Journal of the Scientific Expedition Group Volume 26 Number 3

ECIE



Scientific Expedition Group Inc.

Patron

His Excellency Rear Admiral

Kevin Scarce, AO CSC RANR

Governor of South Australia.

SEG Executive

President Emeritus	C. Warren Bonython, AO.			
President	Dr Richard L Willing			
Chairman	Alun Thomas			
Vice-Chairman	Michelle Trethewey			
Secretary	Gina Breen			
Treasurer	Graeme Oats			

SEG Committee

John Love	Trent Porter
Duncan MacKenzie	Bruce Gotch
Graham Hill	Stuart Pillman

Vulkathunha Gammon Ranges Scientific Project

Chris Wright

Minnawarra project

Janet Furler

SEGments Editor

Andrew Barr

Volume 26 Number 3, December 2010.

ISSN 0816 -6463

SEGments is the authorised journal publication of the Scientific Expedition Group INC., PO. Box 501, Unley SA 5061. It is published four times a year to promote articles about biodiversity, scientific exploration and ecological research.

Copyright 2010, Scientific Expediton Group INC. Permission will be considered for non-profit photcopying of material for personal use and teaching purposes. Written permission must be obtained from the Secretary of SEG.

Contact:

Scientific Expediton Group INC. **SEG email:** segcom@telstra.com

SEG Secretary: Gina Breen PO. Box 501, Unley SA 5061 Email: mary_breen@bigpond.com

SEG Treasurer: Graeme Oats Email: gdoats@bigpond.net.au SEG Website: Http://www.communitywebs.org/ ScientificExpeditionGroup/default.htm



Volume 26 Number 3, December 2010.

Editorial	Page 1
Bimbowrie Science Report 2010	2
Bimbowrie Leader's Report 2010	6
Feral Goat Monitoring	11
Expeditioner's Writings	14
Student Reports	16
SEG's AGM Address	18
Minnawarra Report	20

COVER: Yellow-footed Rock wallaby (Petrogale xanthopus) at the Bimbowrie Conservation Area. Photo by Andrew Barr

Editorial: Plant control?

In the last edition of SEGments, Andrew Barr wrote about the impact of feral animals on the Australian environment. We continue that theme by looking at the impact of some feral plants on the Australian landscape.

On a recent trip to the nursery I made a request for a particular decorative grass where it was revealed that it is a South African native with a very invasive nature. I had sought out plants that were capable of enduring the climatic conditions in my Adelaide garden, and now I wondered about how easily I could have contributed to the spread of invasive plants.

Do our gardens, both private and public, reflect the capacity of the Australian environment to provide water, soil types and nutrients in sufficient quantities to sustain them? Has this problem been aggravated by the introduction of plant species from overseas that were invasive or simply inappropriate for the conditions?

Val Plumbwood (2005) writes that she believes that the gardens and gardeners of Australia have been un-adaptive, or intransigent in their approach to Australian conditions. As she sees it "the desire to produce fine green lawns in hot dry Australian environments such as Perth (are) one expression of such un-adaptive ideals". Similar ideas spring to mind when considering the introduction to Australia of blackberries and lantana. Said simply – Why?

Blackberries were first introduced into Australia by unsuspecting colonists in the 1800s. Blackberries have been identified as a "Weed of National Significance" (WoNS) because of its high degree of invasiveness, potential for spread, and economic and environmental impacts".

Kangaroo Island was identified in 2008-09 as a national priority area for containment, eradication and outlier control. Other target areas identified for blackberry eradication in SA included Yorke and Eyre Peninsulas.

Lantana is also a "Weed of National Significance". Currently Lantana is a significant problem in Queensland, NSW, NT and WA. South Australia though, is on a potential distribution list set to expand from current locations to VIC, SA and Tasmania according to the Department of the Environment and Heritage and the CRC for Australian Weed Management (2003). Both blackberries, as current problems, and lantana in the future, remind us of the impacts of introducing invasive plant species on the Australian environment. Plumbwood (2005) states that "gardeners must seek out the adaptive garden". I agree we must carefully consider all the prevailing conditions when developing private and public gardens in Australia. Living and gardening in a particular environment should be about learning all we can of the native plants in that area, and not replicating plants from somewhere else less suited to the climate and ecology of the area..

The first article is by Duncan MacKenzie (Science Leader), and covers the exciting results of the recent expedition to Bimbowrie, where we found some interesting rare reptiles and mammals.

The second article is by Michelle Trethewey, who was our most capable expedition leader and recounts all the personal events that made the expedition memorable.

John MacDonald (DENR) writes about the feral goat monitoring progress.

The Expedition members took to pen and paper and song to provide some amusing local humour/wit to our nights' entertainment. The students also included their impressions of the trip. One of SEG's goals is to encourage university students to learn about Australian biodiversity.

David Paton contributes some notes from the SEG's AGM address about the Coorong situation.

Finally, the most recent report of the ongoing Minnawarra survey was prepared by Janet Furler.

References

1. Plumbwood, Val (2005) Decolonising Australian gardens: gardening and the ethics of place in Australian Humanities Review

2. www.weeds.org.au/WoNS/blackberry/

www.weeds.gov.au/publications/guidelines/wons/lcamara. html

Guest Editorial: Conrad J. Denyer

Contact: Conrad.Denyer@flinders.edu.au

SEG Editor Email: Andrew.Barr@unisa.edu.au

Bimbowrie 2010- An expedition with a difference

Duncan MacKenzie



Antro Shearers Quarters on Bimbowrie

The scientific work undertaken on the October 2010 Bimbowrie Expedition was different from most other SEG expeditions in a number of respects.

Firstly we worked in a close partnership with the Monitoring Evaluation and Analysis (MEA) Unit of the Science Resource Centre (SRC) of the Department for Environment & Natural Resources (DENR). A number of the their scientific staff worked alongside us on Bimbowrie, providing a great opportunity for SEG members to extend their knowledge in a number of areas and at the same time, DENR staff were able to experience the 'well-oiled' and highly organised and professional performance of SEG.

Reptiles and Mammals

The second major difference was in the sampling methodology. The expedition was a monitoring program rather than a survey in the traditional sense, as it concentrated on monitoring the effects of stock (sheep and goats) removal on one plant community and its associated fauna, Bluebush and Bladder Saltbush Low Chenopod Shrublands in various degraded states, on the open aluvial plains soils. As such, the diversity of species trapped or recorded was less than would be for a survey which intentionally samples as wide a variety of habitat types as possible within the survey area. During 2005 baseline flora and fauna surveys were done by DEH to describe the types of vegetation communities present and the plants and animals that inhabit them. These sites provided a useful baseline for future long-term whole-of-property comparisons. To date there has been no assessment of the impacts of the grazing history on the ground dwelling fauna of Bimbowrie, or monitoring of their response to the recovery of vegetation communities.

The trapping method for capturing reptiles and mammals differed from standard biological survey methodology to more efficiently use the number of pit traps available (192) and allow for replication which is necessary to obtain statistically defensible results. There was one sampling array for each patch which was mostly separated by more than 500m. The trap design used a three pronged star arrangement (see last edition page 6) which has been shown to be marginally more efficient in arid areas than the straight row of pits we normally use. To enhance trapping effort for species less likely to enter a pit trap 15 Elliott traps and 3 funnel traps were used at each array.



Figure 1: Collecting spiders at pitline site.

Monitoring sites were established at ten separate locations, each with four trap and vegetation sampling points. Most were on Bimbowrie, but four of the ten were established on the neighbouring property Plumbago (Plumbago is still an operational sheep property) to provide a comparison between grazed and non-grazed areas. The intention is to repeat the sampling at five year intervals, anticipating that the removal of grazing pressure will improve the habitat quality, which over time should lead to an increase in species and numbers of individuals recorded at the sampling sites.

A further difference was that we were lucky that the DENR District Ranger, Ian Falkenberg, had arranged for a Mobile Outback Work Camp (MOCAMP) team to pre-install the pitline' buckets' at all sites, including trenching for the fenceline. At the completion of our survey, all pits were capped (caps were screwed on) ready for re-surveying in five years time.

