

Stage 3 Progress Report

Coastal Acid Sulfate Soils Program (CASSP)

Milestone Report: 30th May 2002

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

2. Contact Details

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Project Steering committee: The Barker Inlet and Port Estuary Committee (BIPEC) – Contact / secretary Harry Pitrans.

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.

3. Key Dates

Project duration: 1st January 2001 to 31st December 2002 (Final report 28th February 2003).

Stage 3 Progress Report Due date: 30th May 2002.

4. Project Activities

Stage 3 of the project to started on 01/12/2002 and finished on 30/04/2002. The agreed activities and milestones are shown below.

	Activities	Milestones
3.1	Begin implementation of ASS rehabilitation trials as agreed at the Stage 2 workshop	Rehabilitation trials begin
3.2	Implement monitoring program with collection and collation of all soil and water data as agreed at workshop	Monitoring program implementation
3.3	Compile progress report on rehabilitation trials	Progress report finalised
Progress Report for Stage 3 Report against key milestones and performance indicators, including a statement of costs to be lodged with the Department within 30 days of completion of Stage 3. Due date 30/05/2002		

A report against each Milestone follows.

Milestone Report

Activity 3.1 Begin implementation of ASS rehabilitation trials as agreed at the Stage 2 workshop.

Milestone 3.1 Rehabilitation trials begin.

Report: *Milestone 3.1 only partly met.*

We have met Milestones 3.1 with regard to the remediation trials proposed for St Kilda, however the remediation trials proposed for Gillman have not been established at this stage due to a delay in obtaining approval for land access to the trial site (see Gillman Remediation Process – below).

St Kilda Remediation Progress

The remediation trials agreed at the Stage 2 Workshop for the St Kilda mangroves firstly recommended the implementation of an intensive environmental monitoring program before conducting any remediation trials that will modify the existing environment.

This monitoring program is well underway and is detailed in the Milestone 3.2 and Milestone 3.3 reports below. The collection, analysis and monitoring of soil and water samples at four distinct sites at St Kilda will continue over the coming months while modifications are made to the hydrology and soil conditions during the installation of the “Tidal Flushing” remediation experiment agreed at the Stage 2 Workshop. (refer to the Milestone 3.3 Progress for further details).

Gillman Remediation Progress

The Gillman remediation trials proposed at the Stage 2 Workshop have been intensively planned with all infrastructure and monitoring equipment being purchased and built (refer to Milestone report 3.3 below). However the trials are yet to be installed on site while approval from the landowners ORS&R (Office for Recreation, Sport and Racing, and the Dept. for Environment and Heritage) is being finalised.

Although access to the lands was approved by ORS&R on the 29th of January 2002, it was for the purpose of sampling only. An additional proposal for implementing the remediation trials was forwarded to the landowners in mid February 2002. This was followed up with a meeting between the landowners and CSIRO on the 11th of March. Additional information was then requested and provided on the 11th of April. A “Draft Licence Agreement” was received by CSIRO from the landowners on May 2nd. The Draft Licence Agreement was tabled and reviewed by the Project Committee at a

committee meeting held on the 7th May 2002. The committee expressed concern with 2 clauses regarding the sharing and ownership of intellectual property. These concerns were communicated to the Licensor who agreed to amend these clauses. The amendments read very similar to the original clauses so the matter was referred to CSIRO lawyer Fred Van Dijk who liaised directly with the SA Crown Solicitors Office (drafter of the License Agreement). The matter has now been resolved and the Draft License Agreement was signed by CSIRO (22nd May 2002).

CSIRO accepted the Draft License Agreement and have received the “Official” License Agreement, which is due to be signed by CSIRO’s Chief this Thursday 30th May. The Official License Agreement will then be sent to the Licensor to sign. Access will be granted as soon as the Licensor has signed the document. Fred Van Dijk has assured me that the process is now just a formality and that access should be granted to the Gillman site some time during the first week of June 2002.

CSIRO management raised an OH&S matter regarding UXO’s (Unexploded Ordnance) on the Gillman land. This has now been resolved with the matter being regarded as a “non-issue” for the Gillman site.

The remediation trials can begin as soon as Licensor has signed the final “License Agreement”.

Activity 3.2 Implement monitoring program with collection and collation of all soil and water data as agreed at workshop.

Milestone 3.2 Monitoring program implementation.

Report: *Milestone has been met.*

Following an extensive field program, a soil map including schematic cross sections has been constructed that characterize the soils within the Gillman and St Kilda field areas. This information has provided the basis for devising the remediation trials that will be implemented in early June at both field sites. Monitoring of existing soil and water conditions is underway at Gillman and St Kilda and will provide the necessary background data on which to assess the performance of each remediation trial.

Monitoring Program has been implemented at St Kilda.

