

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



NESTING AREAS, NEST AND EGG DATA

RESEARCH MATERIALS CONSOLIDATION REPORT

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March 2014

Cover photo: Banded Stilt hatching quadrat 'BCIH' at Lake Ballard on April 5th, 1995.
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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.

SCOPE OF THIS RMCR

This RMCR collates, inter alia:

1. Printed copies of five Excel spreadsheets prepared by JL in Feb-Mar 2014 that tabulate, in considerable detail, all of the particulars concerning the establishment and monitoring of the hatching and laying quadrats and individually marked nests & eggs on the 1st & 2nd colonies of Lake Ballard in 1995 (no quadrats were established on the Lake Marmion colony). Included are the unique identifying numbers of each of the photos that were taken of the individual monitoring quadrats each day. **TO DO:** Decide exactly what information should be extracted from each photo, how best to do this, and then do it. See elsewhere in this RMCR for thoughts (and attempts to date) on what should be done.
2. Various working documents attempting to document changes in the contents of some of the monitored quadrats and individual nests;
3. 'Thumbnail' prints of the scanned copies of all of the photographs that were taken of the nest monitoring quadrats;
4. Reference to measurements of nesting areas of breeding colonies '1' & '2' on Lake Ballard and the breeding colony on Lake Marmion;
5. Reference to measurements of nest scrapes and nest scrape spacings;
6. Some egg measurements and reference to others.

Observations concerning nesting adult behaviour, attempts to catch and colour mark nesting adults, departure of chicks from the two studied nesting colonies, measurements of chicks, brood sizes, creche formation, predation of chicks, etc., are not in this RMCR, except incidentally. They will be RMCR'd separately.

Copies of published articles ('Wingspan', 'Stilt', 'Tattler', 'WA Bird Notes', etc.) and presentations (to RAOU WA Group, CALM Woodvale, 1996 Southern Hemisphere Ornithological Conference (SHOC)) are also not in this RMCR and have been and will be RMCR'd separately. Some of these included estimates of the size of the breeding colonies (i.e. number of breeding pairs or nests) and perhaps make reference to measurements of nesting areas, etc.

Copies of scientific literature assembled by / for JL to assist him in (co)planning the 1995 Banded Stilt nesting colony monitoring activities are also not included in this RMCR (**and will be RMCR'd separately?**).

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:

- Ask Andy Chapman (ACh) for copies of his field notes from the trips on which he accompanied JL & ACI (Ballard, April-May 1995) and GBP & ACI (Marmion, June 1995).
- See yellow highlighted text in the remainder of this RMCR summary for other Future Work needed / desirable.
- Do the work proposed in '1' above (in 'Scope of this RMCR' section).

Photographs

Thumbnail prints of photos taken by JL, CDTM, GBP & ACh during nest monitoring activities on Lakes Ballard and Marmion in 1995 are included in this RMCR. The 'hardcopy' photos (all 35mm colour transparencies) are held by JL. The scanned (digital) copies of these are on JL's office computer and backups. **CDTM might have** some additional photos not yet seen by JL.

Field Notes

A separate RMCR of 1995 Field Notes has been prepared containing copies of all the Field Notes made by J Lane (JL), G Pearson (GBP), A Clarke (ACl) and A Chapman (ACh) (**have yet to obtain ACh's**) in 1995 while undertaking collaborative research with C Minton (CDTM) on Banded Stilts in Western Australia. **These Field Notes (especially JL's) contain many observations and much data that MUST be consulted and drawn upon when preparing any reports, publications, etc., based on this RMCR.**

CONTENTS

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

This RMCR contains:

1. Sketch (prepared 15/3/2014 by JL) showing the photo coverage of 29 of 31 nests that were numbered on 1st BaSt colony, Lake Ballard, on 03/04/1995 for the visual monitoring of adults on nests. The photos were taken on 07/04/1995. Accompanying is a copy of the spreadsheet (one of five referred to below) with particulars of this work. Details are in JL's field notebooks.
2. **Printed copies of five Excel spreadsheets (Excel file 'Numbered quads, nests and eggs 1995 Ballard.xls', prepared by JL in Feb-Mar 2014) that tabulate, in considerable detail, all of the particulars concerning the establishment and monitoring of the hatching and laying quadrats and individually marked nests & eggs on the 1st & 2nd colonies of Lake Ballard in 1995 (no quadrats were established on the Lake Marmion colony). Included are the unique identifying numbers of each of the photos that were taken of the individual monitoring quadrats each day. TO DO: Decide exactly what information should be extracted from each photo, how best to do this, and then to do it See above and below in this RMCR for thoughts (and attempts to date) on what should be done.**

Note that all of the monitoring photos, originally taken with 35mm slide film, were scanned (digitised) by JL, in 2013. JL holds (as at 19/2/2014) both all of the original slides (in his office) and all of the scanned copies (on his work computer).

Note also that one of the spreadsheets ('1st Colony – All Numbered Nests / Eggs ...') has a column with particulars of 'Monitoring of Adults on Nests ...'. See above ('Sketch ...') for more about this.

3. Three pages (scribblings en route from Perth to Wellington NZ) by JL (on 23/02/2014) exploring some of his thoughts about possible ways of extracting & analysing data from the hatching and laying quadrats on the 1st & 2nd BaSt colonies on Lake Ballard in 1995.
4. A 'Timeline of Nesting Colonies (2) Monitoring on Lake Ballard in 1995', prepared by JL on 18/2/2014 and printed and annotated on 16/3/1995. This needs some more work if it is to be complete and authoritative.
5. A chain of emails (13-19/04/2000) between CDTM, GBP and JL in which, inter alia, JL advises GBP and CDTM that: 'We did collect eggs for DNA work [from Lake Ballard in 1995] and they went to Murdoch Uni [Incorrect, they went to Curtin University! JL 12/02/2014]. Results were not forthcoming. 'In the end I decided we should wait for another breeding effort in WA and collect more, to send to a different DNA lab'.
6. 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: 'Egg laying, incubation and hatching success data to be extracted from daily photographic monitoring of quadrats established in 1995 [Lake] Ballard breeding colonies'. The Science Project Plan refers inter alia to this work (accomplished and proposed) in somewhat more detail.
7. Email exchange (04-08/06/1999) between Michael Yung, Research Scientist [computing] of CALM, and JL referring to '... the program I [MYu] wrote for bird-nests counting using the triangulation ['triangular tessellation'?] method'. JL writes 'I borrowed the Husky ['Husker Hunter'] from Andrew [Burbidge] for a short period in 1995 and returned it to him [unused?] soon after'. See instructions headed 'Program BIRD NEST, in Husky Basic' by 'Michael Yung, 1 Oct [1991]', early in this RMCR, for related info.

