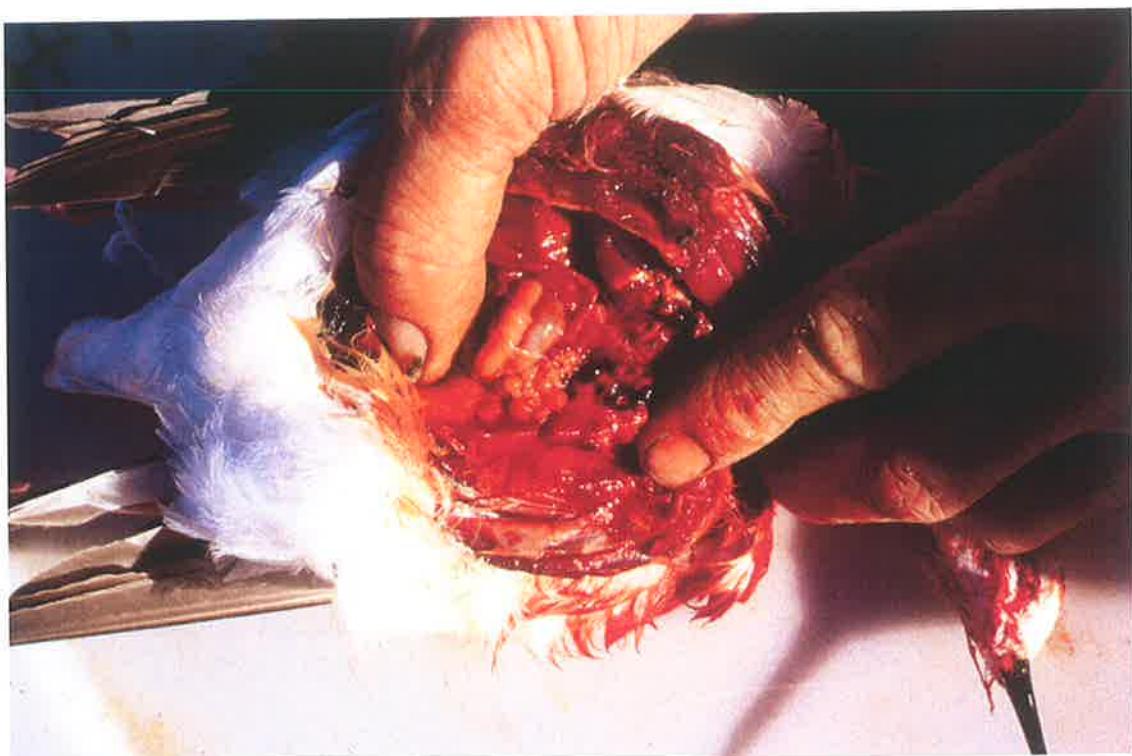


**BANDED STILT *CLADORHYNCHUS LEUCOCEPHALUS*
RESEARCH IN WESTERN AUSTRALIA IN 1995**



**BANDED STILT ADULTS & CHICKS COLLECTED
AT LAKES BALLARD & MARMION IN 1995**

RESEARCH MATERIALS CONSOLIDATION REPORT

**JAK Lane
WA Department of Parks and Wildlife**

April 2014

Cover photo: Ovary of dissected female Banded Stilt, Lake Ballard, April 2nd, 1995. © JAK Lane.

This **Research Materials Consolidation Report** is a preliminary stage in the preparation of research reports and publications relating to the Banded Stilt breeding event on Lakes Ballard and Marmion in Western Australia in 1995.

The purpose of an RMCR is to consolidate and conserve all of the research materials relating to a research project. The material reproduced here is in its original form, with limited or no reformatting.

FUTURE WORK

The next steps to be taken in finalising this RMCR and then preparing reports and publications based on its contents should be to:

- Look in DPaW Busselton Lab (and if not there, at DPaW Woodvale) for the 1995 Ballard & Marmion BaSt gut contents and sweep samples.
- Replenish the alcohol in the BaSt gut and sweep samples.
- Seek funding to sort and ID the BaSt gut and sweep samples.
- Sort and ID the BaSt gut and sweep samples.
- PREPARE AN EXCEL SPREADSHEET WITH ALL DETAILS OF COLLECTED ADULTS & CHICKS: (Lake, Date, Time, Location, Collectors/Measurers, (Bird) Group, Bird ID, Sex, Weight, Measurements (column each), Plumage (breast, belly), Brood patches, Photos, Gut (oesoph, gizzard), Gut contents, Water depth, Water samples (various), in situ salinity, in situ pH, Sweep samples, Comments). LATER ADD FATE (as at 31/3/2014 these appear not yet to have been sorted, and definitely not ID'd) OF GUT & ASSOCIATED SWEEP SAMPLES AND CONTENTS
- Ask Andy Chapman (ACh) for copies of his field notes from his approx. April-May field trip to Lake Ballard with JL & ACl. Copy these to this and other relevant BaSt RMCR's. Note that JL already has ACh's field notes from his June 1995 trip to Lake Marmion with GBP & ACl.
- See yellow highlighted text in the remainder of this RMCR summary for other Future Work needed / desirable.

Photographs

The scanned (digital) copies of all photos taken at Lakes Ballard and Marmion in 1995 by JL, GBP, most or all of those taken by ACh, and some of those taken by CDTM, are on JL's office computer and backups. Those relating to collection of BaSt adults and chicks have been printed (thumb prints only) in this RMCR.

Note that CDTM – and maybe ACh – could perhaps have taken some photos relating to collection of BaSt adults and/or chicks that JL does not have copies of.

Field Notes

A separate RMCR of 1995 Field Notes has been prepared containing copies of the Field Notes made by J Lane (JL), G Pearson (GBP), A Clarke (ACl) and A Chapman (ACh) in 1995 while undertaking collaborative research with C Minton (CDTM) on Banded Stilts in Western Australia. All aspects relating to collection of BaSt adults & chicks at Lakes Ballard and Marmion in 1995 have been fully extracted to this RMCR, except the June 1995 field notes of ACh, see above.

CONTENTS

Note that from early 1995 to the early 2000s, Jim Lane (JL) was based in Busselton and technical officers Grant Pearson (GBP) and Alan Clarke were based at Woodvale (a northern suburb of Perth) – hence the many faxes and emails between JL and GBP listed below.

This RMCR contains:

1. Printout (31/3/2014) of document headed ‘Search (Started by JL on 30/3/2014) for Correspondence / Results of Sorting & Identification of Banded Stilt Gut Samples and Sweep Samples from Lakes Ballard & Marmion in 1995’. JL stopped this search on 31/3/1995 when he felt he had found most or all of the relevant material (which was then incorporated into this RMCR, below).
2. Email exchange (22/12/2005) between ACl and Stuart Halse (CALM Woodvale) with attached agreement for SH to arrange / perform \$8000 of identifications on aquatic invertebrate samples ‘... for the potential Directory [Directory of Important Wetlands in Australia] sites’. Note that the Lakes Ballard and Marmion BaSt gut contents samples and sweep samples are NOT in the list of sites of material to be identified. This was no doubt due to the full amount of funding requested by JL (\$12,000 – see below) not being provided and priority being given to the other sites. Note that Lakes Ballard and Marmion were already listed in the ‘Directory’.
3. Email exchange (02-03/11/2005) between JL and ACl that inter alia indicates that only \$8000 had been granted for aquatic invertebrate identifications (\$12,000 had been requested by JL – see below) and that it might not be possible to identify all of the aquatic invertebrate material collected from potential ‘Directory’ sites and Lakes Ballard and Marmion (which were already listed in the ‘Directory’).
4. Email (02/11/2005) from JL to ACl with an attached copy of JL’s ‘2005/06 Funding Application’ to the Dept. of CALM ‘Wetland Conservation Program’ for ‘Specialist identification and significance assessment of aquatic invertebrate samples from existing and prospective Directory and Ramsar wetlands in remote regions of Western Australia’. Regarding Lakes Ballard and Marmion, it reads (inter alia): ‘During the 1995 Banded Stilt breeding event at Lakes Ballard and Marmion, a number of sweep and gut samples of aquatic invertebrates were collected ...’ ‘All samples [potential ‘Directory’ sites and Ballard & Marmion?] have subsequently been sorted and separated into major taxonomic groups by STO [Senior Technical Officer] Alan Clarke with guidance from CALM limnologists’.
5. Email exchange (04-08/03/2005) between JL and ACl with an attached report by ACh ‘... outlining the current situation with the DIWA (‘Directory’) identification and analysis of aquatic invertebrate species [and the 1995 BaSt gut contents and sweep samples from Lakes Ballard and Marmion]’. **The status of the 1995 BaSt samples is described in detail (current storage location, contents, curation, sorting process required [still] before identification by a taxonomist).** Note that ‘... because the alcohol dries out quickly some samples have been lost’. **Look in DPaW Busselton Lab (and if not there, at DPaW Woodvale) for the 1995 Ballard & Marmion BaSt gut contents and sweep samples.**
A ‘breakdown’ [two Tables in MSWord] of the ‘[1995 BaSt] samples that need sorting’ is attached’. These are ‘BALLARDN.doc’ and ‘MARMIONT.doc’. **Use these to locate all the samples and perhaps as a basis for preparing a more-comprehensive Excel spreadsheet(s) of the collected materials.**
6. Undated, annotated, earlier printouts of the two Tables in MSWord of the 1995 BaSt samples that need sorting. These are the Tables included in the email exchange of 04-08/03/2005 above.

7. Undated, annotated, earlier drafts of the two Tables in MSWord of the 1995 BaSt samples that need sorting. These are the Tables included in the email exchange of 04-08/03/2005 above.
8. Email (03/12/2003) from ACI to JL which, inter alia, indicates that, at that point in time, the 1995 BaSt gut contents and sweep samples from Lakes Ballard and Marmion had NOT been sorted (a necessary preparatory step before identification). AC seeks to 'discuss the options and timing' with JL.
9. Part of what appears to be a fax (20/2/2001) [but note that year is difficult to read] from JL to CDTM in which JL inter alia writes 'We will be making a start on the Ballard-Marmion sweep & gut samples in a few months time ...'
10. A chain of emails (13-19/04/2000) between CDTM, GBP and JL in which, inter alia, JL advises GBP that: 'As far as I am aware, no blood samples were taken at [Lakes] Ballard or Marmion in 1995. My recollection is that we decided not to take them, for practical reasons'. CDTM wrote (16/4/2000) 'We [CDTM and others in the east] collected some blood samples from the [BaSt] chicks at Lake Eyre and these have already been sent to Canada for use by Alan Baker in his classification work. He has agreed also ... to see whether there are any differences yet developed in DNA characteristics between the south australian and west australian Banded Stilt populations'.
11. Faxed (on Fri 17/03/2000; from JL to GBP) copies of a 1999/2000 Budget Request and a Science Project Plan for SPP 'Breeding ecology and conservation of Banded Stilt'. The Budget Request refers inter alia to: 'Sorting, identification and quantification of aquatic invertebrate sweep samples from 1995 breeding event at Lake Ballard' and 'Identification and quantification of Banded Stilt oesophagus contents from 1995 breeding at [Lake] Ballard' as 'Planned Achievements for 1999/2000'. 'Sorting, identification and quantification of macroinvertebrate sweep samples and stilt gut contents' is listed in the Science Project Plan as a 'Phase 1: (1995-2000)' milestone to be completed by Dec 1999. The SPP also says (Item 22) that 'The 1995 macroinvertebrate samples are held and curated by A. Clarke at CALMScience Woodvale'.
12. File record (16/3/2000) by JL headed 'Calculation of Banded Stilt Funds Available as at 16 March 2000'. Inter alia this records that: 'On 26 Nov 1998 Keith Morris [CALM] sent me an email (v4 f16) saying he would provide \$5,000 to enable me to employ an assistant to analyse the Banded Stilt samples ...'; that in May 1999 the funds had not yet been transferred, and that as at 16/3/2000 'There is still \$5,078.80 available in [a Trust Account] to spend on analysing the BaSt invertebrate samples'.
13. Fax (01/8/1997) from JL to CDTM saying, inter alia, 'I spent yesterday in Perth with Grant [GBP] & Alan Clarke [ACI] sorting out the water level & water quality info and organising the [1995 BaSt] gut and sweep (invertebrate samples).
14. Copy (29/7/1997, supplied by WA Chem Centre) '... of Report on 77 samples of water received on 26 June 1995'. See GBP's letter of 26/6/1995 to WACC (and initial, unsent copy of 24/5/1995) for details of these samples.
15. Extract from document (22-24/7/1997) prepared by JL and headed 'The Following is the Makings of the "Water Depth and Quality Section" of the Final Publication on the 1995 Banded Stilt Work'. Inter alia it includes the 'Depths taken by ACI on 02/5/95 (J_Day 122) when he, JL and ACh shot [BaSt] adults and chicks ...' This copy has important annotations by JL concerning the locations of these depths.
16. Fax (24/7/1997) from JL (at Busselton) to GBP & ACI (at Woodvale) arranging for all three to meet at Woodvale 'next Thursday' [31/7/1997] '... to sort out the Ballard, Crossover lake and [Lake] Marmion invertebrate sweep samples and [Banded Stilt] gut samples [collected by GBP, ACI, Andrew Chapman and/or JL on Lakes Ballard and Marmion in 1995 ...' and to have all relevant research materials on hand '... so that we

can clear up all uncertainties before discussing with Andrew Storey [UWA-associated aquatic invertebrate specialist] how they are to be analysed and a price'. The fax indicates that JL was intending to use a computer (a Woodvale PC) '... so that I can compile the info ... as we go'.

17. Tables (faxed 22/7/1997, from ACI/GBP to JL) detailing all the gut and sweep samples collected at Lakes Ballard and Marmion (and Crossover Lake – sweep samples only) in 1995. There is also a map of Lake Ballard annotated by ACI that inter alia indicates where 'most birds [BaSt] taken [collected]' and 'Dist. between Tripod & Camp [Islands] 16km'. The Tables have many important annotations and some corrections by JL, ACI and or GBP. See further above for revised versions.

These are the same or similar to the Tables used in 2005 (see above). The Lake Ballard Tables are the same as those first sent to JL by ACI on 30/1/1996 (see below).

18. JL's fax (10/7/1997) to ACI requesting him to arrange for David Cale [an aquatic invertebrate specialist] to be employed '... to sort, etc., twenty samples [gut or sweep and from where and when unspecified] at \$125 per sample. Were these BaSt gut samples (or sweep samples) from Lakes Ballard and/or Marmion in 1995? Was the work arranged and done? Results?

Note that JL's fax was in response to a fax of the same date (10/7/1997) from ACI to him, the cover page of which reads 'For your info as requested'. Attached to this fax is a sticker in JL's handwriting inter alia calculating the cost of 20 samples at \$125 / sample to be \$2500. This was presumably a record of a phone conversation between JL and ACI before JL's fax of 10/7/1997. Is '\$350 take away' of any assistance in working out what later transpired?

19. 'Rough jottings [by JL] made in preparation for talk at the 'Sthn. Hem. Orn. Congress' to be held in Albany on 07/10/1996. Includes reference to: 'gut samples'. This single page has been scanned over two pages due to its length

20. Hardcopy (16/05/1996) of document 'Banded Stilt *Cladorhynchus leucocephalus* Seminar' '... compiled [by JL] 14-16 May 1996 in preparation for seminar at Woodvale [CALM's Wildlife Research Centre] on Fri 17 May [1996]. Words and sentences relating to collection of BaSt adults and chicks for dietary analysis have been highlighted (circled) in pink (by JL on 29/03/2014). Note inter alia that according to this document (which is not a primary source):

- Ron Johnstone (WA Museum) and co. visited the 2nd BaSt breeding (studied) colony on Lake Ballard on Sat 08/4/1995, where they collected 10-12 incubating adults ranging from 0-100% chest band, collected 4 chicks and took stomach samples (see below for original fax & notes about RJo's visit).
- CDTM & GBP collected '3 males [BaSt] and 1 female with chicks' on Lake Ballard in early April 1995.
- JL, ACh & ACI collected 'parents and chicks for diet, sexing' on Lake Ballard in early May 1995.
- GBP, ACI & ACh collected '1 family' on Lake Marmion on 11/6/1995 and GBP & ACI 'Collected more families' on Lake Marmion on 12/6/1995.

21. One page of 'Notes / Ideas' (by JL, undated, but probably late April 1996) relating to the content of (videos) Tape One to Tape Seven (all or nearly all of the ABC Natural History Unit's filming) for 'Bobby and the Banded Stilt'. Includes the note: 'all [male BaSt] were in good condition when shot with chicks? significance? e.g. for feeding during incubation period?'.

22. Fax (30/1/1996) from ACI to JL (copied to GBP for info) saying: 'I have documented the Lake Ballard gut contents and sweep samples [and Crossover Lake sweep samples]. Are they clear enough? Should I ... do the same for [Lake] Marmion samples? Do you want

me to discuss sorting techniques with Andrew Storey or others?' Attached are tabulations (in MSWord) detailing all the gut and sweep samples collected at Lake Ballard (only) in 1995. These are the same or similar to the Tables used on 22/7/1997 and in 2005 (see above for both).

23. Extract (appears to be late Aug or early Sept 1995) from GBP's field notebook in which GBP writes 'Sort gut samples & retain each for ID [identification of contents]' and 'Sweeps – sort to family & retain' and 'Jim to talk to AW Storey'. Looks like GBP met with JL (& Y. Winchcombe re Vasse-Wonnerup water level loggers) in Busselton on this day and these were his notes relating to processing of BaSt gut samples and aquatic invertebrate sweep samples collected at Lakes Ballard and Marmion earlier in 1995.

This extract has been printed from the 1995 BaSt project 'Field Notebooks' RMCR. Refer to that RMCR if context or higher quality viewing required.

24. Letter (26/6/1995 'FILE: CHEM895') from GBP to Roger Schultz (WA Chemistry Centre) requesting analysis of accompanying water samples. 32 samples are individually listed. They are numbered 1-32. Of these, numbers 1-20 & 32 are listed as being from Lake Marmion (samples 1-9, 12, 15-20), Lake Ballard (samples 10, 14, 32) or Crossover Lake (11, 13). The dates of the 3 samples from Ballard are 02/4 (presumably this one sample was overlooked when a batch was sent to Chem Centre on 24/5/1995, see below) and 09/6/1995. The 2 samples from Crossover Lake are dated 09/6/1995. The dates of the 16 samples from Marmion range from 10-13/6/1995.

The labelling of the Marmion samples (and the 02/4/1995 Ballard sample) indicates some were associated with collected BaSt (11-12/6/1995 only), while some were not. Some were to be analysed for Total Phosphorus and Total Nitrogen and had already been filtered, 'using millipore 0.45 uM HA filters'. Some were to be analysed for conductivity (and TDS).

Mysteriously, there is a copy of this 26/6/1995 request, re-dated in GBP's handwriting to 31/8/1995, and faxed from Woodvale to JL on 04/8/1997. Perhaps this batch of samples was meant to go to the Chem Centre on 26/6/1995 but was delayed until 31/8/1995 and GBP simply re-dated the covering letter by hand.

25. Letter (26/6/1995 'FILE: CHEM895') from GBP to Roger Schultz (WA Chemistry Centre) that is IDENTICAL to the letter of 24/5/1995, except for the date. It is apparent from 29/7/1997 copy of results (see above) that the samples weren't delivered to / received by WA Chem Centre until 26/6/1995. See 24/5/1995 for a description of the letter's content. Note that this 26/6/1995 copy has later annotations by JL relating to where some of these samples were taken, the depths that were measured at the time; some pH measurements; references to the stakes that were installed to monitor water depth, coordinates (lats & longs) and other details.

26. Faxed (19/06/1995) copy of 17/06/1995 report by GBP for JL, headed 'Report on Survey to Lake Ballard and Lake Marmion 8 June 1995 to 13 June 1995'. Inter alia indicates that:

- On 11/6/1995 GBP, ACh & ACI collected 'one family ['Family 1'] of Banded Stilts. 1 adult 5 chicks 3-5 days old' on Lake Marmion. These birds were weighed and measured and other details recorded. An invertebrate sweep was 'taken'; a water sample was taken for 'tot P' and water conductivity (actually salinity – 46ppt) & pH (7.94) were measured (the former, at least, by ACh, presumably in situ). Note that these birds were referred to (labelled?) as 1.1 to 1.6, with 1.1 to 1.5 being the chicks and 1.6 being the adult.
- On 12/6/1995 GBP & ACI collected four families ['Family 2' to Family 5'] of BaSt on Lake Marmion. These birds were weighed and measured and other details recorded, including (it would appear) whether or not the oesophagus and gizzard (or just contents?) were collected (separately), plus a few notes on their contents (e.g. ostracods', 'ants', 'coleo' [coleoptera]). Note that these birds were referred to (labelled?) as '2a, 2b, 2c, 2adult' to '5a, 5b, 5adult'. So (note by JL on 29/3/2014),

when collating and tabulating info relating to collected birds, keep in mind that at least two labelling systems were used on the BaSt collected in 1995. Water depth was also recorded (and water samples and/or salinity and pH measurements taken in situ by ACh?) where these four BaSt families were collected.

27. Andrew Chapman's (Kalgoorlie-based CALM Goldfields Region Ecologist) field notes (9-12/6/1995), from his field notebook 'WATERFOWL #5', recording observations during his visit to Lakes Ballard and Marmion with GBP & ACI. Inter alia, ACh recorded on Lake Marmion the weights of BaSt chicks (note that he records his calculation of each weight and from this it can be deduced that the weighing restraint (cone?) weighed 10gm). Use to check weights recorded by GBP. Not clear if these were captured & released BaSt chicks or collected chicks, probably the former. ACh also records water conductivity, temperature and depth at particular times (but locations not indicated). Check these water measurements against GBP's field notebook records. Were they at sites of collection of BaSt? (noting that the last is labelled as being at 'Collection site').
28. Extracts (11-12/6/1995) from one of GBP's field notebooks concerning collection of BaSt on Lake Marmion.
 - Page 13 records details of BaSt collected on 11/6/1995 ('Dead Bird #1 JUV', 'BAST #2 JUV').
 - Pages 16 – 17 record details of other BaSt collected on 11/6/1995 ('family #1' comprising chicks '1.1' – '1.5' and adult '1.6').
 - Page 23 – 32 record details of BaSt collected on 12/6/1995 ('family 2', 'family 5' comprising '5.1 JUV 5A', '5B (5.2)', 'Family 5 Ad'; 'Family 4' comprising '4A', '4b', '4c', '4 Adult'; 'family 3 comprising '3A', '3b', '3 Adult', and family 2 comprising '2A', '2b', '2C', 'Adult 2').

Gut contents of some of the above birds were noted at the times of collection and some water depths were also recorded.

These extracts have been printed from the 1995 BaSt project 'Field Notebooks' RMCR. Refer to that RMCR if context or higher quality viewing required.

29. One page of jottings (11/6/1995) by JL recording some details of his radio telephone conversation on that day with GBP (who was camped at Lake Marmion with ACI & ACh). Includes: '[GBP et al.] collected 1 [BaSt] family. Ostracods & Parartemia'. It is not clear whether this was a reference to what GBP et al. had found in the birds' guts or in the Lake Marmion water (or both).
30. Fax (07/06/1995) from JL to GBP with a four-page 'Revised Program Lake Ballard June 1995' with instructions for GBP, ACh and ACI regarding survey and other work to be undertaken at Lake Ballard and Lake Marmion from Thurs 8th to Wed 14th June 1995. Inter alia the program refers to the need for 'another wing rule (no less than 25cm) and 'good quality vernier calipers' as 'The dial calipers are stuffed'. On Lake Marmion during 11-13 June 1995, GBP, ACI & ACh are to 'Locate flightless [BaSt] chicks, collect 5 family parties for oesophagus and proventriculus+ gizzard contents analysis'. The 'collecting methodology' to be followed, including labelling of specimens, taking of photos (film), removal & storage of 'oesophagus & gizzard (including proventriculus)', sexing & measuring of gonads, weighing, other measurements ('bill, head+bill, metatarsus & wing of adults and chicks'), recording of breast band and black belly, presence absence of brood patches, is described in detail. Bodies are to be retained or Ron Johnstone (WA Museum). Water samples and sweep samples (aquatic invertebrates) are also to be taken at each collection site and water depth is to be measured.

Note that a waterproof label was to be attached to each collected bird, with adults labelled "Adult (1-5)" and chicks labelled "Chick (1a, 1b etc, 2a, 2b etc, to 5a, 5b etc)".

The 'oesophagus & gizzard (including proventriculus)' of each bird (adults and chicks) was to be stored separately '... in 70% alc [alcohol] with label (Adult 1, Chick 1a etc plus date)'.

See JL's fax of 02/06/1995 below to CDTM for the 'draft work program'.

31. Fax (02/06/1995) from CDTM to JL with suggestions on draft work program that JL had sent him on same date (see below). Inter alia CDTM comments: 'Wouldn't it be worth keeping these sexed & measured breeding birds, or at least giving them to Ron Johnstone at the [WA] Museum to make skins? Who knows but in due course with a good enough sample we may be able to find consistent differences in breeding plumage [and measurements?] between the sexes'.
32. Fax (02/06/1995) from JL to CDTM (also sent to ACh & GBP) with: 'draft work program for Grant [GBP] and co. to work to next week. I ... would appreciate any comments'. This copy of the draft program has subsequent annotations [by JL]. See JL's fax of 07/06/1995 above to GBP for 'Revised Program' and what was finally decided about collecting of BaSt specimens and their gut contents.
33. Letter (24/5/1995 'FILE: CHEM0595') from GBP to Roger Schultz (WA Chemistry Centre) requesting analysis of accompanying water samples. 77 samples are individually listed. They are numbered 1-57, 57A, 58-76. Of these, numbers 27-57, 57A, 58-72 are listed as being from Lake Ballard (samples 27-36, 39-43, 48-49, 51-57, 57A, 58-72) or Crossover Lake (samples 37-38, 44-47, 50). The dates of the 40 samples from Lake Ballard range from 15/3 to 04/5/1995. The dates of the 7 samples from Crossover Lake range from 01/4 to 04/5/1995.

