

Delta Environmental Consulting

Special points of interest:

- A trial of economical data logging equipment in Barker Inlet has produced great results for a local utility company
- The construction of a new vernal pool on the Parafield Airport has produced promising initial results

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Time does fly when you are having fun. 2007 disappeared before it really sank in that we should stop writing '2006' on our reports...

It was a year of comings, goings and growings. We welcomed Faith Cook back from her stint developing a Land & Water Management Plan for the Tintinara district of South-Eastern South Australia. Faith continued field studies right through her pregnancy, undertaking thermal plume studies in Barker Inlet and flora studies in the Flinders Ranges. Now young Daniel comes to work with her. Nothing like early education...

John Barrie finished off his 'landscape-mimicking' revegetation plan for the Angaston Mine, which introduced a new concept of 'painting' with groups of plants to provide an illusion of landscape form over large, regularly shaped mounds.

Mel Batt started work with Delta, helping Renae Eden undertake the Dry Creek Saltfield's biomonitoring program, then was headhunted by the salt company to become a brine operator. We wish her well in your her position, but we will, however, miss her.

Renae Eden finished her studies in July, and now has a little more time to call her own. Congratulations to you for achieving a long-held ambition, Renae.

And the microscope illustrated above? Well, we were lucky enough to obtain two relatively new microscopes – this one is set up with differential interference contrast (Nomarski) and it produces the most stunning delineations of diatoms. The microscope has been fitted with a digital camera that is connected to the laboratory computer, allowing the photographs to be previewed on the large monitor. So you do not need to ask what I have been up to, all this year!



Nikon E600 fitted with DIC for diatom studies

Salt Creek estuary protected

After several years of effort, the Yorke Peninsula community at Coobowie has celebrated the protection of the Salt Creek estuary, with the recent gazettal of two aquatic reserves covering the lagoon and bay. The local community, individual landholders abutting the estuary, District Council of Yorke Peninsula, Yorke Regional Development Board, Coastal Protection Branch, local schools, Waterwatch, Transport SA (now DTEI), local aquaculturalists, PIRSA Fisheries and several sets of consultants (including Delta) worked together to return tidal flooding to this stranded estuary.

The draft Estuary Policy for South Australia has recognised the impacts of restricted tidal flows in estuaries and has recommended the development of guidance relating to tidal crossings – after all, if they are not blocked in the first place, they will not need restoration later.



Getting warmer, getting cooler...



Faith mounting 'Tinytag' temperature loggers in Angas Inlet

The monitoring of thermal discharges in water bodies has traditionally required the installation of expensive data logging equipment. In 2007 Faith Cook trialed the use of Gemini Dataloggers' Tinytag aquatic induction loggers as an economical alternative, when she undertook some thermal plume monitoring for TRUenergy's Torrens Island Power Station, in Adelaide.

The Tinytags are very small, waterproof 'button' loggers that can be attached to surfaces underwater. Downloading these little loggers is simple—they are swiped across the surface of an induction pad, removing the need for an expensive waterproof serial connection. Small equipment is advantageous when monitoring in urban and peri-urban areas—it does not draw attention to itself. Large installations suffer frequent vandalism, whereas loggers that are a similar colour to the mud, wooden pylons or rusty channel markers are rarely detected and so avoid damage.

At the same time she deployed the Tinytags, Faith also set out some periphytometers, to collect samples of benthic diatoms in the thermal plume area. The clear acrylic slide holders also use camouflage to avoid attracting unwanted attention—they become completely invisible when submerged.

Two weeks later, Faith retrieved all her loggers and all her periphytometers—an excellent result in a heavily used waterway. The resulting comprehensive data set was beautifully amenable to statistical analysis, enabling a comparison to be made between the current plume distribution and the 'predicted distribution' based on a plume model that had been developed over a decade ago. The ease of use, reliability and inconspicuous nature of the Tinytags, combined with a clear, written monitoring program (developed by Faith) has enabled the energy company to continue monitoring using their own staff.

Plantscape revegetation

“These patches replicate natural slopes, based on the hillscape east of Angaston”

Penrice Soda Products engaged Delta to review existing its existing revegetation strategy and develop a plan for the long-term revegetation of existing and future spoil mounds at their Angaston mine. The new mine spoil mounds are larger and more exposed to view than earlier mounds, making them conspicuous in the landscape. The size and orientation of the mounds causes a rain-shadow effect, providing challenging growing conditions.

An innovative landscape replication approach was developed by John Barrie, that addressed the visual and environmental aspects while working within the limitations posed by the physical constraints of the site. John's 'plantscape' concept aims to revegetate the single 'blocky' mound landform in patches, to mimic a more natural landform. Plants are grouped by colour to provide areas of differing shade. These patches replicate natural slopes, based on the hillscape east of Angaston. Diagonal lines across a view are dynamic and reorient the appearance of the scene. Within the colour patches, plants of similar growth form are also clustered, to accentuate the effect of shadows during the day, giving a depth of texture to the scene. Grassed patches provide the lightest colours and are an important habitat component between the darker patches.

Traffic hazards



Measuring tree height and canopy spread

Delta Environmental Consulting was recently appointed to the Department for Transport Energy and Infrastructure's pre-approved contractor panel, as a provider of vegetation assessments. The projects are fairly variable, and involve working with developers who need changes to the alignment of State and National roads. Staff photograph and assess the health and biodiversity value of vegetation that may be impacted by the changes in rural areas, assess trees that are affected by the significant tree legislation in the Adelaide metropolitan area and assess trees that may be hazardous to road users.

