

# APPENDIX A

## REPORT TO BIPEC MEETING 11<sup>th</sup> July 2001

Demonstrating amelioration of Acid Sulfate Soils, Barker Inlet / Gillman area,  
South Australia

*Coastal Acid Sulfate Soils Program  
Demonstrating amelioration of Acid Sulfate Soils,  
Barker Inlet / Gillman area, South Australia*

<sup>1</sup>Rob Fitzpatrick, <sup>1</sup>Brett Thomas and <sup>1</sup>Richard Merry  
<sup>1</sup>CSIRO Land & Water, Private Bag No. 2, Glen Osmond, South Australia, 5064

July, 2001



CSIRO LAND and WATER



## APPENDIX A

### REPORT TO BIPEC MEETING 11<sup>th</sup> July 2001

**Project title:** Demonstrating amelioration of Acid Sulfate Soils, Barker Inlet / Gillman area, South Australia

**Project Steering committee:** The Barker Inlet and Port Estuary Committee (BIPEC) –  
*Chairman and contact:* Mr Harry Pitrans

**Project Manager:** Ms Shanti Ditter (Port Adelaide Enfield Council)

**Funding agency:** Environment Australia's Coastal Acid Sulfate Soils Program (CASSP)

**Project Consortium:** Port Adelaide Enfield Council, CSIRO Land & Water, Land Management Corporation, Penrice Soda Products, Department of Environment and Heritage, Salisbury Council, Torrens Catchment Water Management Board, Northern Adelaide & Barossa Catchment Water Management Board and the St Kilda Mangrove Trail & Interpretative Centre.

**Appointments:** PhD student/ project officer, Mr Brett Thomas.

**Research officer:** Dr Rob Fitzpatrick (CSIRO Land & Water)

The following diagram illustrates the various roles of committees overseeing the CASSP funded project entitled: "Demonstrating amelioration of Acid Sulfate Soils, Barker Inlet / Gillman area, South Australia":



**Project duration:** 1<sup>st</sup> January 2001 to 31<sup>st</sup> January 200.

**Due date for milestone report:** 30th July 2001

#### Project objectives:

- quantify the biogeochemical and physical processes in various acid sulfate soils and construct a series of conceptual models, which will point to options to better manage ASS in the Barker Inlet/Gillman area,
- develop and trial a series of innovative remediation techniques such as bioremediation, liming using waste by-products and sea water flushing,
- publish recommended remediation techniques and applicability to potential landuses,

- participate in holding field days,
- produce educational materials (St Kilda Mangrove Trail & Interpretative Centre),
- present findings at national scientific meetings, and report work in peer-reviewed literature,
- develop a set of ASS planning policies at local government level (for Port Adelaide Enfield Council, Salisbury Council, Torrens Catchment Water Management Board and Northern Adelaide & Barossa Catchment Water Management.SA).

#### *General aspects of acid sulfate soils*

1. Naturally formed coastal acid sulfate soils occur throughout Australia and in their natural state are benign.
2. If exposed to air by drainage or excavation, these soils produce acid leachate.
3. High demand for coastal land has led to extensive disturbance and expose of acid sulfate soils, particularly on Australia's eastern coast.
4. This has resulted in large-scale acid generation and runoff that has been inadequately neutralised by the receiving environment.
5. Acid runoff causes adverse impacts to the environment, coastal development, fishing and agricultural industries.

#### **Barker Inlet/Gillman specific points**

6. The off-site ecological impact of discharges from the Barker Inlet/Gillman site is impossible to gauge with our current information.
7. The Barker Inlet/Gillman site is currently severely degraded and a continuing environmental hazard, with:
  - ⇒ Extensive areas of acidic soils;
  - ⇒ Continuing oxidation and release of acid and toxic leachate;
  - ⇒ Acid in the soil is releasing iron, aluminium, and other metals from previously inert mineral forms;
  - ⇒ Some of these are being trapped on the extensive iron precipitates, which are flushing into the Barker Inlet where they can enter the food chain of marine organisms;
  - ⇒ Creeks containing water of low pH and concentrations of iron and aluminium are far in excess of acceptable concentrations are discharging into Barker Inlet.