The labelling of the Ballard samples indicates some were associated with collected BaSt (02/4, 11/4, 02/5/1995 only), while some were not. Some were to be analysed for Total Phosphorus (of these, some had already been filtered, 'using millipore 0.45 uM HA filters', and some were unfiltered). Some were to be analysed for salinity (and conductivity). Those without analysis-specific 'descriptors' were presumably also to be analysed for salinity (and conductivity).

A copy of the results was sent by WACC to GBP on 29/7/1997. Note that all 77 samples were analysed for conductivity (mS/m), Tot P and TDS (mg/L) and 3 of the 77 samples (45, 67, 72) were analysed for Tot N.

Note also that these samples were not delivered to / received by WA Chem Centre until 26/6/1995 (see above for that copy - annotated – of this letter).

Also see another letter of 26/6/1995 for the next (second) batch of water samples delivered to WA Chem Centre.

A hand-written, draft list for inclusion in the letter of 24/5/1995 is also here.

34. Two page extract from Alan Clarke's field notes recording some details (times, locations, water depths, adults & chicks collected) concerning collection of BaSt on Lake Ballard on 02/5/1995 by him & JL (and ACh on that day?). Refers to specifically to 'adult No.1' with 'chicks Nos.1&2', 'ADULT 2' with 'chicks A+B+C', 'ADULT 3' with 'chicks', 'ADULT 4' with 'chicks', and 'ADULT 5'. See JL's field notes below for details of these BaSt.
35. Extracts (02/5/1995) from JL's field notebooks concerning collection of BaSt on Lake Ballard. ACh, JL & ACI, working together, collected '1 adult male + 2chicks' ('Adult', 'C1', 'C2'); 'Adult with 3 chicks' ('2A', '2B', '2C'); 'Adult male with 3 chicks' ('Adult', '3A', '3B', '3C'); 'Adult [male] with 1 chick' ('Adult', '4A'); 'Extra chick'; 'Adult [male] with 1 chick' ('No.5 Adult', 'chick 5A'). JL also wrote a 'Summary of Shot [on 02/5/1995] Birds' with additional info, e.g. missed shooting adult No.2. Guts were sampled. See ACI's field notes (above) for details of locations and water depths at sites of collection of these BaSt.

These extracts have been printed from the 1995 BaSt project 'Field Notebooks' RMCR. Refer to that RMCR if context or higher quality viewing required.

36. Map of Lake Ballard with markings by JL showing 'Camp Island' and 'Work Area' (essentially all that part of the lake around and west of Camp Island). Also shown (by JL) is the 'boat route' taken on 01/5/1995 by JL & ACI (& ACh?) and 'times [1252, 1301, 1312hrs] are those of 29/4/95' and a distance (presumably) calculation of 16.25. **Compare with JL's field notes.** There are also six hand-drawn circles near the north (western) shore of the lake and a straight line (**indicating?**).
37. Two copies of a list of equipment (originally provided to ACI by GBP for ACI's trip (with JL) of 27/4/1995 – 04/5/1995 (approx) to Lake Ballard) and was re-sent by JL to GBP on 07/6/1995 for his upcoming trip to Lakes Ballard and Marmion (with ACh & ACI). Included is the equipment needed for collection of BaSt adults and chicks.
Note especially that it appears that 'gizzards' were to be stored separately from 'oesophagus', the former in 'tall clear jars' and the latter in 'small vials'. Water samples were also to be stored in 'tall clear jars'. Alcohol was to be taken for specimen storage.
38. A list of equipment that was originally provided to ACI by GBP for ACI's trip (with JL & ACh) of 27/4/1995 – 04/5/1995 (approx) to Lake Ballard. Included is the equipment needed for collection of BaSt adults and chicks.
Note especially that it appears that 'gizzards' were to be stored separately from 'oesophagus', the former in 'tall clear jars' and the latter in 'small vials'. Water samples were also to be stored in 'tall clear jars'. Alcohol was to be taken for specimen storage.
39. Fax (13/04/1995) from Ron Johnstone (WA Museum) to JL detailing the observations made during an aerial survey for breeding BaSt that he and ... [not specified in fax, but were Phil Stone and Nick Kolichis] made of Lakes Goongarrie [or Raeside? See notes of 11/04/1995 below], Marmion, Ballard and Barlee on ... [date not specified in fax, but was 07/04/1995]. Inter alia he wrote:
 - 'I will send you details of specimen stomach contents etc. at a later date';
 - 'As mentioned over the phone, I would be grateful if you would help me with the following: ... Collect a series of different age chicks'. 'Our WAM collections of this species are poor so anything you can get will be useful'. **Ask RJo for details of gut contents?**
40. Photocopy (2 A4 pages) of six small notepad pages of notes made by JL during phone conversation with Ron Johnstone (WA Museum) on 11/04/1995 in which Ron shared details of his aerial survey (with Phil Stone and Nick Kolichis) for breeding BaSt on 07/04/1995 and their subsequent ground visit to Lake Ballard, in kayaks, which JL recorded as being on 12/04/1995 but couldn't have been, given date (11/04) of phone conversation [It was on 08/04/1995 (JL 16/3/2014)]. Inter alia the notes read:
 - '[get?] birds – just a trace of band & were incubating – collected small series. (2 clutches + ?)';
 - 'food – chicks forming small creches – 5 chicks dead, 2 just alive – others crow pecked & too smelly to retain';
 - 'collect chicks at various stages – fridged – plastic bags'.
41. Two page memorandum from JL to GBP headed 'GRANT. TASKS FOR SAT 8 – TUES 11 APRIL 95 INCL'. Inter alia these tasks included:
 - 'Find 5 distinct families of BaSt on the water (each 1 adult and 3-4 chicks). Preferably families that are feeding, but it is possible that little or no feeding by families will occur while you are there. Shoot the single, most protective adult in each

family (sometimes there may be a second, non-protective adult with a family). Collect all the chicks of the family. Retain the oesophageal contents of each adult and chick. If oesophagus empty – check stomach for contents and retain if any. Measure the bill length (not incl. head) of each chick and identify which oesophageal contents go with it (i.e. cross reference). Also check for presence and size of yolk sac in each chick'

- 'Take a surface water sample wherever you collect a family group (or single adult) – for salinity and Total P [phosphorus] and turbidity unfiltered. Also measure water depth. Also do a standard, surface-only, invertebrate sweep at each shooting location'.

42. Two pages of 14 photos (thumbnail prints) of the dissected bodies of 12 BaSt collected on Lake Ballard. The photos were taken (by JL) on 02/04/1995 and are numbered 3753-62 and 3923-26. The photo labelling indicates that they were of 'BaSt specimen 1' to 'BaSt specimen 12', plus a photo of 'BaSt specimen 1 ovary' and 'BaSt specimen 2 testes'. The specimen tags are visible in the photos and when specimens 7-12 were photo'd the specimen number was also written on the white tray on which they lay.

43. Extracts (08, 11 & c.21/4/1995) from JL's field notebooks concerning collection of BaSt blood (and eggs). They appear to record a phone conversation between JL and Prof John Wetherall of Curtin University and the latter's thoughts regarding collection of blood (from BaSt, for DNA analysis) rather than eggs. Note that Wetherall 'much prefer[ed] blood' 'blood much easier'. Mentions 'spleen – frozen quickly' and 'heparin or EDTA' and 'frozen blood'. 'Heparin' later (pre 21/4/1995) appears in a 'TO DO' list of JL. These extracts have been printed from the 1995 BaSt project 'Field Notebooks' RMCR. Refer to that RMCR if context or higher quality viewing required.

44. Extracts (02/4 to 11/4/1995) from one of GBP's field notebooks concerning collection of BaSt on Lake Ballard.

- Page '55' appears to be a list of what is to be done at each site of collection of BaSt. Note 'Water sample 1st Bird & last Bird' and '5th'. What was meant by '5th'?
- Pages '57' - '65' record details of BaSt collected on 02/4/1995 ('#9', 'BAST #1' – 'BAST #12').
- Page '79' (circled) appears to have been written on 09/4/1995 and appears to be planning and calculation of the numbers & types of containers needed for gut and associated water and sweep samples. Note that, inter alia, GBP wrote 'keep oes [oesophagus] separate [from 'gizzard']'.
- Pages '87' – '89' record details of BaSt collected on 10/4/1995 ('family group #1' comprising chicks '1.1' – '1.3', 'Adult BAST #1.0). Note that chick #1.2 was 'Banded with 082 74203 on Rt leg [and] Yellow flag [on] left leg'!
- Pages '91' – '97' record details of BaSt collected on 11/4/1995 ('family 2' comprising 'Adult + 4 chicks' including 'chick 2.1'; 'Family 3' comprising chicks '3.1' – '3.3' & adult '3.0'; 'Family 4' comprising chicks '4.1' – '4.3' and adult '4.0'; 'Family 5' comprising chicks '5.1' – '5.3' and adult '5.0').
- Page '101' refers to [chick] 2.1 of 'previous pages' (page '91' – see dot point above) and provides further details of 'Family 2' including chicks '2.2' – '2.4' and adult.

Feeding behaviour and gut contents of some of the above birds were noted at the times of collection and some water depths, water samples and sweeps were also taken/recorded. Locations were recorded.

These extracts have been printed from the 1995 BaSt project 'Field Notebooks' RMCR. Refer to that RMCR if context or higher quality viewing required.

45. Extracts (02 & 07 /4/1995) from JL's field notebooks concerning collection of BaSt on Lake Ballard.

- ‘Grant’s VHF is on Channel 38’ indicates that while GBP (collecting BaSt) was working separately from JL during 02/4/1995, they were in VHF radio contact.
- JL records ‘Photo’ed the 12 [BaSt] birds (9 males & 3 females) in sequence (grant had tagged them 1-12). ‘Female gonad photo was bird #1; male gonad photo was bird #2’. ‘#1 has 2 eggs released from follicles??’ Grant took ovaries out of each female and put in separate vials with formalin ...’.
- JL describes in detail the BaSt collecting instructions he gave him for 02/4/1995.
- Late PM of 02/4/1995, JL photo’d (‘just for record of breast-abdomen plumage’) the 12 BaSt that GBP had collected that morning. Note that ‘Grant said many birds were feeding in pairs but he was only able to shoot one of each pair’.
- On 07/4/1995, the day before he left Lake Ballard for Perth-Busselton, JL wrote a list of work for GBP to do at Ballard during following days. These included instructions for BaSt collection methodology (which was to include water samples and invertebrate sweeps where birds collected) and measurements, etc. Note the instruction to: ‘Sex the single adult most closely associated with the chicks’. ‘Depths’ and ‘Yolk sac’ are also listed.

These extracts have been printed from the 1995 BaSt project ‘Field Notebooks’ RMCR. Refer to that RMCR if context or higher quality viewing required.

46. Undated (but probably around 30-31/3/1995) page of jottings by JL that inter alia lists: ‘100gm pesola for chicks, weighing cones (plastic light), wing ruler, decent calipers’. Not clear whether these were for use on captured (and released) BaSt chicks or collected birds (adults and/or chicks).
47. Fax (20/3/1995) from JL to GBP with a list of equipment for the upcoming trip to Lake Ballard. Inter alia the list includes collecting equipment, for both collection of birds (BaSt) and aquatic invertebrates (sweep samples) (and in situ water testing and water samples). It looks to JL (on 30/3/2014) that this was a typed list of GBP’s, with JL having placed a ‘yes’, ‘no’ or ‘maybe’ against each item and some ‘also’s and other annotations. Collecting equipment with a ‘yes’ against it includes ‘formalin 10% buffered’, ‘alcohol 70%’, ‘Dissecting kit + spare blades etc’, ‘Balance 300gm, 1000gm’ and ‘12gg shotguns’. Concerning ammunition, the annotations in GBP’s handwriting suggest he thought 25 rounds of #6 shot and 25 rounds of #4 shot should be taken.
48. One page of jottings (undated) by JL headed ‘GRANT’ that appear (to JL on 30/3/2014) to have been made soon after the one day helicopter trip (by CDTM, JL, GBP & MR) from Kalgoorlie to Lake Ballard and return on 15/3/1995. It appears to be some initial thoughts on what should be done before, and taken on, the proposed ground trip to the Lake Ballard BaSt breeding colony(ies). Inter alia, the ‘list’ includes ‘[weighing] scales (eggs & birds)’.
49. One page extract (undated, but probably soon after 15/3/1995 helicopter trip to Lake Ballard) 02/5/1995) from one of GBP’s field notebooks. This extract appears to be some initial thoughts on arrangements and equipment for the proposed ground trip to the Lake Ballard BaSt breeding colony(ies). Inter alia, the ‘list’ includes ‘Jars gut 200 ml’ and ‘#10 or 9 shotgun [ammunition]’.
50. Undated page of jottings by JL listing stuff for him to take to Lake Ballard, probably (judging on 29/3/2014 by what is in and not in the list) for the one day helicopter trip from Kalgoorlie to Lake Ballard and return on 15/3/1995. Includes ‘calipers’. If for this trip, calipers were not for collected birds as none were collected or planned to be collected on that day. Maybe for measuring BaSt eggs.
51. Two typed pages by JL headed ‘LAKE BARLEE – MON 2nd – FRI 6th NOV 1992’. This is a plan of work to be done by JL & GBP at Lake Barlee during that period. One of the listed ‘tasks to be performed at Lake Barlee’ is: ‘1.3 Banded Stilt gut content sampling

(GP). Need: shotgun & ammo; gut content containers & labels; bird carcass bags & water-proof tie-on labels; preservatives etc'. These pages are included in this RMCR as a link to the bird (BaSt) and gut content sampling that undertaken at Lake Barlee in 1992 by JL & GBP. Note that Lake Barlee turned out to be dry in Nov 1992, so no BaSt were collected then. Some had been collected there in June 1993, however, as evidenced by photos (and, no doubt, other materials) held by JL. Note also that JL intends (30/3/2014) to prepare a separate RMCR covering the BaSt work undertaken by him & GBP at BaSt breeding locations pre (and post) 1995.

52. Two typed pages headed 'INVERTEBRATE FAUNA OF LAKE BARLEE: Survey of lake Barlee; Date July 3 1992', probably prepared by GBP for JL. The first page indicates what was found in a number of aquatic invertebrate sweep samples at various named locations on Lake Barlee on 02/7/1992. The second page indicates what was found in the oesophagus and/or gizzard of 6 of 7 Banded Stilts (identified as #1 to #7) (at least 6 of the 7 were 'juv'). These pages are included in this RMCR as a link to the bird (BaSt) and gut content sampling that undertaken at Lake Barlee in 1992 by JL & GBP. Note that JL intends (30/3/2014) to prepare a separate RMCR covering the BaSt work undertaken by him & GBP at BaSt breeding locations pre (and post) 1995.

Printout (31/3/2014) of document headed 'Search (Started by JL on 30/3/2014) for Correspondence / Results of Sorting & Identification of Banded Stilt Gut Samples and Sweep Samples from Lakes Ballard & Marmion in 1995'. JL stopped this search on 31/3/1995 when he felt he had found most or all of the relevant material (which was then incorporated into this RMCR, below).

Started 31/3/2014



**SEARCH (STARTED BY JL ON 30/3/2014) FOR CORRESPONDENCE / RESULTS
OF SORTING & IDENTIFICATION OF BANDED STILT GUT SAMPLES AND
SWEEP SAMPLES FROM LAKES BALLARD & MARMION IN 1995.**

1. JL electronically searched files on JL's work PC in folder 'BOONDEROO' sub-folder 'Invertebrate Data' using search words ('in file'): 'Ballard',
2. JL visually searched every file in JL's BOONDEROO/Invertebrates/Russ Shiel IDs sub-sub-folder and found nothing re Ballard or Marmion.
3. JL visually searched every file in JL's BOONDEROO/Invertebrates sub-folder and has printed all files relating to Ballard and Marmion 1995 gut and sweep samples for addition to the 'collected BaSt' RMCR.
4. NEXT; visually search every file in JL's BOONDEROO/Invertebrate Data sub-folder.
DONE ON MON 31/3/2014. NOTHING NEW FOUND RE 1995 BALLARD & MARMION MATERIALS.
- 5.

Email exchange (22/12/2005) between ACl and Stuart Halse (CALM Woodvale) with attached agreement for SH to arrange / perform \$8000 of identifications on aquatic invertebrate samples ‘... for the potential Directory [Directory of Important Wetlands in Australia] sites’.

Note that the Lakes Ballard and Marmion BaSt gut contents samples and sweep samples are NOT in the list of sites of material to be identified. This was no doubt due to the full amount of funding requested by JL (\$12,000 – see below) not being provided and priority being given to the other sites.

Note that Lakes Ballard and Marmion were already listed in the ‘Directory’.

"RE Directory Invertebrate agreement a ^{to} " .doc "

From: Halse, Stuart
Sent: Thursday, 22 December 2005 2:39 PM
To: Clarke, Alan
Subject: RE: Directory invertebrate agreement
Alan

Printed 30/3/2014

JR

Looks good. Please see attached.

Stuart



Agreement with
Stuart_sah.doc



Printed 30/3/2014

From: Clarke, Alan
Sent: Thursday, 22 December 2005 1:50 PM
To: Halse, Stuart
Subject: Directory invertebrate agreement

Hi Stuart,

I have attached a draft of the agreement for the \$8000 worth of invertebrate identifications and report for the potential Directory sites. Could you please track any changes you would like to make and send it back to me.

Alan

<< File: Agreement with Stuart.doc >>

Department of Conservation and Land Management

CALMScience Division

Woodvale Research Centre

Wildlife Place (off Ocean Reef Road) Woodvale Western Australia
PO Box 51 Wanneroo Western Australia 6065
■ (08) 9405 5101 ■ (08) 9306 1641

To: Dr Stuart Halse

From: Alan Clarke

Date: December, 2005

Subject: Aquatic invertebrate identification and reporting for potential DIWA sites

The following description outlines our agreement for you to undertake aquatic invertebrate identification analysis of 19 sites in selected IBRA Regions of the state.

Jim Lane was successful in his funding application to the Department's 2005/6 Wetland Conservation Program. This amount of \$8000 is to be spent this financial year. The purpose of this funding is to obtain species lists and their respective biogeographic significance for selected wetlands from aquatic invertebrate samples that were collected as part of the process for assessing prospective Directory and Ramsar wetlands during 2004.

Through discussions with you we (SAH, AC) have agreed on the following terms for the work I require to be undertaken by you and the remuneration for these services.

I have provided you with 19 aquatic invertebrate site samples that have been sorted to Order, Family or lowest identification where possible resulting from my initial sorting process. I have also provided you with a list of sorted taxa and their relative abundances for each of the sites.

As agreed you will provide a species list to the lowest identification possible for the 19 sites and provide expert statements about each species' obvious taxonomic and biogeographic significance.

The budget for this work is \$8000, of which \$4000 will be made available initially to begin the work and \$4000 at the completion of the project. If towards the end there is room for additional work three sites in the Yalgoo IBRA Region will be analysed. These sites are species rich and the species composition when identified may provide substance for a successful negotiation of new reserve or extensions over these sites.

A funding acquittal statement is required from us (JL/AC) by Michael Coote by 23 June 2006. We (SAH, AC) have agreed that this aquatic invertebrate identification work will be finished and results presented to me in written report form by 5 May 2006 in order to meet Directory reporting requirements.

The following list of wetlands that have been provided to you are arranged according to their IBRA Region. I can provide GPS coordinates and other site information if required.

Hampton Scarp
Yarrabie Rockhole
Linesmans Camp Dam
Cologna Rockholes
Yudenda West Rockhole
Yudenda East Rockhole
Norina Rockhole
12.3km South of Cocklebiddy

Coolgardie
Harris Lake
Samphire Pool

Little Sandy Desert
Lake Disappointment
Onegeunyah Rockhole
Durba Springs Camp Pool
Durba Springs Pool 3
Biella Spring Pool 1
West Pools Calvert Range
Camp Pool Calvert Range
Moongooloo Rockhole
South East Pools Carnarvon Range
Virgin Springs Carnarvon Range

Yalgoo
Billilly Claypan
Yuin Claypan
Nangcarrong Spring

Alan Clarke

For
Jim Lane
Principal Research Scientist

Agreed

Stuart Halse

Stuart Halse
Senior Principal Research Scientist

Ballad and Marnwarng gut
Bast
and investigate sweep samples
not included, probably because
request was for \$12,000, but
only \$8,000 was received - see
earlier correspondence / grant application.

30/3/2014

Email exchange (02-03/11/2005) between JL and ACl that inter alia indicates that only \$8000 had been granted for aquatic invertebrate identifications (\$12,000 had been requested by JL – see below) and that it might not be possible to identify all of the aquatic invertebrate material collected from potential ‘Directory’ sites and Lakes Ballard and Marmion (which were already listed in the ‘Directory’).

"RE CALM Wetlands Conservation Grants Program.doc")

From: Lane, Jim
Sent: Thursday, 3 November 2005 9:25 AM
To: Clarke, Alan
Subject: RE: CALM Wetlands Conservation Grants Program
Very good.

Printed 30/3/2014
JK

I'm more than happy for Stuart and his team to make maximum use of the invertebrate material you have collected for this project. We will, however, need to report results to DEH before they appear elsewhere, because DEH has funded the project and the collecting work has been done under contract to DEH.

Having things named after you can be a two-edged sword. I remember hearing, but I don't know if it is true, that Harry Butler had a parasite that lives up a snake's bum named after him! I suspect it might be a rural myth.

Jim

-----Original Message-----

From: Clarke, Alan
Sent: Wednesday, 2 November 2005 4:34 PM
To: Lane, Jim
Subject: RE: CALM Wetlands Conservation Grants Program

Thanks Jim, I am currently reviewing the application document and familiarising myself with the required outcomes again. I will formulate a list to present to Stuart so that we can determine a best fit scenario. I will go with the priorities that Sue has put forward, being sites on CALM managed land or UCL. I will try and negotiate with Stuart to have the Yalgoo sites looked at separately (pastoral lease issues) because a couple of Taxa that Jane McRae has already identified were present in the Carnarvon basin survey. This would provide useful range extensions for Stuart's work. So I have a few angles to work with. Interestingly a fairy shrimp 'Branchinella halsei' described and named by Jane was previously only found from the Carnarvon basin survey. I had Jane ID the fairy shrimps from Yuin Claypan and Billilly Claypan as halsei. The determining characteristic of halsei is a small appendage on the front of the head !...

Anyway, I will try and get things moving before I go into the field at the end of the week for two weeks.

AI

-----Original Message-----

From: Lane, Jim
Sent: Wednesday, 2 November 2005 1:31 PM
To: Clarke, Alan
Subject: FW: CALM Wetlands Conservation Grants Program

Alan.

I have been advised today by Mike Coote that our project has been allocated \$8,000 (eight thousand dollars) and that this is for 2005/06 with no suggestion of a second year of funding.

So \$8,000 is the amount you need to plan on spending.

As discussed yesterday the task will be to get maximum value from this amount of money, and not necessarily get all of the IDs done.

No doubt the more arrangements you can set up before Christmas the better.

Page 2 of 2.

Sue is not back at work yet so I think you should go with the advice you have received from her to date (regarding her views on priorities), rather than seek further advice this year.

I don't know where the \$8,000 has been put. It would be best if it went into a new Trust Account for this project, in my name. Please pursue with Vicki Hartshorn.

A copy of the project application is attached and I will fax you a copy of the letter of approval.

Over to you.

JL

[**<< File: Wet Cons Fund Appln 2005-06 Lane.doc >>**](#)

-----Original Message-----

From: Lane, Jim
Sent: Wednesday, November 02, 2005 10:19 AM
To: Coope, Michael
Cc: Clarke, Alan
Subject: CALM Wetlands Conservation Grants Program

Mike

I have received a letter dated 29 September 2005, signed by Keith Claymore on behalf of Keiran McNamara concerning 2005/06 grants.

The letter says that my application was 'successful'. It also says that 'funding is for the current year'.

One interpretation of this could be that the entire amount requested (\$12,000) has been approved, but all of it has to be spent this financial year.

An alternative interpretation could be that only the amount requested for 2005/06 (\$9,000) has been approved.

Could you clarify please.

Regards.

Jim

Email (02/11/2005) from JL to ACL with an attached copy of JL's '2005/06 Funding Application' to the Dept. of CALM 'Wetland Conservation Program' for 'Specialist identification and significance assessment of aquatic invertebrate samples from existing and prospective Directory and Ramsar wetlands in remote regions of Western Australia'.

Regarding Lakes Ballard and Marmion, it reads (inter alia): 'During the 1995 Banded Stilt breeding event at Lakes Ballard and Marmion, a number of sweep and gut samples of aquatic invertebrates were collected ...' 'All samples [potential 'Directory' sites and Ballard & Marmion?] have subsequently been sorted and separated into major taxonomic groups by STO [Senior Technical Officer] Alan Clarke with guidance from CALM limnologists'.