Although most efforts were concentrated on the established trap/sample sites, observations of plants of significance and most animals encountered in the general area were collected as "opportunistic" records. Sixty-eight opportunistic records of 27 species of reptiles and



Figure 2: Mammal and reptile indentification.

frog species were collected. Of these, 16 were not recorded at trap sites.



Figure 3: Jill Tugwell inspects funnel trap

Summary of Results at Trap Sites.

A total of 329 captures of 21 species of reptiles, one frog species and five small mammal species were recorded at the sampling sites over five nights.

Two small lizards, the Sandplain Ctenotus Skink and Byrne's Gecko accounted for two thirds of the reptile records.

The most significant of the reptile records were three captures of the Map Gecko (*Lucasium steindachneri*) which has only been recorded in South Australia in a small portion of the state, centred around Bimbowrie. In this location it is at the western extreme of its distribution, which extends throughout inland NSW and Qld. It is a very attractive and colourful lizard, but despite this it is well camouflaged on the rocky open plains which are its preferred habitat. Unlike most geckos it is quite pugnacious, often struggling and attempting to bite when handled.

The small mammals were two species of Dunnarts (Fattailed and Stripe-faced), two native rodents (Bolom's Mouse and Forrest's Mouse) and the introduced House Mouse. The two captures of Forrest's Mouse (*Leggadina forresti*) are outstanding as they are the most southerly records ever collected of this species. They are relatively easily distinguished from other small rodents as they have a short tail, distinctly shorter than the head and body length combined. They appear

Journal of Scientific Expedition Group, December 2010, Vol. 26, No. 3. p. 2-5

stocky or heavily built for a mouse and are grey above with a distinctly paler underside. They are mostly found on heavy clay or loamy soils including stony and gibber country, where they live solitary lives in shallow burrows. They are an exclusively arid species which inhabits some of the harshest areas of inland Australia.



Figure 4: Bat Harp trap setup

Two Harp Traps were erected over tanks to catch bats, however due to the amount of 'natural' water lying about, only one animal was caught. There was, however, evidence of bats roosting in the Antro shearing shed. designed to record cover or detect changes in species abundance. For this reason a point transect approach was used at each patch plus notes were made on the occurrence of key indicator species.

The point transect method used a central site marker (star dropper) as the starting point for 20 transects. Each transect commenced 20m out from the star dropper and ran for 50 points at 1m intervals (total 49m). The direction of the 20 transects were determined by random selection between 1 and 360 degrees of a circle. This method required a team effort and most of the sites required an initial visit to mark out the transects so that time was not wasted by the recoding team who were required to record a number of plant variables at each site.

Additionally each site had three Photopoint photos taken and Physical site data collected as per the normal biological surveys we undertake. As the Bimbowrie area had experienced unusually higher than normal rainfall prior to our visit, many of the plant species were in flower, some of which I had not seen flowering in over 50 years of visiting the 'outback'.



Figure 5: Recording plant variables at site.

Vegetation survey

The vegetation sampling differed from the general biological survey methodology we normally use because it was not



Figure 6: Wedge-tailed Eagle fledglings

Birds

Birds were surveyed at all sites as were spiders and ants. There were plenty of bird species to observe and an indication of the good breeding year were the number of Emu males with up to 10 large chicks 'at foot'. Additionally we observed several Wedge-tailed Eagles nests, all of which had young in various stages of development. Most nests had two young and at one nest the adults were frequently sighted arriving to feed the young.



Figure 7: Science processing centre

We were very lucky in that we were camped at the Antro Shearers Quarters on Bimbowrie and had the use of the historic Antro Woolshed as our science processing centre. To keep us company, a Willie Wagtail was building a nest on the old wool-press, a meter above our heads.

As is now normal with SEG scientific expeditions, the various science leaders were accompanied in the field by rotating teams of expeditioners, thus allowing everyone to gain experience across all science disciplines. Because of the large number of survey sites (40) we were very busy and lost only one day due to rain making the roads impassable.



Figure 8: Marking captured gecko for release.

There were three other projects linked to our survey work and small teams undertook mapping stands of *Acacia carneorum* and *Codonocarpus pyramidalis* to assist in building an initial inventory that will assist in formulating a population management plan..

Additionally, most expeditioners were able to visit the Bimba Hills area on Bimbowrie to look for the Yellow-Foot Rock Wallaby, of which a number were seen at close quarters. Bimbowrie is the location of the highly successful 'Bounceback Program' that aims to rescue the species from the threat of possible extinction. A small team went across to 'Old Boolcoomatta' to visit the historic Mawson Hut and Woolshed.

As is the norm for all scientific data collected on SEG expeditions, it will be input to the SA Biological Database so that it is immediately accessible for other researchers to use.

Editors note: Photographs by Duncan MacKenzie

Contact: Duncan MacKenzie Email: mackenzie@picknowl.com.au

Birds SA (SAOA)

We are holding a camp out over the Christmas period from the 26th December 2010 to 2nd January 2011. We wish to invite all members of Bird watching assn's, Field Nat's, Nature and Friends Groups of Parks etc to join with us in our endeavours to help birds and the rest of nature's creatures. The camp site known as "NYROCA" is a Scouts camping property approx 9 km north of Wangary (west coast of Eyre Peninsula). You can go on line and view this site. The purpose of this camp out is to carry out surveys in Coffin Bay CP a world declared Important Bird Area (IBA) by BirdLife international, managed by Birds Australia and cared for by Birdwatchers of Australia. Your help would be appreciated. So please consider this venue to come and survey any of the fauna you have an interest in. Please feel free to **Contact:**

David Robertson

Email: drdeath@picknowl.com.au Tel: 82787866. **Trevor Cowie** Email: birdos_sa@bigpond.com Tel: 8263 2531

Bimbowrie 2010 Expedition

Michelle Trethewey



Our Bimbowrie home for two weeks

Well, what a terrific holiday we had! I couldn't think of a better way to use my annual leave. From looking around at people during the course of the two weeks, seeing how relaxed and companionable everyone was and seeing new friendships being formed, the way that we all chipped in and worked so hard together when we needed to - all amounts to a great sense of team work and enjoyment. As SEG's Expedition Leader this time, I can honestly say that I couldn't have been more pleased or proud of our group. Quartermaster Trent Porter's super organised daily meal packaging and menus made life easy for the camp team. Bruce Gotch's very logical and organised brain did the hard work of sorting out the teams and how they would move through the groups. For all the months and months of planning, the Recce in June, the meetings, the actions, the minutes and agenda's, the mapping, the photocopying and all the other millions of administrative stuff that happened before the trip, the two weeks really flew way too quickly until that sad time of coming to an end and having to return to work and regular activities. Having to leave two days earlier than the rest of the expeditioners was hard - I wasn't ready to come home and I had a great sense that I would be missing out on too much of what was going on at Bimbowrie - evening activities, poetry readings, songs, talks and general relaxing among friends.

When we first arrived at Bimbowrie on Saturday 9^{th} October, Garry, Annette, Heather and myself met up with Dick Hoare the DENR Works supervisor. He took us down to Antro shearers Quarters where we settled into our accommodation, did a few chores and a bit of setting up around Antro ahead of the full group arriving on Sunday, taking advantage of an early night – the last to be had for a couple of weeks.

On Sunday morning 10th October, Dick took us to a lot of the sites on Bimbowrie to check out the tracks as there had recently been a lot of rain. They turned out to be in surprisingly good shape, however, a few of the pitfalls had surfaced and a lot were thick with mud on the bottom couple of inches. The trenching for the fence lines that the MOWCAMP people had left level with the tops of the pitfalls had washed away, leaving the pitfalls a few inches higher than ground level. So there was a little bit of repair work to be done, however, overall things were looking good.

In the afternoon, the rest of the expeditioners arrived and settled in to their new accommodation, a combination of tenting and shearers quarters. The food was offloaded from the new SEG food trailer which made it through the creek crossings despite the low clearance. While the food sorting was going on, a group of people went out to Plumbago to start working on the sites. During this site set up trip, both David White and Annette Vincent suffered punctures. Not a good omen.

