



## Delta Environmental Consulting

### From the desk with a view...

Merry Christmas everyone!

2011 began in a rush of lizard relocations, and now the year is nearly gone—and I am still looking for the bits of it that I have mislaid. It seems that only yesterday I was bumping about in Indonesia doing flora surveys from the back of a motorbike!

The year has been hectic, with projects in Queensland and South Australia as well as Indonesia keeping me on my toes all year. It seemed almost impossible that we would manage to fit the triennial International Society for Salt Lake Research conference into the schedule—but we did and it was an illuminating experience! The conference was held at Miramar in Cordoba province in Argentina, where the large inland sea, Mar Chiquita, keeps changing its extent to the woe of the small communities on its shores. While we were there we also dropped in on the salt-makers of Salinas Grandes, watched migratory shorebirds in the inland delta of the Rio Dulce, and camped at Cerra Colorado in the Sierras Ambargasta. The locals completely won me over into drinking maté, a local tea made from a holly bush. Now the remarkably useful maté bag with its pockets for thermos, mug, tea-making ingredients and even a space for a couple of biscuits accompanies me everywhere in the field, even if it is carrying coffee instead of maté!



Sleepy lizard about to be re-homed

Well, that's it from me, so keep safe everyone...

*Peri Coleman*

### Lizards, lizards

Defense SA, the developers of Techport at Outer Harbor in SA, are preparing land for port-specific industrial development and they are also implementing improvements to the public open space of the Northern LeFevre Peninsula. But making changes can mean big machinery, and sleepy lizards (*Tiliqua rugosa*) do not mix well with big machinery. These lovely, slow moving lizards mate for life, bear live young and defend a home territory. After identifying that these animals were at risk from earthmoving operations, Defense SA contacted Delta to develop a management plan to reduce the risk. The plan means that each site is swept for lizards prior to any earthmoving and all lizards found are recorded and relocated to nominated relocation areas.

Additionally, contractors are trained to safely capture any lizards that are found during construction operations, and hold them in secure conditions until Delta staff can arrive on site to relocate the animals. This year five sleepies have been safely relocated to appropriate habitat within Mutton Cove Conservation Reserve and the nearby Coast Park.

#### Special points of interest:

- Evidence of relative sea-level rise in Port Adelaide is very clear, with 98% of samphire at Mangrove Cove (Patangga) being lost since 2002
- Yes! Delta has a Facebook page. We are only novices at using it, but hope you will all drop in and give us some pointers!

[www.facebook.com/DeltaEnvironmentalConsulting](http://www.facebook.com/DeltaEnvironmentalConsulting)

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## Samphire loss at Patangga



Surveying mangroves at Patangga

Time changes everything... When the Management Plan for Mangrove Cove (Patangga) was written in 2005, analysis of the spatial extent of mangroves and samphires on the site was undertaken. Aerial photography from 2002 was classified into supratidal, mangrove, mud flat, saltmarsh and transitional areas. The same classifications were used again to analyse aerial photography from this year.

The different habitats and vegetation associations have changed at different rates in the intervening period. Mangroves have expanded and now cover 170% of the area they covered in 2002. While some of the samphire areas have been over-run by mangroves, a much larger area of samphire has died and been replaced by mud flats, and some of what was previously dense samphire is transitioning towards mud or mangroves. Samphire now covers only 2% of its previous extent.

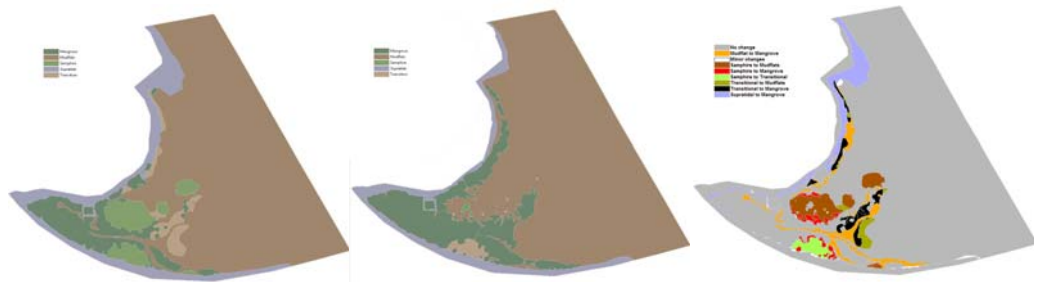
While a large area of mudflat has been colonised by mangroves, there are no areas of mudflat that have been colonised by samphire. Despite losing some area to mangroves, there is more mudflat in 2010 than there was in 2002 because quite large areas that were samphire or transitional have converted to mudflat.