These issues will be explained and expanded on by the workers from CSIRO and University of Adelaide during the proposed workshop to be held in late November.

#### *Current Research*

1. Production, export and fate of leachate from Australian ASS are poorly understood, especially in the Barker Inlet/Gillman Site. Consequently, CSIRO in collaboration with local authorities are currently undertaking research into the formation and degradation processes operating in ASS at the in the Barker Inlet/Gillman Site to:
  - obtain better and more quantitative information,
  - relate the soil and water processes to environmental controls and
  - provide more accurate environmental hazard assessment in order to develop more improved methods of rehabilitation.

2. Research will give us an understanding of the current problem and the processes at work. We can use this knowledge to develop a management strategy to:
  - ⇒ Stop the problem getting worse;
  - ⇒ Improve water quality and environmental outcomes over time; and
  - ⇒ Avoid future rehabilitation and community costs associated with doing nothing.
3. Rehabilitating the site will require the development of a sophisticated strategy that:
  - ⇒ Stops pyrite oxidation and neutralises existing acidity;
  - ⇒ Minimises any off-site impacts of rehabilitation
  - ⇒ Is cost effective and meets development and/or regulatory requirements such as returning the site to an environmentally safe wetland;
  - ⇒ Avoids inappropriate actions that may make the problem worse.
4. Acid sulfate soils are not evenly distributed across the bunded area. Although not as severely affected, evidence of acid discharge can be found in discharge/overflow from windmills, drains and creeks with evidence of iron precipitates and a low pH during periods of low flow. Sophisticated ASS management and site remediation plan for the entire bunded area is needed to reduce the environmental impact.
5. It is unlikely that the site can be returned to truly 'estuarine' conditions in the short term. The best outcome is probably a managed wetland.

### **Future Strategies**

6. The National Working Party on Coastal ASS has been finalised, after extensive public consultation a National Strategy for the Management of Coastal ASS. This strategy provides a framework for governments, industry and the community to manage development on these soils. It seeks an integrated approach to management and provides general background about the impacts of acid drainage water.
7. The Barker Inlet/Gillman site is one of many coastal areas in Australia and indeed the world, where past inappropriate practices undertaken through ignorance, have resulted in acid sulfate soils that are an ongoing environmental hazard. The challenge now is for government, industry and the community to implement the new National Strategy for the Management of Coastal ASS to allow for sustainable coastal development and primary industries while ensuring proper management of acid sulfate soils.
8. That the consortium will continue to undertake research on ASS issues in South Australia, and do this by collaborating with local and State authorities.

A media release has been prepared to coincide with the completion of the first milestone report to Environment Australia (see attached).

**Draft 1.****MEDIA RELEASE****31st July, 2001****Remediation trials to tackle acid soil drainage problems in the Barker Inlet/Gillman area**

“Acid sulfate soils are common in the South Australian coastal areas and develop wherever current or prehistoric buried mangroves and salt marsh areas are disturbed” says CSIRO scientist Dr Rob Fitzpatrick.

“Soils in mangroves and salt marsh areas are usually perfectly safe if left undisturbed, but once you drain them the sulfides within them react with the oxygen in the air and start to release sulfuric acid,” Dr Fitzpatrick explains.

Dr Fitzpatrick estimates that thousands of tonnes of sulfuric acid had been formed in the Barker Inlet/Gillman area since it was cleared over 50 years ago and a substantial reservoir still remains.

“The release of acids and other materials not only kills fish and renders rivers sterile, it also blocks or degrades drains and culverts, eats away concrete and steel in homes and workplace buildings, threatens activities as diverse as agriculture, fishing and tourism and can harm human health” says Dr Rob Fitzpatrick.

