

ASSAY

A NEWSLETTER ABOUT ACID SULPHATE SOILS

No 14. July 1997

\$2.1 Million of NSW ASS projects

The NSW Government has allocated a total of \$2.1 million over the next three years on an Acid Sulfate Soils Program - commonly known as ASSPRO - for projects involving industry, community and government working together to better manage ASS and improve water quality.

The NSW Acid Sulfate Soils Management Advisory Committee will make assessments and allocate ASSPRO funding to encourage projects which:

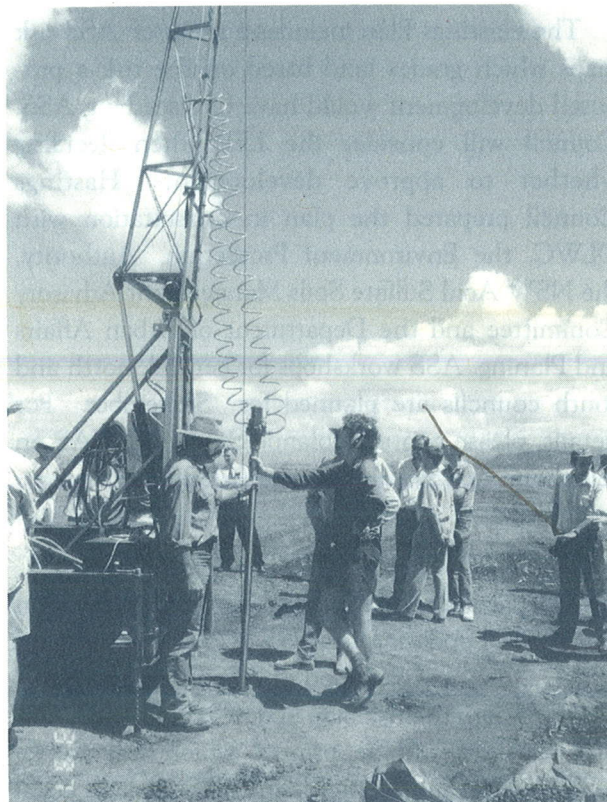
- prevent ASS being disturbed;
- encourage treatment of ASS which are already disturbed or;
- rehabilitate ASS disturbed by past practices.

More specifically, ASSPRO funding will cover four key areas to enhance better management of ASS:

- Industry and community education, awareness, training, investigation and demonstration;
- Industry and community participation in ASS management;
- Development of management techniques to control acid formation and discharge into waterways and;
- Catalytic funding of on-ground works and measures to rehabilitate ASS areas.

Funded projects need to: cover at least one of the key ASSPRO aims (listed above); be well planned, technically sound and properly managed; involve industry and/or community consultation commitment and action; have clear objectives, be achievable and provide measurable benefits; act as a catalyst for further ASS works and/or activities within an industry or catchment, and; complement an existing project.

Applications forms, and further details are available from the NSW Acid Sulfate Soils Information Officer, Jon Woodworth on fax 066 281 744 email: woodwoj@agric.nsw.gov.au or telephone 066 261 244. A two page preliminary application is required



A vibro-suction corer taking core ASS samples at the combined field trip of the Working Party for a National ASS Strategy and Queensland Acid Sulfate Soil Management Advisory Committee visit to the Tweed River in March.

for initial assessment purposes. ASSMAC will then request a more detailed application for suitable projects.

A more detailed application may be requested before final assessments are made. The deadline for preliminary applications is 31 August, 1997. Late applications may be considered if funds are available.

Hasting Council's ASS Local Environment Plan

The NSW Department of Planning will conduct workshops during September dealing with ASS issues and council Local Environment Plans (LEP).

A recent amendment to Hastings Council's LEP is NSW's first official planning instrument specifically designed to limit environmental damage from urban and rural activities that could disturb ASS. The NSW Minister for Urban Affairs and Planning (DUAP), Craig Knowles says the Hastings Local Environmental Plan, 1987, now requires development consent for works on land containing ASS.