On Monday 11th October, the site set up began in earnest when we had all of the equipment to hand. All expeditioners and DENR staff, other than the botany and camp groups worked hard to set up the 20 sites for week one. This went off without a hitch, no new punctures. Yeah! The day had been warm and sunny with a slight breeze. A big day was put in by all.

Ric Williams had not been the best on the journey up and was getting worse. It became obvious that we needed to get him to the Broken Hill Hospital. Jill Tugwell, our primary Medical emergency person and Trent Porter drove Ric in to Broken Hill where they spent an exciting night in the corridors of the hospital until it was decided that Ric would be kept in for a while. Trent and Jill got back to Antro camp around 5.30am Tuesday morning, making a beeline for tents and sleep.

On Tuesday morning 12th October, we were up again to a beautiful sunny day, the first day of checking the sites for captures, all teams fully functioning, beginning their rotation through all of the groups on the board. A good number of skinks, geckos, dragons and a frog were collected. It had become obvious on day one that the botany group and the birds group were quite overcommitted with what could be achieved in the two weeks. The leaders of those groups were already in discussions with the DENR management about whether to drop some whole sites or whether to drop an array within each group of sites.

The night turned wild, windy and stormy, right in the middle of dinner. Those who had already eaten held down tent posts while others attached guy ropes to buildings, the rest



Figure1: Storm night (*Photograph courtesy of Geraldine Clark*)

eating their meals quickly to lend assistance. The meal, though interrupted by the storm was beautifully prepared by Bernard Daube and the kitchen team – curried goat (courtesy of the sporting shooters) and lamb.

Wednesday 13th October, another beautiful sunny day and collecting at the sites went well with another good catch. Jill Tugwell and David White went to pick up Ric from Broken Hill. There had been 3-4 mm of rain overnight and some of the Bimbowrie pits had water in them and the tracks to the furthest sites were quite wet.

After dinner Roman Urban, DENR's GIS person, gave us a talk about Nature Maps, an interactive online mapping site that allows users to look up Nature Links corridors, flora and fauna, vegetation, topography, and upload information to the site. We enjoyed this talk and committed Roman to give another talk the next night. (http:// www.environment.sa.gov.au/naturemaps).

We had 8mm of rain overnight at Antro and 12mm at Bimbowrie which meant that on Thursday 14th October, we couldn't get started at the usual start time of 8.00am. We waited for Kate McNicholl of DENR's Burra Office to check the road conditions and give us the OK before proceeding out to Plumbago. Once Kate advised that the tracks were OK, a forward party headed out to check out the Bimbowrie road and track conditions. By about 10.00am, everyone was on the road and the tracks actually very good.

It was decided that the vegetation group would benefit by another group, an advance party to mark out the twenty random transects at each site. Bruce, Ray and myself started doing this, leaving the vegetation group proper to complete the vegetation recording and sampling. Roman Urban gave us another talk, this evening on managing our GPS data. Those who could stay awake long enough to attend found it very useful.

Friday morning, 15th October, we woke to a very chilly day. We had 12mm of rain overnight at Antro with 18mm at Bimbowrie. This is the day that stopped the camp. Stuart Pillman and Trent Porter thought that they would head out and do a track recce and got as far as the gate heading out of Antro where the car got stuck. Justin Jay came to the rescue, getting the car out.

It became a day for old black and white movies and talks by various people - Brian Blaylock talked about the Birds of the Cayman Islands and Bruce talked about mallee fowl surveys. It was also a day of phone calls to DENR Adelaide. The week one DENR staff were going back to Adelaide on Sunday. John McDonald and a third laser were thankfully secured to replace Justin Jay. The botany task, looking more unlikely to be completed, especially given our set back days with bad weather. The winds were very gusty, tents were being checked regularly and any clothes that were still managing to stay on the clothesline were standing horizontally. The rest being scattered around the camp site.

Jill, Garry and I headed out a little gingerly for a walk in the hail, rain, wind and cold, picking up the pace, if only to try and get a little warmer. We explored some small outcrops about a kilometre away from camp which were really beautiful, with fantastically landscaped gullies at their rear, an eagles nest and various kinds of vegetation and landscapes to explore. Under a bush, Garry found an 1886 penny with a bullet through Queen Victoria's head and on our return, close to camp, I also found a penny - 1877 and intact



Figure 2: 1877 penny. (*Photograph courtesy of John Love*)

Saturday the 16th October - We had so much catching up to do and yet another set back. We were meant to be picking up all the week one sites and putting out the new sites. The tracks had to be checked again in both directions by an advance party before everyone could go out. Bruce, Ray and Michelle went ahead to Plumbago and found major stoppers after the third gate by the dam on Plumbago. Advice was sent back that Plumbago would be out for vehicle traffic for the day, hopefully able to get through on Sunday. Stuart went out with one of the the mammals and reptiles teams to recce the track conditions on Bimbowrie. They found that the tracks were OK and proceeded to pull up week one sites and set up week two sites. The biggest problem was that communications was very poor on Saturday. Not sure why they were worse than any other day, but even relaying wasn't working. This meant that no one at camp was aware that the Bimbowrie tracks were alright to travel on so there were a lot of people sitting around wanting to do something and another lot of people at the Bimbowrie sites who would have loved some assistance but we were unable to communicate. The weather was cool and drizzly with the wind whipping up again fiercely in the afternoon. It was barbecue night tonight and none of the local invited guests arrived due to the lousy weather and poor track conditions. We did have SEG members Richard Willing, Janet Furler and Alan Thomas arrive for a short three day visit. Despite weather conditions and though most people were exhausted, we enjoyed the barbecue.

On Sunday the 17th October, the roads and tracks to the Plumbago sites were in pretty good shape - a couple of parts to be respectful of and thoughtful about but in general very good. The persistent wind on Saturday and the feeble attempts of the sun helped to dry out the roads fairly quickly. The Plumbago sites for week one were pulled out, the new sites set up and two of the sites on Bimbowrie were also put out.

We had a changeover of DENR staff today, the exchange happening at Yunta. We said goodbye to Roman Urban on Saturday (went home with John Morley) and the others, Stuart Pillman, Justin Jay, Dave Armstrong and expeditioner Natalia Diaz (who was heading out on another survey). The new arrivals were John McDonald with guitar in hand, Helen Owens and Kate Lloyd. We also had other visitors arrive - Kevin Burrett SEG member and Harald Ehmann - Threatened Species Officer for the Alinytjara Wilurara NRM Region. Harald spoke to the expeditioners and committee about a biological survey that he is wanting to conduct in the Nullarbor area around March 2011 and was seeking some support from the SEG membership.

Monday 18th October - We seemed to be back on track with the bad weather now behind us and the forecast for the week ahead was looking good. In the evening we had a poetry reading by Claire Coleman relating to collective nouns. Claire had recently won an award for a poem she wrote and had entered in the Spring Poetry Festival. The kitchen team had spent the afternoon constructing a lovely poem that gave a few laughs to all. Kate Lloyd was asked questions about setting out Elliott traps and ended up giving an impromptu talk on the subject. Tonight's meal was especially wonderful - roast goat, roast beef and roast vegetables absolutely loaded with garlic. It was fortuitous that the Sporting Shooters were at Bimbowrie at the same time as us, sharing their spoils, gifting us with half a dozen goat legs. Margie Barnett arrived at the beginning of week two which was great for helping out with the vegetation work and also providing a much needed vehicle. Nick Birks gave a presentation after dinner on the Food Chain and Birds of Prey which was enjoyed by all.

Tuesday 19th October, Claire, Nick and I set up six pin wheels (at each array, 20 random transects are taken and pegged out from the centre survey marker ahead of the vegetation group commencing their survey tasks). We met up with Garry for our lunch break at the beautiful dams behind Bimbowrie Homestead where we sat and listened to the birds and enjoyed the peace and cool of the surroundings. We worked hard and well together so that we could take some time out to meet up with Garry again at the end of the day to go to Bimba Hill which was fantastic. Nick having had a recent ankle operation wasn't able to go to the top, staying a bit lower, watching and photographing while the remaining three of us clambered up big rocks, smooth slabs and gullies that were hidden behind the prominent boulders. We made our way up to the cairn where we enjoyed fabulous views and saw quite a few Euros and rock wallabies. In the evening, Helen Owens gave us a talk about her project work on the Census of South Australian Vertebrates. Helen also informed us about how we can contribute to the database and we were given opportune record books. Good information for us all to know about.