"One of the main problems is that developers of coastal land are often unaware of the problems associated with draining these soils" agrees environmental scientist Dr David Blackburn.

"Land managers are keen to find more effective and economic methods to manage problems that are associated with acid that is generated when old mangrove swamp soils that underlie the Barker Inlet/Gillman area are disturbed, particularly when they are drained” says Port Adelaide/Enfield Council's policy planner Ms Shanti Ditter.

The project will work towards obtaining better fundamental knowledge of the properties of the Acid sulfate soils that exist in the area and the effects of introducing fresh water. This information will be used to develop and trial innovative soil treatment methods such as bioremediation, liming using waste by-products and sea water flushing.

The three year project is the result of a partnership between Environment Australia’s Coastal Acid Sulfate Soils Program (CASSP), with Port Adelaide Enfield Council, CSIRO Land & Water, Land Management Corporation, Penrice Soda Products, Department of Environment and Heritage, Salisbury Council, Torrens Catchment Water Management Board, Northern Adelaide & Barossa Catchment Water Management Board and the St Kilda Mangrove Trail & Interpretative Centre. The consortium will fund a PhD student, Mr Brett Thomas.

The Barker Inlet and Port Estuary Committee (BIPEC) will act as the steering committee for the project.

***More information:***

*Ms Shanti Ditter, Port Adelaide Enfield Council: (08) 8405-6727/ 0403-5784.*

*Dr Rob Fitzpatrick, CSIRO Land & Water (08) 8303 8511/ 0408 824215.*

*Ms Margaret Bryant, CSIRO Land & Water: (08) 9333 6215.*

*Ms Lynne Griffiths, CSIRO Land & Water: (08) 8303 8513/ 0411 557925.*

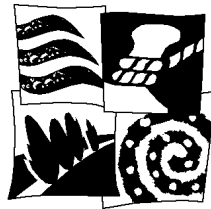
Draft 2.



## Media Release

Mr Nick Goldie	02 6276 6478
Mobile	0417 299 586
Fax	02 6276 6821

CSIRO Media Releases are also available  
on the Internet: <http://www.csiro.au>



A Commonwealth Government Initiative **Port Adelaide Enfield**

31 July 2001  
01/nnn

Ref

### ACID SULFATE SOILS: NEUTRALISING THE PROBLEM

Scientists are joining forces with state, local authorities and industry to map and rehabilitate acid sulfate soils, which are common in the South Australian coastal areas and develop wherever current or prehistoric buried mangroves and salt marsh areas are disturbed.

"Soils in mangroves and salt marsh areas are usually perfectly safe if left undisturbed, but once you drain them the sulfides within them react with the oxygen in the air and start to release sulfuric acid," says CSIRO scientist Dr Rob Fitzpatrick.

Researchers believe that thousands of tonnes of sulfuric acid have formed in the Barker Inlet/Gillman area since it was cleared over 50 years ago.

A substantial reservoir still remains.

"Acids and other materials don't just kill fish and render rivers sterile, they can also eat away concrete and steel in homes and workplace buildings," says Dr Fitzpatrick.

"They block or degrade drains and culverts, threaten industries as diverse as agriculture, fishing and tourism and can harm human health."

"One of the main problems is that developers of coastal land are often unaware of the problems associated with draining these soils" agrees environmental scientist Dr David Blackburn.

"Land managers urgently need to find effective and economic methods to manage acid problems in the Barker Inlet/Gillman area," says Port Adelaide/Enfield Council's policy planner Ms Shanti Ditter.

The new project will gather fundamental knowledge about the acid sulfate soils in the area, and develop innovative soil treatment methods such as bioremediation, liming using waste by-products and sea water flushing.

