# NEURALISATION OF ACID SULPHATE SOIL DISCHARGE

PARTRIDGE CREEK – PORT MACQUARIE, NSW, AUSTRALIA

- pH RAISED
- TOTAL ACIDITY LOWERED
- LOW INPUT FROM OPERATOR
- MINIMAL INFRASTRUCTURE REQUIRED
- ESTURINE ENVIRONMENTS PROTECTED

## LOCATION

Partridge Creek, Port Macquarie, New South Wales, Australia (Latitude: 31 ° 26' S, Longitude 152 ° 52' E).

## SETTING AND CLIMATE

Partridge Creek, a tributary to the Hastings River, is located on the NSW north coast, approximately 350km north of Sydney. It has a subtropical climate with daily maximums of 25 ° C in summer and 18 ° C in winter. The average annual rainfall of 1500 mm mainly falls in heavy bursts during in the summer months.

## CLIENTS

Hastings Council, CSIRO, NSW Department of Land and Water Conservation and the Port Macquarie Shellfish Quality Assurance Program. Funding was also provided by the Commonwealth Government under the Coastal Acid Sulphate Soils Program (CASSP).

## BACKGROUND

Acid Sulphate Soils are organic-rich soils which contain iron sulphides. They are naturally occurring, are formed in seawater or brackish water environments and are common in estuaries and estuarine floodplains along coastal NSW and Queensland. The iron sulphides are generally stable and do not cause a problem when the soils remain water saturated. However, when exposed to air after drainage or excavation, the sulphide minerals rapidly oxidise to form sulphuric acid. This acid can leach into the surrounding area and cause severe environmental damage. The acid water may also pick up and concentrate toxic metals such as aluminium.

Partridge Creek, upstream of doing point.

The acid problem in Partridge Creek has been caused by various drainage projects carried out at the site, particularly since the 1930's. Drainage works have exposed sulphidic soils, leading to the production of up to 400 tonnes of acid annually. The acid has many impacts in the region, especially on aquatic fauna including commercially farmed oysters. The magnitude of the problem at Partridge Creek has lead to the site being declared as one of seven acid sulphate soil priority areas in Australia.

## SITE ISSUES

The treatment site on Partridge Creek was relatively remote so that power needed to be suppled via generator.

In the dryer months, acid is produced and accumulates in the soil. During rain events, the acid is mobilised or flushed out into Partridge Creek. Thus treatment equipment must be able to deal with short periods of relatively high acid loads.

## WORK PROGRAM

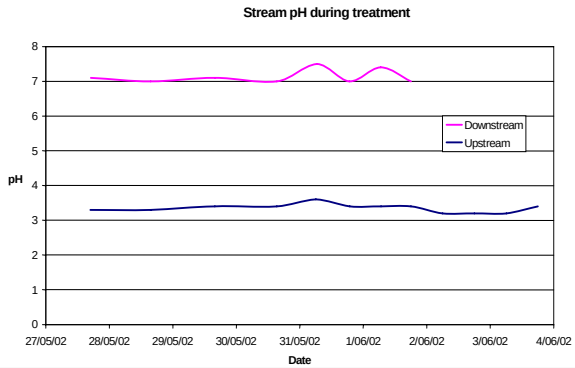
The Hastings Council arranged the installation of power and the construction of a small dam on Partridge Creek for dosing and precipitate settlement. Earth Systems supplied and installed a Hydro-Active Limestone Treatment (HALT) system on Partridge Creek. Three trial treatments were conducted over several months to demonstrate the suitability of the HALT system. Neutralisation was preformed using aggregate limestone ($CaCO_3$). The HALT mill ground the limestone aggregate to produce an ultra-fine grained, highly reactive limestone slurry. The use of limestone is highly cost effective and prevents over treatment .

*Above: HALT system dosing into Partridge creek.*
*Right: Delivery of lime from hopper to HALT system.*

## RESULTS

The HALT system effectively neutralised the drainage coming from Acid Sulphate Soils by delivering an average of 750 kg of limestone per 24 hour period.

The above graph shows that the water in Partridge Creek was at a pH of around 3.5 upstream of treatment and this was raised to a neutral pH below the treatment point. Treatment using the limestone based system indicated that the acid water could be treated to a satisfactory level to protect local ecosystems.

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