The Hastings Plan includes a series of ASS risk maps which grades land based on the risk a proposed development would have of disturbing ASS. Council will consider the LEP when deciding whether to approve developments. Hastings Council prepared the plan in consultation with DLWC, the Environment Protection Authority, the NSW Acid Sulfate Soils Management Advisory Committee and the Department of Urban Affairs and Planning. ASS workshops for central, north and south councils are planned for September. For details, please contact Yolande Stone at DUAP on telephone 02 93912156 or fax 02 9391 2194.

ASS risk maps updated

The Department of Land and Water Conservation (DLWC) is updating its 1995 1:25,000 scale maps which show the likelihood of ASS along the NSW coast. When the risk map update is completed, new map versions will be printed which will enable NSW coastal councils to define ASS areas in Local Environment Plans. The NSW Treasury will fund the mapping work, which the NSW Acid Sulfate Soils Management Advisory Committee supports. If you know of any discrepancies in the existing maps please contact Greg Chapman on telephone 02 9895 6172; fax 02 98957985 or email: gchapman@dlwc.nsw.gov.au.

ASS Briefing for Federal Government Environment Committee.

CSIRO soil scientist Greg Bowman recently spoke to the House of Representatives Standing Committee on Environment about the economic and environmental impacts of ASS in Australia. During a 60 minute presentation, Greg also explained how ASS formed and its distribution in Australia. The committee is chaired by the Member for Wide Bay, Warren Truss. "It would be great to get the Federal Government more involved in tackling ASS issues and hopefully the presentation will help the committee to better understand the scale

of ASS problems," Greg said. Enquiries: telephone Greg Bowman on (06) 2465925.

Senate subcommittee visits ASS areas

Three Federal senators visited Ballina in May as part of a nationwide inquiry into estuarine and marine pollution. They included the acting chairman of the Senate Environment Committee, Senator John Tierney, and Senators Brenda Gibbs and John Hodd. Lismore's Southern Cross University (SCU) was invited by the committee to organise scientific and industry representative briefings to the inquiry at Ballina. Leon Zann, SCU's Head of the Center for Conservation Technology coordinated the briefing day and presented details of the incremental impacts coastal development causes to coastal waterway. Leigh Sullivan presented information on the properties of ASS (see separate story in this issue) Coastal Management, professor, presented details about the importance of fragile coastal wetlands as fish ASSMAC Chairman, John Williams explained how acid runoff affects NSW coastal waterways. NSW Fisheries officer Dick Callinan explained how red spot disease is linked to sulfuric acid runoff. The Committee is due to make its recommendations in August. For further information about the inquiry, please contact Senator John Tierney in Canberra on 06 277 3345.

National Strategy update

The Working Party for a National Strategy for ASS met at Alstonville in June to finalise its draft document which will soon be sent to the Standing Land and Water Resource Management Committee for comment. The strategy deals with issues such as national economic impacts, ASS environmental issues, the various roles and responsibilities of government and industry and community groups as well as scientific research and development. The NSW ASSMAC Chairman, John Williams, chairs the National Strategy Working Party. The Federal Government's set the working party's terms of reference: "to prepare a strategy on the management and use of ASS in consultation with industry and community interests". For further information please contact NSW ASS information officer, Jon Woodworth, on 066 261 344 or John Williams on 066 261 340.

New Gold Coast developments in ASS areas

Much of the Gold Coast's new suburban and commercial developments are spreading into former tidal areas which contain potential ASS according to Trevor Graham, a research scientist with the Federal Government's Australian Geological Survey Organisation (AGSO). He was speaking at a two-day technical workshop in June organised by the Queensland Acid Sulfate Soils Investigation Team (QASSIT). The workshop, which attracted 116 delegates, was supported by Gold Coast City Council and sponsored by the National Landcare Program and the Qld Sugar Industry.