"FW CALM Wetlands Conservation Grants Program.doc"

Page 1 of 2
Printed 30/3/2014

From: Lane, Jim
Sent: Wednesday, 2 November 2005 1:31 PM
To: Clarke, Alan
Subject: FW: CALM Wetlands Conservation Grants Program
Alan.

I have been advised today by Mike Coote that our project has been allocated \$8,000 (eight thousand dollars) and that this is for 2005/06 with no suggestion of a second year of funding.

So \$8,000 is the amount you need to plan on spending.

As discussed yesterday the task will be to get maximum value from this amount of money, and not necessarily get all of the IDs done.

No doubt the more arrangements you can set up before Christmas the better.

Sue is not back at work yet so I think you should go with the advice you have received from her to date (regarding her views on priorities), rather than seek further advice this year.

I don't know where the \$8,000 has been put. It would be best if it went into a new Trust Account for this project, in my name. Please pursue with Vicki Hartshorn.

A copy of the project application is attached and I will fax you a copy of the letter of approval.

Over to you.

JL


Wet Cons Fund
Appln 2005-06 La...

Printed 30/3/2014

-----Original Message-----

From: Lane, Jim
Sent: Wednesday, November 02, 2005 10:19 AM
To: Coote, Michael
Cc: Clarke, Alan
Subject: CALM Wetlands Conservation Grants Program

Mike

I have received a letter dated 29 September 2005, signed by Keith Claymore on behalf of Keiran McNamara concerning 2005/06 grants.

The letter says that my application was 'successful'. It also says that 'funding is for the current year'.

One interpretation of this could be that the entire amount requested (\$12,000) has been approved, but all of it has to be spent this financial year.

An alternative interpretation could be that only the amount requested for 2005/06 (\$9,000) has been approved.

Joe 292

Could you clarify plse.

Regards.

Jim

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
WETLAND CONSERVATION PROGRAM – 2005/06
FUNDING APPLICATION

1. Project Title:

Specialist identification and significance assessment of aquatic invertebrate samples from existing and prospective Directory and Ramsar wetlands in remote regions of Western Australia.

2. Project Aims:

To identify aquatic invertebrate samples collected from existing and prospective Directory and Ramsar wetlands in 1995 and 2004 and to assess and report on their taxonomic, biogeographic and conservation significance.

3. Wetland Name/Location:

Many wetlands in remote areas including Lakes Ballard and Marmion in the Murchison IBRA Region; Yuin Claypan and Nancarrong Spring in the Yalgoo IBRA Region; Rockholes of the Carnarvon Range (7 sites), Virgin Springs, Onegunyah Rockhole and Claypan - Terrace Hill (2 sites), Lake Disappointment, Pools of the Durba Hills (4 sites), Pools of the Calvert Ranges (3 pools) and Moongooloo Rockhole - Constance Headland in the Little Sandy Desert IBRA Region; Harris Lake and Samphire Pool (3 sites) in the Coolgardie IBRA Region; Lake Boonderoo, Gnamma Holes 12.3 kms south of Cocklebiddy (2 sites) and Arrubiddy Stock Dam in the Nullabor IBRA Region; Hampton Scarp Rockholes between Burnabie and Madura (10 sites), Twilight Cove Wetlands and Linesmans Camp Dam - Burnabie in the Hampton IBRA region. These are located in pastoral and desert regions of the State.

4. Wetland Tenure:

CALM-managed lands, Pastoral Leases, Unallocated Crown Land.

5. Wetland Conservation Status

Two of these wetlands (Lakes Ballard and Marmion) have previously been identified (Wetlands International-Oceania 1999) as candidate Wetlands of International Importance under the Ramsar Convention. Another two of these wetlands (Lake Disappointment and the Pools of the Durba Hills) are listed in the *Directory of Important Wetlands in Australia*. The remaining 13 wetland systems (comprising 39 aquatic invertebrate sample sites) are prospective sites for Directory listing.

6. Project Description, Objectives and Outcomes

During the 1995 Banded Stilt breeding event at Lakes Ballard and Marmion, a number of sweep and gut samples of aquatic invertebrates were collected, with CALM funding. During 2004 many more samples were collected from wetlands in remote IBRA Regions, as part of an NHT project aimed at identifying and better-documenting prospective and existing sites for the *Directory of Important Wetlands in Australia*. All samples have subsequently been sorted and separated into major taxonomic groups by STO Alan Clarke with guidance from CALM limnologists.

The sorting and preliminary identification work that has been done by Alan Clarke is considered sufficient to meet CALM's contractual obligations to Environment Australia for the current Directory project. However, given the potential significance of the material and the expense of its collection, it is highly desirable that full value be gained from it. To this end, funding is now sought to pay for specialist taxonomic identification to genera and species and for expert assessment of the taxonomic, biogeographic and conservation significance of this material. This specialist work is beyond the limit of current Directory project funding and this is the reason for seeking support from the CALM Wetland Conservation Program.

The principal outcomes of the proposal would be species lists for each of the sampled wetlands and expert statements on the taxonomic, biogeographic and conservation significance of the invertebrate material. This information would then be used to better-document the conservation values of existing and candidate Directory and Ramsar sites by adding to current site descriptions.

7. Relevant Wetlands Conservation Policy for Western Australia Action Items

This project will make a direct contribution to the achievement of Action Item 2.1 (wetland biological survey) and an indirect contribution to Action Items 1.11 (wetland inventories), 1.14 (wetland evaluation), 2.9 (fulfillment of responsibilities under international agreements), 2.11 (studies to identify wetlands of international significance), 3.1 (review taxonomic knowledge) and 3.2 (clarify taxonomy and distribution).

8. Project Manager and Staff.

This project will be supervised by Principal Research Scientist Jim Lane, with day-to-day management by Alan Clarke. Professional taxonomists and others with expert knowledge of particular taxonomic groups will be engaged to undertake identifications to genus and species. Alan Clarke will continue close consultation with the Woodvale limnology group during the course of the project to ensure the best possible and most cost-effective outcome.

9. Project Budget.

Because several specialists, each with expert knowledge of a particular taxonomic group or groups, will need to be engaged for varying periods, it is not possible to precisely estimate in advance the total cost of all identifications. However, it is anticipated that \$12,000 over 18 months will be sufficient for most if not all material to be identified. If a smaller amount of funding is provided, a correspondingly smaller number of identifications could be performed.

Item	2005/06	2006/07	Total
Specialist taxonomists	8600	2800	11400
Incidentals	400	200	600
Total			\$12000

10. Indicative Time Lines and Major Milestones

It is anticipated that the project would be completed within 18 months of notification of project approval. A shorter period would almost certainly prove more expensive as specialists would need to be encouraged to put aside other work in order to give priority to the project material and to meet shorter time lines.

Major milestones

Project commencement:	2 weeks from notification of project approval.
Negotiation of most identifications:	3 months
Progress Report to WCP:	12 months
Completion of identifications and significance assessments:	16 months
Improved Directory site descriptions	18 months
Final report to WCCP:	19 months

11. Manager's Endorsement

This proposal has been verbally endorsed (16 June 2005 to J. Lane) by Science Division *Landscape Conservation Program Leader* Dr Lachie McCaw. Dr McCaw has indicated that he will be forwarding his written endorsement when he returns to the office next week.

12. References

Wetlands International-Oceania (1999). *Nomination of Additional Ramsar Wetlands in Western Australia*. Unpublished report to the WA Department of Conservation and Land Management. 292pp.

13. Signatures

Email exchange (04-08/03/2005) between JL and ACI with an attached report by ACh ‘... outlining the current situation with the DIWA (‘Directory’) identification and analysis of aquatic invertebrate species [and the 1995 BaSt gut contents and sweep samples from Lakes Ballard and Marmion]’.

The status of the 1995 BaSt samples is described in detail (current storage location, contents, curation, sorting process required [still] before identification by a taxonomist).

Note that ‘... because the alcohol dries out quickly some samples have been lost’. Look in DPaW Busselton Lab (and if not there, at DPaW Woodvale) for the 1995 Ballard & Marmion BaSt gut contents and sweep samples.

A ‘breakdown’ [two Tables in MSWord] of the ‘[1995 BaSt] samples that need sorting’ is attached’. These are ‘BALLARDN.doc’ and ‘MARMIONT.doc’. Use these to locate all the samples and perhaps as a basis for preparing a more-comprehensive Excel spreadsheet(s) of the collected materials.

Printed 30/3/2014 J.

From: Lane, Jim
Sent: Tuesday, 8 March 2005 12:13 PM
To: Clarke, Alan
Subject: FW: DIWA invertebrate ID situation
Alan.

Thanks for the comprehensive description of the situation and options.

I have made comments (tracked) on your "Invertebrate ID analysis" Word document.

Please look at these and then get back to me with your thoughts so we can decide on a course of action

I'd like us to achieve the achievable (and affordable) as soon as we can.

JL

-----Original Message-----

From: Clarke, Alan
Sent: Friday, March 04, 2005 1:18 PM
To: Lane, Jim
Subject: DIWA invertebrate ID situation

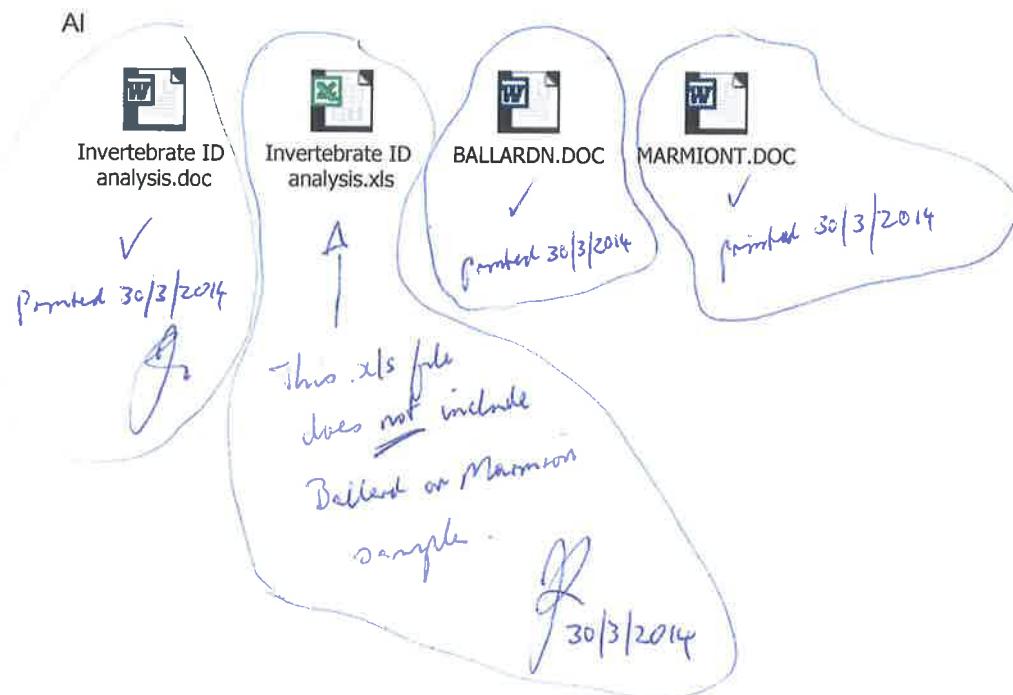
Hi Jim,

I have attached a report outlining the current situation with the DIWA identification and analysis of aquatic invertebrate species. I have also included information on the 1995 BAST samples for further discussion. Please review the report and tables and let me know what other information you require. I would like to discuss site priorities with Sue and you with regard to potential costs and timming now that it appears we will have to go to contractors to finish this work.

I would like to press a case for the inclusion of Nangcarrong Spring in the Greenough River on Yuin Station. It is fresh and in good condition, far better than anything else in the region of similar characteristics. Up for discussion anyway ?

I am on the 4WD course Tuesday and Wednesday, so I will catch you on Thursday.

AI



Department of Conservation and Land Management
CALMScience Division
Woodvale Research Centre
Wildlife Place (off Ocean Reef Road) Woodvale Western Australia
PO Box 51 Wanneroo Western Australia 6065
Ph (08) 9405 5101 Fax (08) 9306 1641

To: Jim Lane

From: Alan Clarke

Date: March 3, 2005

Subject: Analysis of aquatic invertebrate samples

The following report is an assessment of the aquatic invertebrate samples that have been collected for the DIWA project to identify possible sites/wetlands for inclusion into A Directory of Important Wetlands in Australia.

A total of 30 samples have been collected from 27 sites. Each site consists of a 250um benthic sample and a 50um micro water column sweep. At two sites the micro sample was combined with the macro sample (50um net used). My task is to sort through each of the sites, that are identified as priority NEED TO PRIORITISE SITES, into family level. I estimate the sorting process OF ALL SITES? OR JUST THE PRIORITY SITES? will take 8 – 10 weeks. This will dependant on the number of taxa that are in each of the samples and the ease of picking them from the samples. To gain a more accurate indication of the aquatic invertebrate diversity that a site supports these picked samples require identification to species level, where possible, or confirmation that a taxa is a separate species. In addition the species once identified will need to be analysed for its Bioregional significance. This process will involve literature reviews and variational analysis to determine whether any taxa are rare or regionally important OBTAIN 'EXPERT OPINION' INITIALLY.

I have produced an Excel table, which lists the sites and their details. This information includes an assessment of the species diversity, which is the result of field notes and viewing the 250ml vial micro samples under the microscope. It was not possible to determine whether any of the samples contained Copepods or Rotifers because of the very small size of the individuals in these two groups. It is possible that at least half (probable 75%) of the sites will contain either or both groups. Each sample was assessed for its estimated diversity, which will impact on the amount of work that is required to id and analyse each sample. In addition I have assessed whether each sample contains a range of groups that can be analysed by CALM staff and other professionals so that a more accurate cost of analysis can be determined. These categories are detailed as follows.

Ostracoda: It is likely that Stuart Halse will be able to identify and analyse the Ostracoda species. Stuart specialises in this group and would therefore be the most efficient person in the state to process these specimens. 12 of the high priority sites contain Ostracoda. It would be preferable for Stuart to do this work particularly as he resides in the same offices. This may or may not attract a fee. He will need to be approached regarding this proposal. HOW MANY HOURS/DAYS/WEEKS OF ACTUAL WORK ARE LIKELY TO BE REQUIRED?

Copepoda: Jane McRae, who works for Stuart Halse, is a leading taxonomist in micro crustacean. She has indicated that she is currently fully committed with extensive workloads and is unavailable to take on an additional series of work. She has agreed to work in her own time at overtime rates and identify and analyse any Copepods found in our samples. We have discussed the nature of the samples and she estimates that it would take her from one to two days to complete this work. IF JANE IS ALREADY ON THE PAYROLL, I AM AGREEABLE TO HER BEING PAID ONE TO TWO DAYS OVERTIME TO DO THIS WORK. HOW SOON CAN SHE DO IT?

Conchostraca: Jane McRae, confirmed by Stuart Halse, has agreed to include any Conchostraca from the DIWA samples with those that Stuart's group will be sending to Brian Timms who is the taxonomic expert for this group. There will be no charge for this service. WHEN COULD THE SAMPLES BE SENT? HOW LONG WILL IT TAKE FOR THE IDs TO BE DONE?

Anostraca: Only four sites contain Anostraca specimens. Two of these sites, Billilly Claypan and Yuin Claypan, have been identified by Jane McRae as Branchinella halsei, a species found commonly in the Carnarvon Basin survey. I will pursue the details of the sites from the CALM publication from that survey. Jane has agreed to ID the specimens from the two other sites and provide if possible their significance for the Bioregion. SOON?

Rotifera/Cladocera: These two groups require significant work to provide accurate identifications, but are regarded (by those working with these groups) as good indicators of biodiversity. These two groups of taxa will need to be sent to Russ Shiel, who is the leading taxonomist in these groups of micro crustacea. I have been advised that Russ will charge \$150-\$200 to identify and analyse each sample. I am unable to indicate how many of the unsorted sites contain Rotifers. My guesstimate is less than half. The two sites that I have sorted contained Rotifers, but the nature of the sites (Claypans, high diversity) suggested a high chance they would contain both groups. Seven of the sites that at this stage have been adjudged high priority contain Cladocera. WHAT MIGHT THE TOTAL COST BE? HOW DO WE PAY FOR THIS? THAT IS, WHAT PROCESS WOULD WE NEED TO FOLLOW?

The options outlined above provide a system to provide relevant information to assist in the development of a case for inclusion for a site into the directory for the micro samples. A method for identification of the macro samples has proven more difficult.

Stuart Halse has indicated that his group is fully committed with current projects NOT FORGETTING THE BOONDEROO SAMPLES THAT STUART HAS SAID HE WILL FIT IN that will prevent any identification work for the DIWA macro samples. This means that the identification and analysis of the sorted (to family level where possible) samples will need to be done by a competent contractor.

It is difficult to estimate an accurate cost for this service because the majority of the samples have not been sorted. A contractor could only provide an estimate from work previous done for CALM under similar conditions. The estimated price would need to be negotiated on the grounds that some sites would be species poor (generally), but could possibly contain difficult or rare taxa. A set price for each sample would not be

in our interest. It is likely from previous experience that the total price for species identification and analysis would be over \$10 000. This would provide a need to go to tender for the job. A process that would involve some time for Departmental staff, but may provide a range of options that might be presented from the offers to undertake this work. HAS STUART OR STUART'S GROUP CONTRACTED OUT SIMILAR WORK (SIZE AND SCOPE) BEFORE? DID IT GO TO TENDER? DID IT GO SMOOTHLY? IF YES, WAS THIS RECENT?

HOW WOULD YOU FEEL ABOUT HANDLING A TENDER PROCESS FOR THIS WORK? IT WOULD BE DOUBLY DIFFICULT FOR ME GIVEN THAT THIS IS NOT A FIELD THAT I HAVE EXPERTISE IN (YOUR KNOWLEDGE IN THIS FIELD IS GREATER THAN MINE) AND I AM NOT IN PERTH.

I'D BE CONCERNED WE MIGHT BLOW OUR BUDGET LETTING A CONTRACT FOR OVER \$10,000. CAN WE SPLIT THE JOB IN HALF AND ONLY DO THE SECOND HALF WHEN WE ARE SURE THE BUDGET WILL ALLOW IT?

Lake Ballard and Lake Marmion aquatic invertebrate samples IF THE TOTAL WORK ABOVE IS GOING TO COST WELL OVER \$10,000, WE WON'T HAVE SUFFICIENT FUNDS TO DO THE BALLARD AND MARMION SAMPLES THIS YEAR AT LEAST.

Formatted

A large suit of aquatic samples, including water column sweeps, oesophagus and gizzard samples where taken from Banded Stilt at Lake Ballard and Lake Marmion in 1995. These samples are stored in various vials in alcohol at Woodvale. There has been and continues to be a risk of samples drying out because of shattering of the vials. Regular checks are made of the collection, but because the alcohol dries out quickly some samples have been lost.

These samples contain Parartemia (Brine shrimps) as the only 'Macro invertebrate with the remainder of the taxa referred to as micro crustacia.

The sorting process will involve extraction of invertebrate specimens from oesophagus and gizzard samples. And sorting of 50m 50um sweeps samples. The sorting process will need to record species and abundance in the bird samples and similarly species and abundance in the related sweep samples to allow comparisons of available taxa with that, which has been ingested by the sample birds.

There is a large number of sweep vials and intestinal bird samples (containing micro crustacia), which will take some time to sort, count and extract so that species can be identified. Many of the samples will contain similar species. Therefore a competent taxonomist in the micro crustacean field could quickly(?) run through the sorted sample vials and confirm the species break down within each set of samples (bird and associated sweep samples). An appropriate procedure would need to be discussed with a taxonomist to confirm the most efficient technique of sorting and identification. I have attached a break down of the samples that need sorting.

"BALLARDN. loc"

LAKE BALLARD 1995

INVERTEBRATE SWEEPS AT CAMP ISLAND AND CROSSOVER LAKE

Page 1 of 3
Printed 30/3/2014 J.

Date	Site	Sweep No.	Vials	Comments
15/03/95	Camp Island	1	1	250um net was used
01/04/95	Camp Island	1	1	110um net was used
		2	1	
		3	1	
01/04/95	Crossover Lake	1	1	It seems 2 lots of samples were taken for this date. check GP's notes
		2	1	
		3	1	
		1	3	
09/04/95	Camp Island	1	1	Vial damaged, contents dried out
		2	1	
		3	1	
11/04/95		1	1	
		2	1	
		3	1	
28/04/95		1	2	
		2	2	
		3	2	
04/05/95		1	2	
		2	1	2nd vial damaged
		3	2	
09/06/95		1	2	
		2	2	
		3	2	
09/06/95	Crossover lake	1	4	

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Page 2 of 3

Date	Site	Bird	Contents	Vial s	Sweep	Vias	Comments
02/04/95		adult 1	gizz	1			oes empty
		adult 2	gizz	1			oes empty
		adult 3	gizz	1			oes empty
		adult 4	gizz	1			oes empty
		adult 5	gizz/oes	2			
		adult 6	gizz/oes,c	2			
		adult 7	gizz/oes	2			
		adult 8	gizz/oes,c	2			
		adult 9	gizz	1			oes ?
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz/oes,c	2	1	1	
		adult 11	gizz/oes,c	2	1	1	
		adult 12	gizz/oes,c	2	1	1	
10/04/95		adult 1	gizz/oes,c	2			
		chick 1.1	gizz	1			oes empty
		chick 1.2	gizz	1			oes empty
		chick 1.3	gizz/oes	1			
					1	1	
11/04/95		adult 2	gizz	1			
		chick 2.1	gizz/oes,c	2			
		chick 2.2	gizz/oes,c	2			
		chick 2.3	gizz/oes,c	2			
		chick 2.4	gizz/oes,c	2			
					1	1	
		adult 3	gizz/oes,c	2			
		chick 3.1	gizz/oes,c	2			
		chick 3.2	gizz/oes,c	2			
		chick 3.3	gizz/oes,c	2			
					1	1	

	adult 4	gizz	1			
	chick 4.1	gizzoes,c	2			
	chick 4.2	gizz	1			
	chick 4.3	gizz/oes,c	2			
	adult 5	gizz/oes	2			
	chick 5.1	gizz	1			
	chick 5.2	gizz/oes,c	2			
	chick 5.3	gizz/oes,c	2			
				1	1	Sweep for family 4 & 5 in one vial
02/05/95	adult 1	gizz/oes	2			
	chick 1a	gizz/oes	2			
	chick 1b	gizz/oes	2			
				1	2	
	adult 2					missing, presume escaped shot?
	chick 2a	gizz/oes	2			
	chick 2b	gizz/oes	2			
	chick 2c	gizz/oes	2			
				1	1	other vial damaged
	adult 3	gizz/oes	2			
	chick 3a	gizz/oes	2			
	chick 3b	gizz/oes	2			
	chick 3c	gizz/oes	2			
				1	1	other vial damaged
	adult 4	gizz/oes	2			
	chick 4a	gizz/oes	2			
				1	2	
	adult 5	gizz/oes	2			
	chick 5a	gizz/oes	2			
				1	2	

LAKE MARMION 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Sweep No.	Vials	Comments
10/06/95	Depth Post	1	1	110um net
13/06/95		1	1	
13/06/95	Breeding Colony	1	2	

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
11/06/95		adult 1	gizz/oes	2			
		chick 1a	gizz/oes	2			
		chick 1b	gizz	1			oes. not present, nothing recorded
		chick 1c	gizz/oes	2			
		chick 1d	gizz/oes	2			
		chick 1e	gizz/oes	2			
					1	2	
		juv. no.1	gizz/oes	2			Two juvinials seen
		juv. no.2	gizz/oes	2			feeding alone
12/06/95		adult 2	gizz/oes	2			
		chick 2a	gizz	1			oes. empty
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes	2			
					1	1	
		adult 3	gizz/oes	2	1		
		chick 3a	gizz/oes	2			
		chick 3b	gizz	1			oes. not present, nothing recorded
					1	3	
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
		chick 4b	gizz/oes	2			
		chick 4c	gizz/oes	2			
							Sweep missing ?
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
		chick 5b	gizz/oes	2			
					1	2	

Undated, annotated, earlier printouts of the two Tables in MSWord of the 1995 BaSt samples that need sorting. These are the Tables included in the email exchange of 04-08/03/2005 above.

30,

LAKE BALLARD 1995
INVERTEBRATE SWEEPS AT CAMP ISLAND AND CROSSOVER LAKE

Date	Site	Sweep No.	Vials	Comments
15/03/95	Camp Island	1	1	250um net was used
01/04/95	Camp Island	1	1	110um net was used
		2	1	
		3	1	
01/04/95	Crossover Lake	1	1	It seems 2 lots of samples were taken for this date. check GP's notes
		2	1	
		3	1	
		1	3	
09/04/95	Camp Island	1	1	Vial damaged, contents dried out
		2	1	
		3	1	
11/04/95		1	1	
		2	1	
		3	1	
28/04/95		1	2	
		2	2	
		3	2	
04/05/95		1	2	
		2	1	2nd vial damaged
		3	2	
09/06/95		1	2	
		2	2	
		3	2	
09/06/95	Crossover lake	1	4	

29.