The reasons for habitat change can be quite complex, however the prime reason in this case is likely to be relative sea level change. The relative sea level at Port Adelaide has been changing rapidly. Reasons may include being in the graben zone of the horst and graben formation that results from the Para Fault and other local fault lines, oxidation and compression of underlying quaternary coastal alluvial deposits, and actual sea level rise due to warming oceans.

Subsidiary causes for the observed changes include shadowing and competition once mangroves move into an area, and possibly changes to the supply and texture of silt to the area.

The pictures below illustrate 2002, 2011 and the changes to the habitat. Larger detailed mapping can be examined on-line at the Mangrove Cove monitoring program web site at the following web address: <http://www.deltaenvironmental.com.au/archives/mangrove/GIS.htm>

*“The prime reason... is likely to be relative sea-level change.”*



## In Wallacia



Fishermen's shelter near the fish ponds at Mbai

PT Cheetham Garam are hoping to build a large solar saltfield on the Mbai deltaic plain at the mouth of the Ai Sissa (Sissa River) on the island of Flores in Indonesia. The islands in this region are called Wallacia, after Wallace's Line—the imaginary line that separates the Australasian flora and fauna from that of Asia. Delta undertook the initial environmental assessment of the site, considering the site's suitability for the production of solar salt, its current flora and fauna diversity and the uses to which the local people put the land. The huge site supports a range of habitats from mangroves, through beach berms with pes—caprae formations, beach forests, saltflats, riparian floodplains, coastal lagoons, dramatic rocky outcrops and large areas of woody weed infestation.

The local people were very welcoming and escorted us around the site on motorbikes while we undertook the flora and site surveys. We stayed in the nearby Verbist monastery at Nagekeo, which was in the hilly land behind the delta. The elevation of the monastery gave us cooler conditions at night, for sleeping—but the giant geckoes rapidly put paid to any thoughts of sleep with their nocturnal territorial battles across the ceilings, accompanied with amazing barking!

## Estuary monitoring restarts

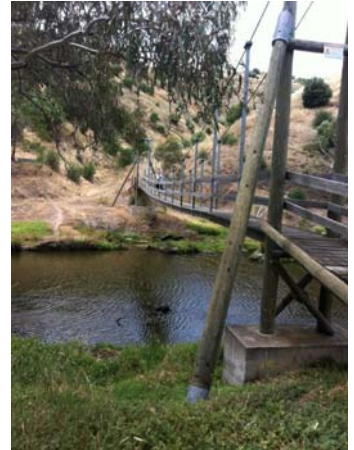
After a break of some months in the middle of the year, the Adelaide & Mount Lofty Ranges NRM Board had Delta Environmental Consulting restart the monitoring program in the estuary of the Onkaparinga.

Monitoring over the past three years had identified a number of impacts in the waterway, including reduced environmental flows and the invasion of mangroves, *Avicennia marina* into the estuary. The monitoring program includes a small suite of physical, chemical and microbiological water quality parameters, vegetation transects in saltmarsh areas and site usage and biodiversity observations. The Board makes the results of the monitoring public on their web site at:

<http://www.amlnrm.sa.gov.au/Monitoringandevaluation/Coastalandmarinemonitoring/Coastalecosystems/Onkaparingaestuarymonitoring.aspx>

Twelve water sampling sites are located between the bridge to the Southport Surf Life Saving Club and the suspension bridge at Old Noarlunga, and three samphire vegetation transects have been set up in the same stretch of the river. A series of benthic diatom studies are planned for next year, to provide further understanding of the estuary's water quality.

With a new environmental flow regime for the river starting up this year we are all pretty excited—monitoring over the next few years will give us a good handle on the effect of those increased flows.



