine or fine to medium grain size, passing down to clean fine sands, occasionally fine to coarse grained, of a littoral marine environment (Thorne et al. 1990).

<Site Name> Martin
<Synonyms>

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 100 metres to River Murray

<Head between basin and river/tributary> 0.5 metres (River Murray)

<Direction of groundwater flow in regional aquifer> The Channel Sands and Parilla Sand aquifers are laterally confined by Blanchetown Clay with the groundwater flow in a westerly direction, ie. down-valley. There is a slight upward hydraulic gradient from the deep to the shallow aquifer, in part derived from the groundwater mound that lays beneath Mildura (20 kilometres to the east-southeast).

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard> 8 metres of Blanchetown clay and 7 metres of Upper Parilla Sand

<kv and kh of aquifer> KH of Parilla Sand – 58 m/d (Thorne et al 1990)

<EC of aquifer> Channel Sands – 1,000 mg/L TDS (Thorne et al 1990)

<Porosity of aquifer>

<Thickness of aquifer> 10 metres of Channel Sands and 3 metres of Parilla Sand

<kv and kh of alluvial aquifer> KH of Channel Sands – 27 m/d

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Slight upward hydraulic gradient from deep to shallow aquifer, in part derived from the groundwater mound beneath Mildura (20 kilometres to the ESE) (Thorne et al 1990). Basin host directly underlain by the Channel Sands aquifer, however, the Parilla Sand is isolated from the Channel Sands by 10 metres of Blanchetown Clay and 7 metres of Upper Parilla Sand.

<Hydraulic linkage to surface runoff> Area subject to inundation. Flood rating given at > 100 (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1932mm/yr (Average rainfall of 268mm and average evaporation of 2200mm/yr.)

<Site Name> Martin
<Synonyms>

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998)

References

(NATMAP 1977) Mildura Topographic Map Sheet 7329 (1:100,000 scale) Edition 1, Division of National Mapping, 1977.

Rural Water Commission, 1991, Mildura Hydrogeological Map (1:250 000 scale), Bureau of Mineral Resources, Geology and Geophysics, Canberra, Australia.

Sinclair Knight Merz (SKM), 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Sinclair Knight Merz (SKM), April 1998, Disposal Basin Database: Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.

Thorne, R., Hoxley, G., and Chaplin, H., 1990, Nyah to the South Australian border hydrogeological project volumes 1 and 2, Investigations branch report 1988/5, Rural Water Commission of Victoria, v 1 (text) 372 pp., v 2 (maps) 63 pp.

<Site Name> McQueen
<Synonyms>

Spatial

<Location description> South east of Boundary Bend, 0.4 kilometres off the Murray Valley Highway on the southern side of the River Murray.

<Located in the Murray Trench> No

<Location 1:250 000> Balranald

<Location 1:100 000> Weimby 7528

<Zone> 54

<Coordinates easting (AMG)> 699000

<Coordinates northing (AMG)> 6154000

<State> Victoria

General

<Year begun operation> 1978

<Active/inactive> Active

<Full surface area (ha)> 1.9

<Volume capacity (ML)> 1.2

<Full surface level (m AHD)> 60

<Groundwater level (m AHD)> 49 (SKM 1998)

<Groundwater seepage/discharge>

<Average annual evaporation> 2000 mm/yr (AUSMAP 1990a)

<Volume disposed annually (ML/yr)>

<Salinity of water disposed (EC)>

<Range of salinity in basin (EC)>

<Sources of water to be disposed> Surface drainage

<Terminal/throughflow basin>

<Range of elevation of lake surface with disposal>

<Lining/treatment of base>

<Site Name> McQueen
<Synonyms>

Engineering/Admin

<Public or private operation> Private

<Agency responsible>

<Project name>

<Natural, modified natural or constructed> Constructed

<Modification type and degree>

Geological

<Site description and Geomorphology> The basin is situated on cleared farmland in gently sloping to flat country, just outside of the Murray Trench (AUSMAP 1990a). The landscape consists of the extensive sand dunes of the Woorinen Formation (Lawrence 1974). The sand dunes in this area can reach up to 10 metres in height (Thorne et al. 1990).

<Subsurface investigations at site>

<Structural setting> Just outside of the Murray Trench (Thorne et al. 1990).

<Stratigraphic setting> The basin is floored by the Woorinen Formation (up to 8m), and underlain by Blanchetown Clay (up to 20m), Parilla Sands (up to 40m) and then the Bookpurnong Beds (unknown thickness) (Lawrence 1974, Thorne et al. 1990).

<Host formation> Woorinen Formation

<Host lithofacies> Unconsolidated sand of aeolian origin which is reddish and clayey; partly modified by pedogenisis forming red calcareous palaeosols. Parallel dunes orientated east-west (Lawrence 1972; Brown & Stephenson 1991).

<Aquitard> Blanchetown Clay

<Aquitard lithofacies> Predominantly a grey sequence comprising an upper unit which is characterised by a high gamma count (the Devil's Elbow Member), with sand lenses occurring at the top of the lower unit which is characterised by a low gamma count (Thorne et al. 1990).

<Aquifer> Parilla Sand

<Aquifer lithofacies> Typically fie to medium sandy clay which may become sandier with depth (Thorne et al. 1990).

<Comments>

Summary of Hydrodynamics

<Distance to Murray or tributary> 2 kilometres to the River Murray

<Head between basin and river/tributary> 1 metre (River Murray)

<Site Name> McQueen
<Synonyms>

<Direction of groundwater flow in regional aquifer> The unconfined Parilla Sand aquifer has a groundwater flow in a westerly direction (down-valley). The standing water level is confined by the Blanchetown Clay aquitard (Thorne et al 1990).

<kv of artificial floor>

<kv and kh of host>

<kv and kh of aquitard>

<Thickness of aquitard> 20 metres of Blanchetown Clay

<kv and kh of aquifer>

<EC of aquifer>

<Porosity of aquifer>

<Thickness of aquifer> 40 metres of Parilla Sand

<kv and kh of alluvial aquifer>

<Pre-existing potentiometric surface>

Interpretive 1

<Hydraulic linkage to regional aquifer> Basin isolated from regional aquifers by up to 20 metres of Blanchetown Clay. The standing water level exists below this aquitard (Thorne et al. 1990).

<Hydraulic linkage to surface runoff> Flood rating given at > 100 (SKM 1998).

<Category – hydraulic stability>

<Category – degree of hydraulic isolation>

<Evaporation surplus> 1680mm/yr (Average rainfall of 320mm and average evaporation of 2000mm/yr.) (AUSMAP 1990a)

Interpretive 2

<Ranking of sustainability> Ranking based on environmental risk: some risk (SKM 1998)

<Site Name> McQueen
<Synonyms>

References

Lawrence, C.R., and Macumber, P.G., 1974, Geology of part of Balranald and Deniliquin (1:250,000 scale), Geological Survey of Victoria

(AUSMAP 1990a) Weimby Topographic Map Sheet 7528 (1:100,000 scale) Edition 2, Australian Surveying and Land Information Group, Canberra 1990.

Sinclair Knight Merz (SKM), 1996, Database of Victorian Drainage Disposal Basins - status report, Volumes 1 & 2, Murray-Darling Basin Commission, Canberra.

Sinclair Knight Merz (SKM), April 1998, Disposal Basin Database: Results of Field Survey and Revision of Basin Ranking, Report No. WC00294.100, Goulburn Murray Water.