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vias	Comments
02/04/95		adult 1	gizz	1			oes empty
		adult 2	gizz	1			oes empty
		adult 3	gizz	1			oes empty
		adult 4	gizz	1			oes empty
		adult 5	gizz/oes	2			
		adult 6	gizz/oes,c	2			
		adult 7	gizz/oes	2			
		adult 8	gizz/oes,c	2			
		adult 9	gizz	1			oes ?
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz/oes,c	2	1	1	
		adult 11	gizz/oes,c	2	1	1	
		adult 12	gizz/oes,c	2	1	1	
10/04/95		adult 1	gizz/oes,c	2			
		chick 1.1	gizz	1			oes empty
		chick 1.2	gizz	1			oes empty
		chick 1.3	gizz/oes	1			
					1	1	
11/04/95		adult 2	gizz	1			
		chick 2.1	gizz/oes,c	2			
		chick 2.2	gizz/oes,c	2			
		chick 2.3	gizz/oes,c	2			
		chick 2.4	gizz/oes,c	2			
					1	1	
		adult 3	gizz/oes,c	2			
		chick 3.1	gizz/oes,c	2			
		chick 3.2	gizz/oes,c	2			
		chick 3.3	gizz/oes,c	2			
					1	1	
		adult 4	gizz	1			
		chick 4.1	gizz/oes,c	2			
		chick 4.2	gizz	1			
		chick 4.3	gizz/oes,c	2			
		adult 5	gizz/oes	2			
		chick 5.1	gizz	1			
		chick 5.2	gizz/oes,c	2			
		chick 5.3	gizz/oes,c	2			
					1	1	Sweep for family 4 & 5 in one vial

28.

02/05/95		adult 1	gizz/oes	2			
		chick 1a	gizz/oes	2			
		chick 1b	gizz/oes	2			
					1	2	
		adult 2					missing, presume escaped shot?
		chick 2a	gizz/oes	2			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes	2			
					1	1	other vial damaged
		adult 3	gizz/oes	2			
		chick 3a	gizz/oes	2			
		chick 3b	gizz/oes	2			
		chick 3c	gizz/oes	2			
					1	1	other vial damaged
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
					1	2	
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
					1	2	

LAKE MARMION 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Sweep No.	Vials	Comments
10/06/95	Depth Post	1	1	110um net ✓
13/06/95		1	1	✓
13/06/95	Breeding Colony	1	2	

2 days

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
11/06/95		adult 1	gizz/oes	2 ✓			
		chick 1	gizz/oes	2 ✓			
		chick 2	gizz	1 ✓			
		chick 3	gizz/oes	2			
		chick 4	gizz/oes	2 ✓			
		chick 5	gizz/oes	2 ✓			
				1	2		
		Stilt No. 1	gizz/oes	2 ✓			are these two birds
		bast no. 2	gizz/oes	2 ✓	5uv		failed attempts ?
12/06/95		adult 2	gizz/oes	2 ✓			
		chick 2a	gizz	1 ✓			
		chick 2b	gizz/oes	2 ✓			
		chick 2c	gizz/oes	2 ✓			
				1 ✓	1 ✓		
		adult 3	gizz/oes	2 ✓	*		
		chick 3a	gizz/oes	2 ✓			
		chick 3b	gizz	1 ✓			
				1 ✓	3		
		adult 4	gizz/oes	2 ✓			
		chick 4a	gizz/oes	2 ✓			
		chick 4b	gizz/oes	2 ✓			
		chick 4c	gizz/oes	2 ✓			
							Sweep missing ?
		adult 5	gizz/oes	2 ✓			
		chick 5a	gizz/oes	2 ✓			
		chick 5b	gizz/oes	2 ✓			
				1	2		

2 days

3 days

2 days

1 day

HOW FAR
AWAY FROM
OTHER
BIRDS

2 days

12

7 weeks

Undated, annotated, earlier drafts of the two Tables in MSWord of the 1995 BaSt samples that need sorting. These are the Tables included in the email exchange of 04-08/03/2005 above.

24.

LAKE BALLARD 1995
INVERTEBRATE SWEEPS AT CAMP ISLAND AND CROSSOVER LAKE

Date	Site	Sweep No.	Vials	Comments
15/03/95	Camp Island	1	1	250um net was used
01/04/95	Camp Island	1	1	110um net was used
		2	1	
		3	1	
01/04/95	Crossover Lake	1	1	It seems 2 lots of samples were taken for this date. check GP's notes
		2	1	
		3	1	
		1	3	
09/04/95	Camp Island	1	1	
		2	1	
		3	1	
11/04/95		1	1	
		2	1	
		3	1	
28/04/95		1	2	
		2	2	
		3	2	
04/05/95		1	2	
		2	1	2nd vial damaged
		3	2	
09/06/95		1	2	
		2	2	
		3	2	
09/06/95	Crossover lake	1	4	

photo copies of note books



230

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
02/04/95		adult 1	gizz	1			gizz empty
		adult 2	gizz	1			gizz empty
		adult 3	gizz	1			gizz empty
		adult 4	gizz	1			gizz empty
		adult 5	gizz/oes	X 2			FOLICLE
		adult 6	gizz/oes/c	X 2			
		adult 7	gizz/oes	X 2			
		adult 8	gizz/oes/c	X 2			
		adult 9	gizz	1			oes ?
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz/oes/c	X 2	1	1	
		adult 11	gizz/oes/c	X 2	1	1	
		adult 12	gizz/oes/c	X 2	1	1	FOLICLE
10/04/95		family 1			1	1	no gizzard or oes. check GP's notes
11/04/95		family 2	gizz	1	1	1	
		family 3	gizz	1	1	1	
		family 4	gizz	1			
		family 5	gizz	1	1	1	Sweep for family 4 & 5 in one vial
02/05/95		adult 1	gizz/oes	2			
		chick c1	gizz/oes	2			
		chick c2	gizz/oes	2			
					1	2	
		adult 2					missing, presume escaped shot?
		chick 2a	gizz/oes	2			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes	2			
					1	1	other vial damaged
		adult 3	gizz/oes	2			
		chick 3a	gizz/oes	2			
		chick 3b	gizz/oes	2			
		chick 3c	gizz/oes	2			
					1	2	other vial damaged
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
					1	2	
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
					1	2	

Note G.P. should have a rough location of where the birds were taken on lake ballard.

22.

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
02/04/95		0x adult 1	gizz	1			
		0x adult 2	gizz	1			
		adult 3	gizz	1			
		adult 4	gizz	1			
		adult 5	gizz	1			
		adult 6	gizz/oes	1			
		adult 7	gizz/oes	1			
		adult 8	gizz/oes	1			
		adult 9	gizz	1			
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz	1	1	1	
		adult 11	gizz	1	1	1	
		adult 12	gizz	1	1	1	
10/04/95		family 1			1	1	no gizzard or oes. check GP's notes
11/04/95	<i>contents</i>	family 2	gizz	1	1	1	
	<i>exact</i>	family 3	gizz	1	1	1	
		family 4	gizz	1			
		family 5	gizz	1	1	1	Sweep for family 4 & 5 in one vial
02/05/95		adult 1	gizz/oes	2			
		chick c1	gizz/oes	2			
		chick c2	gizz/oes	2			
					1	2	
	?	adult 2					missing, presume escaped shot?
		chick 2a	gizz/oes	2			
		chick 2b	gizz/oes	2			
	?	chick 2c	gizz/oes				
					1	1	other vial damaged
		adult 3	gizz/oes	2			
		chick 3a	gizz/oes	2			
		chick 3b	gizz/oes	2			
		chick 3c	gizz/oes	2			
					1	2	
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
					1	2	
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
					1	2	

* copies of field notes for complete

11/4	ADULT 5	GIZZ	OES
	5.1	GIZZ	-
	5.2	GIZZ	OES/c
	5.3	GIZZ	OES/c

ADULT 4	GIZZ	-
4.1	GIZZ	OES
4.2	GIZZ	-
4.3	GIZZ	OES

ADULT 3	GIZZ	OES/c
3.1	GIZZ	OES/c
3.2	GIZZ	OES/c
3.3	GIZZ	OES/c

ADULT 2	GIZZ	-
2.1	GIZZ	OES/c
2.2	GIZZ	OES/c
2.3	GIZZ	OES/c
2.4	GIZZ	OES/c

10/4	ADULT 1	GIZZ	OES/c
10/4	1.1	GIZZ	OES EMPTY NO WORM
	1.2	GIZZ	OES EMPTY NO WORM
	1.3	GIZZ/OES	

c = contents

25

LAKE MARMION 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Sweep No.	Vials	Comments
10/06/95	Depth Post	1	1	110um net
13/06/95		1	1	
13/06/95	Breeding Colony	1	2	

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
11/06/95		adult 1	gizz/oes	2			
		chick 1	gizz/oes	2			
		chick 2	gizz	1			
		chick 3	gizz/oes	2			
		chick 4	gizz/oes	2			
		chick 5	gizz/oes	2			
					1	2	
		Stilt No.1	gizz/oes	2			are these two birds
		bast no.2	gizz/oes	2			failed attempts ?
12/06/95		adult 2	gizz/oes	2			
		chick 2a	gizz	1			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes	2			
					1	1	
		adult 3	gizz/oes	2	1		
		chick 3a	gizz/oes	2			
		chick 3b	gizz	1			
					1	3	
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
		chick 4b	gizz/oes	2			
		chick 4c	gizz/oes	2			
							Sweep missing ?
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
		chick 5b	gizz/oes	2			
					1	2	

Email (03/12/2003) from ACI to JL which, inter alia, indicates that, at that point in time, the 1995 BaSt gut contents and sweep samples from Lakes Ballard and Marmion had NOT been sorted (a necessary preparatory step before identification). AC seeks to 'discuss the options and timing' with JL.

Extract from "Boonderoo invertebrate samples text extracts.doc"

Printed 30/3/2014

(This PC) "Boonderoo invertebrate samples text extracts.doc"

000

From: Clarke, Alan
Sent: Wednesday, December 03, 2003 3:06 PM
To: Lane, Jim
Subject: Invertebrate sorting and ID status

Jim, I have reviewed the invertebrate and identification situation and it is as follows.

Jane McRae has inspected the Boonderoo samples and indicated to me that the identification of all the Boonderoo samples, including the 2003 sites, to species level would take her approximately two weeks. I need to spend 4 days to sort through the 6 sites for the 2002 and 03 benthic samples so that the extracted animals are ready for the identification process. I am unsure of the cost that Stuart would charge to have one of his TOs do this work or if they have the time.

I have spoken to both David Cale and Jane McRae about sampling procedure, expertise and timing to sort through the Lake Ballard and Lake Marmion samples. It seems it would be preferable for me to sort through the samples, which would include extracting animals from gut samples. They have used volunteer workers and tried training casual people for this work with little success. They find it difficult to come across experienced competent people in this specialised field. I am capable to do this work and it would only cost my time to you. We have estimated, to sort through these samples, it will take at least 6 weeks full time of more likely 9 weeks with regular half days of sorting over the microscope. I expect that this needs to be done during January to the end of March 2004. The identification process may not be so daunting. The samples are all from two similar lakes. The species will be the same or similar just repeated for each site or bird sample with the abundance the only variable factor. An estimate for the ID work could only be done once the samples are sorted. A ball park figure for the cost three to 4 weeks ID time might be useful to factor in for April 2004.

Please ring me to discuss the options and timing.

Alan Clarke

000

Part of what appears to be a fax (20/2/2001) [but note that year is difficult to read] from JL to CDTM in which JL inter alia writes 'We will be making a start on the Ballard-Marmion sweep & gut samples in a few months time ...'

With Compliments

Clarice M. Mather

Many thanks for the excellent work
you sent to me for the Board
addition of the Director.
Enclosed is a copy of the
background information between
you and the Board.

I'm steadily finishing off
projects that have been around to
long - w/ the Director and W. his new
new site nomination (incl. debt fore).
We will be meeting - start on
the Belvedere - Mission sweep & just samples
in a few months time when
the Belvedere Action Plan work
completed. Clear
J-2010
2012/10

A chain of emails (13-19/04/2000) between CDTM, GBP and JL in which, inter alia, JL advises GBP that: 'As far as I am aware, no blood samples were taken at [Lakes] Ballard or Marmion in 1995. My recollection is that we decided not to take them, for practical reasons'.

CDTM wrote (16/4/2000) 'We [CDTM and others in the east] collected some blood samples from the [BaSt] chicks at Lake Eyre and these have already been sent to Canada for use by Alan Baker in his classification work. He has agreed also ... to see whether there are any differences yet developed in DNA characteristics between the south australian and west australian Banded Stilt populations'.

To: iSMTP@CALM.COMO.1@Servers [mailto:<mintons@ozemail.com.au>], Jim
Lane@BUSS.SID@CALM
From: Grant Pearson@WOOD.SID@CALM
Cc: Alan Clarke@WOOD.SID@CALM
Subject: re: Various
Attachment:
Date: 19/Apr/2000 11:47 AM

clivegr3.doc

Hi Clive

A couple of things. Thanks for the impressive report on Lake Eyre. We have exhausted all available funds for air surveys for stilts and unless we can find alternative funds we cannot look any further.

Jim would like to know what colour combination did you use at Eyre. No doubt we should keep a look out for flags from Eyre?

We did not take blood from chicks at Ballard or Marmion. We did collect eggs for DNA work and they went to Murdoch Uni. Despite many attempts we were never able to extract any results from Murdoch. We believe they never got round to testing them. In the end we decided we should wait for another breeding effort in WA and collect more, to send to a different DNA lab.

We will continue to monitor for breeding events. Would it not be possible to take samples from a number of adults from, say Rottnest, and determine if there are differences in the adult population or if there are similarities with the SA birds?

Cheers
Grant

Grant Pearson
Department of Conservation and Land Management
WA Wildlife Research Centre
Wildlife Place
Woodvale WA 6026
Tel:(8) 9405 5163, Fax: (8) 9306 1641
Email: grantp@calm.wa.gov.au
----- Original Text -----

From: "Pat and Clive Minton" <mintons@ozemail.com.au>, on 13/04/2000 1:55 PM:

Dear Grant,

Just got down the pile to your 15th March note.

1. Have not had any enquiries yet refereeing your award application.
2. Robin Phillimore would be most welcome. Get her please to contact me urgently. Two people have dropped out recently and I would welcome replacements.

Best wishes,
Clive.

To: Grant Pearson@WOOD.SID@CALM
 From: Jim Lane@BUSS.SID@CALM
 Cc:
 Subject: re: fwd: Various
 Attachment: BEYOND.RTF
 Date: 18/Apr/2000 3:07 PM

Grant

As far as I am aware, no blood samples were taken at Ballard or Marmion in 1995. My recollection is that we decided not to take them, for practical reasons.

We did collect eggs for DNA work and they went to Murdoch Uni. Despite many attempts I was never able to extract any results from Murdoch. I believe they never got round to testing them. In the end I decided we should wait for another breeding effort in WA and collect more, to send to a different DNA lab.

There is a list of yellow tag sightings reported to us in an early 1996 (or thereabouts) issue of WA Bird Notes. There have been a few since but I don't have time to dig them out just now.

Unless you can find money from somewhere, we won't be able to do any more aerial searching for nesting BaSt this financial year. As you know, the \$2,000 of CALM funds that we obtained for this purpose has now been fully spent.

On a different subject, which type of film and filter (if any) did you end up using for the Ramsar extension shots?

When are you thinking of doing your next Vasse-Wonnerup logger download?

Also, which pilot would you now recommend for the gull monitoring (Carnac & Penguin) that Doug Coughran and/or I need to do in mid May (from Jandakot).

Jim

From: Grant Pearson@WOOD.SID@CALM, on 17/Apr/2000 5:37 PM:

Jim

I recall talking about blood samples but not actually taking it. This would have required liquid nitrogen I guess and all sorts of bleeding procedures. Did Clive take these samples with you or Al or on his own??

Lake King is certainly full and Lake Grace less so.

Do you have a list of recent tag sightings for Clive. My file is with Al.

Pelicans at Peel/Har 17/4

Larger than normal numbers of P but I won't have counts til I look at photos. I got shots of all ramsar wetlands except preston when we ran out of time. The aircraft had to be back for another booking. Will develop and send to you.

Cheers

Grant

Grant Pearson
 Department of Conservation and Land Management
 WA Wildlife Research Centre
 Wildlife Place
 Woodvale WA 6026
 Tel:(8) 9405 5163, Fax: (8) 9306 1641
 Email: grantp@calm.wa.gov.au
 ----- Original Text -----

From: "Pat and Clive Minton" <mintons@ozemail.com.au>, on 16/04/2000 3:49 PM:
 To: Grant Pearson@WOOD.SID@CALM

Dear Grant,

I'm sorry your flight did not reveal any breeding Banded Stilts. I'm sure they must be somewhere. Is it possible to reexamine the detailed rainfall records for other possibilities. Could they be further south in the Lake Gra... (Lake King area)? Or much further east in that huge long lake full of islands (whose name I can't remember). It would be great if you could find them and I hope that you may be able to do one more aerial recce.

13.

You did not mention in your response to my last email whether you would be able to prepare the requested list of all yellow leg flag sightings.

I have still heard nothing from the bulletin about my Eastern Curlew slide. I suggest you talk to the editor [REDACTED] [REDACTED]

I spoke to John Stokes at Anna Plains this morning and learned that he is currently surrounded by water with the beach access road invisible under half metre deep water. It is touch and go whether we will even be able to get down to the beach in our visit in May. But the marsh and bush birds should be fantastic!

We collected some blood samples from the Banded Stilt chicks at Lake Eyre and these have already been sent to Canada for use by Alan Baker in his classification work. He has agreed also, at his expense, to see whether there are any differences yet developed in DNA characteristics between the south Australian and west Australian Banded Stilt populations. Where are the blood samples which we collected in 1995 at Lake Ballard? Would it be possible to spare 5 of these, please? If so could you send them to Alan Baker or alternatively get them to me for forwarding please?

That's all for now,
Best wishes,
Clive.

Faxed (on Fri 17/03/2000; from JL to GBP) copies of a 1999/2000 Budget Request and a Science Project Plan for SPP 'Breeding ecology and conservation of Banded Stilt'.

The Budget Request refers inter alia to: 'Sorting, identification and quantification of aquatic invertebrate sweep samples from 1995 breeding event at Lake Ballard' and 'Identification and quantification of Banded Stilt oesophagus contents from 1995 breeding at [Lake] Ballard' as 'Planned Achievements for 1999/2000'.

'Sorting, identification and quantification of macroinvertebrate sweep samples and stilt gut contents' is listed in the Science Project Plan as a 'Phase 1: (1995-2000)' milestone to be completed by Dec 1999. The SPP also says (Item 22) that 'The 1995 macroinvertebrate samples are held and curated by A. Clarke at CALMScience Woodvale'.

10
DEPARTMENT OF CONSERVATION AND LAND
MANAGEMENT

14 QUEEN STREET, BUSSELTON WA 6280
PHONE - (08) 9752 1677 FAX - (08) 9752 1432



FAXED
FACSIMILE TRANSMITTAL SHEET

TO: *Grant Peterson*

FROM:

Jim L.

COMPANY:

DATE:

17/3/00

FAX NUMBER:

TOTAL NO. OF PAGES INCLUDING COVER:

(9)

PHONE NUMBER:

SENDER'S REFERENCE NUMBER:

RE:

YOUR REFERENCE NUMBER:

NOTES/COMMENTS:

Re Mongey's flight

- a) CF (including ED / NC Division) allocation: \$5,000
- b) External allocation and source: Support to value of \$2,000 provided by mining industry.

6. PLANNED ACHIEVEMENTS FOR 1999/2000 (5-6 dot points):

- Sorting, identification and quantification of aquatic invertebrate sweep samples from 1995 breeding event at Lake Ballard.
- Identification and quantification of Banded Stilt oesophagus contents from 1995 breeding at Ballard.
- Egg laying, incubation and hatching success data to be extracted from daily photographic monitoring of quadrats established in 1995 Ballard breeding colonies.
- Data and observations from 1995 Ballard breeding event to be prepared for publication in "Emu".
- *In the event that suitable rainfall occurs, aerial surveys are proposed to determine Banded Stilt breeding locations, colony size, colony site characteristics, breeding success, etc.*
- *In the event that suitable rainfall occurs and breeding is successful, banding and flagging of Stilt chicks is proposed to determine movements, longevity, etc.*

7. 1999/2000 CF BUDGET REQUEST:

2

BIODIVERSITY CONSERVATION GROUP

CF BUDGET REQUESTS

1999 / 2000

1. SPP TITLE: Breeding ecology and conservation of Banded Stilt

2. SPP NUMBER: Req. No. WD/0023

3. SCIENTIST: J.A.K. Lane

4. ACHIEVEMENTS IN 1998/9 (5-6 dot points):

- Aerial survey of limited number of known and potential breeding sites in Eastern Goldfields conducted in April 1999 following rainfalls from ex-tropical cyclones Elaine and Vance.
- Effectiveness of March-April 1999 rainfall in providing suitable conditions for breeding activity by Banded Stilt on Lakes Ballard, Goongarrie, Marmion and Carey determined.
- Precise location of new breeding site on Goongarrie identified.
- Mining industry support obtained for CALM Banded Stilt research.
- Potentially useful contacts established with mining industry.

5. 1998/9 BUDGET ALLOCATION:

- a) CF (including ED / NC Division) allocation: \$5,000
- b) External allocation and source: Support to value of \$2,000 provided by mining industry.

6. PLANNED ACHIEVEMENTS FOR 1999/2000 (5-6 dot points):

- Sorting, identification and quantification of aquatic invertebrate sweep samples from 1995 breeding event at Lake Ballard.
- Identification and quantification of Banded Stilt oesophagus contents from 1995 breeding at Ballard.
- Egg laying, incubation and hatching success data to be extracted from daily photographic monitoring of quadrats established in 1995 Ballard breeding colonies.
- Data and observations from 1995 Ballard breeding event to be prepared for publication in "Emu".
- *In the event that suitable rainfall occurs, aerial surveys are proposed to determine Banded Stilt breeding locations, colony size, colony site characteristics, breeding success, etc.*
- *In the event that suitable rainfall occurs and breeding is successful, banding and flagging of Stilt chicks is proposed to determine movements, longevity, etc.*

7. 1999/2000 CF BUDGET REQUEST:



Department of Conservation and Land Management

CALMScience Division

Science Project Plan

(Page 1)

Important: Refer to the *Explanatory Notes (Staff Guideline No. 7)* when preparing an SPP.

PART A Title and Location

SPP Number: [allocated by D/AA]
Request No: [allocated by WASPP] WD/0023
Concept Plan No: [allocated by D/AA]

1. Project Title: Breeding ecology and conservation of the Banded Stilt
2. CALMScience Group: Project Team:
Biodiversity Conservation Aquatic Ecosystems
3. Staff [Names and estimates of percentage of time]:

Supervising Scientist:	J. Lane (15% in 1999/00)
Other Scientists:	
Technical Officers:	G. Pearson (2% in 1999/00) A. Clarke (10% in 1999/00)
External Collaborators:	Dr C. Minton (Australian Wader Study Group)
Volunteer(s):	A. Chapman
4. a) Departmental Program(s): Nature Conservation
b) Land Tenure(s): Vacant crown land, pastoral lease, CALM-managed land.
c) CALM Region(s): Goldfields, Wheatbelt, Pilbara
d) CALM District(s): All within above regions.
e) Location of plots/transects [Name] : Not applicable
5. Related SPPs: WD/0024 (*A Directory of Important Wetlands In Australia*)
6. Proposed commencement date: Phase 1: 1995 Phase 2: 1999
7. Proposed completion dates: Phase 1: 2001 Phase 2: 2005
8. Date of submission of this Plan and signature of Supervising Scientist:

PART B Endorsements

9. List the relevant District Manager(s), Business Unit Manager(s), and/or Regional Manager(s) whom you have consulted about the SPP. If the SPP relates to all Regions, you should confer with the Director of Regional Services:

Goldfields Regional Manager (Ian Keally)

10. Biometrician:
Return comments to D/AA

11. Animal Ethics Committee:
Return comments to D/AA

12. Project Team Leader:
Return comments to D/AA

13. Group Manager:
Science Group Manager to forward to D/AA

14. Divisional Administrative Assistant (D/AA):
Divisional Admin. Assistant to manage approval process, load approved SPP on WASPP, arrange filing at SOHQ, publish in CALMScience News, send photocopy of completed SPP to Supervising Scientist and notify Biometrician of SPP No., copy cover sheet to Regional Manager, District Manager and relevant Program Manager (for their information)

PART C Relevance and Outcomes

15. **Background:** The Banded Stilt *Cladorhynchus leucocephalus* is an Australian endemic. It nests in large colonies (up to 100,000+ pairs) on small islands (about 1-5 ha) on huge (100+ km²) claypan lakes of inland Western (mainly) and South Australia following exceptional rainfall events (c. 3-7 year intervals). Its breeding biology has been little studied, due mainly to the difficulty of finding and gaining access to breeding colonies. Nesting attempts fail spectacularly if lakes dry prematurely during breeding attempts. Few known nesting locations are within conservation reserves, and these only partly. The mining industry is showing substantial interest in mining the beds of claypan lakes and utilising them for storage / disposal of wastes and for water supply. Without an improved knowledge of Banded Stilt breeding biology and environmental requirements, CALM is not well placed to ensure conservation of the species.

16. **Project aims:**

- Determine the principal breeding locations of Banded Stilt in Western Australia and their relative importance.
- Develop an improved understanding of their breeding biology.
- Quantify key environmental factors (e.g. hydrological regime, salinity) governing breeding success;
- Identify any significant human-induced threats to nesting colonies and habitats.
- Obtain and disseminate knowledge needed to ensure conservation of the species.