8. Email (02/08/1997) from JL to GBP asking that he sort and label his slides (35 mm photos) from Lakes Ballard, Marmion and Barlee. Explains why JL labelled some slides with '1K', '2K', etc. Note that all of GBP's work photos are now – 2014 – in JL's possession and have been scanned (digitised) by JL.
9. Note (23/06/1997) from Michelle Handley (this is the correct spelling) to JL and photocopies of print photos of nesting BaSt and BaSt nesting quadrat 13-16 ('13, 14, 15, 16') (photo number 3832 of JL's collection, dated 04/04/1995), both taken by JL on Lake Ballard in April 1995.
10. Fax (14/10/1996) from CDTM to JL that reads, *inter alia*, 'Re slides [35mm photos]. I don't think I need the banding ones [for a BaSt presentation CDTM was to give in New Zealand 'next week']. And I don't think I've got anything that you haven't'.
11. Two of the 'overheads' that JL projected during his presentation (on behalf of JL, CDTM *et al.*) at the 'Southern Hemisphere Ornithological Conference' (SHOC) in Albany, WA, on 07/10/1996. One is a map showing the path of Cyclone Bobby and the dates (25-28/02/1995) of its movement across WA. The other is headed 'Lake Ballard – Main Colony – 1995 Breeding Cycle. It contains JL's calculations / estimates of the number of days taken by each stage (including site selection, scrape formation, laying, incubation and hatching) in the breeding cycle and the number of days from 'lake full' to 'lake dry' (calculated to be approx. 200 days, from approx. 1st March to 16th Sept 1995).
12. List of slides (photos) used in Banded Stilt talks given by JL to the SHOC at Albany on 07/10/1996 and the RAOU WA Group in Perth on 25(?)09/1996. Some of these photos were: aerial photo of Ballard colony on 15/03/1995; marking out of nesting quadrats and marking of individual eggs on 15/03/1995; Quadrat NOUT with eggs on 01/04; Quadrat 13-16 with eggs and '1m frame' on 2nd colony on 04/04; eggs; Quadrat NOUT with eggs & chicks on 04/04; eggs & chicks in nests on 05/04; 'Photo ID: Blank. Close-up of adult + 1 chick in nests (Mark Lamble)' [Find photo. Possible to work out where & when?]; 'nests washed away (5.95)', and '[three other] nesting islands from air (30/3)'.
13. '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: 'clutch size'; hatching success'; 'individual colour mark[ing] [i.e. proposed marking of nesting adults]' and 'eggs collected – DNA'. This single page has been scanned over two pages due to its length.
14. 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]. The many paragraphs / sentences / words relating to nesting (those aspects that come within the scope of this RMCR) have been highlighted in green (by JL on 10/02/2014). This document is an incomplete draft but does give a useful account (overview) of the work that was done in 1995. Better to work from the relevant source documents, all of which are in this RMCR.
15. Fax (01/03/1996) from JL to John Weatherall (OOPS! Should have been 'Wetherall'! JL/02/2014) at Curtin University (fax number not on fax) asking: 'Could you advise me of status of DNA testing of the eggs please'.
16. Fax (18/07/1995) from JL to Prof John Weatherall (OOPS! Should have been 'Wetherall'), at Curtin University (Fax 09 351 2342), asking 'Could you let me know how the DNA testing of the [BaSt] eggs is going please?.
17. Fax (dated 28/06/1995, but sent 27/06/1995) from CDTM to JL requesting mailing address as 'I have some slides [photos] & papers to post to you'. These were the photos (of nesting quadrats on Ballard 'Colony 1') and papers (regarding the Bellchambers / Carpenter paper) that accompanied CDTM's letter of 27/06/1995, below.
18. First two pages of letter (27/06/1995) from CDTM to GBP & JL. Accompanying this letter was 'A copy of the draft Bellchambers/Carpenter paper on the 1989 Lake Torrens

Banded Stilt breeding, together with associated correspondence', and 'Slides [35mm colour transparencies] I took of Colony 1 [on Lake Ballard] after the birds had largely departed [Check and add date]. These are numbered as per the relevant block, with the first photo being taken from the NW end just as you and I did. These photos should tally with the physical count data I did at the same time & which has already been sent to you [see CDTM's fax of 24/04/1995 to JL, below]. Could you please process them as you did the very first lot [cross-reference to that processing] & make your estimates of (a) number of unhatched eggs left in nests; (b) number of abandoned eggs in groups; (c) number of still occupied unhatched nests/eggs' [JL yet to do?].

19. Undated map of Lake Ballard, with annotations (1995) in ACI's handwriting. The following locations are marked: 'Crossover Lake (Fresh)', 'Camp Island', 'BaSt No.1 Breeding Colony', 'No.2 BaSt Breeding Colony' and 'Tripod Island'.
20. 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 reads 'The extent of the breeding [on main breeding island of Lake **Ballard**] was measured and mapped [On 09/06/1995] for Camp island colony' [JL has annotated 'Grant has dimensions'].
On 13/06/1995 GBP & ACh located (using compass bearing provided by ACh following his survey flight of previous day) and visited the BaSt nesting colony on Lake **Marmion**. GBP reports his observations, including: BaSt adults; live chicks; dead chicks, possible predators (Peregrine Falcon; Wedge-tailed Eagle); some chicks and eggs in nests; 'no incubation for many hours perhaps days'; 'measured length and breadth of colony plus several other satellite colonies'; took photos of colony and collected vegetation samples; 'Much evidence of ancient nest attempts from egg shards'; 'Coordinates of colony 29.44.36, 121.29.13'.
A copy of the last page of this report, with GBP's work hours annotated, is also here.
21. Aerial oblique photos (one page of 'thumbnail prints') of Lake Marmion BaSt flocks and BaSt nesting area that were among a batch of Lake Boonderoo photos sent by Ian Kealley to JL in 2013. Most or all are probably photos taken by ACh when he flew over Lake Marmion on 12/06/1995 looking for the BaSt nesting site on this lake. Some of the photos were labelled 13/06/1995 so need to double-check with ACh about the date (almost certainly should be 12/06/1995) and with ACI about the photo content. JL scanned (digitised) these photos in 2013 and will return the originals to IK.
22. Photos (3 pages of 'thumbnail prints') by GBP of what is probably (first photo) Andy Chapman flying overhead (Lake Marmion) on 12/06/1995 and then (subsequent photos) GBP & ACI's trip the next day (13/06/1995) to the BaSt breeding site on Lake Marmion.
Note especially that on 12/02/2014 JL changed (corrected – to 13/06/1995) the dates in the file names of the scanned copies (JL's photo numbers 4309-4336) of GBP's photos (slides) of the day GBP & ACI located and visited the BaSt nesting island on Lake Marmion. GBP had started labelling these slide mounts as 11/06/1995, then changed some and labelled the rest as 12/06/1995. They were actually taken on 13/06/1995 (based on his field notes and subsequent report of this trip).
See JL's work PC (and backups) for these photos in digital format (scanned from 35mm colour transparencies, i.e. slide film).
23. Photos (3 pages of 'thumbnail prints') by GBP of 09/06/1995 visit by GBP & ACh (& ACI) to 1st colony (by this time deserted) on Lake Ballard. Inter alia they measured the nesting area and areas including (incidentally) some quadrat pegs and individually labelled nests. **Check if these photos have been referred to in the Excel Tables (Excel file: 'Numbered quads, nests and eggs 1995 Ballard.xls') prepared by JL in Feb-Mar 2014 (see above).**

See JL's work PC (and backups) for these photos in digital format (scanned from 35mm colour transparencies, i.e. slide film).

