



ASSAY

A NEWSLETTER ABOUT ACID SULPHATE SOILS

No.6 July 1995

Welcome to the sixth issue of ASSAY, the newsletter about acid sulphate soils (ASS). It has been more than a year since the fifth issue, but much has happened in the interim, including the formation of the Acid Sulphate Soils Management and Advisory Committee (ASSMAC) and its technical committee. Both committees have worked hard over the past year, and their activities are reported below. This newsletter will appear every three months, to keep you up to date with ASS activities and developments.

ASS maps

This month the Department of Land and Water Conservation will release maps showing the probability of occurrence of acid sulphate soils along the NSW coast from the Queensland border to the Victorian border. The maps will be released at a series of information days from Tweed Heads to Moruya. The days will be advertised widely. Anyone interested in the ASS issue is urged to attend one of the meetings listed below.

North coast map meetings

- Monday 10 July
Kempsey Shire Council Chambers 9am
- Wednesday, 12 July
Old Maclean Civic Centre, Maclean 9am
- Thursday 13 July
Tweed Heads Civic Centre 9am
- Friday 14 July
Ballina RSL Club 9am
- Monday 17 July
Urunga Golf & Sports Club, 9am
- Tuesday 18 July
Westport Bowling Club, Port Macquarie 9am

Central and south coast map meetings

- Monday 10 July
Shortland Wetlands Centre, Newcastle 9.30am
- Wednesday 12 July
Deepwater Motorboat Club, Milperra 10am
- Thursday 13 July
Nowra Golf Club 9am
- Friday 14 July
Luhana Motel, Moruya 9am

EPA guidelines for ASS management

The Environment Protection Authority has updated its guidelines for the management of ASS and will release them with the ASS maps this month. The guidelines have been in draft form since September 1993; the updated guidelines include information gathered in the past two years. The guidelines are free and will be available at the map meetings, and from EPA offices, the ASS information officer (066 240 319), and through EPA's Pollution Line (131 555).

ASS field manual

ASSMAC's technical committee is currently developing an ASS field manual. The manual will provide standards for initial assessment, field sampling and field-based measurements, and a description of laboratory methods appropriate for site assessment. It is designed for use by consultants, developers and landowners and will be available before the end of the year.

Industry guidelines

The technical committee is also writing a series of industry guidelines for industries working in potential acid sulphate soils. These industries include tea tree, extractive industries, dairying and grazing. The committee hopes these guidelines will also be available by the end of the year.

Second ASS conference

ASSMAC has endorsed the holding of Australia's second national conference on acid sulphate soils next year. At this stage a two day program is planned, with emphasis on speakers active in the field, including farmers, fishers, consultants and scientists. Now is the time to think about papers, posters, trade displays, sponsorship and travel budgets. Contact conference convenor Bob Smith for more details: telephone 066 283 472, mobile 015 456 367, fax 066 280 653.

Units for reporting ASS concentrations

The ASSMAC technical committee has recommended to ASSMAC that a standardised system be used for reporting the sulphide (pyrite) concentration in ASS for Environment Impact Statements (EIS) and development applications. The units were chosen to reflect the potential hazard posed by the soil. The units chosen are:

kg of sulphuric acid that can be generated by complete oxidation of the soil per tonne of oven-dry soil.

A conversion table between this and other units used is given in the EPA guidelines. The following section from the guidelines emphasises the importance of buffering potential in assessing acid sulphate severity.

Levels of oxidisable sulphur within a soil or sediment can provide a guide to the risk to the environment if the soil is exposed. The acid sulphate potential of a soil can vary considerably depending upon its texture and mineralogy, thus two levels are suggested below. Sandy deposits, even with very little pyrite, can produce a significant impact due to the low buffering potential of the sand and high oxidation rates.