17. **Anticipated project outcome(s):** Scientific and other publications that will provide information necessary to ensure that the principal breeding sites and habitats of the Banded Stilt can be adequately conserved and wisely managed.

18. **Anticipated users of the knowledge to be gained and technology transfer strategy:** CALM, Department of Environmental Protection, Environmental Protection Authority, Department of Minerals & Energy, mining and tourism industries, conservation groups. Results of Phase 1 have been transferred through articles in the media, popular and ornithological magazines, an ABC television documentary, presentation at Southern Hemisphere Ornithological Conference. Scientific publication is also proposed.

19. **Milestones [Describe tasks and when they will be completed]:**

Phase 1: (1995-2000)

• Aerial survey to locate Banded Stilt breeding colonies in Eastern Goldfields following passage of Cyclone Bobby.	Mar 1995
• Establishment of base camp to study Lake Ballard breeding colony	Apr 1995
• Collection of data on breeding colony characteristics, timing of nesting, clutch size, incubation period, hatching & fledging success, fledging period, lake filling / drying cycle, water chemistry.	Jun 1995
• Collection of stilt adults and chicks for gut content analysis.	Jun 1995
• Leg banding and flagging of chicks on Lakes Ballard and Marmion.	Jun 1995
• Sorting, identification and quantification of macroinvertebrate sweep samples and stilt gut contents.	Dec 1999
• Extraction of clutch size, incubation period, hatching success data from photographic monitoring of 1995 Ballard nesting event.	Dec 1999
• Preparation and write-up of 1995 breeding event data and observations for scientific publication.	Apr 2000
• Publication of 1995 breeding event results in journal <i>Emu</i> .	2001

Phase 2: (1999-2005)

• Monitor rainfall reports from Eastern Goldfields and Wheatbelt.	2004
• <i>In the event that exceptional rainfall occurs (annual probability low), conduct aerial surveys to locate and photograph breeding colonies.</i>	2004

- *In the event that exceptional rainfall occurs and breeding colonies become established, conduct aerial (& possibly ground) monitoring to determine colony success and major limiting factors.* 2004
- *In the event that successful fledging of chicks appears probable, 2004 conduct banding and leg flagging of chicks.*
- Prepare and write-up of data and observations for publication. end 2004
- Publish in *Emu* or other scientific journal. 2005

PART D Study Design

20. Method [including statistical analysis]: Phase 1 (1995-2000): Conduct aerial survey of Lakes Barlee & Ballard following Cyclone Bobby (Feb 1995) to locate breeding colonies. Establish base camp on Lake Ballard. Establish quadrats in nesting areas for daily monitoring (photographs) to determine laying rate, clutch size, incubation period and hatching success. Collect adults and chicks to determine diet. Conduct macro-invertebrate (standardised sweeps) to monitor food availability. Install continuous recorder to monitor lake water level. Sample water chemistry. Develop safe method of catching chicks. Band / leg flag chicks. Conduct additional aerial surveys to monitor fledging success. Analyse results. Prepare for publication. Publish.

Phase 2 (1999-2005): Rainfall in the main breeding range of the Banded Stilt (in WA) will be monitored using daily rainfall data obtained by the Bureau of Meteorology. Following exceptional rainfall events (approx 3-7 year intervals) and reports of flooding, aerial surveys will be conducted to locate and monitor breeding colonies. Colonies will be photographed from the air and, if feasible, visited on the ground to determine number of breeding pairs, nesting and fledging success, water depths, water chemistry and food availability. Chicks will be banded and leg-flagged to obtain information on movements and longevity. Standard statistical techniques will be used where appropriate.

PART E Data Management and Budget

21. Voucher specimens [how many are anticipated to be collected and where will they be lodged?]: Voucher specimens (at least) from macroinvertebrate samples will be retained and curated at CALMScience Woodvale.

22. Data management [how and where are data being archived/maintained?]: The original data (field note books, other papers) and nest monitoring photographs are held by J.Lane at CALM Busselton. Data from a continuous water level recorder (Lake Ballard 1995) are on disk in a datasafe in JL's office. The 1995 macroinvertebrate samples are held and curated by A.Clarke at CALMScience Woodvale. Data to be collected (Phase 2) will be held by JL at Busselton.

23. Budget Estimate [anticipated expenditure]:

Consolidated Funds (CALM)

	Year 1 (94/95)	Year 5 (98/99)	Year 6 (99/00)
FTEs - Scientist	0.2	0.02	0.15
FTEs - Technical	0.5	0.03	0.12
Equipment	0	0	200
Vehicle	0	0	500
Travel	0	0	500
Other	0	5 000	1 800
TOTAL	0	5 000	3 000*

	Years 7 to 10 (00/01 to 03/04)	Year 11 (2004/05)	
FTEs - Scientist	0.05	0.1	
FTEs - Technical	0.1	0.05	
Equipment	200	200	
Vehicle	500		
Travel	500		
Other	1 800	800	
TOTAL	3 000*	1 000	

External Funds

	Year 1 (94/95)	Year 5 (98/99)	Year 6 (99/00)
Salaries/Wages/Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
TOTAL	10 000**	1 200**	**

	Years 7 to 10 (00/01 to 03/04)	Year 11 (2004/05)	
Salaries/Wages/Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
TOTAL	**	**	

* CALMScience funding (\$3,000 each year) is being sought from 1999/00 to 2003/04 to enable a *rapid response* in the event (<50% probability) that potentially-suitable rainfall events occur. These funds will be used for aerial surveys. External funds will be sought to support follow-up work in the event that breeding colonies with a high likelihood of success are located. In years when potentially-suitable rains do not occur (by end of April), *the funds could be reallocated to other projects*.

** There is a strong possibility of significant, external, in-kind support (\$1,000s) being provided (as occurred in 1994/95 & 1998/99) to this project by the mining industry and other sources in the event that suitable rainfall events occur in 1999/2000 and subsequent years.

24 Budget Actual [to be updated at the end of each financial year by D/AA and local AA]:

Consolidated Funds (CALM)

	Year 1 (94/95)	Year 5 (98/99)	Year 6 (99/00)
FTEs - Scientist	0.2	0.02	
FTEs - Technical	0.5	0.03	
Equipment	0	0	

Vehicle	0	0	
Travel	0	0	
Other	0	0	
TOTAL	0	0	

	Years 7 to 10 (00/01 to 03/04)	Year 11 (2004/05)	
FTEs - Scientist			
FTEs - Technical			
Equipment			
Vehicle			
Travel			
Other			
TOTAL			

External Funds

	Year 1 (94/95)	Year 5 (98/99)	Year 6 (99/00)
Salaries/Wages/Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
TOTAL	10 000**	2 000**	

	Years 7 to 10 (00/01 to 03/04)	Year 11 (2004/05)	
Salaries/Wages/Overtime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
TOTAL	**	**	

25 Account code(s) for this SPP [allocated by Group AA]:

26 Latitude and longitude of plots/transects: Not applicable (no permanent plots/transects)

File record (16/3/2000) by JL headed 'Calculation of Banded Stilt Funds Available as at 16 March 2000'.

Inter alia this records that: 'On 26 Nov 1998 Keith Morris [CALM] sent me an email (v4 f16) saying he would provide \$5,000 to enable me to employ an assistant to analyse the Banded Stilt samples ...'; that in May 1999 the funds had not yet been transferred, and that as at 16/3/2000 'There is still \$5,078.80 available in [a Trust Account] to spend on analysing the BaSt invertebrate samples'.

CALCULATION OF BANDED STILT FUNDS AVAILABLE AS AT 16 MARCH 2000

1. On 26 Nov 1998 Keith Morris sent me an email (v4 f16) saying he would provide \$5,000 to enable me to employ an assistant to analyse the banded Stilt samples and that he would put the funds in my RAOU account.

2. On 28 Nov 1998 Keith Morris emailed (v3 f...) to Rod Mell (copied to me) a request to transfer \$5,000 from one of his accounts to my RAOU account for analysing BaSt samples.

3. External Funds summary provided by Rod Mell on 5 march 1999 (v3 f ...) says (as at Fri 5 March 1999)

L29	RAOU Trip	Opening Balance	Expenditure	Revenue	Closing Balance
		105.80	27.00	0.00	78.80

4. I calculated cost of BaSt air survey at \$2,068 around 30 April 1999 (v3 f...)

5. On 13 May 1999, following my appraisal in Nov 1998, I sent an email (v4 f17) to Rod Mell saying that the \$5,000 promised by Keith Morris for banded Stilt work had not appeared in Job L29 (RAOU Trip) report of 2 march 1999 and asking if it had been transferred since. No reply (until 21 May, see below).

6. On 21 May 1999, I sent an e-mail to Keith Morris saying he had agreed to "transfer \$5,000 into my RAOU account (Job L29) to enable me to employ a consultant to analyse the banded Stilt samples" but that the transfer had not happened yet (v4 f18, 30, 58). Folios 30, 59 have discussion of what would be done and reason for holdup. Keith emailed on 22 May 1999 (f59) indicating the \$5,000 would be transferred "this financial year" (1998/99).

7. On 21 May 1999 Rod Mell emailed me (v4 f31) saying he had processed the paperwork for the transfer but it would take a few days to be processed..

8. 1999/2000 CRF budget allocation summary page (v4 f133, 131) indicates as follows:

SPP No.	Account	Project	Request	Received 99/00	Alloc. 99/00
(WD/0023)	535AE516M	Breeding ecology and conservation of BaStilt	3,000	5,000	2,000

The \$2,000 for 99/00 was allocated to 535AE516M by 20 Sep 1999 (see v4 f127). Which account did the \$5,000 allocated in 98/99 go in to? It went into Trust Account L29 (see v4 f143; this folio shows a credit (negative expenditure) of \$4,973 for 98/99, this was the credit of \$5,000 minus the expenditure in 98/99 of \$27).

9. (as at Tues 16 November 2000) (v4 f172)

L29	RAOU Trip	Opening Balance	Expenditure	Revenue	Closing Balance
		5,078.80	0.00	0.00	5,078.80

Note that \$5,078.80 was also the balance at the end of the 1998/99 financial year (v4 f143 & 142).

Note that Job L29 has account codes 535GL29M etc.

10. (as at Tues 7 March 2000)

WASPP 99/0013	Materials - Breeding ecology and conservation of the Banded Stilt	Budget	Expend	Availabl
535AE516M		2,000	10.75	1,989.25

(Note that nothing had been spent from this account as at)

CONCLUSIONS

1. There is \$1,989.25 available in CRF account 535AE516M to spend in 1999/2000 on BaSt air survey following flooding.
2. There is still \$5,078.80 available in Trust Account L29 to spend on analysing the BaSt invertebrate samples.

J. Lane
16 March 2000

Fax (01/8/1997) from JL to CDTM saying, inter alia, 'I spent yesterday in Perth with Grant [GBP] & Alan Clarke [ACl] sorting out the water level & water quality info and organising the [1995 BaSt] gut and sweep (invertebrate samples).

2.
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
BUSSELTON DISTRICT
FAX NO: (097) 521 432

FAXED

TO: Clive Merson URGENT: YES / NO

AT:

Fax No.

FROM: Tim Lane

DATE: 1/8/97

Your Ref:

Local Ref:

Thanks for the fax, comments + info. I spent yesterday in Perth with Grant + Ian Clark sorting out the water level + water quality info and organising the gut and sweep (invertebrate samples). Grant did have the missing info about the stick so the water level info now looks good. Cheers.

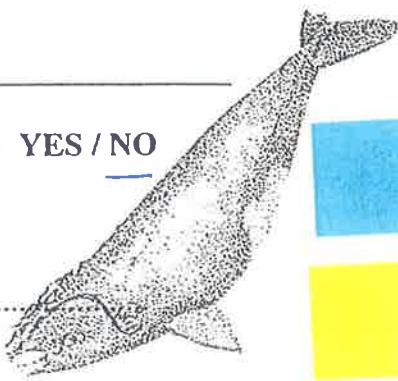
No. of pages inc. this page: 1

specifically asked to make recordings. My only note in my diary is the one you already have, Grant will be able to answer your question about the stick position I hope.

I did not get back to Ballard in 1996, I look forward to seeing draft sections in due course, and I'll lead on some later in the year.

Best wishes,

Clive 03-9589-4901



Fax to Tim Lane 08-97-521432. 30/7/97

I'm delighted you are picking up the
Banded Stilt ball and are going to lead the
running on it! My decks are now clearing & I'll
be able to input too over the next few months.

Re your specific questions on water levels,
I left this entirely to Grant except where I was
specifically asked to make recordings. My only
note in my diary is the one you already have, Grant
will be able to answer your question about the
stilt position I hope.

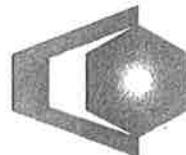
I did not get back to Ballard in 1996,
I look forward to seeing draft sections in due
course, and I'll lead on some later in the year.

Best wishes,

Clive 03-9589-4901

Copy (29/7/1997, supplied by WA Chem Centre) '... of Report on 77 samples of water received on 26 June 1995'.

See GBP's letter of 26/6/1995 to WACC (and initial, unsent copy of 24/5/1995) for details of these samples.



178.
**CHEMISTRY
CENTRE**

Water Analyses, File: CHEM0595/
 Your Ref: 94E2471; 3.1.9
 Our Ref: Roger Schulz
 Enquiries to:
 Telephone:

Research Centre Manager
 Department of Conservation and Land Management
 Woodvale Research Centre
 Ocean Reef Road
 WOODVALE WA 6065
Attention : G Pearson

Copy of Report on:

77 samples of water received on 26 June 1995

Analyte Unit		ECond mS/m	P_total mg/L	TDS_180C mg/L	N_total mg/L
CCWA ID	Client ID	Sampled			
94E2471/001	1	09/03/95	47	0.15	300
94E2471/002	2	09/03/95	424	0.16	2400
94E2471/003	3	09/03/95	6670	0.13	49000
94E2471/004	4	09/03/95	6640	0.12	51000
94E2471/005	5	09/03/95	6530	0.12	50000
94E2471/006	6	09/03/95	6740	0.07	52000
94E2471/007	7	21/03/95	65	0.22	380
94E2471/008	8	21/03/95	6470	0.13	49000
94E2471/009	9	21/03/95	6680	0.05	51000
94E2471/010	10	06/04/95	6620	0.06	51000
94E2471/011	11	06/04/95	6410	0.14	48000
94E2471/012	12	06/04/95	2530	0.19	17000
94E2471/013	13	06/04/95	55	0.19	350
94E2471/014	14	21/04/95	6420	0.07	48000
94E2471/015	15	21/04/95	6380	0.06	47000
94E2471/016	16	21/04/95	6430	0.06	47000
94E2471/017	17	21/04/95	6300	0.05	47000
94E2471/018	18	21/04/95	6310	0.08	47000
94E2471/019	19	21/04/95	6440	0.10	47000
94E2471/020	20	21/04/95	134	0.16	760
94E2471/021	21	17/05/95	5750	0.11	43000
94E2471/022	22	17/05/95	5710	0.08	41000
94E2471/023	23	17/05/95	5740	0.13	42000
94E2471/024	24	17/05/95	5530	0.06	39000
94E2471/025	25	17/11/94	4480	0.08	31000
94E2471/026	26	17/11/94	99	0.21	580
94E2471/027	27	15/03/95	2340	0.03	16000
94E2471/028	28	11/04/95	3480	0.05	24000
94E2471/029	29	11/04/95	3460	0.04	24000
94E2471/030	30	11/04/95	3600	0.05	25000

94E2471
 29 July 1997

1/3

Chemistry Centre (WA)

177.

**CHEMISTRY CENTRE (WESTERN AUSTRALIA)
ENVIRONMENTAL CHEMISTRY LABORATORY**

REPORT OF EXAMINATION

Analyte Unit			ECond mS/m	P_total mg/L	TDS_180C mg/L	N_total mg/L
CCWA ID	Client ID	Sampled				
94E2471/031	31	11/04/95	3490	0.06	24000	-
94E2471/032	32	11/04/95	3440	0.04	24000	-
94E2471/033	33	11/04/95	3620	0.07	26000	-
94E2471/034	34	01/04/95	3300	0.22	23000	-
94E2471/035	35	01/04/95	3300	0.02	23000	-
94E2471/036	36	01/04/95	3290	0.19	23000	-
94E2471/037	37	01/04/95	31	0.12	220	-
94E2471/038	38	01/04/95	41	0.19	260	-
94E2471/039	39	02/04/95	3550	0.07	26000	-
94E2471/040	40	02/04/95	3490	0.11	25000	-
94E2471/041	41	02/04/95	3430	0.06	25000	-
94E2471/042	42	09/04/95	3860	0.20	28000	-
94E2471/043	43	11/04/95	3380	0.06	25000	-
94E2471/044	44	02/04/95	30	0.11	510	-
94E2471/045	45	04/05/95	30	0.08	180	1.0
94E2471/046	46	04/05/95	31	0.09	170	-
94E2471/047	47	04/05/95	30	0.06	180	-
94E2471/048	48	01/04/95	3260	0.25	24000	-
94E2471/049	49	01/04/95	3250	0.47	25000	-
94E2471/050	50	01/04/95	29	0.09	140	-
94E2471/051	51	02/04/95	3550	0.08	26000	-
94E2471/052	52	02/04/95	3550	0.06	26000	-
94E2471/053	53	02/04/95	3500	0.11	26000	-
94E2471/054	54	02/04/95	3460	0.09	24000	-
94E2471/055	55	09/04/95	3880	0.21	28000	-
94E2471/056	56	09/04/95	3870	0.27	28000	-
94E2471/057	57	11/04/95	3390	0.06	23000	-
94E2471/058	57A	11/04/95	3420	0.10	24000	-
94E2471/059	58	02/05/95	4180	0.06	29000	-
94E2471/060	59	02/05/95	5320	0.05	39000	-
94E2471/061	60	02/05/95	5140	0.05	37000	-
94E2471/062	61	02/05/95	5450	0.07	40000	-
94E2471/063	62	02/05/95	5450	0.07	40000	-
94E2471/064	63	04/05/95	4120	0.12	29000	-
94E2471/065	64	28/04/95	4220	0.02	29000	-
94E2471/066	65	28/04/95	4200	0.02	31000	-
94E2471/067	66	28/04/95	4190	0.03	31000	-
94E2471/068	67	04/05/95	4130	0.13	30000	1.1
94E2471/069	68	02/05/95	4140	0.06	29000	-
94E2471/070	69	02/05/95	5290	0.08	39000	-
94E2471/071	70	02/05/95	5420	0.06	40000	-
94E2471/072	71	02/05/95	5490	0.06	41000	-
94E2471/073	72	02/05/95	5170	0.09	38000	0.88
94E2471/074	73	14/02/95	1710	0.24	11000	-
94E2471/075	74	14/02/95	70	0.05	440	-
94E2471/076	75	14/02/95	1140	0.01	7100	-
94E2471/077	76	14/02/95	466	0.08	2700	-

176.

**CHEMISTRY CENTRE (WESTERN AUSTRALIA)
ENVIRONMENTAL CHEMISTRY LABORATORY**

REPORT OF EXAMINATION

Analyte	Method	Description
ECond	iEC1WZSE	Electrical Conductivity, 25 degrees celcius.
P_total	iPP1WTCO	Phosphorus, persulphate total.
TDS_180C	iSOL1WDGR	Total dissolved solids, <0.45um.
N_total	iNP1WTAA	Nitrogen, persulphate total.

These results apply only to the sample(s) as received.

The TDS for sample 94E2471/044 appears anomalous in comparison with the conductivity value. The conductivity has been confirmed but there was insufficient sample to repeat the TDS.

Jenny McGuire
Acting Principal Chemist
ENVIRONMENTAL CHEMISTRY LABORATORY

29 July 1997

Issued 
29/7/97

Extract from document (22-24/7/1997) prepared by JL and headed 'The Following is the Makings of the "Water Depth and Quality Section" of the Final Publication on the 1995 Banded Stilt Work'.

Inter alia it includes the 'Depths taken by ACI on 02/5/95 (J_Day 122) when he, JL and ACh shot [BaSt] adults and chicks ...'

This copy has important annotations by JL concerning the locations of these depths.

THE FOLLOWING IS THE MAKINGS OF THE "WATER DEPTH AND QUALITY SECTION" OF THE FINAL PUBLICATION ON THE 1995 BANDED STILT WORK

PREPARED 22-24/7/97

Final draft 1/7/97

The following is a compilation of all data and observations relevant to this section of the report. When this has been completed, prepare a draft of the text for publication.

Water Depth of Ballard (observations in chronological order)

- Lake Ballard was dry when rain began to fall on 25 February (check) (JDay 56) 1995.
- Judging by rainfall records for (locations), Lake Ballard had been dry since at least (month/year).
- Rain from Cyclone Bobby began to fall on (date), and fell continuously for .. days, by which time a total of .. mm had fallen.
- Rain between then and 15 March (time of first ground visit (by helicopter) to lake) was ... mm.
- I could use my photos (ground) to estimate the maximum flood level (as well as the water level at the time of the photos (e.g. 12 & 15 /3/95), which should be evident on the islands.
- An article by CM, GP & JL in The Tattler (April 95) says "Marj Reni, Grant and Clive did a 4.5 hour aerial survey from Kalgoorlie on 12 March. They covered lakes Marmion, Barlee and Ballard ... All of the lakes were full ..."
- Photos were presumably taken by GP and CM which could be used to estimate water level at time of first aerial inspection (12 March) (J_Day 71)..
- A stick with tape around it was used (by JL, GP & CM) to mark the water's edge (shoreline) on the south side of Camp Island on Wed 15 March (J_Day 74).
- If no further observations were made of water level in relation to stick (above) I could use my photos (need to go through my slides, and the prints in the BaSt box) from this day and subsequent days to calculate water level of 15/3. I took air photos of colony on 15/3 (see folios 14-16 of V1 for tracings), did I take photos of colony on subsequent air survey?
- Some "rough jottings" made (when?) in preparation for talk at SHOC held on 7/10/96 say water depth "estimate c. 50cm - on 15/3". Source? This may have been (probably was) an estimate by me at the time of doing the jottings, based on the other depths I jotted on same sheet.
- On 15 March photos were taken (by JL at least) on the ground and from the helicopter) that could be used to estimate water level at that time.
- **Grant installed a continuous water level recorder on 1 April 95 (JDay 91)** (date by deduction from logger records).
- A "stake" (wooden stake - see my notebook entry (2nd) of 28/4/95) was installed on N side of Camp Island on .. (date - on or before 28/4). *it was 1 year by GP*
- The first Wingspan article (June 1995, p15) says "And, who knows, a further round of the breeding cycle may be aided by an unexpected 70 mm "top up" of rainfall on 10 April (J_Day 100), which restored the gradually drying lake almost to its maximum level". Can Clive supply supporting data?
- My rough notes on file (folio 80) have CM telling me by telephone on .. April 95 (after he was on the island - calling from Broome Bird Observatory) that "rain added 13 cm (51 cm water depth at stake on .. 4 days after rain)". Folio 88 (see below) indicates the missing date was 14/4/95. Therefore the water level before the rain was $51-13=38$ cm on 10/4/95 (prior to the rain on 10/4).
- CM's fax to JL on 24 April 95 (folio 88) says "Water depth at marker beside island. 4pm 14/4/95 (JDay 104). 51cm (depth of water)"
- JL flew Ballard on 27/4/95 and observed (folio 97) "Many family parties ... all the way to the W end of the lake. Water appears too shallow for outboards here and access difficult"
- Folio 106 (photocopy from AC1 notebook) says "28/4/95 (JDay 118) 8.30 (am). depth top -> water 0.89m. bottom to top of water 0.54" (also gives pH and temp readings). This data collected at gauge post on N side of Camp Island.