24. Photocopies of the pages of GBP's field notebook that cover his (with ACI & ACh) 8-13 June 1995 trip to Lakes Ballard and Marmion, during which they, inter alia, visited and measured the main BaSt breeding colony on Lake Ballard and located, visited, made observations, took photos, measured, etc. a BaSt breeding site on Lake Marmion. These field notes include some/many details that are not in GBP's subsequent report of 17/06/1995, and vice-versa. ACh had left Lake Marmion the day before GBP & ACI visited this breeding colony, but ask him for a copy of his field notes of the days prior, including of his flight on 12/06/1995 when he found the Marmion breeding site for GBP.
25. 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: a camera, suitable film types, need to replace the 'stuffed' dial calipers with vernier calipers; need to precisely measure the boundaries of the nesting area on the 1st breeding island (on Lake Ballard); 'Attempt to locate Marmion nesting island. If successful: ... [measure, photograph, sample plants, measure nest scrapes; record number of chicks & adults reaching water (i.e successfully leaving nesting island); note any predator / scavenger activity]'. Check: was the program revised partly on the basis of an aerial survey of Lake Ballard and Marmion between sending out the draft program and sending out the revised program? Aerial surveys RMCR should provide the answer. See JL's fax of 02/06/1995 below to CDTM for the 'draft work program'.
26. Fax (06/06/1995) from JL to John Wetherall (Murdoch Uni – OOPS! Should have been Curtin Uni!! JL 19/02/2014) seeking a progress report 'Regarding progress with DNA analysis of the 36 Banded Stilt eggs from the Goldfields'.
27. Fax (05/06/1995; typed 01/06/1995) message from Mark Lamble, ABC Natural History Unit, to JL with a 'rough diary' of observations he made while at Lake Ballard from 09/05 to 17/05/1995. Inter alia, on 12/05/1995 he/they 'Filmed about Camp Island and deserted [main] colony' and on 13&14/05/1995 they 'Filmed about Camp Island and second colony island'. Under the heading 'Observations' they describe 2-3,000 adult BaSt behaving on 12/05/1995 as though they might have been about to re-nest at main colony island (JL's interpretation). JL faxed a copy of this fax to CDTM on 06/06/1995.
28. Fax (02/06/1995) from CDTM to JL with suggestions on draft works program that JL had sent him on same date (see below). Inter alia CDTM suggests that: 'If a new colony is found we need to take steps to get more data in areas where we area still deficient, i.e. incubation period & sharing of incubation duties. Also need to'.
29. Fax (02/06/1995) from JL to CDTM (also sent to GBP) with: 'draft work program for Grant [GBP] and co. to work to next week. I ... would appreciate any comments'. The draft program refers to a camera, suitable film types, the need to precisely measure the boundaries of the nesting area on the 1st breeding island (on Lake Ballard) and includes a detailed description of the 'Nesting Colony Methodology' to be followed. Note that there are two copies of the draft program here – one with subsequent annotations by JL and one without. See JL's fax of 07/06/1995 above to GBP for 'Revised Program'.
30. Undated page of jottings by JL headed 'Next Ballard Trip (6/95) [June 1995]' that records some preliminary thoughts of JL about the trip to be undertaken to Lake Ballard (and Lake Marmion) by GBP, ACI & ACh in June 1995. Inter alia reads 'measure 1st colony precisely'. See faxes above for draft (02/06/1995) and revised (07/06/1995) programs.
31. Two pages of jottings by JL that appear to record several phone conversations with Jeremy Hogarth (ABC Natural History Unit) and Clive Minton (CDTM) in May 1995 and perhaps very early June 1995. A note relevant to nesting activity is: ' – all birds left 2nd island'. This would have been the 2nd BaSt nesting colony (that was worked on). Some

detective work, e.g. by comparing with Mark Lamble's fax of 05(01)/06/1995, could probably put an approximate date on this.

32. Handwritten notes by JL headed 'Grant's [GBP's] Tasks Sat 8 → Tues 11 April 95'. Inter alia they read: 'No-one should walk thru or otherwise disturb nesting area which has chicks. No banding of chicks [is to be undertaken] (too small)'.
33. Several undated pages of scrawl by JL trialling several formats for understanding / tabulating / presenting laying rate data (from the 1995 BaSt breeding at Lake Ballard). One favoured Table seems to have been the one headed 'Number of Eggs Layed at Intervals (between laying of 1st, 2nd, 3 egg and subsequent eggs) of ... 1/3 day, 1/2 day, 1 day, 2 days, 3 days'. See beginning of this RMCR for further thoughts (23/2/2014) of JL on how to analyse the nest monitoring data.
34. Two undated pages of scrawl by JL which show a number of attempts at calculating / describing / tabulating BaSt laying rates. Presumably the data come from 'laying quadrats' established by JL at the 2nd (studied) colony (on Lake Ballard in 1995).
35. Two undated typed pages by JL using data from successive visits to '**Quadrat 5-8**' (2nd Breeding Island, Lake Ballard, 1995) to calculate BaSt egg-laying rates. Note that this is a single quadrat; that the data comes from a total of 51 nests visited four times, at daily intervals, and that this quadrat measured 2 metres x 2 metres square (presumably this was a 'laying quadrat' and all the 'laying quadrats' on this island had the same dimensions).
 'Numbers/densities of nests and eggs in quadrat' on 4th, 5th, 6th, 7th April & 3rd May are also calculated. 4th – 7th April are the dates of the four visits referred to above. Some important notes are listed on the second page. The last section, headed 'Conclusion' is blank. **Look** for digital copy (not found in JL's current PC on 11/02/2014) to see if this was added to. **Try searching** old PC backups.
36. Six undated hand-written pages by JL recording:
 - the number of eggs in each of 49 or 50 numbered nests (including some 'no nests') in '**Quadrat 5-8**' on 4th, 5th, 6th, 7th April and 3rd May 1995 and in seven nests (a-d) starting 5th April 1995. It's apparent that hatching was prior to 3rd May.
 - based on the above, the % of eggs on 7th April that had hatched as at 3rd May 1995; the minimum number of eggs that hatched; the number of eggs not hatched (most or all being dead), and the number of dead chicks (there being no live chicks in this quadrat) in each of the 49 or 50 numbered nests in '**Quadrat 5-8**'.
 - A page of 'Notes on Quadrat 5-8'.
 - A page of additional thoughts about the above.
37. Handwritten pages by JL, listing all the individual nests in quadrat '5-8' and their contents on various days. **Check this txt, added in hurry on 19/2/95.**
38. Hand-written tabulations by JL (1st page headed 'From JL's photos of Ballard Colony on 15/3/95') in which JL records the number of nests with 1 egg, 2 eggs, etc., in each of 5 quadrats (ABHG, BCIH, CDJI, DEKJ, EFLK; each photographed in two sections) and the number of 'Extra' eggs and nests (i.e. one nest with 11 eggs and 2 nests with 7 eggs) and totals these. Each quadrat section is matched to the corresponding photo number. Percentages are calculated. JL calculates (a few assumptions are made) that '... most (77%) of nests would have full clutch on 17/3' and '... most clutches would hatch on 17/3 + 21 days = 7th April'. Nest density in these five quadrats is calculated to be 8.5 nests/m² with 4 quadrats ranging 9.4 to 10.9 nests/m² and one (at 'periphery' of nesting area) at 2.9 nests/m². JL notes that 'Clive Minton has photos of 10 more quadrats'. CDTM later (in 1995?) sent these to JL, who subsequently (in 2013) scanned (digitised) them and still (11/02/2014) has them. **Check:** were the nests with 7 & 11 eggs really nests or were they 'dumps'? Note that each of these five quadrats (all of which were pegged with white-topped wooden pegs) measured 5 metres x 2.5 metres.