Trevor said that as Gold Coast developments spread into back swamp and mangrove areas, developers will need to deal with increased amounts of potential ASS. (In 1996 QASSIT assessed ASS management plans for developments worth more than \$2 billion.) "Maps produced by AGSO and the Department of Natural Resources after a one-year study reveal ASS on most of the remaining undeveloped areas of floodplain stretching from Carrara south to Robina," Trevor said. Recent developments in the USA now enable satellites to chart ASS areas by depicting higher iron concentrations associated with disturbance. "Satellite imagery offers a cheap and efficient tool for finding the extent of ASS areas within a coastal floodplain and can be used as a monitoring tool after development," Trevor said.

Gold Coast City Council Executive Officer (CEO) Douglas Daines spoke of a recent visit to California where concrete pads used to raise houses above ASS areas had failed resulting in court cases for compensation some 20-30 years after development. The QASSIT team's Col Ahern reported recent Queensland discoveries of ASS in a "closed system" (without oxygen) at 20 metres AHD. "The ASS dated from millions of years ago, much earlier than previously associated with ASS deposits in Australia," he said. Other speakers included Jes Sammut University NSW (acid fish kills); Dennis Baker and Bernie Powell (Introduction to ASS and QASSIT's work); Ian Yarrol (Qld Environmental Protection Act); Samantha Miller (Qld Fisheries Act), Associate Professor Paul Saffigna from Griffith University (Chinderah bypass), and John Carleton from Gold Coast City Council (sustainable development).

The workshop included field trips to Oyster Cove, the Pimpama River, Hotham Creek and to Burleigh Cove. For further information, contact QASSIT's Queensland Acid Sulfate Soils Information Officer, Kylie Hey on HeyK@dnr.qld.gov.au.

Rediscovered - early research on ASS in Australia

Queensland Acid Sulfate Soils Investigation Team (QASSIT) member Don Malcolm has discovered a 1950's description of ASS near Perth, probably the first description of this type of soil in Australia.

The Western Australian ASS soils, with a pH 2.8-3.8, are described in a 1952 publication, "Laterite and Lateritic Soils" (Commonwealth Bureau of Soil Science Technical Communication no47, 1952) by J. A Prescott and R.L Pendleton. "Such very acid soils are frequently associated with the oxidation of ferrous sulphides (sic) such as marcasite and their paedogenesis may well have some bearing on the origin of laterite," the authors state. QASSIT team leader Bernie Powell says the book is significant because it provides evidence of recognition of ASS in Australia at an earlier date than previously understood. Contact: Bernie Powell 07 38969398

Mosquito control and ASS

A recent study by Griffith University's Paul Saffigna has found potential ASS was common in areas proposed for mosquito control measures in coastal wetland ecosystems in Noosa, Maroochy, and Coomera in Queensland. The Queensland Department of Health and the Noosa and Maroochy councils funded the study.

Australian mosquitos transmit the debilitating Ross River Virus which makes up 91% of Australia's reported arbovirus diseases. Public concerns about the adverse environmental effects of chemical sprays (previously, the most common mosquito control) has led to the open marsh water management technique which encourages natural marsh processes to reduce mosquito populations. Runneling (channels < 30cm deep) and ditching (50cm deep) are also used to reduce mosquitos numbers. Paul will now work with Dr Pat Dale (Griffith University) and Queensland Acid Sulfate Soil Information Officer Ms Kylie Hey to find out how much sulfuric acid is generated from pyritic

material exposed during habitat modification for mosquito control. American scientists Soukop and Portnoy (1986) reported a case from Wellfleet, Massachusetts where drainage ditches dug for freshwater mosquito control exposed ASS and the sulfuric acid runoff released toxic levels of aluminium in waterways. They found that mosquitoes are acid tolerant to pH levels as low as 2.9 and survive with virtually no predators because the acid kills fish and eels. Enquiries: telephone Kylie Hey, on: (07) 3896 9819, Fax: (07) 3896 9782, or Email: HeyK@dnr.qld.gov.au, or Paul Saffigna, Griffith University Tel: (07) 3875 7494, Fax: (07) 3875 7459, or email: P.Saffigna@plato.ens.gu.edu.au.