Figure 3: Where is the water gone?(*Photograph courtesy of Geraldine Clark*)

Wednesday 20th October, day five of pin wheeling for me. Thank goodness there were only three more sites to set up. I had enjoyed doing the set up, but by now I was a bit over it. I spent the afternoon back at camp, drinking tea, chatting and starting to pack up for my departure in the morning. I think that if there was a medal to give out, it would have to go to Russell Sinclair. He would win this medal based on two criteria - one for writing the terrific Bimbowrie theme song performed to the tune of Botany Bay and secondly for his patience in doing the transects at every site, every working day without a break - the monotonous work of recording rock, bare, rock, bare etc. I asked Russell to do a repeat performance of his Bimbowrie song with the new verses he had added, including the up to the minute water problems. In the afternoon, we suddenly ran out of both cold and hot water to the laundry and water to the toilets. Our team of handy men working on the problem ranged from about 20 advisors and helpers in the beginning, down to about 4 helpers once dinner was served and when John McDonald started his evening talk on goat control. The four handy men missed out on the talk and I missed most of it too as I was off doing the team movement board in Bruce's absence. We caught the end of the talk which was followed by heaps of questions, a good sign. After the talk, the night being warm, Helen Owens took interested people out spotlighting, looking for geckos and lizards.

Thursday 21st October – departure day for me and Claire and I was definitely not ready to leave - I wanted to be involved in the closure and clean up at camp. Claire and I had a fairly uneventful drive back to Adelaide other than the crazy man at the fruit inspection station at Oodla Wirra yelling at us and nearly having a heart attack - what an angry soul! It was only on the drive home that I realised just how tired I was and couldn't wait to unpack and then get an early night - only I didn't sleep very well because I was thinking about what I was missing out on at Bimbowrie.....Tonight at camp, a talk by Bernard Daube about Dung Beetles and more spotlighting. From all accounts the pick up of some the sites on Thursday and the remainder on Friday went off without a hitch. All spare hands washed the Elliotts and rolled up the fences. I am told that Friday night followed with more great poetry reciting and music, an enjoyable last night had by all.

In closing, thanks to everyone on the trip. You all contributed to making it a success, you put up with the bad radio communications during the couple of days of being house bound, you rallied together to help catch up when we could get back on the road, and all in all were a great bunch of people to have shared a holiday with. Extra thanks go to all of those people who added to the ambience and the "specialness" of this survey. They are -Helen Johnson for her regular updates of the night sky in relation to the space station and the iridium flare and for her clackers playing, Ray Hickman, Russell Sinclair, and Dick Hoare for their poetry readings, Russell Sinclair for his fantastic Bimbowrie song, Claire Coleman and the kitchen crew for their Bimbowrie poem, Bernard Daube for his fiddle and harmonica playing, his excellent cooking and for talking about Dung Beetles, Kevin Burrett for his squeeze box playing, John McDonald for his guitar playing, gentle singing, his help on the June recce, his mapping input and his goat management talk, Roman Urban for his information sessions on Nature Maps and GPS data management, David Armstrong for presenting an excellent show and tell of the mammal and reptile captures, Helen Owens for her Census talk, Kate Lloyd for talking about Elliotts, both Helen and Kate for showing and talking about the days catch, Rob Brandle for the June recce and his hard work co-ordinating everything leading up to the expedition, Dick Hoare and the MOWCamp people for preparing all the sites for us, Bruce Gotch for talking about Mallee Fowl and his excellent team movement board work, Trent Porter for being a first-class Quartermaster, Stuart Pillman for competently straddling the line, Garry Trethewey

for setting up and maintaining the Bimbowrie website, Brian Blaylock for talking about birds of the Cayman Islands, Nick Birks for talking about Birds of Prey and the food chain, Harald Ehmann for talking about the Nullarbor and the work that he does in the Alinytjara Wilurara NRM Region, all of the Science Leaders for doing what they do best, everyone on the Bimbowrie planning committee and DENR for mentoring the SEG new leaders. And...Bimbalina for holding down the tent poles.

Lets see what next year brings – maybe it will be a return to tents and no facilities, maybe long drop toilets, cooking and science tents and millions of flies - mmmm – we have had a couple of years of luxury with real buildings, toilets and showers. Are we becoming soft? Keep a watch on the SEG website to see if the main trip will be the Nullarbor, Witjelina, Dalhousie, Arkaroola stage 3 (Hidden Valley), Arkaroola Stage 2 (Mawson Plateau) or more than one trip. Wherever we go, I look forward to catching up with you again next year!

Contact: Michelle Trethewey Bimbowrie SEG Expedition Leader **Email: michtreth@bigpond.com**



APRILAND/OR SEPTEMBER 2012

Please note change of date

A call for expressions of interest More challenging than some SEG expeditions!

SEG has been invited to participate in a biological survey on the Nullarbor Plain. As one of the biggest slabs of limestone in the world, with comparatively little impact from human activity, this plain is an ideal setting for observing the effects of climate change over millions of years past and establishing methods for assessing future changes. Remnants of species typical of wetter climates have survived, while other species are moving in from arid areas further north. Subjects to be studied will include mammals, reptiles, birds, invertebrates, vegetation, land forms, soils (yes, there is soil). Camping will be under canvas. The weather in autumn and spring might be hot but the survey area is no further north than the Gammon Ranges, where SEG has been working in all seasons for 20 years. The change of date was beyond our control but it allows more time to make arrangements. You can go in autumn or spring or both. We still need to get an indication of numbers very soon. Your reply does not have to be a definite commitment at this stage. To those who have already responded, please confirm your interest in the revised plan.

Please reply by the end of January 2011 to **PO Box 501, Unley 5061** or email **jhlove@internode.on.net**

feral Goat Monitoring

Introduction

When Bimbowrie Station was purchased in 2004 for inclusion in South Australia's protected area network, restoration objectives of Operation Bounceback became the major emphasis for landscape management. For the plains and valleys, monitoring of recovery involves ecological restoration after 130 years of commercial stocking. For the hills areas monitoring recovery involves ecosystem restoration after 40 years of unmanaged goat populations.

Hills Plant Communities and Feral Goat Impacts

Vegetation in the hills is broadly described as *Acacia aneura* (mulga) low open woodland with shrub understorey. Tall open shrublands of *Acacia* spp and *Eremophila* spp persist where mulga thins out.

Despite an ability to browse many plant species, feral goats favour certain species and in the arid conditions forage on perennials. Over the forty problem years, goats preferentially consumed regeneration of mulga, Eremophila alternifolia, Alectryon oleifolius and Santalum lanceolatum, reducing individuals to heavily browsed forms commonly less than 1 m in height. Mature adults of these species persist; being taller than 2 m (general upper limit to goat browsing) they have escaped feral goat browse. Flowers, fruit and seed still produce seedlings, but estimates indicated regeneration cohorts were not growing fast enough to escape goat browse; in the long run, risking failure to renew species populations. Prostanthera striatiflora, a shrub species to 1 m high and very palatable to feral goats, cannot escape browse at all. When foliage and shoots of the most preferred species were exhausted by goats, Acacia tetragonophylla became the staple of drier times.

Feral Goat Management, Impact Monitoring and Detecting Recovery

Aerial culls occurred in autumn of both 2005 and 2006, supplemented by on-ground culls at other times. In late June 2006, sufficient rain fell to stimulate plant growth after a dry spell lasting more than 2 years. In September 2006, unbrowsed new growth of mulga, *Eremophila alternifolia, Acacia tetragonophylla* and *Prostanthera striatiflora* was noted in various areas. These species being relatively common and widespread throughout the hills serve usefully as indicator species. Over 2007-09, a goat impact monitoring scheme was developed based on the following premises:

1. The growth of regeneration cohorts of these species stems from substantial reduction in feral goat population density, achieved through control programs of 2005-2007. The size of growing individuals exceeding the size of former browse form (a baseline) is a useful measure of plant response to reduction in browse pressure.