39. Several pages, mostly prepared on 18-19/2/2014, by JL, describing the butcher's paper projections of photos of hatching quadrats ABHG, BCIH, CDJI, DEKJ, EFLK on 1st colony (Ballard) on 15/3/1995; laying quadrat ABCD on 1st colony (Ballard) daily from 31/3 to 6/4/1995, and laying quadrat '5-8' on 2nd colony (Ballard) daily from 4/4 to 7/4/1995 and on 3/5/1995]. Consider scanning (digitising) the butcher's paper projections (each measures 61x91cm) and adding A4 prints to this RMCR.
40. All of the monitoring photos ('thumbnail prints') that were taken (by JL & CDTM) of the hatching and laying quadrats on the 1st and 2nd nesting colonies on Lake Ballard. The earliest of these photos were taken on 15/03/1995 and the last on 04/05/1995. *Some more-general photos of the quadrat areas are also printed here.
41. Seven page fax (24/04/1995) from CDTM (at Broome Bird Observatory) to JL (at Busselton) with a cover note that reads 'Herewith 6 pages of data – some of it partly processed and/or with comments. It will give you knowledge of what we've got & what we still need!'. Note that pages 2, 4 & 6 'spilled over' onto a second page for each.

This fax indicates, inter alia, that on Lake Ballard CDTM:

- At 1st colony, on 12/04/1995 and 14/04/1995, individually weighed eggs of clutches of various clutch sizes and stages of embryo development.
- Used several different approaches to estimating / calculating the incubation period from the various recordings made.
- At 1st colony, on 14/04/1995, photographed and counted 'currently occupied nests', eggs, chicks (assuming 'Y' means chicks), dead chicks, addled eggs, 'dumped' eggs and 'chipping eggs' in each of 15 'gridded areas' [quadrats].
- Was on Lake Ballard on at least the 9th, 11th, 12th, 13th & 14th April 1995, as each of these dates is specifically mentioned in the above dates.

Text at top of second p.2 appears to read: 'Eggshell etc must therefore weigh close to ... ?? gm'.

Note that JL's only copy of this fax has small amounts of important text missing due to cropped borders.

See CDTM's letter of 27/06/1995 in which he asks JL to 'process' (extract specific data from) the nest quadrat photos CDTM took while doing the work described above. CDTM's photos accompanied that 27/06/1995 letter. Note that the requested processing has not yet (as at 16/03/2014) been done.

See also "JL's recordings (notes) of phone conversation with CDTM in April 1995 ..." below.

42. JL's recordings (notes) of phone conversation with CDTM in April 1995, after CDTM had left Lake Ballard for Broome. Inter alia CDTM had [on 14/4/1995] taken '2 photos of each of 15 quadrats' in the 'original pegged area' and 'counted addled eggs, dead chicks & active nests'. He asked JL to 'exactly measure' the two colonies on Ballard [JL measured the 2nd colony on 03/5/1995 and GBP & ACh measured the 2nd colony on 09/6/1995]. Additionally, CDTM talked of indirect evidence of re-nesting, this being that 4 out of 5 of the (single) adults that led chicks off the colony were males (how determined?). CDTM had also weighed 10 clutches of 1-5 eggs and in one clutch all 5 eggs were over 40gm (up to 48gm?).

See also "Seven page fax (24/4/1995) from CDTM ... to JL ..." above.

43. 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: 'As mentioned over the phone, I would be grateful if you would help me with the following: (1) Measure a few nest scrapes; (2) Collect some

of the semi-buried clutches and some of the groups of eggs that I think are possibly gathered by non-breeders'.