The three year project is a partnership between the Commonwealth's Coastal Acid Sulfate Soils Program, funded through the Natural Heritage Trust, with Port Adelaide Enfield Council, CSIRO Land & Water, Land Management Corporation, Penrice Soda Products, South Australian Department of Environment and Heritage, Salisbury Council, Torrens Catchment Water Management Board, Northern Adelaide & Barossa Catchment Water Management Board and the St Kilda Mangrove Trail & Interpretative Centre.

The consortium will fund a PhD student, Mr Brett Thomas.

The Barker Inlet and Port Estuary Committee (BIPEC) will act as the steering committee for the project.

***More information from:***

***Ms Shanti Ditter, Port Adelaide Enfield Council:***

***08-8405-6727***

***0403-578 4***

***Dr Rob Fitzpatrick, CSIRO Land & Water***

***08-8303 8511***

***0408 824 215***

***Ms Margaret Bryant, CSIRO Land & Water***

***08-9333 6215***

***0417 247 241***

## Final Media Release



# Media Release

Mr Nick Goldie 02 6276 6478

Mobile 0417 299 586

Fax 02 6276 6821

CSIRO Media Releases are also available  
on the Internet: <http://www.csiro.au>

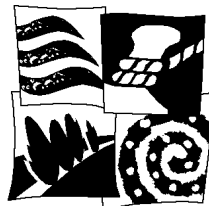
2 August 2001

Ref 01/nnn



Natural  
Heritage  
Trust

*Helping Communities  
Helping Australia*



CITY OF

A Commonwealth Government Initiative **Port Adelaide Enfield**



## PARTNERSHIP TO INVESTIGATE ACID SULPHATE SOILS

Scientists are joining forces with state and local authorities and industry representatives to tackle acid sulphate soils in the Gillman and Barker Inlet areas.

CSIRO Land and Water's Dr Rob Fitzpatrick has announced a partnership between the Commonwealth and State Government Agencies and industry.

"The partnership provides us with a unique opportunity to bring together key agencies and organisations and gather essential information about the nature and impact of acid sulphate soils in South Australia", Dr Fitzpatrick says.

Dr Fitzpatrick says that it is important for industry and land management authorities to understand the cause of acid sulphate soils and how they might be managed.

"Acid sulphate soils are most commonly found in coastal regions where present-day mangroves and salt marshes (and prehistoric buried areas) have been cleared or disturbed", he says.

These soils are usually safe if left undisturbed.

"However, once you drain them the sulfides within them react with the oxygen in the air to create acidic conditions, as we have found in the Eastern states," says Dr Fitzpatrick.

The new partnership will provide South Australia with an opportunity to advance its knowledge of acid sulphate soils and to set new benchmarks in management practises, according to Port Adelaide Enfield Council's policy planner Ms Shanti Ditter.

"The partnership includes a commitment from all parties to fund a PhD student to gather fundamental knowledge about acid sulphate soils in SA and develop innovative soil treatment methods such as bioremediation, liming and sea water flushing", says Ms Ditter.

"This partnership is an example of all levels of Government working together with industry to better identify and manage environmental impacts."

The two-year partnership includes the Commonwealth's Coastal Acid Sulphate Soils Program, Port Adelaide Enfield Council, CSIRO, Land Management Corporation, Penrice Soda Products, Department of Environment and Heritage, Salisbury Council, Torrens Catchment Water Management Board, Northern Adelaide and Barossa Catchment Water Management Board and the St Kilda Mangrove Trail and Interpretive Centre.

The Barker Inlet and Port Estuary Committee (BIPEC) will act as the steering committee for the project.

***More information from:***

***Dr Rob Fitzpatrick, CSIRO Land and Water 08 8 303 8511 Mobile: 0408 824 215  
Ms Shanti Ditter, Port Adelaide Enfield Council, 08-8405-6727 Mobile 040403 5784***

***Ms Lynne Griffiths, CSIRO Land and Water 08 8303 8513***

***[Back to Contents Page](#)***