*38
+ 9.8
136 cm*

*89
54
143 cm*

- *1st April '95 - water at stake was 38 cm deep and 9.8 cm exposed* (GP notebook)
- *2/4/95 - water level - 161 mm from bottom of red tape at 0807 hrs* (GP notebook) (JDay 92, 338)

- Depths taken by ACI on 2/5/95 (J_Day 122) when he, JL and ACh shot adults and chicks were
 - “1st shoot. 10.30am. 1km south of 2nd island. Depth 0.47m”
 - “Adult 2. 11.45am. Depth 0.48m”
 - “Adult 3. 12.10am. Depth 0.49m”
 - “Adult 4. 1.50pm. Depth 0.33m”
 - “Adult 5. 2.20pm. Depth 0.31m”
- (folio 109; photocopy from ACI ? notebook) 4/5/95 (JDay 124) 0.97 depth top of stick to water. 0.44 depth from bottom to water level of stick (temp and pH also read)
- Mark Lamble and Cam were further west (see map on folio 129 - also shows boat limit due to too shallow) on 16th & 17th May (folio 131). They filmed chicks “Birds marched E during day & west at night. 2-3cm depth. Chicks were wading not swimming (folio 119).”
- ACh flew Ballard on 6/6/95, five rafts of flight-capable stilt there, “Most of the larger rafts were in the NW sector .. and would be inaccessible to dinghy with outboard” (folios 138-140a). Definitely no flightless chicks or signs of further nesting. Grey Teal in 1000s, Shel in 100s.
- Grant downloaded logger data on 9 June 95 (J_Day 160) and “reset to record every hour and average every 6 hours” (folio 154). “Water levels varied from 398 (units) to 689 for the 70 days it was in place”.
- GP’s memo (folio 154) says “Camp Isd (9 June 95, JDay 160) .. Depth 775mm”. *← This is the length of stilt*
- ACh flew over Ballard (and Marmion) on Fri 14/7/95. “He did 4 passes over Ballard - 6-7000 BaSt all flying - no further nesting” (folio .. V2). See later folios for full report. The traverses were all E to W or W to E.
- ACh also flew over Ballard (and Marmion) on 22/8/95. Did four traverses. “western end of lake - dry”. Counted 11,000 BaSt. Also Grey Teal, Shelduck, Avocet. Flock of 1,500 BaSt at “eastern end of lake”. Some avocet and teal were around camp Island.
- JL memo of 23/8/95 to GP says “Monday’s air survey by Andy Chapman showed that Lake Marmion will be dry in a week or so and Ballard in the next month or two”. (folio .. V2).
- JL memo of 29/8/95 to GP says “Your suggestion that you go to Kal and Ballard is a good one .. As well as retrieving the logger, I would like you to go (walk?) out to Camp Island and do standard sweeps, water samples etc, as before”. (folio .. V2).
- GP retrieved water level recorder on 14 Sep 95 (J_Day 257). Depth of water at the logger was 315mm (i.e. still high!). He didn’t go out to Camp Island.
- Did Andy C or anyone else from Kalgoorlie fly over Ballard subsequently and see it dry? When?. Get satellite imagery to work out when dried (on 23/7/97 I asked GP to get Ballard “quick looks” for Jan 95 or pre 25th Feb 95, and Sep - Dec 95). Get evaporation rate data for individual months Sep to Dec (actual for 95?) (also get Feb-April data to provide another method of estimating maximum flood level in March 1995). Use with rainfall data for same period. Did Clive Minton walk out to the colony at Camp Island at end of June 1996 (as he suggested he might)?

Water Temperature of Ballard

- Folio 106 (photocopy from GP or AC notebook) says “28/4/95 8.30. ... Temp top 19.0. Bottom 19.0 (also gives depth and pH data). This data collected at gauge post on N side of Camp Island.
- Folio 109 (photocopy from ACI notebook) says “4/5/95. ... temp top 12.6 bottom 12.6” This data collected at gauge post on N side of Camp Island.
- GP’s memo (folio 154) says “Camp Isd (9 June).. Temp?NA” But hand note by me says “yet, (Alan has)”.

← ACI's note saying "temperature not working".

Water pH of Ballard

- Folio 106 (photocopy from GP or AC notebook) says “28/4/95 8.30. ... pH Top 7.89. Calibration - Solution 7.01 read 6.95. Solution 10.01 read 9.78. Tried to calibrate, meter read E4”. This data collected at gauge post on N side of Camp Island.
- Folio 109 (photocopy from ACI notebook) says “4/5/95. ... Standardisation - buffer 7.01 read 6.99, buffer 10.01 read 9.75. pH at surface 7.78”. This data collected at gauge post on N side of Camp Island.

Fax (24/7/1997) from JL (at Busselton) to GBP & ACI (at Woodvale)
arranging for all three to meet at Woodvale 'next Thursday' [31/7/1997] '...
to sort out the Ballard, Crossover lake and [Lake] Marmion invertebrate
sweep samples and [Banded Stilt] gut samples [collected by GBP, ACI,
Andrew Chapman and/or JL on Lakes Ballard and Marmion in 1995] ...'
and to have all relevant research materials on hand '... so that we can clear
up all uncertainties before discussing with Andrew Storey [UWA-associated
aquatic invertebrate specialist] how they are to be analysed and a price'.
The fax indicates that JL was intending to use a computer (a Woodvale PC)
'... so that I can compile the info ... as we go'.

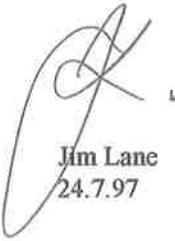
TO: **GRANT PEARSON**
ALAN CLARKE

SUBJECT: BANDED STILT DATA FOR THURS 31 JULY AT WOODVALE

In addition to sending me this week any info I requested in a fax to you on 11 July that hasn't already been sent, please do the following:

1. Alan: obtain and fax to me the monthly evaporation rates for Lake Ballard from the Met Bureau.
2. Grant and Alan: when we meet at Woodvale next Thursday to sort out the Ballard, Crossover lake and Marmion invertebrate sweep samples and gut samples, please have all relevant data, field notes, reports, photographs, etc. with you so that we can clear up all uncertainties before discussing with Andrew Storey how they are to be analysed and a price.
3. Alan: please book the Woodvale small meeting room for the day. On the day please set up a computer so that I can compile the info from 2. above as we go.

Ring me if any queries.



Jim Lane

24.7.97

76.
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
BUSSELTON DISTRICT
FAX NO: (097) 521 432

A copy to each place

TO: G. PEARSON / A. CLARKE URGENT: YES / NO

AT: WOODVALE

Fax No.

FROM: Jim Lane

DATE: 24/7/97

Your Ref:

Local Ref:

No. of pages inc. this page: 2

Please call us on (097) 521 677 if this message was incomplete or illegible

JK
Jim Lane
24.7.97

Tables (faxed 22/7/1997, from ACl/GBP to JL) detailing all the gut and sweep samples collected at Lakes Ballard and Marmion (and Crossover Lake – sweep samples only) in 1995.

There is also a map of Lake Ballard annotated by ACl that inter alia indicates where 'most birds [BaSt] taken [collected]' and 'Dist. between Tripod & Camp [Islands] 16km'.

The Tables have many important annotations and some corrections by JL, ACl and or GBP. See further above for revised versions.

These are the same or similar to the Tables used in 2005 (see above). The Lake Ballard Tables are the same as those first sent to JL by ACl on 30/1/1996 (see below).

First 6 pages were
unrelated issue

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
02/04/95		✓ adult 1 ♀	gizz	1			
		✓ adult 2 ♂	gizz	1			
		✓ adult 3 ♂	gizz	1			
		✓ adult 4 ♂	gizz	1			
		✓ adult 5 ♂	gizz	1			
		✓ adult 6 ♂	gizz/oes	1			
		✓ adult 7 ♂	gizz/oes	1			
		✓ adult 8 ♂	gizz/oes	1			
		✓ adult 9 ♂	gizz	1			
					1 (x 50ml)	1	one sweep in one vial for birds 1-9
		✓ adult 10 ♂	gizz	1	1	1	
		✓ adult 11 ♂	gizz	1	1	1	
		✓ adult 12 ♀	gizz	1	1	1	
10/04/95	depth shot at camp 2.	family 1	.	1	1	1	no gizzard or oes. check GP's notes
11/04/95		family 2	gizz	1	1	1	400m N of Colony 1
		family 3	gizz	1	1	1	between Colony 1 and Colony 2
		family 4	gizz	1			" " "
		family 5	gizz	1	1	1	Sweep for family 4 & 5 in one vial
02/05/95		✓ adult 1	gizz/oes	2			
		✓ chick c1	gizz/oes	2			
		✓ chick c2	gizz/oes	2			
					1	2	
		adult 2					missing, presume escaped shot? 4
		✓ chick 2a	gizz/oes	2			
		✓ chick 2b	gizz/oes	2			
		✓ chick 2c	gizz/oes	2			
					1	1	other vial damaged
		✓ adult 3	gizz/oes	2			
		✓ chick 3a	gizz/oes	2			
		✓ chick 3b	gizz/oes	2			
		✓ chick 3c	gizz/oes	2			
					1	2	other vial damaged
		✓ adult 4	gizz/oes	2			
		✓ chick 4a	gizz/oes	2			
					1	2	
		✓ adult 5	gizz/oes	2			
		✓ chick 5a	gizz/oes	2			
					1	2	

* This is a family of 1 red-throated chick - all samples gone missing.

LAKE BALLARD 1995
INVERTEBRATE SWEEPS AT CAMP ISLAND AND CROSSOVER LAKE

Date	Site	Sweep No.	Vials	Comments
15/03/95	Camp Island	1	1	250um net was used
01/04/95	Camp Island	1	1	110um net was used
		2	1	
		3	1	
01/04/95	Crossover Lake	1	1	It seems 2 lots of samples were taken for this date, check GP's notes
		2	1	
		3	1	
		1	3	
09/04/95	Camp Island	1	1	
		2	1	
		3	1	
11/04/95		1	1	
		2	1	
		3	1	
28/04/95		1	2	
		2	2	
		3	2	
04/05/95		1	2	
		2	1	2nd vial damaged
		3	2	
09/06/95		1	2	
		2	2	
		3	2	
09/06/95	Crossover lake	1	4	

t Why more than one vial per sweep is more accurate?
 for copies of GP's notes & comments on vials collected
 full name for all sweep & what collected

4.00 g

Folha 66.



NLRV COLLECTOR

765 CHICKS,
50% EMPTY

OR GIZZ OES EMPTY

65.

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
02/04/95		adult 1	gizz	1			OES EMPTY
		adult 2	gizz	1			OES EMPTY
		adult 3	gizz	1			OES EMPTY
		adult 4	gizz	1			OES EMPTY
		adult 5	gizz/oes	X 2			FOLICLE
		adult 6	gizz/oes/c	X 2			
		adult 7	gizz/oes	X 2			
		adult 8	gizz/oes/c	X 2			
		adult 9	gizz	1			OES ?
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz/oes/c	X 2	1	1	
		adult 11	gizz/oes/c	X 2	1	1	
		adult 12	gizz/oes/c	X 2	1	1	FOLICLE
10/04/95		family 1			1	1	no gizzard or oes. check GP's notes
11/04/95		family 2	gizz	1	1	1	
		family 3	gizz	1	1	1	
		family 4	gizz	1			
		family 5	gizz	1	1	1	Sweep for family 4 & 5 in one vial
02/05/95		adult 1	gizz/oes	2			
		chick c1	gizz/oes	2			
		chick c2	gizz/oes	2			
					1	2	
		adult 2					missing, presume escaped shot?
		chick 2a	gizz/oes	2			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes	2			
					1	1	other vial damaged
		adult 3	gizz/oes	2			
		chick 3a	gizz/oes	2			
		chick 3b	gizz/oes	2			
		chick 3c	gizz/oes	2			
					1	2	other vial damaged
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
					1	2	
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
					1	2	

64-

LAKE MARMION 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Sweep No.	Vials	Comments
10/06/95	Depth Post	1	1	110um net
13/06/95		1	1	
13/06/95	Breeding Colony	1	2	

1 day

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
11/06/95		adult 1	gizz/oes	2			
		chick 1	gizz/oes	2			
		chick 2	gizz	1			
		chick 3	gizz/oes	2			
		chick 4	gizz/oes	2			
		chick 5	gizz/oes	2			
					1	2	
		Stilt No.1	gizz/oes	2			are these two birds
		bast no.2	gizz/oes	2			failed attempts ?
12/06/95		adult 2	gizz/oes	2			
		chick 2a	gizz	1			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes	2			
					1	1	
		adult 3	gizz/oes	2	1		
		chick 3a	gizz/oes	2			
		chick 3b	gizz	1			
					1	3	
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
		chick 4b	gizz/oes	2			
		chick 4c	gizz/oes	2			
							Sweep missing ?
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
		chick 5b	gizz/oes	2			
					1	2	

3 days

1 day

HOW FAR
AWAY FROM
OTHLMR
12-20-95

2 days

12

7 weeks

JL's fax (10/7/1997) to ACl requesting him to arrange for David Cale [an aquatic invertebrate specialist] to be employed '... to sort, etc., twenty samples [gut or sweep and from where and when unspecified] at \$125 per sample. Were these BaSt gut samples (or sweep samples) from Lakes Ballard and/or Marmion in 1995? Was the work arranged and done? Results?

Note that JL's fax was in response to a fax of the same date (10/7/1997) from ACl to him, the cover page of which reads 'For your info as requested'. Attached to this fax is a sticker in JL's handwriting inter alia calculating the cost of 20 samples at \$125 / sample to be \$2500. This was presumably a record of a phone conversation between JL and ACl before JL's fax of 10/7/1997. Is '\$350 take away' of any assistance in working out what later transpired?

60.
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
BUSSELTON DISTRICT
FAX NO: (097) 521 432

TO: Alan Clarke URGENT: YES / NO

AT:

..... Fax No.

FROM:

DATE:

Your Ref:

Local Ref:

I am agreeable to David Cole being employed
to sort, etc. twenty samples at \$125-00 per sample
Please arrange. He should send us two invoices
(half the work done, all the work done) for etc. Please arrange.

No. of pages inc. this page:

NO OF PAGES:

(INCLUDING FACE SHEET)

MESSAGE: FOR YOUR INFO. AS REQUESTED.

Fri Pm 1.30 → 6pm.

Yes

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

58.

INFORMATION DIVISION

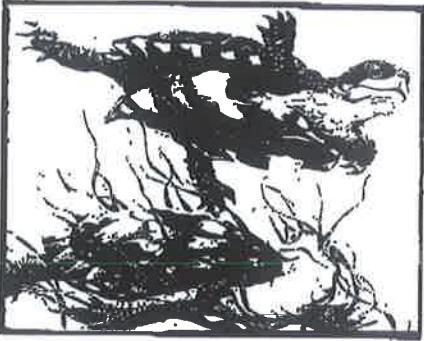
WOODVALE

NO (09) 405 5100

FAX N

1 m/s f.
20 → \$12
\$12 → \$12
\$25.00
28/6/96
\$35.00
+ 44 cents
= \$125

Folio 59



DATE: 10/7/97

TO: JIM LANE

FROM: ALAN CLARKE

NO OF PAGES: 2

(INCLUDING FACE SHEET)

MESSAGE: FOR YOUR INFO. AS REQUESTED.

Fri Pn 1.30 → 6pm.

Yes

**'Rough jottings [by JL] made in preparation for talk at the 'Sthn. Hem.
Orn. Congress' to be held in Albany on 07/10/1996.**

Includes reference to: 'gut samples'.

This single page has been scanned over two pages due to its length

seasurface
pH: 7.9, 7.8, 8.7
temp: 22°C

44 cm on " "
0 cm on 4/6/96

Sweep samples =
just samples =

Chick size

Brood size - 2.9, 2.7, 2.6 then 2.4 in water (1-2 days after hatching)

hatching success - 2000 chicks hatched = 2 hrs.

fluffy success

15 quadrats
2.5 x 5 m

Entire nest
490 eggs
birds
Then 200

Individual colour marks

Banded -
$$\begin{bmatrix} 10 \text{ (clue)} \\ 200 \text{ (Total)} \end{bmatrix} \begin{matrix} \text{?} \\ + \end{matrix}$$

Total ≈ 690 (700?) birds
Ballard
Marion

Leg Flagged -
$$\begin{bmatrix} 10 \text{ (clue)} \\ 195 + 260 + 20 = 475 \end{bmatrix} \begin{matrix} + 170 \\ + \end{matrix}$$

500 by flight? $\begin{matrix} \text{Ballard} \\ \text{Marion} \end{matrix}$

Sightings -
1 Little Tern (24 km N of Wal) 24/10/95 -
1 Ruffnest 26/11/96 -
1 Sumpur Sut 7/3/96 -
3 Pure Herdland sightings 28/2/96 -
1 4-cm Laysan 19/96 -

Egg collected - DNA

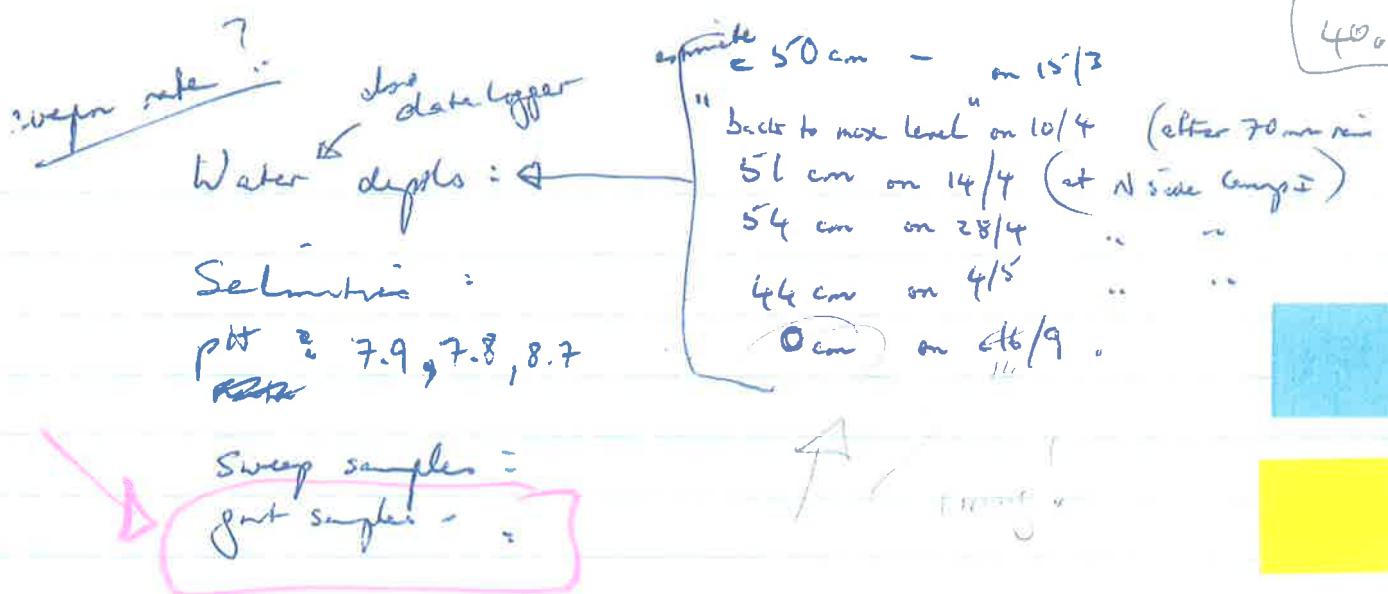
Predations = Little corm (mostly dead, 2 live)
Wt Eagle (1 live)
Cat (potential)
Not gulls.

Waterfall on Copper Lake briefly.

ADC form



ROUTINE JOTTINGS MADE IN PREPARATION FOR TALK
AT "STHN - ITEM. OVER. CONGRESS", ALBANY 7/10/96



Chick size

15 quadrats
2.5 x 5 m

brood size - 2.9, 2.7, 2.6 then 2.4 on water (1-2 days after hatching)

hatching success - 2000 chicks here = 2000.

fluffy success

Instrument colour marks:

490 signs (water) 490 signs (land) Then 200	Banded -	10 (choc) \approx ? 200 (Total) \approx ?	Total ≈ 690 (200?) feathers	Ballard Mcconnell
	Leg Flagged -	10 (choc) + 170 $195 + 260 + 20 = 475$ + 106		
	Sightings -	1 Little Brown (24 km N of Isal) 24/10/95 - 1 Rottnest 21/1/96 - 1 Dumper Sut 7/3/96 - 3 Pure Wedgetail sightings 28/2/96 - 1 Yarrow Leach 19/96 -	≈ 500 flagged?	Ballard Mcconnell

Egg collected - DNA

Predators \rightarrow Little Brown (mostly dead, 2 live)
Wt Eagle (1 live)
Cat (potential)
Aotus (gutted)

Waterfall on Crossover Lake breeding.

Hardcopy (16/05/1996) of document 'Banded Stilt *Cladorhynchus leucocephalus* Seminar' '... compiled [by JL] 14-16 May 1996 in preparation for seminar at Woodvale [CALM's Wildlife Research Centre] on Fri 17 May [1996].

Words and sentences relating to collection of BaSt adults and chicks for dietary analysis have been highlighted (circled) in pink (by JL on 29/03/2014).

Note inter alia that according to this document (which is not a primary source):

- Ron Johnstone (WA Museum) and co. visited the 2nd BaSt breeding (studied) colony on Lake Ballard on Sat 08/4/1995, where they collected 10-12 incubating adults ranging from 0-100% chest band, collected 4 chicks and took stomach samples (see below for original fax & notes about RJo's visit).
- CDTM & GBP collected '3 males [BaSt] and 1 female with chicks' on Lake Ballard in early April 1995.
- JL, ACh & ACI collected 'parents and chicks for diet, sexing' on Lake Ballard in early May 1995.
- GBP, ACI & ACh collected '1 family' on Lake Marmion on 11/6/1995 and GBP & ACI 'Collected more families' on Lake Marmion on 12/6/1995.

I flew to Kalgoorlie from Perth 0615 hrs on Wed 15 March for helicopter trip (returned to Perth same evening, (with Grant?)).

Grant, Clive, Marj Reni (VWSG) (staying at Prospector Caravan Park) and I flew to Ballard colony on Wed 15 March 1995.

Perfect island for helicopter adjacent, even shade. We landed 600m away from nesting area without disturbing the birds.

Circled island first for photographs of extent of nest area (see folios 14-16 for map (from my air photos) of nesting area on this day).

Landed, walked, waded to nest island. Found we could sit 10-20m from nesting birds.

Observed plumages, nesting behaviour, eggs, staked out and phot'd (to see how many nests, eggs and eggs/nest) some quadrats to, marked eggs in c250 nests for determination of clutch size, nesting desity, hatching success etc .. (We marked every egg in every nest in an area (still laying) outside the quadrats with the number of eggs in that nest), photographed birds.

Colony now 4500 nests (from 2000 in 3 days).

Copulation attempted everywhere, 45 seconds each, up to 20 visible at one time.

Nests contained 1-5 (mostly ..) eggs, colony still growing. Assuming laying rate of 1 per day, the first eggs (i.e. of the nests containing 5 eggs, and also assuming they were all layed by one bird) were layed around 8 March, 12 days after 4 days rain started and only 8 days after it finshed! *3 eggs in 5 days → 10/3 = 14 days*

Frenzied activity - pairing, fighting, copulating.

One third of birds did not have complete plumage. 10% had no band at all. Yet doing everything including copulating (both males and females) and incubating.

Back plumes.

Predators?

Incubating adults dunking belly feathers in water and having drink before returning to nest (hot day).

Spent 8 or 9 hrs (check notebooks) at island then flew back to Kal.

I flew back to Perth at 1940 hrs (with Grant?).

This was the earliest stage at which a nesting colony had been visited by anyone (not true for early scrapes).

Planning

Discussion with Clive and Jeremy. Opportunity for the first time too follow breeding event from go to whoa.

Information on how soon after lake fills does nesting start, clutch size and laying rate, incubation period, how long for chicks to fledge, diet, salinity, role sharing, nesting behaviour, hatching success, fledging success, predators, dispersal. Also band and leg flag for first time - dispersal, movements, survival. I had particular interest in seeing what threats might be, any conservation needs.

ABCTV would join us. We would make logically possible (Argo, boats, radios, camp, etc) and ABC would pay for air surveys including first and helicopter flight.

Did literature searches with Romeny Lynch's help re colonial nesting studies, DNA, Banded Stilt.

Planned to return on ground on .. (me booked to fly to Kal on evening of 22 March and do air survey 23/3) but delayed 1 week (?) due to ill camera man (bitten in Qld, hospitalised) and need to find replacement.

Sun 26 March - Fri 7 April. Me, Grant (most of time), ABC TV, on Lake Ballard, at Camp Island
Grant and I drove to Kalgoorlie with trailer, 2 punts (10', 12'), outboards, Argo, Argo trailer, etc (SLIDE)
on Sun 26 March, meeting ABCTV Nat Hist crew (Mark Lamble and Campbell ..) at Kal airport around 7.15 pm).

Next day, Grant and Mark (?) did air survey of Ballard and Barlee. Found fewer birds and no nesting on Barlee, but now 3-4 (how many seen on flight, only 3 and not including colony 3.5 km west of Camp Island?) nesting colonies on Ballard.

After lunch, Grant, I (our vehicle) and ABC team (with hired Toyota personnel carrier) drove to Jeedamya Station (leaseholder/manager is John Finlayson) and then to Crossover Lake. Ferried some gear across Crossover Lake by punt, then camped on N side for the night. Next morning (29/3), ferried rest of gear across lake, then to shore of Ballard (by Argo + Argo trailer) then ferried gear by punts (1 8hp outboard, 1 electric) out to Camp Island. Established camp there (water, fuel, generator, tents, tarps, fridges, 25 watt portable HF radio with selcall, hand radios. Water .. deep. Camped there for .. days.

Is the following air survey data or ground data?

Now 1st colony grown to 20 000 nests (10 per sq metre).

Second colony of 15 000 found 3.5 km west.

Also two other, smaller colonies (seen by Mark and Grant further west during air survey) on Ballard.

Observed ... numbers in and out of colony, colony size, new quadrats to determine laying rate - photographed these daily. Photographed quadrats established on previous visit daily - most interested in when hatching would occur (incubation period) (from incomplete catches of 15/3 plus knowledge of final clutch size and laying rate and date hatched).. Stopped photographing these when first chicks appeared because of concern about mortality (Mark Lamble had observed aggressive behaviour of adults to chicks on nest. Established 4? new quadrats in area where laying still occurring (nests contained 1 preferably or two eggs) using 20mm PVC pipe and elbows, and phot'd each day to determine laying rate.

Established automatic water level recorder, took water samples for salinity and nutrient (P & N?) analysis, sweep samples (50um or 110um nets?) near camp island for invertebrates. Water and air temps taken, ult feeding areas to collect adults and sweeps for diet analysis.

Hatching began on 3 April (peeping on 2/4?), .. approx .. days after....