Working alongside highways has its own hazards, and staff underwent Workzone Traffic Management training to learn how to work safely and how to control traffic through a work zone, before venturing out onto National Highway One. Once on site, Renae Eden and Peri Coleman found that the weather was a larger problem than the traffic — high temperatures and hot winds proved challenging. However the fine conditions produced very clear photographs of the impacted vegetation, allowing the production of a high quality product.

Dry Creek flume replacement monitoring

Renaë Eden and Melissa Batt monitored the turbidity impacts of a dredging (well, digging) operation in the estuary of Dry Creek during the winter months. Civil contractors were replacing a fragile wooden flume that crossed the creek on a wooden trestle supported by pylons. The flume had been subject to vandalism over many years and was at constant risk of catastrophic failure. The replacement was to be a buried polyethylene pipe.

The civil contractors needed to remove the old superstructure, create a trench for the pipe in the same footprint occupied by the original flume, and lay the 140m long welded pipe into the trench. As the location is estuarine, two tides a day would cover the work site, leaving only a small window for working.

Being in the intertidal area, the project was considered to be 'dredging' and so Delta designed a monitoring program that met the requirements of the South Australian Environment Protection Authority. The program included the collection of ambient turbidity readings in Dry Creek for a period prior to any work being undertaken, and further collection of turbidity readings several times a day, upstream and downstream of the construction location, during the civil works and after project completion.

In addition to monitoring the water quality, mangroves (*Avicennia marina*) occurring adjacent to the project area were photographed before and after the project, to assess any impacts from the project on these protected plants.



Starting to excavate the trench for the new pipe across Dry Creek

New vernal pool at Elder Smith Drive

A civil works team from the Department for Transport, Energy and Infrastructure completed the earthmoving works for the creation of a 'mitigation' vernal pool at Parafield Airport in April 2006. The created pool is experimental, as vernal pools have not been re-created in Australia before. The pool forms part of the mitigation works for the vegetation impacts of the new Elder Smith Road. Delta Environmental Consulting designed the mitigation program and oversaw the earthworks for the new pool. DTEI's team carefully stripped away the weedy pasture grasses, removed the top soil, compacted the pool base, replaced the topsoil and then 'inoculated' the new pool with a fine layer of topsoil and organic mulch retrieved from the impacted pools in the new road's alignment.

Winter of 2006 saw a severe drought, so little was observed over the first year. The winter of 2007 was still a drought, but enough rain fell that the pool held water. In no time at all the inoculum started to sprout. A green cover of specialist vernal pool plants grew across the pool, with the water staying long enough for many to set seed and complete their life cycle.

Delta is conducting a long-term monitoring program to determine if the re-creation approach is successful. Details of the pools, the program, and progress reports are hosted on Delta's website at <http://www.deltaenvironmental.com.au/archives/vernal/index.htm>

"A green cover of specialist vernal pool plants grew across the pool..."



DTEI's team at work, under canine supervision, constructing the new vernal pool at Parafield Airport.

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Wet? Salty? Arid? Muddy?
Our element...

Delta Environmental Consulting is an independent South Australian consulting business. We offer services including sampling, monitoring and discharge monitoring programmes for waterways, tidal areas, saline lakes and wetlands, assessment of revegetation projects, flora and fauna biodiversity surveys of terrestrial, shallow aquatic (fresh, brackish and haline) and stygian habitats, site environmental surveys, evaporation basin modelling, GIS habitat change assessments, land use histories, enterprise carbon footprinting, compliance audits and research programs.

Delta Environmental Consulting has a policy of continuous improvement in the areas of :

- Providing a quality product to our clients,
- Providing ongoing training and development opportunities for our consultants (we have InSkill SA certification),
- Maintaining high standards in the areas of health, safety and the environment both within Delta and while working with our clients.



The company's quality assurance management system has been third party certified to the international Q-base standard by NATA Certification Services International. A copy of the scope of certification is available on request.



Delta is proud to be associated with the Water Industry Alliance

Directions for 2008

2008 is shaping up to be a very interesting year. Regular bio-monitoring, water quality programs and groundwater investigations will keep Renae and Faith out on the road conducting fieldwork for much of the early part of the year. Faith is also developing a 'Working with Consultants' workshop for community groups, NRM and local government staff – keep an eye out later this year!

Flora surveys for sites as far away as Broken Hill and the Eyre Peninsula are either underway or planned, and should provide opportunities for staff to become familiar with an even wider range of vegetation associations and habitats, not to mention an opportunity to brush up their off-road driving skills.

Greenhouse gas foot-printing is proving to be a topic of interest to manufacturing industries. Recent work in this area, undertaken by Faith, has provided local industries with a method for benchmarking their emissions performance against national and international standards. We hope to see some market response to her efforts in the year ahead.

Delta's ongoing association with the Water Industry Alliance has seen the business' details listed in 'capacity profiles' provided to international consortiums that have expressed an interest in constructing the desalination infrastructure for supplying Adelaide's water needs. We look forward to any opportunities for providing assistance in this significant project.

Staff training and development continues to be a high priority in the business. The triennial International Society of Salt Lake Research conference will be held in May 2008, in Salt Lake City, Utah. Two staff members will be attending this conference and will extend their stay to visit US salt lakes in the company of local researchers. A visit to the San Francisco Bay salt ponds and saltmarsh restoration projects is on the agenda for another staff member. Back in Adelaide, staff are planning to attend several ICEWarm seminars, as well as regular CSIRO Land and Water seminars.

And as a last word – please don't hesitate to contact us if you have any queries regarding the services we offer. We welcome customer input and are always happy to tailor our services to suit our customers' needs.



Arid lands flora survey