44. 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: 'eggs for variation for handbook'; 'nest scrapes – please measure 10-12 scrapes and distance apart'; 'collect eggs from group'.
45. A list (from 30/03/1995 to 07/04/1995) of the 35mm colour positive Films (JL numbered the film boxes 1-12) and 35mm cameras ('new' and 'old') that JL used at Lake Ballard in 1995, and the Dates (of film exposure) and the exposure numbers and subject material. Inter alia the list matches films & photos to quadrats ('quadrats', 'laying quadrats', 'hatching quadrat'), colonies ('1st Island' or 'Island 1', '2nd Island') and dates. It does not match photos to individual quadrats.
The strike-through and notation 'See photocopy of this side (6/6/1995)' suggest there might be a more recent version of the above list of films somewhere. Nonetheless this is a very useful page for double-checking dates on photos.
46. A Table by JL in 1995 tabulating the film (slide box) & photo numbers that correspond with each of the monitoring visits (31/03/1995 – 07/04/1995) to three categories of Quadrats, these being '10(15) hatching quadrats on 1st Island', '4 laying quadrats on 1st island' and '10 laying quadrats on 2nd island'. '10(15) hatching quadrats' refers to the fact that although 15 hatching quadrats were originally (on 15/3/1995) established, only 10 of these were subsequently monitored at frequent intervals.
47. Photos by JL of collected BaSt eggs. These 36 Banded Stilt eggs were collected by JL from either the 1st or the 2nd colony (it's not clear from JL's field notes of 07/4) on Lake Ballard on Fri 07/4/1995 and photographed by JL in Perth on Sat 08/4/1995.
48. Photos of 2nd BaSt breeding colony on Lake Ballard, while approaching by boat on 07/4/1995. Seems odd that cloud in photo 3967 is very different from cloud in photos 3968-72, though note that they were taken from different directions. Also seems odd that photos 3968-72 were taken while *approaching* island, yet photos 3945-3966 (i.e. *earlier* photos) were of quadrats on this island on the same day (07/4/1995). JL's field notes on this day are not adequate to explain. Best not spend more time attempting to explain, but keep in mind if any problems appear with quadrat dates.
49. Many photos taken by JL on 07/4/1995. Photos 4001-19 were taken from a high point on the west side of Camp Island with a telescopic zoom lens, early in the morning. They are of the 1st breeding colony. *Some of the photos are of adult BaSt sitting on individually tagged (numbered) nests. These nests were tagged to study the nesting behaviour of adult BaSt. Mark Lamble (filming) and Cameron Miller (sound recording) (ABC Natural History Unit) are in some photos. Many photos are of adult BaSt walking their chicks from nests to water's edge and away.
50. GBP's aerial photos of the 1st and 2nd BaSt nesting colonies on Lake Ballard, taken by him on 30/03/1995. Camp Island is visible in the distance in one photo. The original slides (35mm colour transparencies) are now (17/03/2014) in JL's work collection. The scanned (digitised) copies of the slides are on JL's work computer.
51. Fax (24/03/1995) from UWA Library to CALM Library re Miller CD (1994). *Patterns of reproductive success determined by DNA fingerprinting in a communally breeding oceanic bird*. Biological Journal of the Linnaean Society 52(1):31-48. It appears that a copy was provided (for JL).

52. Fax (20/03/1995) from JL to CALM Library requesting copy of Bellchambers, K & Carpenter, G (1992). *Nat. Hist.* 4:42-48.

53. Instructions headed 'Program BIRD NEST, in Husky Basic' by 'Michael Yung, 1 Oct [1991]'. MYung was a computer programmer at CALM's Wildlife Research Centre in Woodvale, Perth. This program was for use at colonial nesting sites, to ... [calculate total number and/or spacing of nests from a measured sample?]. JL's recollection (10/02/2014) is that Andrew A. Burbidge used a 'Husky Hunter' at one or more WA seabird colonies (Abrolhos Archipelago?) in the 1990s. See also the email exchange of 04-08/06/1999 above.

54. Table of 'Pairs of random co-ordinates ...' that was photocopied by JL for possible use in setting up / conducting nest monitoring activities at Lake Ballard (and Marmion) in 1995.

55. Blank 'RAOU Nest Record Scheme Colonial Breeding Record Sheet' faxed to JL from Australian Museum on 20/03/1995. JL was interested in the type of information recorded and the format in which it is recorded.

56. Fax (20/03/1995) from JL (at CALM Busselton) to Raelene [Hick] (at CALM Woodvale) with corrections (typos) to her typescript of the 'Banded Stilt Research Programme – Lake Ballard, March/April 1995' that CDTM had hand-drafted (see 14/03/1995 below).

57. Fax (20/03/1995) from JL to GBP requesting that he have Romeny Lynch '... search through recent issues of 'Corella', 'Field Ornithology' and 'Colonial Waterbirds' for scientific papers that describe methodologies for censusing nests and eggs, and for determining laying rates, incubation periods and hatching success, etc., of colonial nesting seabirds and waterbirds ...'.

58. Fax (20/03/1995; cover sheet & last page only) from JL to GBP with *inter alia* a list of equipment for GBP to obtain for next trip to Lake Ballard. The instructions include: 'Get an extra 10 rolls of Ektachrome 64 ASA (or similar)' and 'approx 100 short (30-40cm) wooden stakes with white tops (We will number them with a broad marker pen so that we can read the numbers from our photos)'. GBP has annotated the later with 'Jim white markers'. This gear would have been for staking out more nest monitoring quadrats and monitoring (film) the quadrats.

59. Six undated pages of jottings by JL that relate *inter alia* to: film [10 more rolls of 36 exposure 64ASA Ektachrome] presumably for monitoring nest quadrats; weighing scales for eggs, [wooden] stakes with white tops and 'fat [i.e. broad] marker pens'; 'How collect / preserve eggs for DNA analysis?'; references [re DNA], possible sources of advice [re DNA]; 'How we test for mixed parenting', 'standardised sampling techniques'; 'shortcoming'; 'not marking eggs'; 'incubation period, laying rates, hatching success, clutch size' and 'egg dumping / ex pair copulation frequency'. There is also a timeline with breeding event stages from 'rain' to 'flying' and the possible number of days for each stage. One stage is 're-nest at 20 days?'.

60. Fourteen small pages of notes by JL on red 'Shellabear & Son' note paper (which suggests to JL that he was in transit in Perth when he made these notes). Folio 65 has the following written on it: 'These notes made in preparation for 2nd visit ([proposed to be in] March 95), JL 14/5/96'. The pages are numbered as file folios 65-52. It is difficult – but probably unimportant – to know in which order each was written in. What is important is what was actually done.

The notes are transcribed as follows, because the originals are difficult to read.

Folio 65: 'Info To Get: hatching success, laying rate, incubation period, date of earliest eggs'. Each of these is ticked.

Folio 64: 'Date of earliest eggs: work out from – laying rate, plus, DNA testing (of those nests with 5 eggs on 15/3) laid by one female (?Ask Clive who does DNA)'.

Folio 63: 'Incubation Period': Work out from incomplete clutches (on 15/3) (of quadrats) plus knowledge of how many in final clutch (need two more visits to confirm for most) plus laying rate (when known) plus date of hatching – OK for all quadrats'.

Folio 62: 'Laying Rate': [Monitor?] New area for several days (up to 5?). Peg quadrats (or line) in a line. Take photos of each quadrat each day of same area, from same position, and same height. No other egg marking or nest marking'.

Folio 61: Indecipherable thoughts with dates '23/3' and '24/3'. It seems JL was considering possibly having someone back at Lake Ballard by 23/03/1995 to resume nest monitoring.

Folio 60: Apparently unproductive sketch labelled 'Laying Rate', '15/3/95' and 'if 28/3/95'. Page ends with: 'Don't continue with this area – photos no good (none taken initially and not in defined area and disturbs 15/3 quadrat area'.

Folio 59: 'Laying rate': Find many of the 1 and 2 egg nests marked to the SW of pegged area. Count how many eggs now in each. Relate to number of days elapsed (at least 8). Therefore elapsed time too great. Therefore need to mark a new lot of 1 egg nests & follow them every day'. The 'at least 8' (days elapsed) perhaps refers to 23/3, this being 8 days after the visit by helicopter on 15/3. The 23/3 is referred to on folio 61 above.