Highly reactive Greigite found in ASS sample

A highly reactive iron sulfide which can oxidise very rapidly, greigite (Fe_3S_4), was recently identified in an ASS sample by Lismore based Southern Cross University researchers Richard Bush and Leigh Sullivan.

Pyrite is usually the most abundant sulfide in ASS and the largest source of potential acidity. Rapid pyrite oxidation is usually mediated by specific soil micro-organisms and the activity of these microbes increases dramatically when the soil pH falls below 4. Leigh and Richard say that chemically reactive sulfides (like greigite) that do not require biological oxidation, might be important triggers which enable rapid soil acidification and consequentially rapid pyrite oxidation. Greigite was identified by x-ray diffraction and scanning electron microscopy and had a platy morphology which measured up to 1 micrometres wide and 0.2 micrometres thick. The greigite occurs as black accumulations within decaying roots and sometimes larger pyrite crystals. To assess the stability of greigite, samples are monitored by x-ray diffraction after exposure to a range of oxidising conditions.

Moist greigite oxidises within hours under ambient conditions at 25°C and within minutes at 88°C but is stable if kept air dry. Drying ASS at 80 - 85°C inhibits pyrite oxidation but completely oxidises the greigite. Thus potential acidity may be significantly underestimated if ASS samples containing greigite are oven dried. Therefore, freeze drying, or analysing wet or frozen samples directly is required.

****** Potential ASS identification ******

Organic matter in standard soil analyses of ASS's potential acidity and sulfate after oxidation (ie. with peroxide) can produce false positive results. The analytical scanning electron microscopy (SEM) Unit at Southern Cross University can determine if soil materials identified by standard chemical tests as potential ASS actually contain iron sulfate minerals. The results show that soil materials identified by some standard chemical tests as being potential ASS do not contain detectable amounts of iron sulfate minerals.

The SEM is fitted with both an energy dispersive x-ray microprobe and appropriate analytical software which allows:

- the identification of iron sulfate directly in samples and,
- measures iron sulfate minerals (e.g. is there 0.01 % of iron sulfides in the sample).

When used with appropriate sampling procedures, this technique has the advantage of revealing the elemental composition of the iron sulfate minerals present (e.g. Is there greigite present). Enquiries: Richard Bush or Leigh Sullivan by email: rbush10@scu.edu.au, lsulliva@scu.edu.au or telephone 066 203742; or fax: 066 212669

Lower Hastings ASS project

A northcoast ASS consultant, Bob Smith, will develop a \$20,000 wetland management strategy for the lower Hastings River floodplain. He will assess the 10 worst ASS scald areas to find ways to remediate vegetation and groundwater. The project will modify a floodgate to keep water at or near ground level in the lowest part of catchment. This will reduce oxidation and acid runoff. Bund walls will be used to pond ASS scald areas. Drains will be reshaped to reduce acid water discharges to oyster and fishing areas. The project is supported by Hastings Estuarine Management Committee and the Port Macquarie Oyster Farmers Assoc Inc. Enquiries: telephone NSW Fisheries' Craig Copeland on 066 261 394.

Port Stephens - Anna Bay ASS plan

Port Stephens Council, in conjunction with community representatives and government agencies, is developing a draft management plan for ASS remediation for the Anna Bay drain. Local NSW

Fisheries manager, Dr John Holliday says there are more than 400 km of drains, mostly in ASS areas, situated in the Port Stephens region. A recent council soil survey uncovered drain spoil areas with pH 2.2 after oxidation. John says that recent urban developments which are feeding more storm water onto agricultural drains could be exacerbating the acid runoff problems. Recent meetings between DLWC, the local drainage union, Port Stephens Council, NSW Fisheries and EPA have discussed ways to fix local ASS problems. Enquiries: telephone John Holliday on 049 821 232 or Port Stephens Council environmental officer, David Bonger on 049 800251 or fax 049 873 612