2. Continued growth of the regeneration cohorts is dependent on maintaining low population densities of feral goats, which is achieved through ongoing management activity from 2008. The browse intensity on these species would be a useful indicator of the intensity of impact from current populations.

From these two premises, two monitoring techniques have developed:

Dimension analysis – tracking the size of individually marked plants as they grow from former browsed states to mature forms. Benchmarks and milestones are set by proportions of individuals/sites exceeding baseline measures and attaining sapling/mature form (determined by size of local survivors).

Current browse analysis – determining the browse intensity on individual bushes/or for sites by observing the diameter class of browsed branch tips. The greater the diameter, the more intense is browse impact. Management aim is to restrict goat browse intensity to smallest diameter classes.

Dimension analysis is largely in the realm of the ecologist/ scientist, involving precise measures with statistical analysis every 4-5 years and interpreting results in a context of plant species demographics. Current browse analysis is in the realm of the land manager, involving quick estimates of seasonal impacts and applying rules of thumb in order to determine a management activity – Do we continue with our activity because it works? Do we tweak it a bit (or a lot) to make it work better? Or do we review it completely because it doesn't work. Table 1 indicates the browse diameter classes with the reference objects employed also illustrating the operational nature of this technique.

Class	Reference Object	Diameter Range (mm)		
IT	Intact			
ТР	Toothpick	< 1.5		
MS	Match	1.5 - 3		
DS	Drink Straw	3.1 - 5		
PC	Pencil	6 - 9		
LF	Little Finger	10 - 15		
ТВ	Thumb	16 - 25		
DF*	Defoliated			

Table 1 – Diameter Classes with Reference Objects used in Current Browse Analysis

Results

In March 2010, all monitoring sites at Bimbowrie were visited and growth measured. Comparisons are revealed in Table 2. Three measures of size are made – Height of plants and lateral measures termed Length and Width. The table shows all three species are bigger (on average) than what they used to be, with mulga showing the greatest

increase in height – on average doubling its height (perhaps not surprising for a dominant species). Unexpectedly, both mulga and *Eremophila alternifolia* increased lateral size to greater degree than height, possibly something to do with browse influences on plant architecture.

Plant Species	Height	Length	Width		
Acacia aneura	2.06	2.67	2.92		
Eremophila alternifolia	1.69	1.92	2.3		
Acacia tetragonophylla	1.3	-	-		

Table 2 – Average size ratio of current growth to browsed form for select hill species over period June 2006 to March 2010

Table 3 indicates the spread of browse intensities across the sites in March 2010. All sites have bushes largely Intact, but 6 have significant portion of bushes showing Toothpick size browse. Overall this corresponds to very light browse levels, which may be the browse intensity at which management may aim. But it also indicates that if negligible browse impact is the management aim, it could be achieved by more diligent activity in areas of sites 9572, 9655, 9658 and 11306. These lie proximate to a particular boundary of the Park and probably reflect immigration.

Class	5377	5659	9572	9655	9657	9658	10546	11304	11305	11306	NW1
IT	83	100	84.2	88.9	100	75.7	100	97.6	78.3	88.5	94.1
ТР			15.8	7.4		21.6			8.7	11.5	5.9
MS				3.7							
DS											
DF	17					2.7		2.4	13		

Table 3 – Browse intensities recorded at sites on Bimbowrie March 2010

Conclusion

The Feral Goat Monitoring at Bimbowrie illustrates landscape recovery in detail as well as revealing effectiveness of ongoing management activity. A joint exercise between scientists and land managers, the techniques are being slightly adapted for use in NRM contexts in Arid and Semi-Arid Ranges.



Figure 1: *Acacia aneura* - Browsing of this young tree left broken stems of Pencil Size diameter, inducing sufficient stress, that the bush could only sprout from basal main branches. Despite some notable new growth from browse intensity reduction, the plant is about only half the size of what it used to be. Progress milestones would include when new growth surpasses the height of the lifeless woody stems, and exceeding 2 m height. Attaining mature height of local mulga - about 5-7 m - is the ultimate goal. Mulga's very slow growth rates however promote the use of arbitrary milestones based on 1/4, 1/2 and 3/4 the average mature height for mulga at Bimbowrie.



Figure 2: *Prostanthera striatiflora* - Continual browse by feral goats, coupled with episodic growth response by the plant created a strongly browsed form characterised by bristly, somewhat topiarised, low shrub, with Match Size stems. Feral goat population reductions with consequent reduction in browse pressure, have enabled growth to nearly double the height of the browsed form. A growth target for this bush would be to attain its usual, unbrowsed size - approximately 1 m.



Contact:

John McDonald Monitoring Evaluation and Analysis Science Resource Centre, Client Services Dept of Environment and Natural Resources South Australia **Email: john.mcdonald@sa.gov.au** **Figure 3:** *Eremophila alternifolia* - This is a young plant of a species that normally grows almost to 3 m tall. Feral goat browse kept trimming the plant back to stems of Drink Straw size. The plant retains sufficient vigor to continue sprouting, some of which grew beyond the browse form, but then suffered defoliation, either through moisture stress or herbivory. Current growth is not browsed, and barely contained within browsed form. Progress milestones for similar forms include growing beyond the browse form and attaining height exceeding 2 m (the general upper limit to goat browse). The eventual target is attaining their mature height.

Expeditioner's Writings and Songs

The SEG Bimbowrie Song Tune: Botany Bay Chorus:

Singing Too-Ra-Li-Ooo-Ra-Li Addity, Singing Too-Ra-Li-Ooo-Ra-Li Aye. Singing Too-Ra-Li-Ooo-Ra-Li Addity, For it's Bimbowrie done the SEG way.

There's Michelle who is our commander, There's Bruce and the whole DENR crew, There's all of the Science team leaders Knows what those poor SEG-ites goes through.

'Tain't leaving our homes that we cares about, 'Tain't 'cos we've come such a long way, But because all we amateur botanists had to go reading transects all day.

We did have such high-tech. equipment. Those lasers we thought the ants' pants. But no matter how we tried to fiddle it We scored: "Bare, bare, bare, rock, litter, rock, bare, bare....NO PLANTS!"

Poor old Rick went off to hospital. His gut-aches were giving him hell. We won't enquire just what they did to him, But he came back as sound as a bell.

We had unisex toilets and showers. If the door wasn't latched, you'd be right. The system worked well, at all hours, Save for Nick, nearly locked in all night.

The goat-shooters added variety With goat-meat to add to the lamb. The curries we ate with avidity With the self-saucing puddings and Spam.

The Friday programme was aborted; It blew and it rained and it poured. The marquees (and Trent) all went air-borne As did everything not firmly moored.

The rain it came down like a fire-hose. Fine weather - for taking a nap. Or to sit and watch old English videos From the bin clearly marked - "utter crap". There's the fast moving green Painted Dragon, Of shiny bright skinks there were lots. But the reptile was everyone's favourite Was the handsome brown gecko with spots.

There were endless supplies of hot water; We could have a hot shower every day! Til on Wednesday, Disaster! No water! And the plumbing crew had a field-day.

On Sat'day we're packing and leaving. On Sat'day we'll be on our way. But if all of us oldies live long enough We'll come back to Bimbowrie one day. **Chorus:** Singing Too-Ra-Li-Ooo-Ra-Li Addity,

Singing Too-Ra-Li-Ooo-Ra-Li Aye. Singing Too-Ra-Li-Ooo-Ra-Li Addity, For we did Bimbowrie the SEG way.

Email: russell.sinclair@adelaide.edu.au

Kitchen Crew Poem

Collective nouns we have plenty, Like a flock of sheep or a parliament of owls. There's this other one that many don't know. It's a winkle of SEG folk and when they get together, the voices flow and flow. There are some native nouns to this big group. Like a Birk of spiders or a Porter of dinosaurs. A Kate of mammals that get fed apples. There's a gluten of celiacs, a stir-fry of vegos. A limp of old men, that crowd around BBQs, beers in hand. There's an order of Michelles. A menopause of old women, a dearth of wenches. A bluster of Bruces, a derk of Duncans. A brigade of budgie Bryans. A cacophony of Kellies. A galaxy of Garrys. A hospital of Ricks. A colony of Annetts. A sprig of Heathers. A lollobridgia of Ginas. A race of Henrys'. The archive of Love. A segway of Andrews into a Russle of spring.