The presence of significant buffering sources should be considered in assessing the acid sulphate severity, but current indications are that:

- *levels of oxidisable sulphur in clayey sediments which are greater than 0.05% of the total sediment mass (1.54 kg H₂SO₄/tonne soil) may constitute a significant risk in the absence of significant buffering sources, and*
- *levels of oxidisable sulphur in sandy sediments which are greater than 0.01% of the total sediment mass (0.31 kg H₂SO₄/tonne soil) may constitute a significant risk in the absence of significant buffering sources.*

ASS information officer

The National Landcare Program has funded the three year appointment of an information officer to raise awareness and provide information about ASS to the general public. The officer is Rebecca Lines-Kelly, previously the north coast soils media officer, and producer of the book *Soil Sense: soil management for NSW north coast farmers*. Rebecca reports to an inter-agency committee comprising representatives of NSW Agriculture, NSW Fisheries, Environment Protection Authority and the Department of Land and Water Conservation, and is based at Wollongbar Agricultural Institute near Lismore.

If you have any ASS queries, she can put you in touch with the information you need. You can contact her by phone 066 240 319 (this number changes to 261 319 from mid-July), fax 066 285 925 or on lineskr@agric.nsw.gov.au if you have e-mail.

Consultancy reports

Consultants working in acid sulphate soils are invited to send examples of their ASS consultancy reports to ASS information officer Rebecca Lines-Kelly so that she can refer enquiries back to relevant consultants. For more details ring Rebecca on 066 240 319.

ASS research

Several research students have completed theses on ASS projects.

Pamela van Oploo
(B.Sc. (hons), University of NSW)

Nature and development of ASS at McLeods Creek NSW

The main findings were the uniformity of ASS backswamp sediments in distribution and pyrite concentrations over a large area, and the accuracy and usefulness of field techniques using glass spear pH probe and 30% peroxide, and field profile description for determining ASS occurrence and distribution.

Chuxia Lin
(Ph.D., University of NSW)

The nature and distribution of ASS in regions of contrasting physiographic and human impacts

The main findings were that the major contrasts in ASS formation between southern China and eastern Australia were due to differences in freshwater discharge and sediment loads. In China massive landclearing in much larger catchments has led to conditions which lessened the accumulation of pyrite. This, coupled with extensive paddy rice- fish pond rotations in delta regions, has permitted sustainable management of ASS for 1000 years. Recent developments in intensive aquaculture threaten this sustainability.

Mark I. Pease
(M.Sc. (hons), University of Wollongong)

ASS and acid drainage: Lower Shoalhaven floodplain, NSW

Major findings were that the lowering of watertables by drainage and use of floodgates in the floodplain of the Shoalhaven River has led to severe acidification in a tributary of the river; that watertables in pasture lands were controlled by the depth of water in drains; that control of acidification may be possible by modifying floodgates to increase watertable heights.

Richmond River studies

Work by Jes Sammut and Mike Melville (University of NSW) and Ian White (CSIRO) has shown that acid waters in drains and estuarine reaches can become stratified. This means that the use of spot measurements of water quality to monitor acid outflows can be misleading. At the very least, measurements at the top and the bottom of the water column are required.

Their work has also shown that floodgates on tributaries of the Richmond can create major acid reservoirs. These can release pulses of acidity into estuaries for periods of at least six months. In a major flood in 1994 one set of floodgates on the Tuckean Swamp released over 750 tonnes of sulphuric acid over a two month period with a peak acid discharge of about 40 tonnes in a single day. These discharges resulted in dramatic changes in the species of water plants in the estuary.

Tweed River studies

Work by Ben Wilson and Mike Melville (University of NSW), Ian White (CSIRO), and cane grower Robert Hawken on the Tweed River has shown that evapotranspiration from plants is a major determinant of watertable height. Most frequent acid drainage originates from acid groundwater outflow and runoff close to drain banks. This suggests that liming of drains may be effective in controlling these events. A drain-liming trial has shown that liming is effective for at least 10 months with drainwater pH still three pH units above unlimed drains.

Seven Oaks ponding trial

In December 1993 Clybucca landowner Russell Yerbury ponded a section of his ASS-affected land in the Seven Oaks drainage union district. He had to wait until January 1995 for rain, but now has a wide, shallow lake surrounded by



Acid-scalded land at Seven Oaks, Clybucca

thick swards of swamp grasses, a dramatic change from the scalded land it has replaced (see photos below). It is too early to tell whether the trial is successful, because oxidation will continue once the water evaporates. Russell hopes the water cover will allow enough organic matter to establish to prevent complete oxidation when the water evaporates.