Fish kill study

University of NSW postgraduate student Andrew Porter is recording the dynamics of acid sulfate induced fish kills at Pimpama River on Queensland's Gold Coast. Andrew's masters thesis project is titled, "Monitoring biota health in Acid Sulfate contaminated waterways." This research will add to previous work by Sammut, Callinan and Fraser (1996) on the role of acidity in estuarine fish kills. Andrew will use water quality monitoring and representative biological sampling to establish baseline conditions. Observations of acid sulfate related fish kills will then indicate the recurring impacts on recreational and commercially important fish species. Low pH water and dissolved aluminium and iron leached from ASS can kill fish by preventing their gills from absorbing oxygen. Exposure of fish to low pH can cause Red Spot Disease (Callinan, Sammut and Fraser, 1996). However, not all estuarine fish kills are caused by acid runoff. The project is sponsored by the Federal Government Coastcare program. Additional support is provided by the North-east Albert Landcare group, Gold Coast City Council, UNSW and University of Qld. Jes Sammut from UNSW is supervising Andrew's project which will finish in 1999. Contact: Andrew Porter tel 07 55467612

ASS oyster project

A major epidemiological study on production problems with the Sydney rock oysters is being done by the University of New South Wales School of Geography and NSW Fisheries. Belinda Lake and colleagues from UNSW, are conducting the study to unravel some of the complex associations that exist between oyster production problems, environmen-



Extruding an ASS core from QASSIT'S vibro-suction corer.

tal change and production methods. Michael Dove from UNSW, is completing bioassay research on the effects of ASS runoff on oyster health. Belinda and Michael are working under the supervision of Jes Sammut (UNSW) and Dick Callinan (NSW Fisheries). The project is funded by FRDC and has the support of NSW oyster growers, particularly lease holders on the Hastings River. For further information please contact Jes Sammut on 02 9385 6211 or by email on J.Sammut@unsw.edu.au.

ASS threat to Barrier Reef World Heritage areas

North Queensland's valuable fishing industries were being put at risk for the benefit of farming, Queensland's recreation fishing group Sunfish has claimed. Sunfish's North Queensland spokesman, Vern Veitch says land-clearing on the coast near Tully to make room for cane growing was a direct threat to the Great Barrier Reef fish breeding grounds. He said recent clearing on private lands on the edge of Barretts Lagoon between Tully and Murray Rivers had exposed ASS and was a threat to waterways. (Australian Associated Press July 7) Enquiries: Vern Veitch - on 077 716087.

Sheriden Morris, the Great Barrier Reef Marine Park Authority's (GBRMPA) Water Quality Liaison

Officer, says large agricultural drainage developments near Tully and Ingham in North Queensland could have ASS impacts. The proposed Tully Murray Riversdale Water Management Scheme would cover 7,000 hectares in stage one, with further areas to be developed later.

She says the Federal Government plans to join with the Qld government and the cane industry to provide a \$5.65 million infrastructure package for the proposed drainage and development of sugar cane areas in the Tully region. A total of \$400,000 worth of drainage works is proposed for floodplains near Ingham. Sheridan says GBRMPA has written to Federal and State environment ministers about the extent of the proposed clearing of coastal wetlands for cane. GBRMPA is doing aerial surveys of the proposed drainage areas to establish a benchmark of the existing environment's condition. Enquiries: Sheridan Morris on 07 0671 689.

Adam West, a Technical Officer for the Department of Natural Resources which is overseeing the proposed implementation of a Sugar Industry Infrastructure Package (SIIP) in the Tully area says there is a need for responsible floodplain development in the wet tropics. "The Department recognises that potential ASS exist within some of the defined area. Recent sales of large areas of former grazing land on the floodplain of the Tully and Murray Rivers have paved the way for the rapid expansion of the local sugar growing industry," he said.