Mark and Campbell .. boated off to west and found a second colony of .. pairs, .. km distant. Filmed frenetic behaviour. Reported new nests being formed and eggs laid, so next day I went there and established ten .. quadrats to determine laying rate and subsequently size of colony hatching success and hopefully incubation period

Predators observed were ..

Banding, colour marking and flagging approved by ANCA on 23/3).

Had bands (initially 490 (issued 23/3), size 8, incoloy) on this trip. Used this trip? by Clive?

I tried catching adults on nest to individually colour mark (20 bands of each colour). Too disturbing. Then tried individual recognition by plumage. Too time consuming.

I collected 30? eggs of .. clutches (SLIDES or prints?) for DNA testing to see if all laid by same female. Show also SLIDES of clutches in nest?

Recorded waterfowl breeding at Crossover Lake for comparison.

Ron Johnstone, Phil Stone, Nick Kolichis's air survey on Fri 7 April (and 1 day ground visit on Sat 8th).

They flew (air survey) Barlee (central arm & northern portion), Goongarrie, Marmion, Ballard and Raeside (central) on 7 April (flew over me at 1st colony) and found:

- Marmion: 500-1000 stilt (no colony seen),
- Ballard: 1st colony 3-5000 pairs, 2nd colony 2-3000 pairs, at 29 23'S 120 51'E colony of 500-1000 pairs, western end possibly 500-1000 pair colony
- Barlee: 1000 pair colony (my Guitar I.)

On 8/4 they paddled kayaks out to both colonies (met our team). Phil Stone took "viewCAM". Took photos. Rain, cold squalls. On 2nd colony they did/saw:

- collected 10-12 incubating adults ranging from 0-100% chest band.
- collected 4 chicks
- took stomach samples
- collected small series of eggs
- Saw creches of 50-100 birds
- hoard of crows came off the island

- Wedge-t Eagle

Ron J. also said "John Darnell, Port Hedland 50-60 000 birds, 80% inactive"

Grant returned to Perth on .. for a few days (left vehicle in Kal?) to do Peel-Harvey on 5/4 and for private reasons, but did his back in (so Alan Clarke and Raelene did P-H on 6/4 instead). I left Ballard on Fri 7 April, Cam gave me a lift in ABC vehicle back to Kal for the night. Grant returned (flew) to Kal on Fri 7 April and had late dinner (valium) with me and Cam in Kal. Next morning I flew to Perth and Grant and Cam returned to Ballard, meeting Clive at Jeedamya (he had driven down from Broome) and taking him out too.

I took stilt eggs to John Weatherall at Murdoch Uni on Sat 8 for DNA analysis (what requested?)

Sat 8 April Clive joins, Grant rejoins, ABC TV team on Lake Ballard at Camp Island (I left previous day). Grant and ABC leave .. April, Clive leaves 15 April

Grant had returned to Perth on .. for a few days. He returned (flew) to Kal on Fri 7 April and met (late dinner) me and Cam in Kal. Next morning Grant and Cam returned to Ballard (I flew to Perth), meeting Clive at Jeedamya and taking him out too.

Clive and Grant did the following.

- collected with Grant 3 males and 1 female with chicks

Much rain. Clive's vehicle bogged at Crossover Lake.

Grant and ABC left on .. Gear left in ABC tent and under green tarp on Camp I.

Clive stayed on his own for three days until Sat 15/4, when he left.

Clive did the following.

1st colony

- photo'd the 15 quadrats (on 15/4?)
- counted addled eggs, dead chick, active nests
- guessed 20 000 nests

2nd colony

- measured approx as $80 \times (20-5 = av15) = 1200 \text{ sq m} = 12-15000 \text{ nests}$

General

- 9-10 AM (12/4), incubation changeovers observed. .. PM (9/4) birds left nest, drank etc, returned to unoccupied (except eggs) nests to resume incubation. Unclear how frequently changeover occurs and in what proportion of nests.
- 1 parent with chicks when leave island
- rain added 13cm to Ballard. Water depth 51cm at 4pm on 14/4, four days after rain (at stake on N side of Camp I.)
- didn't band in colony.
- caught broods going to water for measurement purposes. Footprints trap chicks, fill them in.
- by boat & plankton net, Clive (alone) banded, flagged, weighed, measured 10 chicks (4 families) in 2hrs, don't catch all at once.
- expects high survival
- on some mornings Clive saw up to 2000 chicks leaving 1st breeding island in just a couple of hours.
- recorded brood sizes
- families were closely associated on water, but no true creching at this stage at least.
- lack of predation. Compare with Lake Torrens in 1989 where Silver Gulls totally destroyed last part of colony and took many eggs and some chicks throughout the breeding event. No gulls yet (I saw 1 later, not at colony).
- Little Crows mainly took dead chicks, often failed to take live chicks, only succeeded twice.
- Wt Eagle snatched chick from group of adults and chicks crossing island.
- 70mm of rain fell on 10 April, topping up the lake almost back to its maximum level..
- parents don't do distraction displays, unlike other waders.

Incubation period:

- hatching commenced 3 April, 22 days after first air survey of 12 March, therefore incubation at least 23 days (counting 12/3 and 3/4). Note that I said hatching started 3/4, but I actually heard cheeping in 2/4 (check), which gives incubation period of at least 22 days.
- 2nd method of calculation [from general area where we marked (on 15/3) eggs of incomplete (1-2 egg) clutches, and Mark Lamble's advice that most here hatched 6, 7, 8th April, i.e. 23 days after 15/3, assuming they became 3-4 egg clutches] gives 21-23 days (counting 12/3 and 7/4) (23-2+1= incubation period of 22 +- 1 day)
- 3rd method [Clive's visit on 9/4 to area of eggs marked on 15/3 and observation of a nest with 4 eggs, one of which was marked "1" (i.e. only one egg in this nest on 15/3), with 3 of these chipping on 9/4] (25-3+1=23 days) (includes day of hatching). Also 2 nests with marked eggs, some chipping and 1 or 2 chicks in nest. One is consistent with 23 day max incubation period, the other calculates to 23 day period.
- Most other eggs in marked eggs area visited on 9/4 had hatched (some addled) therefore the above three calculations probably at upper end of range of incubation period, therefore average incubation period probably 21-23 days.
- Note that all three methods assume incubation commences after laying of last egg of clutch. It probably commences after 2nd last egg so add 1 day to each of above, gives incubation period of 22-24 days.

Hatching success

Clive photo'd and counted eggs etc in the 15 quadrats on 14 April at completion of nesting.

Weights

Egg weights: within week of hatching (2 chipping): 28-45gm (average c 37.5gm). Note that Clive wrote in Wingspan that "clutch of eggs weighs almost as much as female itself". CHECK CLUTCH SIZES AND WEIGHTS.

Chicks caught as leaving colony (before reaching water) on 12 April: 22-31gm (average 27.6gm, n=11)

Chicks banded & flagged c1km west of colony: 23-31gm (average 27.4gm; n=10)

Chicks (1-2 days after leaving nest) collected 1-2km W of colony on 11/4: 23-28.5gm (average 25.8gm; n=14; c1/8 of adults).

Adults collected with 1-2 day old broods: 4 male 203, 209, 210, 241gm; 1 fem 197gm. (average 212gm)
All had active large double brood patches.

Brood sizes	as leaving the colony			on water 1-3km from colony (1-2 days after leaving)	
	9/4	12/4	14/4	11/4	
Average	2.9	2.7	2.6	2.4	
Mode	3	3	3	2	
broods (n)	60	131	153	81	->425

Crossover lake records.

Grant went to PNG from Sun 23 April to .. so unavailable for next Ballard trip.

26 April - 4 May ?, Alan Clarke, Rob Thomas (1 night) and me, joined by Andy Chapman, Lake Ballard, at Camp Island.

Alan and I drove up from Perth in 4Runner with punt and outboard (SLIDE) on Wed 26 April. Now have 2 petrol outboards(.. and 8hp) plus electric.

I did air survey of Barlee and Ballard on Th 27 April AM.

- Barlee: Found breeding island (empty), I creche of 50 large chicks + 10 adults. W-t Eagle swooping. Also c3000 adults".
- Ballard: Found no stilt on 1st island, but still stilt sitting on 2nd. No other breeding sites found. Many creches (to 50) to west and north of 2nd island. Chicks in 1000s, not 10 000s (underestimate?).

Mon 5 May 1995
22/12/13 6.

27 April PM, Alan, Rob and I drove (2 vehicles to Jeedamya and then out to Camp Island in the dark on compass bearing).

Next day (Fri 28/4), 1st breeding island already deserted (SLIDES). Counted chicks coming off 2nd island. Rain.

Rob left for Kal that afternoon (Fri), wet track out. Pissed down overnight?

Andy Chapman joined us for 3 days (picked him up at Crossover Lake) on PM of ... (Sun or Mon).

Andy, Alan and I took water samples, measurements, Collected parents and chicks for diet, sexing. Caught (SLIDES), banded .. and leg flagged (SLIDES and EXHIBIT) on tibia (above "knee"). 500 flags made by VWSG (Mike Barter, need to thank) Why yellow?

Flagged 170 chicks. .. by boat (SLIDES), ranging .. km west of 2nd nesting island. We shot, collected, swept.

Brine shrimp abundant.

Water depth, quality:

28/4: water 0.54m deep at stake next to Camp island (0.89m from top of stake down to water surface), pH 7.9, Temp 19.0 (8.30hrs. am?). (V1, folio 106)

2/5: depths at sites of collection of adults and chicks, 0.47, 0.48, 0.49, 0.33, 0.31m. (V1, folios 108-9).

4/5: 0.44m deep at stake (0.97 down from top of stake), pH 7.8, temp 12.6 (time?)

Measured 1st nesting area on 4 May (when 2nd?) and used triangular tessellation method to compare later.

Alan and I left on 4 May, driving 4Runner back to Perth (Northam).

Crossover Lake records (see Vol 1, folios 107, 109).

8hp outboard taken to Kal for servicing, electric outboard left at the Lake.

9 - 17 May, ABC TV team at Ballard on own, Camp Island then drove to West end of Ballard air survey?

Detailed report at V1 folios 129-33.

Did air survey with Andy Chapman.

All birds had left 2nd island. All creching at W end of Lake.

Mark and Cam left Kal Tues night (9/5) and drove to Crossover Lake. 1-3mm rain o'night.

Wed 10/5 to Camp I. then Mark boated c 15 km W till too shallow. V. strong NW wind flattened tent on Camp I. Rained o'night<5mm.

11/5 looked for tracks to W on mainland.

12/5 filmed Camp I. and 1st deserted colony. 2-3000 adult stilt landed in water near 1st island, then moved up close to it. Attempted copulation on water. Very vocal. Very flighty. They filmed it. The birds left when Wt eagle landed on breeding island. "over 2.5-3hrs (meaning?).

13-14/5 filmed Camp I. and 2nd deserted colony.

15/5 moved from Camp I. to New Camp.

16/5 filmed chicks on lake.

17/5 filmed chicks, returned to Crossover lake camp.

18/5 returned to Kalgoorlie.

They then drove to west end of lake along N side trcks/fencelines. Camped there. (2 days?). Big sand dune, visibility for c2km. Takes 2hrs towing trailer to drive from Crossover Lake to new camp when have done it once. 60km/hr in good stretch. 3 fences to cross, then camp 500m from lake (good map at V1, folio 129).

Many adults flying back and forth past Camp I while camped there.

Found "hundreds and perhaps thousands of chicks" 30? (not 70) km W of Camp Island. Compare this with statement in Wingspan that Mark reported tens of thousands of well-grown chicks on the western end of Ballard. CHECK.

Fledging on 17 May Mark and Cam saw chicks flying 30-50 cm above water for 10-15 meters. These were the oldest chicks seen. Saw chicks flying only 3 times near New Camp. So if these were the first chicks to hatch, i.e. hatched at 1st island on 3rd April, they fledged at 44 days (6 weeks 2days).

No strict creches, loose groups of 3-20, all different ages, adults interspersed and came and went. Adults acted as sentry/alarm birds and lead chicks away from threat. Didn't appear attached to particular chicks. Birds very very flighty to people (1 km or more away). Used Argo as film platform. Half a km from new camp he (Mark) had birds walking past very close.

One person can round them (chicks) up on hard ground.

Conditions changed day to day (wind).

The birds marched E during day and W at night. Chicks are wading, not swimming.

Very few "artemia" in water near new camp, but v. thick around breeding island (estimated 4x as many as previous visit).

Wingspan article says chicks feeding in very shallow water on minute items too small to be brine shrimp, and adults periodically left chicks to fly to deeper water, presumably to feed on brine shrimps.

Bogged the Argo many times in soft spots in mud. It did not fare well..

No predators except uid raptor.

- Mark caught one banded chick on 10/5 at 2pm, 3km NW of Camp I. (among 7 chicks and 3 adults). Didn't get number.

Filmed chicks from Argo. Birds came to accept it and was a great filming platform (said it would also be good catching platform).. Cat came down sand dune and birds ran away.

7-14? June 1995. Grant, Alan and Andy Chapman at Ballard, then Marmion Lake

Air survey by Andy Chapman and Ian Kealley in Cessna 210 on Tuesday 6 June of Ballard and Marmion with objectives of .. (V1, folio 123). Not paid for by ABC (agreed). Strong NW wind. (full report at V1 folios 139-40). (Also see V2, folio yy for another full report COMPARE!!)

- Ballard 22 000 stilt. No flightless chicks left. Not one! Therefore all fledged Check against date at which last chicks came off 2nd island. No new nesting activity. GyTl in thousands, Shel in hundreds.
- Marmion: c1500 adults and c600 chicks (about same age as Ballard at beginning of May, i.e. some not long out of nest) in lee of one island. Also another c700 adults Water too shallow for outboard. Did not find nest site but thought could find on ground. GyTl & Shel.. Note that Wingspan article says colony on Marmion was "5000 pairs, with at least 2000 chicks seen in June" and "nesting success probably lower than Ballard due to regular presence of Wt Eagle and a Peregrine Falcon..

at Camp Island

My Diary says "advise Grant of Marmion location" (ticked).

Grant and Alan then drove to Kalgoorlie (see full report of this trip at V1 folios 150-154).

Initially they went to Ballard?

Water depth and quality: depth 775 mm (??), pH 8.7. Samples taken, sweeps done. Nesting area of 1st island precisely measured. Depth datalogger downloaded, logger left in place.

All gear withdrawn from Camp Island and Crossover lake campsite.

Crossover Lake records:

Grant, Alan and Andy moved from Ballard (Camp Island) to Lake Marmion on Sat 10 June access via V. Tonkin's station. Have "magic" campsite.

Marmion

Installed staff gauge. Measured water quality., samples, pH 7.4.

Found 10-15 000 adults and 1000 chicks.

On 11/6, banded 200 chicks (all that were issued) on left tibia. Flagged 195 chicks on right tibia. Worked from Argo, towing 3m punt. (Note that extra 20 were flagged but flags removed because thought on wrong leg).

Collected 1 family. Chicks weighed 32, 33, 34, 39, 42 gm. All had large yolk sacs. Adult was male, 221 gm.

Salinity 46 ppt on 11/6 (Andy Chapman), pH was 7.9..

Ostracods and Parartemia.

Depth mainly 10-20cm, too shallow for boat, used Argo.

Capture chicks by driving to creches, chase 20-30, catch, take back to boat, release, adults come back.

Oldest chicks have well developed flight and body feathers, will fly within week. Also chicks 2-4 days old..

Andy left at 0700hrs on 12/6 and flew air "survey" of Marmion (and.?) on Mon 12 June to find nesting site and direct Grant that way (also to Grant via radio in PM).

Banded and flagged chicks. Total flagged = 195+260+20=475.

Collected more families. Detailed measurements taken.

On 13/6 Grant and Alan visited Marmion nest site (SLIDES??).

Water depth up to 52 cm.

Detailed observations made at colony.

Measurements. Size of colony. Peregrine Falcon and Wt Eagle. Photos & veg samples taken.

Totals of chicks banded and flagged.

Argo and trailer left at Marmion.

Grant and Alan returned to Perth on ..

12/6 2052

Air survey by Andy Chapman on Fri 14 July.

(See V2, folio yy for full report)

Ballard: 4 passes over lake. 6-7000 Stilt all flying, no further nesting

Marmion: 20-25 000, include. 10% chicks not flying but "coloured up". He reported gear (trailer + Argo) was OK at Marmion.

Other bird observations made (see V2 folio xx)

Flight was 3hrs, Piper Warrior, \$630 in toto.

Air survey of Ballard and Marmion Andy Chapman and .. on Tues 22 August 1995

Piper Warrior. (See V2, folio yy for full report)

Ballard: 4 traverses of lake. Western end dry. c11 500 stilt "all adults wading and flying" ..

Marmion: 7500 stilt, c20 incapable of flight.

10 August 1995 Andy and .. collected Argo and trailer from Marmion

Depth 5cm at sample point near camp. Salinity 63 ppt. Of c200 stilt observed from shore only 5-6% had bands on chests.

.....Sep? , Grant diverted from SW lakes survey (9-17/9) to Ballard to collect water level recorder.

Drove up from Esperance.

Retrieved Water level recorder from Ballard. Observations?

Brought gear back from Marmion (observations?) and Kal?

Tag publicity and sightings

Publicity for tags - Wingspan? WA Bird Notes (see my Vol 1, folio 113), Direct approaches, Mike Bamford. "Tattler"? Clive will do SA and Vic.

Subsequent sightings, by, on, where, implications,

5.

Mike Bamford reported 10 000 Banded Stilt at Port Hedland prior to Cyclone Bobby and none one week later.

Andy reported that on 24 October 1995, 1 stilt in flock of 300 in 2cm water at Lake Arrow 24km of Kalgoorlie was leg flagged (yellow). He is going to S coast over Xmas - observations??

Letter of late Nov 1995 from Mike Bamford.

Terri Lloyd at Dumbleyung.

1 yellow flagged Stilt observed at Rotto on 21 Jan 1996.

Cargill Salt, Port Hedland, stilts began arriving 13 Feb 1996.

One yellow flagged stilt at Dampier Salt on 7 March 1996. Steve vL said BaSt have only begun arriving in past 2 weeks.

Grant saw 3 leg flagged and one banded Banded Stilt at Port Hedland Saltworks on 28 (check) Feb 1996.

↑ direction?

ABC film

half our program "Bobby and the Banded Stilt"

Film in final stages. 1st draft of narration. ... of film. Jeremy Hogarth to TVNZ.

Working on data with Clive as time permits for publication in Emu. Popular articles in Wingspan.
No plans for further work at this stage, snowed under.

Andy Chapman

Found nesting on Marmion (why looked? for renesting?).

Finished

Travel claims, diaries (checked mine 15/5/96), vehicle logs,

Granr, Alan and Andy slides?

No renesting as at Lake Torrens (Wingspan)

One page of 'Notes / Ideas' (by JL, undated, but probably late April 1996) relating to the content of (videos) Tape One to Tape Seven (all or nearly all of the ABC Natural History Unit's filming) for 'Bobby and the Banded Stilt'.

Includes the note: 'all [male BaSt] were in good condition when shot with chicks? significance? e.g. for feeding during incubation period?'.

NOTES / IDEAS

170

- advantageous to disperse rapidly + widely from nesting island (food ^{availability}) linked to aggression?
- yes, BAST eyes often do appear swollen.
- is the head profile unusual? salt glands?
- importance of washing / preening to maintain plumage
- all ♂ were in good condition when shot with chicks? aggression?
e.g. for feeding during incubation period?
- sagging bellies (feathers only?) in some adults with chicks - not evident in others or some birds - which?
- slow motion to show swallowing action? prey?
- a lot of unusual feeding (& washing) film # (Check first video).
- RCP footage not used - not good enough?
- comment on long necks/heads?
- comment on difference in size of chicks in some brood.
- use different cow footage (predator)
- could make the point that ^{extra} rain kept water levels up
- they breed on the smallest of the many islands - show island sizes
- small islands also offer best view of approaching predators.
- purpose of aggression may be to disperse chicks as quickly as possible so food source not depleted. No - no aggression between families.
- have average of 2 chicks cause can only protect 2....
- webbed feet - dispersed? any other spp with
- low fat in of large chicks used?
- much on chick survival + due to Alago traders.
- comment on wind + bird mobility?

Fax (30/1/1996) from ACI to JL (copied to GBP for info) saying: 'I have documented the Lake Ballard gut contents and sweep samples [and Crossover Lake sweep samples]. Are they clear enough? Should I ... do the same for [Lake] Marmion samples? Do you want me to discuss sorting techniques with Andrew Storey or others?"

Attached are tabulations (in MSWord) detailing all the gut and sweep samples collected at Lake Ballard (only) in 1995. (These are the same or similar to the Tables used on 22/7/1997 and in 2005 – see above for both).

CONSERVATION AND LAND MANAGEMENT
SCIENCE & INFORMATION DIVISION
WILDLIFE RESEARCH CENTRE, WOODVALE
FAX NO (09) 306 1641 TELEPHONE NO (09) 405 5100



36

Date: 30/1/96
To: SIM LANE
At: BUSSELTON
From: ALAN C.
No of Pages: 3
(including face sheet)

Message:

..... I have documented the Lake Ballard ~~an~~ ~~but~~
contents and ways sample are they
clear enough? Should I proceed to do the
same for Marion samples? Do you want
me to discuss conting techniques with
Andrew Steney or others?



LAKE BALLARD 1995
INVERTEBRATE SWEEPS AT CAMP ISLAND AND CROSSOVER LAKE

Date	Site	Sweep No.	Vials	Comments
15/03/95	Camp Island	1	1	250um net was used
01/04/95	Camp Island	1	1	110um net was used
		2	1	
		3	1	
01/04/95	Crossover Lake	1	1	It seems 2 lots of samples were taken for this date. check GP's notes
		2	1	
		3	1	
		1	3	
09/04/95	Camp Island	1	1	
		2	1	
		3	1	
11/04/95		1	1	
		2	1	
		3	1	
28/04/95		1	2	
		2	2	
		3	2	
04/05/95		1	2	
		2	1	2nd vial damaged
		3	2	
09/06/95		1	2	
		2	2	
		3	2	
09/06/95	Crossover lake	1	4	

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
02/04/95		adult 1	gizz	1			
		adult 2	gizz	1			
		adult 3	gizz	1			
		adult 4	gizz	1			
		adult 5	gizz	1			
		adult 6	gizz/oes	1			
		adult 7	gizz/oes	1			
		adult 8	gizz/oes	1			
		adult 9	gizz	1			
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz	1	1	1	
		adult 11	gizz	1	1	1	
		adult 12	gizz	1	1	1	
10/04/95		family 1		1	1		no gizzard or oes. check GP's notes
11/04/95		family 2	gizz	1	1	1	
		family 3	gizz	1	1	1	
		family 4	gizz	1			
		family 5	gizz	1	1	1	Sweep for family 4 & 5 in one vial
02/05/95		adult 1	gizz/oes	2			
		chick c1	gizz/oes	2			
		chick c2	gizz/oes	2			
					1	2	
		adult 2					missing, presume escaped shot?
		chick 2a	gizz/oes	2			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes				
					1	1	other vial damaged
		adult 3	gizz/oes	2			
		chick 3a	gizz/oes	2			
		chick 3b	gizz/oes	2			
		chick 3c	gizz/oes	2			
					1	2	
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
					1	2	
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
					1	2	

DEPARTMENT OF
CONSERVATION AND LAND MANAGEMENT
SCIENCE & INFORMATION DIVISION
WILDLIFE RESEARCH CENTRE, WOODVALE
FAX NO (09) 306 1641 TELEPHONE NO (09) 405 5100



22

Date: 30/1/96

To: JIM LANE GRANT FYI

At: BUSSELTON

From: ALAN C.

No of Pages: 3

Message: I have documented the bath Ballard ~~as~~ ^{but} contents and sweep samples. Are they clear enough? Should I proceed to do the same for Mormon samples? Do you want me to discuss casting techniques with Andrew Story or others?



(23)

LAKE BALLARD 1995
INVERTEBRATE SWEEPS AT CAMP ISLAND AND CROSSOVER LAKE

Date	Site	Sweep No.	Vials	Comments
15/03/95	Camp Island	1	1	250um net was used
01/04/95	Camp Island	1	1	110um net was used
		2	1	
		3	1	
01/04/95	Crossover Lake	1	1	It seems 2 lots of samples were taken for this date. check GP's notes
		2	1	
		3	1	
		1	3	
09/04/95	Camp Island	1	1	
		2	1	
		3	1	
11/04/95		1	1	
		2	1	
		3	1	
28/04/95		1	2	
		2	2	
		3	2	
04/05/95		1	2	
		2	1	2nd vial damaged
		3	2	
09/06/95		1	2	
		2	2	
		3	2	
09/06/95	Crossover lake	1	4	

LAKE BALLARD 1995
BANDED STILT GUT CONTENTS AND SWEEP SAMPLES

Date	Site	Bird	Contents	Vials	Sweep	Vials	Comments
02/04/95		adult 1	gizz	1			
		adult 2	gizz	1			
		adult 3	gizz	1			
		adult 4	gizz	1			
		adult 5	gizz	1			
		adult 6	gizz/oes	1			
		adult 7	gizz/oes	1			
		adult 8	gizz/oes	1			
		adult 9	gizz	1			
					1	1	one sweep in one vial for birds 1-9
		adult 10	gizz	1	1	1	
		adult 11	gizz	1	1	1	
		adult 12	gizz	1	1	1	
10/04/95		family 1			1	1	no gizzard or oes. check GP's notes
11/04/95		family 2	gizz	1	1	1	
		family 3	gizz	1	1	1	
		family 4	gizz	1			
		family 5	gizz	1	1	1	Sweep for family 4 & 5 in one vial
02/05/95		adult 1	gizz/oes	2			
		chick c1	gizz/oes	2			
		chick c2	gizz/oes	2			
					1	2	
		adult 2					missing, presume escaped shot?
		chick 2a	gizz/oes	2			
		chick 2b	gizz/oes	2			
		chick 2c	gizz/oes				
					1	1	other vial damaged
		adult 3	gizz/oes	2			
		chick 3a	gizz/oes	2			
		chick 3b	gizz/oes	2			
		chick 3c	gizz/oes	2			
					1	2	
		adult 4	gizz/oes	2			
		chick 4a	gizz/oes	2			
					1	2	
		adult 5	gizz/oes	2			
		chick 5a	gizz/oes	2			
					1	2	

Extract (appears to be late Aug or early Sept 1995) from GBP's field notebook in which GBP writes 'Sort gut samples & retain each for ID [identification of contents]' and 'Sweeps – sort to family & retain' and 'Jim to talk to AW Storey'.