*Folio 58: '*Get to see photos [taken on 15/3] of quadrats before 2nd visit! 'Hatching Success': Take photos from same directions! Use 1→, A→, P→ to identify clutches started at different dates. Need 30 photos/day = 1 roll film/day. Egg marking is only verifying what we should get from our photos, nothing more'.*

Folio 57: '1st visit 15/3: Marked every egg in every nest in each quadrat with no. of eggs in that nest. Photographed quadrat to see how many eggs, nests and eggs/nest. 2nd visit 18/3 [this must have been a proposed date, as it was not achieved]. All clutches should be complete but possibly some new clutches. Change numbers. Use A→O. Use little letters. 3rd Visit: Use P→Z'.

Folio 56. This appears to be a page exploring possible alternative ways of indicating (by marking each egg) how many eggs are in each clutch on each visit.

Folio 55: 'Hatching Success': Either (1) ... or (2) ... [two different ways of re-numbering the eggs in a nest as the number of eggs increases with each 'visit'. The second alternative is crossed out].

Folio 54: Sketch labelled '15/3/95' that appears to show the number of eggs in each of a number of nests in a hypothetical quadrat on that date. Underneath is written 'If no predators and eggs don't roll out, no problem. If predators, need to be able to identify which eggs predated versus which eggs hatched'.

Folio 53: 'Hatching success = % of eggs that hatched [and/or] = % of nests successful'.

Folio 52: Diagrammatic sketch map of nesting island / colony with a hypothetical grid of numbers 1-100 and letters A-F, perhaps contemplated by JL as a way of randomly positioning (using random numbers, see below) quadrats in addition to those established on 15/03/1995. Notations read 'Backpack. 20mm pipe (8m), 4 elbows, [a closed circle & open triangle – meaning what?], pegs / droppers'.

61. Tracings (by JL) of the boundaries of the main BaSt nesting island (i.e. the one next to 'Camp Island') and of the 'nest area (15/3/95)' as they appeared in three photos (3648-3650 in JL's scanned and original film collection) taken by JL from the helicopter on 15/03/1995. **These could be used** to measure the dimensions of the nest area at that time and compare with on-ground measurements made on 09/6/1995 by GBP & ACh (and any post-15/3/1995 aerial photos taken of this colony)..
62. Some photos taken by CDTM which were published (with others) in the June 1995 issue of *Wingspan*. These photos have been scanned by JL from that article. At least one, and probably all (**check** captions), were taken on the 1st colony island on Lake Ballard on 15/03/1995. None of the nesting quadrat monitoring photos taken by CDTM on that day

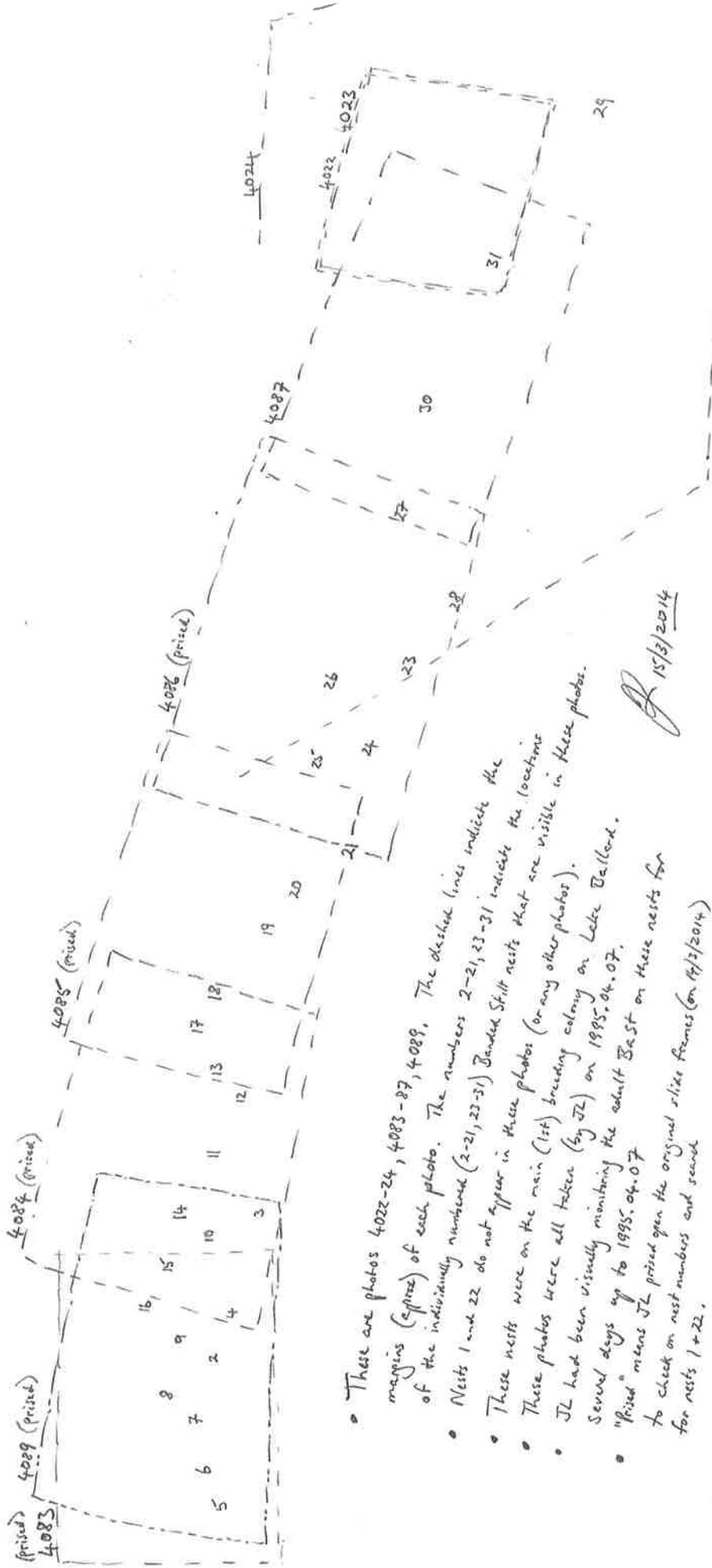
are here (they are with all the quadrat photos taken in later days / months – see above). CDTM sent those photos (original slides) to JL in 1995 for ‘processing’.