The SIIP offers regulation through a formal review process which would assess the expansion plans on their environmental merits. Given the lack of specific legislative controls on development of potential ASS, A Water Management Board would be established to ensure landowners adopted best management practices based on an Environmental Management Plan developed for the scheme. This is particularly so with drainage which is the aspect of the development most likely to realise the potential ASS of the area. Without the Water Management Board, development will inevitably occur in the same haphazard way that has led to ASS problems in the past," he said Enquiries: Adam West (070) 643 911 (Tully Murray SIIP) Helen Dawson (070) 643 911 (ASS).

Book now for coming events

November Coastal Conference

Local government town planners, engineers, councillors, government department officers, academics, consultants and community representatives will meet at Ballina from November 12th to 14th for the seventh annual NSW Coastal Conference. The conference title is "The Coastal Zone - Beyond the Beaches". Keynote topics will include floodplain management, integrated management estuary management, and Coastcare. A number of papers, including studies on ASS, will be presented. Enquiries Debra McCombie for accommodation and other details on email ballina@peg.apc.org, tel (066) 86 3484; or fax (066) 860136. The closing date for registration is October 10.

Floodgate workshop at Kempsey

A workshop, "Floodgate management from a fisheries perspective" will be held at Kempsey Shire Council in the last week of August. The workshop covers issues for NSW mid north coast, including catchments for the Bellinger, Nambucca, Macleay, Hastings and Manning Rivers. Participants will include representatives of Catchment Management Committees, councils, farming groups, fisheries industry and government agencies.

Research topics will include:

- the audit of tidal control structures; effects of floodgate fish populations - Dave Pollard;
- the effect of culvert replacement on fish populations - Rob Williams;
- the impact of floodgate management on acid sulfate soils and cane production on the Tweed River - Ian White;
- and examples of changes to floodgate management - Rob Kasmaik.

A workshop session will then develop practical applications of research findings. The workshop is by invitation. Contact: NSW Fisheries Craig Copeland 066 261 394.

Tea Tree workshop

A workshop entitled, "Tea Tree Farming - soil pH and best yields" will be held in Ballina, NSW, on September 10.

The Workshop will explain the environmental and economic incentives for "best practice" when farming on floodplains and ASS. Professor Ian White from the Australian National University has

been invited to speak about how tea tree roots can affect watertables, while Bruce Blunden (currently on study leave from the Environmental Protection Authority) will cover environmental legislative issues. A number of tea tree consultants, including Dr John Murtagh and Neil Sullivan will present practical advice on how to improve productivity. The Australian Tea Tree Industry Association (ATTIA) Chairperson, Tony Doherty, says the workshop will give growers an ideal opportunity to learn how to deal with ASS issues. ATTIA Secretary, Pat Bolster will demonstrate her farm's production trials on soils with varying pH levels. Bookings for this free workshop can be made by contacting the NSW ASS information officer, Jon Woodworth on 066 261 344 fax 066 281 744. Please book by September 1. The workshop is sponsored by the Federal Government's National Heritage Trust and Ballina Shire Council.

RTA tender for Pacific Highway Impact Study

The NSW Roads and Traffic Authority (RTA) will soon announce the successful tender for a Cumulative Impact study of the upgrading of the Newcastle north to the Queensland border section of the Pacific Highway.

Project Manager, Cumulative Impact, Pacific Highway Development Office, Bruce Parks, says the study will look at the potential for the highway upgrade to affect acid sulfate soil (and methods to deal with this) as well as rural land, water and air quality and noise issues. The RTA will spend \$30,000 to update Geographic Information System maps for the route to include ASS details. The NSW Government has committed \$1.6 billion to the 10-year project and the Federal Government \$0.6 billion. Enquiries: tel. Bruce Parks on 066 401 300, or fax 066 401301.