Looks like GBP met with JL (& Y. Winchcombe re Vasse-Wonnerup water level loggers) in Busselton on this day and these were his notes relating to processing of BaSt gut samples and aquatic invertebrate sweep samples collected at Lakes Ballard and Marmion earlier in 1995.

This extract has been printed from the 1995 BaSt project 'Field Notebooks' RMCR. Refer to that RMCR if context or higher quality viewing required.

1/22/95

39522

b49. Buds
a case

b. 811

0 = 0.090 m exposed side

Spring broken at bottom of
cylinder. Replaced with
new spring. - looks too
short - only longer at
strange openings

Woman to wait in debt
or R. Kelly P.M. in 10 days
U in to advise on requirements.
Woman to tell her to what
hong.

1615 at busin office.
Converted debt to ~~new~~ file
& referred to debt to Vannard

W.

Retuned Jim High books to library

FB

360 of the Harvey

1/ diagonal lakes com
1000

Markham City Council

Admin centre
Markham + co.

Tuckey Room

30/8/95 F Hong Fox

Conn 2005 trip

Fl 06 Bloomer trip

Kingsbury trip

Fl 06a trip

Winn Co trip

Other people wanted me
to bring them back

AC. 10th

SD

USA - other
+ middle

Li xi South Coast

Bon so exp.

Very 5th Route

DCG

And Sel Sel
1st Sel Nat.
of 100

Sort out samples &
return each for ID

Swaps - sort to friends
+ return.

Don't talk to audience.
1815 TO PARK RD.
MELBOURNE 8800.

NO UNQUOTE 1/10

Ted. Henderson
093 391106
checks at 0900

Call at 0830.

Phil lives on 10th
Phone No
Cockburn.
041 891200

Letter (26/6/1995 'FILE: CHEM895') from GBP to Roger Schultz (WA Chemistry Centre) requesting analysis of accompanying water samples. 32 samples are individually listed.

They are numbered 1-32. Of these, numbers 1-20 & 32 are listed as being from Lake Marmion (samples 1-9, 12, 15-20), Lake Ballard (samples 10, 14, 32) or Crossover Lake (11, 13). The dates of the 3 samples from Ballard are 02/4 (presumably this one sample was overlooked when a batch was sent to Chem Centre on 24/5/1995, see below) and 09/6/1995. The 2 samples from Crossover Lake are dated 09/6/1995. The dates of the 16 samples from Marmion range from 10-13/6/1995.

The labelling of the Marmion samples (and the 02/4/1995 Ballard sample) indicates some were associated with collected BaSt (11-12/6/1995 only), while some were not.

Some were to be analysed for Total Phosphorus and Total Nitrogen and had already been filtered, 'using millipore 0.45 uM HA filters'. Some were to be analysed for conductivity (and TDS).

Mysteriously, there is a copy of this 26/6/1995 request, re-dated in GBP's handwriting to 31/8/1995, and faxed from Woodvale to JL on 04/8/1997. Perhaps this batch of samples was meant to go to the Chem Centre on 26/6/1995 but was delayed until 31/8/1995 and GBP simply re-dated the covering letter by hand.

Department of Conservation and Land Management
Woodvale Research Centre
Ocean Reef Road Woodvale 6065
Telephone: (09) 405 5163
Fax: (09) 306 1641

To: Mr Roger Schultz
Principal Chemist
Environmental Chemistry Laboratory
Chemistry Centre

From: Grant Pearson
Research Centre Manager

Date: June 26 1995

Subject: Water Analyses
FILE: CHEM895

I would be grateful if you could analyse the accompanying water samples for conductivity and TDS (reported in Parts per thousand) and for total phosphorous and total nitrogen. The samples are from Lake Marmion, Lake Ballard, Harvey Estuary, and Harvey River.

Some of the samples from Lake Marmion are to be analysed for Total P and N and have been filtered using millipore 0.45 uM HA filters.

No.	Date	Descriptor	Analysis
1	12/6	Marmion Family 2	Tot P and N
2	12/6	Marmion gauge site	Tot P and N
3	12/6	Marmion Family 4	Conductivity
4	12/6	Marmion Family 4	Tot P and N
5	12/6	Marmion gauge site	Conductivity
6	12/6	Marmion family 3	Tot P and N
7	13/6	Marmion Camp site	Tot P and N
8	13/6	Marmion Colony site	Tot P and N
9	10/6	Marmion Camp site	Tot P and N
10	09/6	Ballard Camp site	Tot P and N
11	09/6	Cross over lake	Tot P and N
12	11/6	Marmion Bird 1	Tot P and N
13	9/6	Cross over Lake	Conductivity
14	9/6	Ballard Camp site	Conductivity
15	11/6	Marmion Bird 1	Conductivity
16	10/6	Marmion Camp site 1	Conductivity
17	12/6	Marmion Family 2	Conductivity
18	12/6	Marmion Family 3	Conductivity
19	13/6	Marmion Colony	Conductivity
20	13/6	Marmion Camp site	Conductivity
32	02/4	Ballard BAST 1-9	Conductivity

*Sampling
Bast
Start
Assess Project
J 03/5/12*

Harvey Estuary samples for analysis for conductivity and salinity in PPT by evaporation.

21	30/8	Harvey Est. site 1	Cond. & salinity
22	30/8	Harvey Est. 2	Cond & salinity
23	30/8	Harvey Est. 3	Cond & salinity
24	30/8	Harvey Est 4	Cond & salinity
25	30/8	Harvey Est 5	Cond & salinity
26	30/8	Harvey Est 6	Cond & salinity
27	30/8	Harvey Est. 7	Cond & salinity
28	30/8	Harvey River Depth Post	Cond & salinity
29	29/6	Harvey Est site 4	Cond. & salinity
30	29/6	Harvey Est site 6	Cond & salinity
31	02/6	Harvey Est site 4	Cond & salinity

T. Jim Lane

6.

Department of Conservation and Land Management

Woodvale Research Centre

Ocean Reef Road Woodvale 6065

Telephone: (09) 405 5163

Fax: (09) 306 1641

To: Mr Roger Schultz
 Principal Chemist
 Environmental Chemistry Laboratory
 Chemistry Centre

From: Grant Pearson
 Research Centre Manager

Date: 31/12 1995

Subject: Water Analyses

FILE: CHEM895

I would be grateful if you could analyse the accompanying water samples for conductivity and TDS (reported in Parts per thousand) and for total phosphorous and total nitrogen. The samples are from Lake Marmion, Lake Ballard, Harvey Estuary, and Harvey River.

Some of the samples from Lake Marmion are to be analysed for Total P and N and have been filtered using millipore 0.45 uM HA filters.

No.	Date	Descriptor	Analysis
1	12/6	Marmion Family 2	Tot P and N
2	12/6	Marmion gauge site	Tot P and N
3	12/6	Marmion Family 4	Conductivity
4	12/6	Marmion Family 4	Tot P and N
5	12/6	Marmion gauge site	Conductivity
6	12/6	Marmion family 3	Tot P and N
7	13/6	Marmion Camp site	Tot P and N
8	13/6	Marmion Colony site	Tot P and N
9	10/6	Marmion Camp site	Tot P and N
10	09/6	Ballard Camp site	Tot P and N
11	09/6	Cross over lake	Tot P and N
12	11/6	Marmion Bird 1	Tot P and N
13	9/6	Cross over Lake	Conductivity
14	9/6	Ballard Camp site	Conductivity
15	11/6	Marmion Bird 1	Conductivity
16	10/6	Marmion Camp site 1	Conductivity
17	12/6	Marmion Family 2	Conductivity
18	12/6	Marmion Family 3	Conductivity
19	13/6	Marmion Colony	Conductivity
20	13/6	Marmion Camp site	Conductivity
32	02/4	Ballard BAST 1-9	Conductivity

Need to check GL's
 reports, phragmites from
 notes to see if
 have to do the
 details
 to S with these
 14/8/97

o5

Letter (26/6/1995 'FILE: CHEM 95') from GBP to Roger Schultz (WA Chemistry Centre) that is IDENTICAL to the letter of 24/5/1995, except for the date. It is apparent from 29/7/1997 copy of results (see above) that the samples weren't delivered to / received by WA Chem Centre until 26/6/1995

See 24/5/1995 for a description of the letter's content.

Note that this 26/6/1995 copy has later annotations by JL relating to where some of these samples were taken, the depths that were measured at the time; some pH measurements; references to the stakes that were installed to monitor water depth, coordinates (lats & longs) and other details.

79.

Department of Conservation and Land Management

Woodvale Research Centre

Ocean Reef Road Woodvale 6065

Telephone: (09) 405 5163

Fax: (09) 306 1641

To: Mr Roger Schultz
Principal Chemist
Environmental Chemistry Laboratory
Chemistry Centre

From: Grant Pearson
Research Centre Manager

Date: June 26 1995

Subject: Water Analyses

FILE: CHEM0595

I would be grateful if you could analyse the accompanying water samples for conductivity and ^{T21} salinity (reported in Parts per thousand) and for total phosphorous. The samples are mainly from Harvey Estuary, Harvey River and Lake Ballard.

Some of the samples for total phosphorous (tP) have been filtered using millipore 0.45 μ M HA filters. These are recorded below as "filt'd". Samples unfiltered are referred to as "unfilt'd".

All samples are marked on the lids with a number from 1 to 76 corresponding to the numbers listed below. Please report using the sequential numbers, the date and descriptor.

No.	Date	Descriptor	
1	09/03/95	Harvey River depth gauge Post	
2	09/03/95	Site "00"	Harvey River
3	09/03/95	Site 2	Harvey Est.
4	09/03/95	Site 4	Harvey Est.
5	09/03/95	Site 7	Harvey Est.
6	09/03/95	200m South of Island Point	
7	21/03/95	Site 3.5km	Harvey River.
8	21/03/95	Site 7	Harvey Est.
9	21/03/95	200m South of Island Point	
10	06/04/95	Ramp	Harvey Est.
11	06/04/95	Site 7	Harvey Est.
12	06/04/95	Mouth, "00"	Harvey River
13	06/04/95	Post	Harvey River

14	21/04/95	Site 0 North side of Island	
15	21/04/95	Site 1 North side of Island	
16	21/04/95	Site 3	Harvey Est.
17	21/04/95	Site 6	Harvey Est.
18	21/04/95	Site 7	Harvey Est.
19	21/04/95	Fishtrap	Harvey Est.
20	21/04/95	Site 4km	Harvey River
21	17/05/95	Site 1	Harvey Est.
22	17/05/95	Site 2	Harvey Est.
23	17/05/95	Site 3	Harvey Est.
24	17/05/95	Site 4	Harvey Est.
25	17/11/94	Site "00"	Harvey Est.
26	17/11/94	Site 5, site 1.0km	Harvey River
27	15/03/95	Lake Ballard	<i>most bacteria taken in Crossover L. 1st reading strong water</i>
28	11/04/95	Family 2	Lake Ballard, salinity
29	11/04/95	Family 3	Lake Ballard, salinity
30	11/04/95	Family 4/5	Lake Ballard, salinity
31	11/04/95	Family 2,tP	Lake Ballard
32	11/04/95	Family 3,tP	Lake Ballard
33	11/04/95	Family 4/5,tP	Lake Ballard
34	01/04/95	Site 1,tP,unfilted	Lake Ballard
35	01/04/95	Site 1,tP, filtd top	Lake Ballard
36	01/04/95	Site 1,tP	Ballard
37	01/04/95	Site 1, tP,unfilted	Crossover Lake
38	01/04/95	Site 1, tP, filtd	Crossover Lake
39	02/04/95	Site 2,Bast 10, tP	Ballard
40	02/04/95	Site 3,Bast 11, tP	Ballard
41	02/04/95	Site 4,Bast 12, tP	Ballard
42	09/04/95	Site 1, tP <i>(sampled 8/4/95)</i> <i>as near as possible</i>	Ballard
43	11/04/95	Site 1, tP <i>(sampled 8/4/95)</i> <i>Crossover L.</i>	Ballard
44	02/04/95	Site 1	Crossover Lake, salinity
45	04/05/95	t P+N	Crossover Lake, salinity
46	04/05/95	Bottom	Crossover Lake, salinity
47	04/05/95	Top	Crossover Lake, salinity

15

pH 6.75

~~24~~ ~~25~~ ~~26~~ depth 56 cm
~~24~~ ~~25~~ ~~26~~ depth 51cm, no pH.
~~24~~ ~~25~~ ~~26~~ depth 51cm, no pH.

(shallow)
 GPS
 Installed "pig" due
 north of east end of
 Crossover Island
 This is site 2

sample 51 for Total P (unfiltered sample)
 8/4/95
 (Bast 1-3)

48	01/04/95	Top, site 1	Ballard, salinity
49	01/04/95	Bottom, site 1	Ballard, salinity
50	01/04/95	Site 1	Crossover Lake

51	02/04/95	Bast 1-9	Ballard, salinity
52	02/04/95	Bast 10, site 2	Ballard, salinity
53	02/04/95	Bast 11, site 3	Ballard, salinity
54	02/04/95	Bast 12, site 4	Ballard, salinity

55	09/04/95	Top, site 1	Ballard, salinity
56	09/04/95	Bottom, site 1	Ballard, salinity

57	11/04/95	Top, site 1	Ballard, salinity
57 A	11/04/95	Bottom site 1	Ballard, salinity

58	02/05/95	Adult 1	Ballard, salinity
59	02/05/95	Adult 2	Ballard, salinity
60	02/05/95	Adult 3	Ballard, salinity
61	02/05/95	Adult 4	Ballard, salinity
62	02/05/95	Adult 5	Ballard, salinity

63	04/05/95	Camp	Ballard, salinity
----	----------	------	-------------------

64	28/04/95	Camp, tP	Ballard
65	28/04/95	Top Camp	Ballard
66	28/04/95	Bottom Camp	Ballard

67	04/05/95	Camp Island, t P+N Ballard	
----	----------	----------------------------	--

68	02/05/95	Adult 1	Ballard
69	02/05/95	Adult 2	Ballard
70	02/05/95	Adult 4	Ballard
71	02/05/95	Adult 5	Ballard
72	02/05/95	Adult 3, t P+N	Ballard

73	14/02/95	Unicup	
74	14/02/95	Muir	
75	14/02/95	Yarnup	
76	15/02/95	Tordit Garmp	

94 E 471

depth at this site
was 10 cm.

Ball Log angle.

depth 29 cm.

depth 49 cm.

depth 51 cm.

29° 30' 08"
121° 03' 41"

no pH
or temp
for these sites.

pH 6.98
no temp.



uncertain whether
mins + secs
or min + seconds of min

"Family 1" on 10 April
was shot in 25 cm of water.
no pH, no temp,
no water samples

12.4 April the depth at
the data logger was 42 cm
(GR)

location
was near shore
at Camp Island

Faxed (19/06/1995) copy of 17/06/1995 report by GBP for JL, headed 'Report on Survey to Lake Ballard and Lake Marmion 8 June 1995 to 13 June 1995'. Inter alia indicates that:

- On 11/6/1995 GBP, ACh & ACI collected 'one family ['Family 1'] of Banded Stilts. 1 adult 5 chicks 3-5 days old' on Lake Marmion. These birds were weighed and measured and other details recorded. An invertebrate sweep was 'taken'; a water sample was taken for 'tot P' and water conductivity (actually salinity – 46ppt) & pH (7.94) were measured (the former, at least, by ACh, presumably in situ). Note that these birds were referred to (labelled?) as 1.1 to 1.6, with 1.1 to 1.5 being the chicks and 1.6 being the adult.
- On 12/6/1995 GBP & ACI collected four families ['Family 2' to Family 5'] of BaSt on Lake Marmion. These birds were weighed and measured and other details recorded, including (it would appear) whether or not the oesophagus and gizzard (or just contents?) were collected (separately), plus a few notes on their contents (e.g. ostracods', 'ants', 'coleo' [coleoptera]). Note that these birds were referred to (labelled?) as '2a, 2b, 2c, 2adult' to '5a, 5b, 5adult'. So (note by JL on 29/3/2014), when collating and tabulating info relating to collected birds, keep in mind that at least two labelling systems were used on the BaSt collected in 1995. Water depth was also recorded (and water samples and/or salinity and pH measurements taken in situ by ACh?) where these four BaSt families were collected.

DEPARTMENT OF
CONSERVATION AND LAND MANAGEMENT
SCIENCE & INFORMATION DIVISION
WILDLIFE RESEARCH CENTRE, WOODVALE
FAX NO (09) 306 1641 TELEPHONE NO (09) 405 5100



155

Date: 19/06/95
To: Alan Lane
At: BSN
From: CP
No of Pages: (including face sheet)
Message: Copy for your consideration & queries
Thursday
Cheers
CP

Re visit to
Shoal Bay of Bellbird + Mernion from

8 - 13 June 95

(1)

187.
154.

REPORT ON SURVEY TO LAKE BALLARD AND LAKE MARMION 8 JUNE 1995 TO 13 JUNE 1995

(Tues)

(Fri)

G Pearson and A Clarke in Toyota Landcruiser 7QE 236. Met Andy Chapman in Kalgoorlie on 9/6 and departed for Ballard. A Chapman had flown the lakes and reported no flightless chicks remained on Ballard but young chicks found at Marmion

OBJECTIVES (from Jims notes) (Jim Lane's)

Obtain further water chemistry data

Measure extent of breeding site on Camp Island colony

Download datalogger

Withdraw gear from Camp Island

Record waterbirds seen on crossover lake during trips

Results

/ yet (Alan's)

Water samples for salinity, Total P (unfiltered) were collected from the camp island site and from the crossover lake site.

Camp Isd... Depth. 775mm... Temp? NA... PH. 8.67...

Crossover 53cm. 12.0 8.76....

Invertebrate sweeps collected at each site

The extent of the breeding was measured and mapped for Camp island colony *Great colony has dimensions*

Datalogger was downloaded and reset to record every hour and average every 6 hours

Waterlevels varied from 398 to 689 for the 70 days it was in place.

All gear was withdrawn from the island and Crossover camp leaving the sites clear.

Waterbirds

Ballard

BaSt	6
Pipit	1
White-backed Swallow	1
Banded Lapwing	2
RNAV	7
Shel	2
Gylt	11
RCaP	2 plus 1 juv

Crossover Lake

Coot	11 plus 6 juv
MusD	3 male
	2 female
PaBD	2 (pr)
LiGb	1

(2)

HSE
153.

10 June

Packed and loaded gear and departed to Lake Marmion 1108 to Jeedamya. Called in to station for first aid kit and to talk to Finlaysons. Neither were located. Left a note for the latter.

Drove on to Marmion via Bronc Rock fence line to lake edge.

OBJECTIVES

Use all available yellow flags

Band 200 chicks

Collect water samples

Record depth and install depth post

Locate colony if possible and measure extent and size

Photograph colony

Collect dominant vegetation

1545 arrived Marmion.

Installed depth gauge using an old survey line peg (second from camp side of shore) 770 mm above water level
depth at gauge was 220 mm

Installed second marker to denote location of site only

Collected water samples and sweep.

pH.. 7.39....

temp 12.0C.....

Argod to big island at 300 degrees from camp to reconnoitre.
Back to camp at nightfall

11 June 95

Began banding and flagging in argo towing 3m punt

Banded 200 on left tibia

Flagged (yellow) 195 on right tibia

Collected one family of Banded Stilts. 1 adult 5 chicks 3-5 days old.

Family 1

1.1 39 gms yolk sac large

1.2 34 gms yolk sac large

1.3 33 gms yolk sac large

1.4 42 gms yolk sac large

1.5 32 gms yolk sac large

1.6 adult male 221 gms

wing length 199 mm

total head 118.7 mm

teste 14.4 mm

Brood patch yes Band full belly 100%

sweep taken

tot P

conductivity 46% (Andy Chapman)

pH 7.94

12/6/95

Next to confirm ACb departed
on 12/6 *10/01/94*

(3)

1ST
152

Andy Chapman departed for Kalgoorlie at 0700
AC and GP headed east for 5 mins and then back west when it
became obvious that there were no chick east of the camp.

Large numbers of loose creches and masses of adults
extending out of site to the west and north.
Drove up behind creche of 30 chicks and ran all down placing
them in a nally bin with a cloth base. Flagged all and
released with adults which had remained in attention.
Caught brood of 5 and released with parent.
Continued catching flagging and releasing all day releasing
chicks with attending adults.
Ages varied from 2 to 18 days. Total flagged. 195
+ 260
10
475

Collect

Family 2 Depth 29 cm

5 young 1 adult

number	wt (gms)	mt	th	b	wing		gizzard		teste
					total	head	oesophagus	giz	
2a	34	24.4	51.5	27.3	-	y	y	-	-
2b	32	25.2	49.7	26.5	-	y	y	-	-
2c	30	25.6	52.3	31.8	-	y	y	-	-
2adult	238	35.0	111.5	74.7	-	y	y	m	17.2
brood patch	yes	Band	strong	belly	80%			r	-

Family 3 Depth 3cm

2 young 1 adult

3a	31	23.3	48.8	23.8	-	y	ostracods	y	-
3b	34	25.3	50.9	25.9	-	y	y	-	-
3adult	232	32.5	107.8	71.9	202	y	y	m	120.1
								r	14.6

brood patch yes Band full Belly 100%

Family 4 Depth 12 cm

3 young 1 adult

4a	30	22.7	46.3	23.6	36	y	y	-	
4b	34	23.5	49.8	26.3	23	y	y	-	
4c	31	24.1	49.9	26.5	25	y	y	-	
4adult	200	34.3	-damaged bill	189	y	ost.	y	m	
								l	15.5
								r	10.4

Brood patch yes Band full Belly 100%

Family 5 depth 9cm

2 young 1 adult

5a	35	24.1	52.1	22.2	25	y	y	-	
5b	34	24.9	50.2	29.8	25	y	ost, ants, coleo		
5adult	205	32.0	104.9	68.5	193	y	ost, y	m	
Brood patch	yes	Band	full	Belly	100%			r	-

(4)

180.

151.

13/6/95

0615 to colony on a bearing of 300degrees determined from flight of aircraft previous day.. Distance unknown

Gytl 4 large waders 8
small waders 30 shel 2

Masses of adults and broods at north end of Big Island. Proceeded west along north side of Big island. Located colony with telescope from west end of Big Island. Proceeded west across expanse of water to 52cm deep.

Approaching colony 28 chicks and 18 adults in a loose creche. Numerous dead chicks about 1-5 days old along the strand line of the colony island.

300-400 adults at the waters edge in front of the central part of the colony. Agitated and flighty. Occasional dashes by 30-50 birds up the bank to the colony but they would almost immediately fly off in alarm. Peregrine falcon flew low over colony putting flock of Bast on the colony to flight. Wedge-tailed Eagle took off from rear of colony about 100m from active area and flew to a raised tussock about 200 m west of the colony where it sat and watched. On our approach of the colony the eagle departed and during measurements every stilt flew out of site out of sight. Began measurements at 0846 and finished at 0931

Observations

21 chicks in nests with unhatched eggs in a small discrete area of the colony

About 100- 200 nests spread around a greater area of the colony, but within a roughly discrete area, with 2-3 eggs all very cold. No incubation for many hours perhaps days. Some covered with fine sand suggesting exposure during rain some days ago.

Numerous (up to 20) moribund chicks in nests in the discrete active area with an egg or often with one healthier but obviously cold stressed chick.

About 10 small chicks wandering through active part of the colony.

Measured length and breadth of colony plus several other satellite colonies.

Photos of colony

vegt'n samples collected

Measured twenty nests for diameter and dispersal

On our departure about 50 -80 adult bast returned and milled about at the front of the colony . Several ran into the active area but left quickly. We continued to observe until 0950

Chapman reports that the eagle was present on the colony at 1400 when Chapman flew the area and there were no Bast on the colony at all or in the area.

Much evidence of ancient nest attempts from egg shards.

Notes

In large groups of adults there was some copulation attempted. Two families of Rnav with two young each. One had adopted a Bast chick about 3 days old and bigger than Rnav chicks.

Left at the camp is argo inside trailer. Chains had been sprayed but require more. Engine needs oil change. Have to buy a vaccuum pump to get the oil out of the sump. one jerry can of water. One 3m punt. Lighting and generator.

Depth post installed at colony 211 mm exposed

Coordinates of colony	29.44.36
	121.29.13
camp	29.47.01
	121.33.06

G Pearson
17 June 1995