Monitoring of chemical and physical conditions (redox measurement using Pt Eh electrodes and site hydrology) has begun at St Kilda where eutrophic conditions in the soils are causing mangrove dieback. Three data loggers are currently monitoring four areas. The third data logger was installed at St Kilda to intensify the monitoring program and will be relocated to Gillman once the Gillman ASS remediation trials begin. 4 peizometers have also been installed to extract soil-water. The soil profiles have been described and over 60 soil samples and water samples have been collected. Geochemical, mineralogical, carbon content, water content, bulk density, and chromium reducible sulfur analysis is continuing on these samples.

Monitoring Program has been implemented at Gillman.

11 soil profiles were excavated and described in detail as part of the soil-sampling program conducted at Gillman in February and April 2002. 5 type sections have been identified that characterise the various soils in the area and will be monitored for seasonal variations for the duration of the project.

No data loggers have been installed at Gillman due to the restricted access to the site, however these soil profiles are subject to monitoring of soil and water redox conditions, salinity variations, pH, hydraulic conductivity and groundwater heights. It is intended that 3 data loggers will be installed at the remediation trials site and one data logger be installed across the bund wall as a control to monitor undisturbed mangrove soils and drained mangrove soils. The installation of these data loggers will complement the continual monitoring of current soil conditions and assist the intense monitoring of soil and water in each of the remediation experiments planned for the Gillman ASS.

Activity 3.3 Compile progress report on rehabilitation trials.

Milestone 3.3 Progress report finalised.

Report: *Milestone has been met according to the information at hand.*

Progress is advanced for the remediation trials proposed for St Kilda at the Stage 2 Workshop. The Gillman remediation trials proposed at the Stage 2 Workshop have been planned with infrastructure completed, however are yet to be installed. Approval from the landowners (Office for Recreation, Sport and Racing, and the Dept. for Environment and Heritage) will soon be finalised.

Progress Report: St Kilda Remediation Trials.

Monitoring of chemical and physical conditions (e.g., redox measurement using Pt Eh electrodes and site hydrology) has begun at St Kilda where eutrophic conditions in the soils are causing mangrove dieback. Three data loggers are currently monitoring four areas:

- Healthy mangrove soils have been sampled and 16 Pt electrodes placed at 4 horizons within the soil profile are monitoring field redox conditions.
- Calcareous ridge covered by samphire vegetation has been sampled and 16 Pt electrodes at 4 horizons are monitoring field redox conditions.
- Highly reducing (eutrophic) soils in stagnant pools between mangroves stands, where mangrove pneumatophores have retreated, are being monitored by 8 Pt electrodes placed at 4 horizons within the soil profile.
- 8 Pt electrodes placed at 4 horizons within the soil profile are monitoring eutrophic soils still occupied by mangrove pneumatophores.

A tidal flushing/drainage trial will be conducted once monitoring of these areas is complete. Preliminary monitoring results show that the extremely low Eh of the soil in the eutrophic pools is related to the amount of organic material hence the amount of microbial activity within the soil profile. This has led to the development of another remediation trial an “Organic Burial” trial that will be implemented alongside the “Tidal Flushing” trial proposed at the Stage 2 Workshop.

Progress Report: Gillman Remediation Trials.

Detailed, scaled plans and designs for the remediation trials proposed for Gillman have been drafted with all infrastructure and monitoring equipment being purchased or built and is ready to be installed as soon as access to the land becomes available (refer to Appendix A and C).

The following ASS remediation trials have been designed and will be conducted on the most degraded ASS in the Gillman area once the landowners have granted final approval:

- Re-flooding trials utilizing existing freshwater, tidal and saline ponds in constructed wetlands and brackish water in a storm-water ponding basin.
- Bioremediation trial to re-establish reducing conditions to stop pyrite oxidation by the addition of sulfate-reducing bacteria and various organic wastes, in effect re-establishing the sulfide formation processes that operate in the mangrove soils outside the bund wall.
- Slotting trial using soda lime by-product to treat acidic discharging meteoric water and groundwater leachate. The ASS in the banded areas will be compared with PASS in adjacent, relatively undisturbed mangrove, samphire and sea grass flats. The infrastructure required to implement these remediation trials has been completed and is just waiting for permission to be granted.

The establishment of these trials should only take about a week with some results and analysis being reportable soon after implementation.

A remediation trial designed to monitor the response of ASS after burial/loading, was also planned for Gillman. However the land that contains the “pre-loaded” ASS is about to change ownership and LMC could not provide the land for the required duration. There are no other suitable areas to conduct the “burial/loading” remediation trial. This trial has been abandoned.