Email: claireclear@hotmail.com

A Volunteer's Bimbowrie

Bimbowrie for SEG trip – wherever is that? Maps and geol books, have got to look at. We set off at sunrise for six hour drive The country's had rain and it looks so alive.

Olary's a ghost town, but does have a pub The bitumen stops and we head for the scrub. Thirty k's later we see a grand sight Bimbowrie Homestead and Post on the right.

Off to our quarters, another ten k's What's that? A Cathedral from earlier days? The grand Antro Shearing Shed looms huge and white Shearers' quarters and kitchen a welcome sight.

There's bustle, unpacking and greeting old friends The SEG girls and boys are together again. We are led by a team of superb organisers And the Science contingent is SEGGOS and DENR's. We volunteers are all made to feel good Whatever our talents we can all make a pud.

The night skies are wondrous, expansive and free But that's what I see when I go for a wee. The satellite viewing is a dud after tea Although the space shuttle for minutes we see.

We trap a few dunnarts, some Mus Musculus And many a ghekko and lizard for us. The search for the trap-doors was truly spectacular Especially when spiders like soothing vernacular. Ants have two purposes: one for collecting: And ant powder liberal is meant for protecting. The Birdos are clever and teach us to listen To Orange Chats, Wedge Bills and blue wrens that glisten.

The weather is fine for most of the trip But two days of rain brings a temperature dip. Work comes to a standstill except for the cooks Who labour and laugh and check out the books. The woodstove is burning, the kitchen is cosy The cooks are all busy with cheeks nice and rosy The mob files in all chilled to the bone In need of a cuppa and a real good moan.

The night entertainment is just like old times With music and laughter and poetic lines. Here's a group by the campfire – a wonderful find But that song "Hallelujah" plays tricks with your mind. With Veggos you learn what a sheep likes for tea Saltbush for them. But that Sturt Desert Pea!! Sunrise and sunset are a time just to gaze The colours and grandeur can't cease to amaze. The team are all happy, no tears and no pain Can't wait for next Spring to join SEGGOS again.

If you're thinking just idly you might volunteer If you're fit and you're willing and you have not a fear No matter your age; we range teens to the eightees There's plenty of fun, work and thrills for you mateys.

Email: kdolphin@internode.on.net

BIMBOWRIE'S Expeditionary The "Never Ending Story"

When I went for a walk to the toilet last night, I saw something that made me stop still in my tracks. It was..... the very rare and elusive Bimbowrie sand dolphin.....

I froze and it winked at me.....

I recall the last time when I saw an alluring wink, strange things happened as they always do.....

After the plastic surgery had healed mostly, I'm beginning to look like I recollect.....

Meanwhile back at the SEG campsite a serious crisis was developing among the kitchen staff and food organisers..... SHE, who not be named, has been accused of heinous crime of "chair stealing", this person has claimed mitigating

circumstances of not having one of her own.....

Not only this, but an inexplicable decrease in the reserve supply of SPAM has been detected – it looks like a case of illegal hoarding?.....

Dinosaurs are renowned for this especially the species *"Trentasaurus"*. The big chief -on the prowl- was heard to say "Gotcha" when he discovered the true hiding place in the red fridge.....

The mouse the Bruce released in his car ate all the SPAM, and was seen in the kitchen looking for more but the cooks on duty were drunk with power and passion and decided to write a poem in quick fashion.....

Meanwhile, the dreaded sand dolphin had given birth and it's fourteen offspring had carried off the four DENR staff and one student of Spanish origin......

Were they to be used in some kind of biological survey? When it spat out three more DENR staff were they real or androids?.....

Maybe a cross between the Bimbowrie Bunyip and Sand dolphin that caused a problem with the DNA testing......

Student's Bimbowrie reports

Andrew Barr

The SEG Bimbowrie trip was an enthralling experience for me. I enjoyed every moment of it, from the people and their wealth of knowledge, to the everyday jobs we did. I am in year eight of high school, so this has helped me in deciding what I may want to study when I get out of school and go onto University or TAFE. I also have a great love for photography and I love that I came home with 400 photos, most of which were good.

While I was on the trip I met so many new people. Everyone had their own interests and could tell you quite a lot about them. Every day learnt something new from those people, even if it was the smallest thing.



Figure 1: Survey setup

There were four main things that we were surveying. The first one was mammals and reptiles. Before we could catch anything the pit lines and Elliott's had to be set up. The pit lines, Elliott traps and funnel traps were set out in a certain way that had to be the same for each sites. There was a central dropper and from it were three lines of netting. Alone there lines were four pit falls, one at the centre and the other three half way along the lines. These were where the animals fell in. The three funnel traps were placed alone the pits and the Elliots surrounded the lines. There were fifteen of the Elliot traps and they were carefully placed. The idea was the mammal would run all the netting and fall into one of the four buckets placed along the lines. Either that or get caught in the Elliott traps or funnel traps which were placed carefully about the pit lines. The Elliott traps were baited with baits made out of peanut butter and rolled oats. We had a pretty good catch rate; usually we would come back with a couple of mammals and a few reptiles for the DENR people.



The next thing we were surveying was ants/invertebrates. To do this we had to set up micro pits, they were a rather easy job. There two 50 metre lines heading north and south from the central point at the sites. At every 10 metres we would put one micro pit in. which was a test tube filled with a mix

Figure 2: Ant micropit of water and methylated spirits.

of water and methylated spirits. The ants would walk along and fall into the mixture and die, sink to the bottom.

The next thing we had to survey was vegetation or plants. This was one of those days which was a hard and challenging one. For vegetation surveying, you had to set out 20 lines 70 metres out from the central point at the site. The lines had to be at random degrees. Once they were set out two people would go along each line and record at every metre what was there. To do this they had a long pole and attached to it was a laser. Whatever hit the laser when you turned it on would be what you recorded. You had to do this for all 20 lines.

I really loved this expedition and recommend it to all people who have an interest in this kind of thing. I am going to have so many memories that are going to stay with me forever. I thank Nature Foundation for making it possible for me to go on this trip.

Contact email: clareclear@hotmail.com

SEG Bimbowrie Survey re port 2010

The SEG Bimbowrie expedition was a wonderful opportunity for me to meet many interesting and lovely people, to learn new skills, and to visit beautiful countryside. I thoroughly enjoyed my time on the trip and would recommend other students and interested people to take part in future expeditions. Last year I completed a Bachelor of Science Honours, studying Black-faced cormorants. This expedition gave me the opportunity to learn skills associated with mammal and reptile trapping, which I had not experienced before. The new skills gained, along with my experience with seabirds, will hopefully help me gain employment as a budding biologist.

Through SEG's mentor program I was lucky enough to be able to shadow 2 DENR staff for the trip, allowing me to learn more about Australian mammals and reptiles of the area. The DENR staff and other scientific leaders and volunteers on the trip have a wealth of knowledge which is invaluable, just listening to them I learnt so much.

Whilst on the trip I solely worked on the mammal and reptile trap lines each day, allowing me to become more familiar with the methods. During my time on the trip I helped extend the pin-wheel shaped trap lines and put in the drift fence along the pitfall traps (4 in total). Also I helped set out the fifteen Elliott traps, and pack up the sites. Each morning I assisted in checking the pitfall traps and the elliotts. On the trip I also had the opportunity to learn how to set up a Harp trap and an anabat (one trap was placed by a water trough and another by a water tank).

During the trip we caught many species of animals including mice (*Mus musculus* and *Pseudomys bolami*), dunnarts (*Sminthopsis macroura* and *Sminthopsis crassicaudata*), a single bat, geckos, skinks, legless lizard, dragons and a snake. The majority of these animals were then marked with a colour marker (colour depended on site number) at the base of the tail to allow us to know if they were re-captured. Some animals were not marked because they were kept as Museum voucher specimens.