ASS Local Action Committee news

Lower Macleay: Local teacher, Peter Ennis, explained details of a flood mitigation scheme to committee members during a bus tour of the Lower Macleay River on May 25. Peter believes that better water management in swamps through flexible floodgate design to keep water on the land, and drain maintenance, would help pasture growth during dry periods and improve the quality of water runoff. Mike Dutton from Kempsey Shire Council demonstrated how the six dataloggers along the

Belmore River measure 7 water quality parameters every 15 minutes. The data will help council and landowners determine the relationship between water quality and climate. Enquiries: tel. Stuart Naylor on 065 631212.

Richmond Tweed: Cudgen Lake is a 260 ha lake on the Tweed Coast, in far northern NSW which was once a major prawn nursery and fishing area. Excavation works within the local catchment have disturbed ASS sediments. After heavy rains, drainage from these soils is very acidic and contains toxic concentrations of aluminium and iron. The Richmond-Tweed Acid Sulfate Soils local Action Committee has identified Cudgen Lake as a priority restoration site. Don Buckley from Tweed Council says that the committee has proposed the restoration of Cudgen Lake be done as a Clean Up Australia 2001 community-based project in stages over the next four years. The committee is comprised of representatives from farming and fishing industries, government agencies, local government and local community groups.

Manning River: Greater Taree Council has appointed Steven Silcock to map drains in ASS areas of the Manning River. He will also measure the depths of the drains and adjoining ASS layers to develop management plans for each drainage system. The project was developed by the Manning Catchment Committee and is funded by the National Landcare program.

New ASS Publications and Papers

Brandjes PJ, Lauckner FB. On-farm assessment of two liming materials in cabbage and hot pepper cultivation on acid sulphate soil in Guyana. Source: *Experimental Agriculture* 1997 Apr;33 (2):225-35.

Davies BE. Deficiencies and toxicities of trace elements and micronutrients in tropical soils - limitations of knowledge and future research needs. Source: *Environmental Toxicology & Chemistry* 1997 Jan;16 (1):75-83.

Golez NV, Kyuma K. Influence of pyrite oxidation and soil acidification on some essential nutrient elements. Source: *Aquacultural Engineering* 1997 Mar;16(1-2):107-24.

Portnoy JW, Giblin AE. Effects of historic tidal restrictions on salt marsh sediment chemistry. Source: *Biogeochemistry* 1997 Mar;36 (3):275-303.

Vuori KM. Species and population-specific responses of translocated hydropsychid larvae (trichoptera, hydropsychidae) to runoff from acid sulphate soils in the River Kyrönjoki, western Finland. Source: Freshwater Biology 1995 Apr;33(2):305-18.

LQ Minh, TP Tuong, HWG Booltink, MEF Vanmensvoort, J Bouma: Bypass flow and its role in leaching of raised beds under different land use types on an acid sulphate soil Source: Agricultural Water Management 32: 2 (FEB 1997)Page(s) 131- (in English; Address - LQ Minh, Agr Univ Wageningen, Dept Soil Sci & Geol, POB 37, NL-6700 AA Wageningen, Netherlands

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Acid Sulfate Soils database (ASSIST) update

ASSAY is updating the current ASSIST database list of people who are working in the field of acid sulfate soils. The database is available to the public on request and aims to encourage networking and communication about ASS. We encourage ASS researchers, consultants, academics, landowners, managers and government officers to be involved. Please note that inclusion in the ASSIST data base does not imply recommendation by ASSAY or the Acid Sulfate Soils Management Advisory Committee.

To change your existing list address, or to be included in ASSIST for the first time, simply fill in the form below and mail it by August 15, 1997 to:

Jon Woodworth, c/o NSW Agriculture, WOLLONGBAR, NSW 2477
or fax to: 066 281 744

NAME.....

ADDRESS.....

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PHONE.....FAX.....

EMAIL.....

Classification (eg landowner, consultant, researcher etc)

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Area of interest/expertise (maximum 30 words)

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