63. All of GBP’s photos from the helicopter trip of 15/03/1995 (see notes below re JL’s photos for some more details of this trip). The original slides (35mm colour transparencies) are now (17/03/2014) in JL’s work collection. The scanned (digitised) copies of the slides are on JL’s work computer.
64. All of the aerial and ground photos (from takeoff at Kalgoorlie to takeoff on the return flight, but except the nesting quadrat monitoring photos) that JL took on the day of the helicopter flight (15/03/1995) to Camp Island (as it came to be known) and the walk and wade to the nearby ‘1st island colony’ (of nesting BaSt) on Lake Ballard. The original slides (35mm colour transparencies) are in JL’s work collection. The scanned (digitised) copies of the slides are on JL’s work computer. None of the nesting quadrat monitoring photos taken on that day are here (they are with all the quadrat photos taken in later days / months – see above). Photos taken on the return flight to Kalgoorlie are not here as they were not of nesting.
65. Undated page of notes by JL listing equipment he was thinking of taking on helicopter trip to BaSt breeding colony on Lake Ballard on 15/03/1995. It included: ‘egg mark pens?’, ‘board & string’, ‘tape measure’, ‘film [35mm]’, ‘camera lenses & camera’, ‘notebook’, ‘pens’, ‘calipers’, ‘pegs & tape’, ‘compass’ and ‘Orange [? other word?] rods’. Most or all of these items would have been intended for measuring / recording nesting activity. PS: ‘Orange’ is perhaps ‘Gorenje’ and might be a reference to rods to be inserted into washing machine (Gorenje?) when moving house (JL Perth to Bsn)!
66. Fax (14/03/1995) from CDTM to JL with his (CDTM’s) draft manuscript headed ‘Banded Stilt Research Programme – Lake Ballard, March/April 1995’. Inter alia CDTM lists ‘... specific parameters which should be studied / measured / assessed’ , including (all verbatim):
 - (c) Frequency of laying & commencement of incubation (and egg protection prior to incubation);
 - (d) Clutch size and nest density;
 - (e) Incubation period & the sharing of incubation duties;
 - (f) Hatching success (related to clutch size, e.g. can they successfully hatch 5 egg clutches?
 - (g) DNA analysis of clutches (especially 5 egg ones) to assess egg dumping / ex pair copulation frequency;
 - (j) Re-nesting attempts;
 - (k) Re-nesting attempts.
 CDTM also writes: ‘In particular the main existing nesting area can be ‘pegged out’ and eggs (particularly of incomplete clutches) marked as a foundation for future follow up (e.g. to determine incubation periods / hatching success’ .
67. Two pages of notes by JL headed ‘Telephone Discussion with Clive Minton (at Kalgoorlie) on Monday ... February [1995] (\pm 1 day)’. Is February correct? Or was it March? The notes ‘all on one egg today?’ and ‘15 days since’ suggest this conversation was on the day of the first aerial survey in 1995, i.e. on Sunday 12/03/1995. In relation to nesting, these notes read: ‘incubation period?’; ‘assess productivity ... of pairs’; ‘mark 100s eggs (incomplete clutches) to follow up’; ‘get in before predation (gulls)’; all on one egg today? or on full clutches – 15 days since ...?; mark eggs’ and ‘photos’. These were probably CDTM’s thoughts on the work that should be done / started on the day of the first visit to the colony, i.e. on 15/03/1995 (helicopter trip).
68. GBP’s aerial photos (‘thumbnail prints’) of the main (i.e. ‘1st colony’ or ‘1st island colony’) Banded Stilt nesting colony on Lake Ballard, taken by him during the aerial survey (by fixed-wing aircraft) of 12/03/1995 (the day of discovery of this actively

nesting colony). One photo is of the nearby 'Camp Island' (as it came to be known by those who camped there in 1995). The original slides (35mm colour transparencies = diapositives) are now (17/03/2014) in JL's work collection. The scanned (digitised) copies of the slides are on JL's work computer.

Sketch (prepared 15/3/2014 by JL) showing the photo coverage of 29 of 31 nests that were numbered on 1st BaSt colony, Lake Ballard, on 03/04/1995 for the visual monitoring of adults on nests. The photos were taken on 07/04/1995.

Accompanying is a copy of the spreadsheet (one of five referred to below) with particulars of this work. Details are in JL's field notebooks.



- These are photos 40223-24, 4083-87, 4089, margins (apex) of each photo. The dashed lines of the individually numbered (2-21, 23-31) Banded Swift nests indicate the locations.
- Nests 1 and 22 do not appear in these photos (or any other photos).
- These nests were on the main (1st) breeding colony on Lake Ballard.
- These photos were all taken (by JL) on 1985.04.07.
- JL had been visually monitoring the adult Bst on these nests for several days up to 1985.04.07.
- "Faded" means JL poised open the original size frames (on 14/3/2014) to check on nest numbers and record for nests 1 + 22.

Printed copies of five Excel spreadsheets (Excel file 'Numbered quads, nests and eggs 1995 Ballard.xls', prepared by JL in Feb-Mar 2014) that tabulate, in considerable detail, all of the particulars concerning the establishment and monitoring of the hatching and laying quadrats and individually marked nests & eggs on the 1st & 2nd colonies of Lake Ballard in 1995 (no quadrats were established on the Lake Marmion colony).

Included are the unique identifying numbers of each of the photos that were taken of the individual monitoring quadrats each day. TO DO: Decide exactly what information should be extracted from each photo, how best to do this, and then to do it See above and below in this RMCR for thoughts (and attempts to date) on what should be done.

Note that all of the monitoring photos, originally taken with 35mm slide film, were scanned (digitised) by JL, in 2013. JL holds (as at 19/2/2014) both all of the original slides (in his office) and all of the scanned copies (on his work computer).

Note also that one of the spreadsheets ('1st Colony – All Numbered Nests / Eggs ...') has a column with particulars of 'Monitoring of Adults on Nests ...'. See above ('Sketch ...') for more about this.

1st Colony - Four 'Laying Quadrats' - Banded Stilt, Lake Ballard, 1995.

JL = Jim Lane, RJ = Ron Johnstone (WAM), CM = Clive Minton, ML = Mark Lamble (ABC Team), GP = Grant Pearson, ACh = Andrew Chapman.

JL, JL2, etc. indicates the order in which JL took his photos.

'1p', '2p' indicates number of photos taken in each quadrat.

Numbers in square brackets, e.g. '13787', are individual photo numbers (of original 35mm transparencies and scanned copies of these, with the numbers as allocated by JL. All are held by JL).

Unless indicated otherwise, this table is based on JL's notes and some from CM in 1995.

*Photos taken daily of quad 'ABCD' from 31/3 to 9/4 were projected (in 1995 by JL) onto butcher's paper and positions of nests & numbers of eggs recorded. These (**scan them?**) are stored in 1m tube (as at 19/2/2014).

Arrangement of these 4 quadrats was:
(16 droppers labelled A-P)

These quadrats were 2m x 2m.