5. Request for Stage 4 Key Date Revision

Due to the delays in obtaining access to the Gillman remediation trials site, it is requested that the finish date and subsequently the reporting date of Stage 4 be delayed by one month. Stage 4 of the project started on the 01/05/02 and will finish on the 31/08/02. The project will still be able to meet the Stage 4 milestones on time without any change to methodology, however I feel that an extension of one month would be well worth the extra data that we could collect. With a one-month delay, we can still meet, or more than meet the agreed milestones for the final Stage 5 Report. The agreed activities and milestones for Stage 4 are shown in table 1, below. No changes to the Stage 5 key dates are being sort (Table 2, below).

Table 1. Key dates for Stage 4 with the requested finish date amendment shown in red font (30/09/02).

Stage	Start Date	Finish Date		Activities	Milestones
4.	01/05/02	31/08/02	4.1	Complete ASS rehabilitation trials as agreed at the Stage 2 workshop	Rehabilitation trials completed
		Amend to 30/09/02	4.2	Collate monitoring program data	Monitoring program findings collated
			4.3	Finalise report detailing conclusions and recommendations from trials	Report finalised
Due Date 30/09/02		Progress Report 4.	Report against key milestones, performance indicators and costs to be lodged with the Dept. within 30 days of completion of Stage 4		

Table 2. Key dates for Stage 5. There is no amendment being requested for Stage 5 key dates.

Stage	Start Date	Finish Date		Activities	Milestones
5.	01/09/02	31/12/02	5.1	Disseminate information from ASS rehabilitation trials as per Communication and Awareness Strategy (Annexure A Q11) and via: <ul style="list-style-type: none"> • Demonstration workshops at trial sites • Publication of research outcomes • Publication of Development Brochure 	Information disseminated
			5.2	Finalise and distribute Industry Manual, <i>Best practice soil improvement strategies for ASS</i>	Industry Manual finalised and distributed
			5.3	Commence Plan Amendment Report to Amend Councils' Development Plans	Plan Amendment Report finalised
			5.4	Final research report compiled	Final research report delivered
			5.5	Begin Project Final Report	Project Final Report begun
Due Date 28/02/03		Progress Report 5.	Report against key milestones, performance indicators and costs to be lodged with the Dept. within 30 days of completion of Stage 5		

6. A brief description and analysis of Program Performance Indicators as per Item K.

The project has been actively communicating and demonstrating objectives and outcomes to a wider audience during this reporting period. The articles and presentation slides are attached in Appendix A. All pictures and information is available for posting on the CASSP website.

Communications and Correspondence made during the reporting period.

- **Channel Ten TV program “Totally Wild”** (At St Kilda, Brett Thomas and Rob Fitzpatrick were interviewed for a story about the effects of pollution on the mangrove environment – due to be aired in June or July 2002).

Appendix A

- **Abstract: Properties and distribution of South Australian coastal acid sulfate soils and their environmental hazards.** (Accepted for publication in the 5th International CASS Conference transactions). A presentation and/or poster detailing this abstract will be presented at the conference in August/September 2002 at Tweed Heads.
- **Abstract: Approaches to remediation of acid sulfate soils in Barker Inlet, South Australia.** (Accepted for publication in the 5th International CASS Conference transactions). A presentation and/or poster detailing this abstract will be presented at the conference in August/September 2002 at Tweed Heads.
- **Information brochure** (draft): information on the environmental conditions at St Kilda (aimed at Secondary School students).
- **Seminar presentation:** Project proposal and experimental design presented by Brett Thomas to CSIRO and Adelaide University staff and students.
- **Project Progress: SAG 9 REPORT:** Report to CLW Dec. meeting, Townsville.

7. Overall project progress to date.

Although the project has not completely met all of the milestones for Stage 3, the Project is online to meet, or more than meet all of the milestones of Stage 4 and Stage 5 (Final Report) by 28th February, 2003.

8. Project Committee Meetings Minutes.

Appendix B

Agenda, minutes and attachments from committee meetings:

- **12/07/01**
- **19/09/01** Attachments

9. Proposals, Draft Licence Agreement and related documentation

Appendix C

Project proposals and correspondence documentation relating to the application for land access for the Gillman remediation trials.

- Proposal for conducting monitoring and soil sampling at the St Kilda boardwalk (published Feb. 2002).
- Proposal for conducting Burial Trials on LMC land (published Feb. 2002).
- Proposal for conducting Lime-slotting, Chemical neutralisation, Leaching and Bioremediation trials (published Feb. 2002).
- Proposal to place data loggers at Gillman (published Feb. 2002).
- Gillman Acid Sulfate Soils Remediation Trials – Detailed Plans (published April 2002).
- Draft Licence Agreement (amendments attached).
- Permission to access SARA land (letter from SARA Executive Officer Paul Gale – requirement of Clause 3.5 of the Licence Agreement).

10. Electronic copy of Stage 1, Stage 2 and Stage 3 Progress (Milestone) Reports

Appendix D

- CD