Maria River field day

More than 100 people, half of them landowners, attended Hasting Council's field day in May on the effect of ASS on Maria River's water quality. Attendance was much greater than anticipated, indicating a high level of interest in the issue. Scott Johnson's research report on the water quality of the Maria River and an executive summary of the report will be available from Hastings Council soon. For more information contact council's environment manager David Pensini on 065 832 099.

ASS database

ASS information officer Rebecca Lines-Kelly is establishing an ASS database and library for use by people wanting ASS information. If you have material you would like added to the database please send details to Rebecca at Wollongbar Agricultural Institute, Bruxner Highway, Wollongbar 2477.

Mailing list

The ASSAY mailing list needs updating. To add, delete or correct entries, please contact Jan Edwards, Wollongbar Agricultural Institute, Bruxner Highway, Wollongbar 2477, phone 066 240 345, fax 066 281 744. Send your e-mail address to lineskr@agric.nsw.gov.au if you would like to receive ASSAY on e-mail.

ASSAY is edited by Rebecca Lines-Kelly for the acid sulphate soils information and awareness program, and funded by the National Landcare Program.



Similarly scalded land after ponding

NSW ASS MANAGEMENT & ACTION COMMITTEES

Acid Sulphate Soils Management

Advisory Committee (ASSMAC)

ASSMAC formed in August 1994 on the initiative of the then Minister for Agriculture, Fisheries and Mining, Ian Causley. Its objectives are to review the current situation in acid sulphate soils, develop guidelines for their use and management, and develop strategies for rehabilitation of severely affected areas. So far, the committee has met five times in Sydney (2), Ballina, Shoalhaven and Port Macquarie. It has also produced three newsletters. Its current members are:

- John Williams (chairman), NSW Agriculture, Wollongbar
- Grame Budd Environment Protection Authority, Grafton
- Jeff Champion, NSW Farmers Association, Tucki
- Ian Cranwell, Urban Affairs and Planning, Sydney
- Peter Houghton, Land and Water Conservation, Sydney
- Duncan Leadbitter, NSW Fishing Industry Council, Sydney
- Paul O'Connor, NSW Fisheries, Sydney
- Mark Porter, Land and Water Conservation, Sydney
- John Schmidt, Land and Water Conservation, Grafton
- Ian White, CSIRO, Canberra

ASSMAC technical committee

ASSMAC has formed a technical committee to look at the technical issues raised in ASSMAC's meetings. This committee is reviewing work already done on ASS, suggesting rehabilitation techniques, and developing guidelines for industries affected by ASS. The committee has met in Canberra, Wollongbar (2) and Kempsey.

Members are:

- Ian White (chairman), CSIRO, Canberra
- Bruce Blunden, Environment Protection Authority, Grafton
- Craig Copeland, NSW Fisheries, Wollongbar
- Ian Kelly, Land and Water Conservation, Grafton
- Roy Lawrie, NSW Agriculture, Rydalmere
- Mike Melville, University of NSW, Sydney
- Stuart Naylor, Land and Water Conservation, Kempsey
- Jesmond Sammut, University of NSW, Wollongbar
- Yolande Stone, Urban Affairs and Planning, Sydney

RTASSLAC

RTASSLAC is the acronym for the Richmond Tweed Acid Sulphate Soils Local Action Committee which looks at ASS issues in the Richmond-Tweed region. Members are interested in urban and agricultural developments involving ASS, liming trials and research into the issue.

Members are:

- David Lovell (chairman), Richmond TCM
- Martin Bellert, NSW Agriculture
- Don Buckley, Tweed Council
- Bernie Bugden, dairy industry
- Jeff Champion, beef industry
- Lindsay Doust, amateur fishing
- John Gallagher, fishing industry
- Ray Johnston, NSW Agriculture
- Frank Kirkham, oyster industry
- Robert Quirk (deputy chairman), cane industry