

Heterogeneity of a Seawater Aquaculture Pond Built in Acid Sulphate Soil (ASS): Ineffective Mechanical Mixing by Pond Paddlewheels

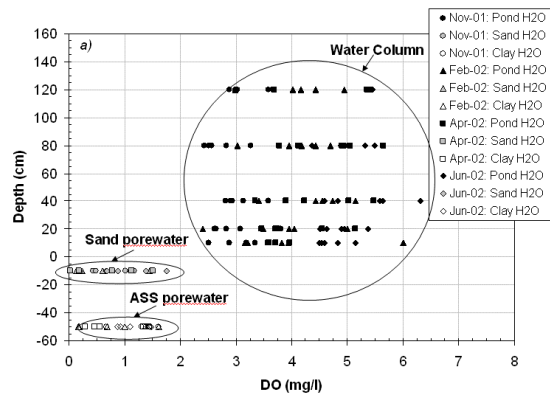
S.A. GROVES¹

¹CSIRO Marine and Atmospheric Research, 233 Middle Street, Cleveland, Queensland, Australia; sarah.groves@csiro.au

A temporal and spatial investigation of the pond water chemistry was carried out at a prawn aquaculture farm built in acid sulphate soils in south-east Queensland, Australia. Water samples were collected over a 7 month period from replicated points in the pond water column and underlying sediment porewater with the use of specially designed pond water samplers.

Water samples are commonly collected from ponds by spot sampling. This type of sampling assumes that pond water is homogeneous and therefore, classification of a ponds water chemistry can be grossly misrepresented. Data collected with the use of samplers demonstrate that the pond water is chemically heterogeneous.

Concentrations of dissolved oxygen below 2mg/l were recorded in the sand layer: where the prawns habituate (see Figure). The spatial data shows that the paddlewheels move



insufficient concentrations of oxygenated water from the pond surface to the sand layer; and DO concentrations are lethal to *P. japonicus* (the culture species being grown in the pond) [1].

Metal ions are leached from pond ASS during biochemical and geochemical reactions. Metals and trace elements such as Fe^{2+} , Al^{TOT} , As^{TOT} are leached from the ASS's and negatively impact the health/productivity of cultured prawns and surrounding estuary ecosystem.

References

[1] Egusa, S. (1961). *Bulletin of the Japanese Society of Scientific Fisheries*, **27**, 650-659.