Sampling site 12, at Old Noarlunga

## Fitzroy delta lagoons

This year Delta had several visits to Central Queensland, working on a project to revitalize two long established solar saltfields in the delta of the Fitzroy River. Association with the area in the 80s and early 90s had been during a period marked by intermittent floods that temporarily interrupted extended droughts, so it has been wonderful to visit the area after the recent string of wet years—although the salt manufacturers do not take such a rosy view of all that freshwater!

Driving back to Rockhampton each night, a detour off the main highway and onto the back roads allowed me to travel past the many lagoons that dot the huge delta of the Fitzroy River—the Eight Mile down at Bajool, Frogmore and Woolwash near Port Curtis and the Yeppen Yep-pen and Pink Lily lagoons on the outskirts of Rockhampton were all looking stunning.

Bird life included jabiru, brolgas and flocks of magpie-geese, while the lagoon surfaces were awash with flowering water lilies. In the early mornings the sodden delta soils gave rise to a golden mist, demonstrating how much freshwater can be held in this huge sponge-like area that extends to cover over 800 square kilometers. Something to see for a freshwater-starved adopted South Australian!

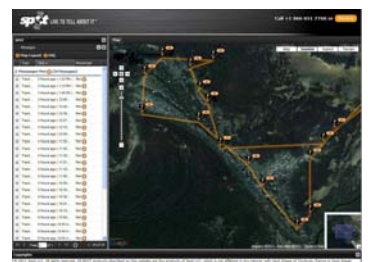
## Safely SPOTted

With the phase-out of the 121.5/243 Mz radio EPIRB system we wondered what would be our best safety option for fieldwork. Maritime work has never been a big focus for Delta, so the 406Mhz EPIRB was not required. Delta tends to dabble around in the littoral zone, or work within kilometers of where we check-in with a client, or possibly we may be just down in their back paddock!

We ended up moving across to the SPOT personal satellite tracker system, which is not considered to be an EPIRB because the emergency signal it sends only transmits for as long as the battery lasts—up to a maximum of 7 days, but possibly less. The device does, however, allow you to transmit check-in messages, send for help from your local contact and send a tracking location every 10 minutes to a dedicated web page, as well as allowing you to contact emergency services even if you are out of normal mobile phone range.

Clients' safety officers have been very happy with the use of the satellite tracking system for keeping an eye on where we are at any time on their sites, and we like the small size and convenience.

*“With a new environmental flow regime for the river starting up this year we are all pretty excited...”*



Recent SPOT track of a flora survey in the River Light delta





## Delta Environmental Consulting

12 Beach Road  
ST KILDA SA 5110  
AUSTRALIA

Phone: 08 8280 5910

Fax: 08 8280 5179

E-mail: [consulting@deltaenvironmental.com.au](mailto:consulting@deltaenvironmental.com.au)

Web: [www.deltaenvironmental.com.au](http://www.deltaenvironmental.com.au)

FB: [www.facebook.com/](http://www.facebook.com/DeltaEnvironmentalConsulting)

DeltaEnvironmentalConsulting

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.

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



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.

## Directions for 2012

EBS Ecology and Delta are working together to develop an estuary management plan for the River Light, north of Adelaide. The area is remarkably remote considering its proximity to a capital city and much of the access for flora and fauna surveys is on foot. It has been fun! A dense mangrove woodland forms the western, seaward edge of the delta, replaced by a mosaic of chenier ridges and dense shrubby samphires along deep tidal creeks to the east. These give way further east again to a series of playas that support several different types of samphire shrub lands, including the nationally Vulnerable *Tecticornia flabelliformis*. The landward edge of the delta is marked by several dunes (which may be cheniers or possibly stranded beach ridges) that support saltbush shrub lands.

The project will continue in the New Year with EBS Ecology undertaking a range of fauna studies, before the team starts work on prioritizing the threats and identifying what management actions are required to ensure this relatively small wonderland can maintain its biodiversity value into the future.

Generational change in several solar saltfields in Australia has resulted in something of a shortage in the number of skilled brine operators available to staff these unique renewable mining operations, and Delta is looking forward to working with staff at several solar saltfields as they provide training for new operators and management staff.

This year we discovered Facebook as a more dynamic approach to interacting with our clients, and we hope that in the coming year you may let us know exactly how you could benefit from our use of this method of communication. We have already had several people ask for photographs of samphires, and we have started an album in response—don't be shy in asking!



Tidal creek in the River Light delta