Through shadowing some of the DENR staff, I was able to watch how a museum voucher specimen is prepared, and even got to take part in a dissection. The animals which were to become specimens for the museum were given lethal doses of anaesthetic. When ready the animals had various measurements taken and their weight recorded. The animal was then cut open and the liver removed and stored in a labelled tube which was placed into dry ice to be taken back to the museum. A label was then tied onto the specimen. Mammals were dropped into a container of formalin, and reptiles were placed on trays with their limbs set into positions, injected with formalin and surrounded by formalin soaked paper towels.

Also through shadowing the staff and other scientific leaders I gained experience in sexing mammals, identifying which species they were, weighing species and completing data sheets. Another learning experience for me on the trip was through a fellow volunteer who was kind enough to teach me how to 4wd one afternoon in his car, it was a great experience and an important skill I want to have. The wildlife at Bimbowrie was amazing, particularly with the good rains we've had this year, it was great to see everything so green. We were even fortunate enough to see Sturt Desert Peas. At Bimbowrie we also had the opportunity to see Wedge-tailed eagle chicks, and went searching and found Yellow-footed rock wallabies.

Bimbowrie was an amazing experience which allowed me to learn so much, see beautiful wildlife and to gain new skills. It also allowed me to meet many wonderful people from all walks of life which I really appreciated.

Contact: Kellie Howell Email: howe0083@flinders.edu.au



Sturt Desert Peas

The Natural History of the Coorong

David Paton

Presentation at SEG AGM, 3rd September 2010 by Dr. David C. Paton

Introductory notes

David Paton's presentation on the Coorong began by reminding the audience that water was the critical ingredient for life and was a major component of all living organisms. Water was also important in agricultural production, but also in manufacturing and that clothing and appliances and other infrastructures had large embedded water components as well. He then went on to describe some of the key features of the Coorong and how the region's ecology had changed particularly in recent years as a consequence of the over-extraction of water for human use from the Murray-Darling Basin.

The Coorong –description and general ecology

The Coorong is a long, shallow coastal lagoon that stretches from the Murray Mouth, 110km SE along the South Australian coast. The Coorong is 1-4 km wide and up to 3m deep, but water depths average around 1m. Salinities within the Coorong typically range from estuarine conditions near the Murray Mouth to increasingly hypersaline conditions in the south with salinities typically 50-100gL⁻¹ or 1.5 to 3 times those of seawater at the southern end. In addition to the marked salinity gradient along the Coorong, there is a strong seasonal pattern to salinities and water depths, with salinities typically lowest in late winter and spring coinciding with the period when river water is typically released over the Barrages and flows to the Mouth. Salinities then increase as summer approaches and typically peak in late summer and early autumn. Water levels are usually highest during winter and spring and lowest in summer and autumn associated with changes in seasonal rainfall, evaporation, sea levels and flows over the Barrages. This coastal wetland is protected from the almost constant swell waves of the Southern Ocean by the 1-2km wide sand-dunes of Younghusband Peninsula.

The Coorong can be divided into three components along its length based on the salinity gradient: an estuarine area that stretches for approximately 17km from the Goolwa Barrage to Pelican Point and two lagoons (North and South) with increasing salinities. The North Lagoon (approximately 45km in length) runs south-east from Pelican Point to Parnka Point where a peninsula juts out from the mainland almost across the water body to Younghusband Peninsula. This peninsula separates the North Lagoon from the South Lagoon, the latter also about 45km in length during summer when water levels are lower. With changes in salinity the food chains also vary and become increasingly less diverse as the salinity increases with distance from the Murray Mouth. For example, a diverse array of benthic invertebrate fauna involving more than a dozen species including molluscs, polychaetes and oligochaetes exist in estuarine areas but the numbers of species diminishes such that at high salinities (above about 70gL⁻¹) only one species, the chironomid *Tanytarsus* barbitarsis, is abundant in the South Lagoon. Similarly the numbers of fish species decreases with increasing salinity with only one species existing in abundance in water when salinities are typically above 70gL⁻¹, the smallmouthed hardyhead Atherinosoma microstoma. The other key resource in the food chains for waterbirds using the Coorong particularly in the South Lagoon is the aquatic plant Ruppia tuberosa, its foliage, turions and seeds consumed by various waterfowl. The waterbird communities also vary along the length of the Coorong, with the numbers and types of species using the Coorong changing along its length but not to the same extent as other aquatic organisms with typically at least 20 species of waterbird regularly using the southern Coorong and at least another 20 species using it less frequently.

Immediately upstream of the Coorong are the expansive freshwater wetlands of Lake Alexandrina and Lake Albert, collectively known as the Lower Lakes. These Lakes have historically been predominantly fresh, but in the late 1930s a series of Barrages were built between the Coorong and Lower Lakes effectively preventing any incursions of marine water into the Lakes. This secured year-round freshwater supplies for local communities around the Lake facilitating irrigation of adjacent areas.

The Coorong along with the adjacent freshwater wetlands of the Lower Lakes are listed as a Wetland of International Importance under the Ramsar Convention the initial nomination made in November 1985. The region was nominated and listed because of the diversity of its wetlands: fresh, estuarine and hypersaline; and, because of the importance of the area, particularly the Coorong, for large numbers of water birds: ducks, swans, pelicans, terns, grebes, migratory sandpipers and endemic shorebirds (e.g. stilts, avocets, oystercatchers). The vast majority of Australian waterbirds that use the Coorong do so during summer and autumn, and this use is primarily as a summer and drought refuge. A suite of trans-equatorial migratory waders also use the Coorong during this period. Only a few species of waterbird, however, breed in the Coorong, notably several species of tern and the Australian Pelican.

Recent changes to the Coorong and the need to reinstate adequate environmental flows

In recent years, environmental flows along the Murray River have diminished greatly. This has been the consequence of over-extraction coupled by a severe drought. Since 2002 little river water has reached the Murray Mouth and Coorong. This has resulted in regular incursions of coarse marine sands through the Mouth and into the estuary clogging the Mouth and associated Coorong channels. To prevent the Murray Mouth from closing and to maintain a tidal prism within the estuary, the Murray Mouth and channels have been constantly dredged for the last 8 years. The tidal prism is important to allow large numbers of migratory sandpiper access to productive mudflats. These birds forage on mudflats covered in shallow water typically no deeper than 3-4 cm. In the absence of tides the areas available for foraging are limited for these birds. However with a tidal prism the birds can gain access to a much broader area of mudflat with the birds generally shifting their foraging across the intertidal area, following the water's edge on an ebbing tide. So dredging has maintained some ecological functionality to the Coorong's tidallyinfluenced northernmost sections, and numbers of migratory waders using this area have not declined in recent years but their numbers may drop in due course as the productivity of this region drops in the absence of regular freshwater flows. However their counts in recent decades are lower than counts in the 1980s and earlier, suggesting that there has been some deterioration of the Murray Estuary. Importantly the dredging of the Murray Mouth merely provides a life line to this region. In reality the dredging is an "engineering solution to a symptom" and is no lasting solution and no substitute for the reinstatement of environmental flows. The underlying cause-the lack of an adequate environmental flow to the Murray Mouth region needs to be addressed to provide a sustainable outcome for the ecology of this region.

The other major change to the Coorong has been to the hypersaline systems of the southern Coorong. With the absence of river flows, marine water now enters the Coorong to offset evaporative water losses instead of fresh or slightly estuarine water. This marine water carries salt and as a consequence the salinities in the South Lagoon have increased dramatically to 4-5 times the salinity of seawater, and have typically been around 150gL⁻¹. These salinities exceed the reported physiological salinity tolerances of the smallmouthed hardyhead fish Atherinosoma microstoma and chironomid Tanytarsus barbitarsis. Both taxa have an upper salinity tolerance of around 120gL⁻¹ and both have disappeared from the South Lagoon in recent years. Furthermore the key macrophyte, Ruppia tuberosa, has also been eliminated, including its seed bank. This in turn has resulted in changes in the abundances of selected waterbirds across the South Lagoon, and led to suggestions in the media that the Coorong is dead or dying and has deteriorated to such an extent that it should be delisted as a Wetland of International Importance. However, high salinities and lack of fish has allowed brine shrimps to flourish, and Banded Stilts have benefitted. Despite these changes in the abundances of most waterbirds, the Coorong still easily meets the criteria of regularly supporting 20,000 waterbirds. This even holds for the individual components of the Coorong: the South Lagoon; North Lagoon; and Murray Estuary. Furthermore, the Coorong continues to regularly support in excess of more than one per cent of the global populations or subpopulations of nine species of waterbird, and so easily meets the criteria for listed as an internationally important wetland.

The salinity in the South Lagoon needs to be reduced significantly and appropriate water levels need to be reinstated to recover the Ruppia-dominated ecosystems and allow fish and chironomids to return. Re-instatement of small environmental flows to the Murray Mouth will not do this, and are unlikely until drought conditions are broken and the water storages for human use re-filled. Instead highly saline water will need to be pumped out of the South Lagoon. Recovery of Ruppia will now also require translocation of seeds from other wetlands. The long term health of the Coorong ultimately depends on re-instating an adequate and regular environmental flow to the Murray Mouth. This should be provided because of the importance of the Coorong and Lower Lakes as a drought and summer refuge for waterbirds. For example around 95% of all the waterbirds using the icon sites along the Murray in the recent drought, such was the importance of the region.

David concluded his talk by reminding people that there were many places where minimizing wasting water in our everyday lives ultimately reduces our water use, even suggesting that one should wear clothes out or recycle them through second-hand stores to maximize the benefit from the water used to produce the garments.

[Ed. – Since this talk fresh water has started to flow into the Coorong, but its volume is not sufficient to reverse the damage already done, so the above problems still remain.]

Minnawarra Spring Report

Janet Furler

Minnawarra geared up for it's Spring survey, starting on the first Saturday of the school holidays. As usual, many (320) hours were donated by many (29) people to achieve a successful outcome. Thank you to all. We had several teams of grandparents and children, who especially seemed to enjoy it.

Weather

The weather was fairly consistent, mostly overcast with some showers on two days. The temperature probably explains why we only saw 1 skink.Daytime temperatures ranged from 15 to 18, nights were 6 to 9.

The Results

We caught 83 individuals (animals, birds, others) a total of 139 times. One of our marsupial mice (*Antechinus flavipes*) was caught and released 7 of the 8 times we checked the traps. I guess she likes peanut paste and oats.

The range of little mammals was consistent, with native marsupial mice (*Antechinus flavipes*), Bush rats (*Rattus fuscipes*), and Swamp rats (*Rattus lutreolus*) caught and released. One feral house mouse (*Mus musculus*) and two feral rats were also caught. Due to their unusual colouring there have been different opinions as to whether they are *Rattus rattus* or *Rattus norvegicus*. A trip to the SA Museum has identified them as *R. rattus*. Thank you to the Museum staff for their help.

We have bought a Harp Trap for catching bats thanks to a



Figure 1: Harp trap being checked

grant from NRM. This was put up and checked over several days but caught nothing. We will try to think like bats and pick a new position next survey. The most recent NRM grant application was also successful, so next survey will have the use of an Anabat, which records the bat sounds. They can then be identified.



Figure 2: Nick Birks and Little Raven

The other less common captures in the cage traps were three different species of birds – Little Raven (*Corvus mellori*), Australian Magpie (*Cracticus tibicen*) and Grey Currawong (*Strepera versicolour*). The first two were caught more than once each. A most impressive sight was Nick, having extracted a raven from the trap, then holding it by wings, legs and tail as it proudly surveyed us

A Pobblebonk, a.k.a. Banjo frog (a.k.a. *Limnodynastes dumerillii*) made it's first appearance at a site, although they have been in the dams previously. A Brown Tree Frog (*Litoria ewingi*) visited the house at the same time, so it was a good opportunity to demonstrate the differences between the species. One exciting recent development is agreement from Bush For Life to accept Minnawarra in their Private Lands Program, which will give us help maintaining the survey sites and the other scrub, as well as access to support and information. We will be setting up volunteer weeding days through the Victor Harbor area coordinator, and will keep you posted.

Next Survey

We will be back at it next autumn, and would love to see any keen people.Saturday 16th– Wednesday 20th April 2011. Contact:

Janet - 0419 842 667 or 7329 8236 or $\underline{thefurlers@gmail.com}$; or Richard – 0408 807 517 or 8558 6381



Come walking in some great Australian places and let us do all the hard work.

Phone for our 2011 brochure and find out why Exploranges goes the extra mile for you.





Tours for the active over 50s

- personal service
- accredited guides
- great food
- small friendly groups
- discounts for clubs

Ph: 08 8369 1779 or email: info@bushwalkingtours.com.au

ARKAROOLA WILDERNESS SANCTUARY

From the ARK Update 13/11/10

ROLLING THE DICE FOR OUR HERITAGE

Sarah Martin was on the money in the November 6th edition of The Advertiser. In "Battle for geological Las Vegas" the political reporter described Arkaroola as "an area that attracts naturalists and prospectors in equal measure". She presented arguments for and against the development of the Mount Gee uranium deposit. But she did not explore the dark face of her metaphor. At Arkaroola, the casino or the racetrack, there will be more losers than winners.

Mineral explorers are among the world's greatest gamblers. They chase the bonanza using shareholders chips. They gamble with environmental and heritage assets. If their horse comes in, they argue there will be a benefit for everyone as they share their winnings with governments, traditional owners, Australian citizens and shareholders. But at what price? Sometimes the odds are enormous. No dollar each way at the mineral explorers TAB. No modest Saturday night Lotto ticket in the mineral exploration lottery.

Like any gambling house, the mineral exploration casino has its own vernacular. Bookmakers handle wagers on inferred, indicated and measured resources. At the long odds end, speculators gamble on inferred resources, making assumptions about the quality, size and continuity of the ore-body, with a low level of confidence and a high-level of risk. Hearts don't flutter quite so much when bets are placed on indicated resources, because the gamblers have a reasonable level of confidence about the size and quality of the resource. Measured resources are the sure favourites, where winning is almost guaranteed. But at what cost?

Sarah Martin cited a stockbroker's report whose modelling suggests that the Mount Gee deposit, estimated at 31,400 tonnes of uranium oxide, would deliver an economic benefit to South Australia of 4.86 billion dollars and create 1500 to 1900 permanent jobs. Interesting speculation when 91% of the Mount Gee resource is only inferred, that is, there is little certainty about the size, quality and continuity of the ore-body. Yet in the last week, 643, 341 Marathon Resources shares were traded on the Australian Stock Market. One stockbroker report is deemed sufficient to justify the risk of continued exploration. But what of several hundred *Seeking a Balance* submissions, including evaluations from environmental experts, about the likely long-term impacts of this highly risky wager?

Arkaroola Wildemess Sanctuary is one of a kind. With the most intense concentration of Geological Monuments in the state, a recently discovered ancient reef and unique endemic minerals, this 1.6 billion year old landscape has no replicate anywhere in the world. No four of a kind in the wild mountainous heartland of the northern Flinders Ranges. Yet this is what the South Australian Government is prepared to gamble. Like a two dollar scratchie from the local newsagency, once Arkaroola's fragile surface is destroyed it can never be properly restored. If it doesn't make a collect, the minerals explorer will do what it is legally obligated to do and move on. The land will bear the scars of the wager for decades, just as the family of a problem gambler suffers the real and lasting impacts of their parent's or child's risk-taking behaviour.

We can't allow the Rann Government to gamble with our heritage. This isn't bingo at the local RSL or a quiet game of poker at the shack. This is an extraordinary natural repository of unique minerals and landscapes held in Nature's Trust for millions of years. This is the crown jewel of the Flinders Ranges, sensitively managed by the Sprigg family for more than forty years. Please help us prevent Arkaroola from becoming a victim of the mineral exploration lottery. You are our ace in the hole.

For more information go to: www.savearkarools.com.au or www.arkarools.com.au/breakingnews.php

You are our ace in the hole

AUSTRALIA

NORTHERN FLINDERS RANGES SOUTH AUSTRALIA

FROM THE ARK Update 13/11/10