Date	1st Colony Laying Quadrats				Comments
	ABCD*	EFGH	IJKL	MNOP	
Mar 15					Day of helicopter visit and establishing hatching quadrats, etc. None of the laying quadrats was established today.
Mar 31	JL 1 1p [3787]	JL 2 1p [3788]	JL 3 1p [3789]	JL 4 1p [3790]	JL established these laying quadrats today. Apparently with labelled 'droppers' & '2m pipe square'. Photo'd 17/10-17/21hrs.
Apr 01	JL 1 1p [3791]	JL 2 1p [3792]	JL 3 1p [3793]	JL 4 1p [3794]	Used 28mm lens. Took 4 photos. JL photo'd 1625-1632hrs.
Apr 02	JL 1 1p [3719]	JL 2 1p [3720]	JL 3 1p [3721]	JL 4 1p [3722]	Used '20mm pipe frame'. Probably took 4 photos. Used 28mm lens. JL photo'd 1612-1620hrs.
Apr 03	JL 1 1p [3825]	JL 2 1p [3826]	JL 3 1p [3827]	JL 4 1p [3828]	Didn't use 20mm pipe frame, just the existing markers'. Took 4 photos. Used 28mm lens. JL photo'd 1657-1702hrs.
Apr 04	JL 1 1p [3927]	JL 2 1p [3928]	JL 3 1p [3929]	JL 4 1p [3930]	JL photo'd 'without frame', between 1612 & 1623hrs
Apr 05	JL 1 1p [3932]	JL 2 1p [3933]	JL 3 1p [3934]	JL 4 1p [3935]	JL took 4 photos. Photo'd c. 1606hrs to c. 1625-1630hrs.
Apr 06	JL 1 1p [3993]; 1p @90deg [4000])	JL 4 1p [3994]; (JL 3 1p @90deg [3999])	JL 3 1p [3995]; 1p @90deg [3997])	JL 1 1p [3996]; (JL 2 1p @90deg [3998])	JL took one photo of each as usual, then (for first time) a second photo of each from S side (90 deg) shift, in different sequence. Photo'd between 1604 & 1623hrs
Apr 07	JL 1 1p [4100]	JL 2 1p [4101]	JL 3 1p [4102]	JL 4 1p [4103]	JL photo'd on 1st colony today.
Apr 08					Note that on 8/4, RJ & co. kayaked to 1st ('met our team') and 2nd colonies. On 2nd colony collected incubating BaSt adults, chicks & eggs. Took photos and 'Viewcam' (PS).
Apr 09					Note that CM visited (today) area (check to confirm outside laying quadrats) where eggs in c. 250 nests were numbered on 15/3 and noted contents (fx of 24/4 to JL). GP writes '1300[hrs] to [1st] colony [with CM]. Took photos (look for these) & inspected site for numbered eggs'.
Apr 28					JL visited 1st colony. 'No stilt'. Took some photos?
May 04					JL made some 'triangular tessellation' nest spacing measurements in 10 hatching quadrats (deserted). Took some photos?
May 12					ML 'filmed about ... deserted [1st] colony'.
Jun 09					GP & ACh measured & photo'd (now deserted) nesting area on 1st colony.

Printed 13/3/2014

2nd Colony - Ten 'Laying Quadrats' - Banded Stilt, Lake Ballard, 1995.

JL = Jim Lane, R.Jo = Ron Johnstone (NAM), CM = Clive Minton, ML = Mark Lamble (ABC Team).

JL.1, JL.2, etc. indicates the order in which JL took his photos.

'1p', '2p' indicates number of photos taken in each quadrat.

Numbers in square brackets, e.g. [3829], are individual photo numbers (of original 35mm transparencies and scanned copies of these, with the numbers as allocated by JL. All are held by JL.)

Unless indicated otherwise, this Table is based on JL's notes & some from CM in 1995.

*The photos taken daily of quadrat '5-8' from 4/4 to 7/4 and on 3/5/95 were projected (in 1995 by JL) onto butcher's paper and the positions of nests & numbers of eggs recorded and nests individually identified. These sheets (**scan them?**) are stored in a c.1m long tube (as at 19/2/2014).

Arrangement of these 10 laying quadrats was:

Date	2nd Colony Laying Quadrats					Comments				
	1-4	5-8*	9-12	13-16	17-20					
						UVWX				
Apr 04	JL.1 1p [3829]	JL.2 1p [3830]	JL.3 1p [3831]	JL.4 1p [3832]	JL.5 1p [3833]	JL.6 1p [3834]	JL.7 1p [3835]	JL.8 1p [3836]	JL.9 1p [3837]	JL.10 2p [3838-39]
Apr 05	JL.1 2p [3864-65] (from N & S sides),	JL.2 2p [3866-67] (from N & S sides),	JL.3 2p [3868-69] (from N & S sides),	JL.4 2p [3870-71] (from N & S sides),	JL.5 2p [3872-73] (from N & S sides),	JL.6 2p [3874-75] (from N & S sides),	JL.7 2p [3876-77] (from N & S sides),	JL.8 2p [3878-79] (from N & S sides),	JL.9 1p [3880] (from N or S side only)	JL.10 2p [3881-82] (from N or S sides),
Apr 06	JL.1 2p [3973-74] (from N & S sides),	JL.2 2p [3975-76] (from N & S sides),	JL.3 2p [3978-79] (from N & S sides),	JL.4 2p [3980-81] (from N & S sides),	JL.5 2p [3982-83] (from N & S sides),	JL.6 2p [3984-85] (from N & S sides),	JL.7 2p [3986-87] (from N & S sides),	JL.8 2p [3988-89] (from N & S sides),	JL.9 1p [3990] (from N or S side only)	JL.10 2p [3991-92] (from N or S sides),
Apr 07	JL.1 3p [3945-47],	JL.2 2p [3946-49]	JL.3 2p [3948-51]	JL.4 2p [3950-53]	JL.5 2p [3952-55]	JL.6 2p [3954-57]	JL.7 2p [3956-59]	JL.8 2p [3962-63] (3960-61 of wrong area),	JL.9 [3964] (from N or S side only),	JL.10 2p [3965-66]
Apr 08										
Apr 11										
Apr 28 to May 02										
May 03	JL.1 2p [4119-20] (4121 of 2 chicks & 2 eggs in nest),	JL.2 1p [4122-23]	JL.3 [4124, 4126] (4125 of 1 chick & 4 eggs in nest)	JL.4 [4127-28]	JL.5 [4129-30] (4131 of 3 chicks in nest)	JL.6 [4132-33]	JL.7 [4134-35]	JL.8 [4136-37]	JL.9 1p [4138]	JL.10 [4139-40]
May 13										
May 14										

Quadrat '1-4' on Apr 06 (photo 3973): No nest tags in place.

Quadrat '1-4' on Apr 06 (photo 3974): No nest tags in place, but bunch (incl. #32) visible in corner of photo. Punt visible close by.

Quadrat '1-4' on Apr 07 (photo 3945): Nest tags 32-46, 50 distinguishable. Four more tags just outside quadrat (two might be 47,48). One appears to be '5 something' (58?). All are red perm. pen on white plastic tags.

Quadrat '1-4' on Apr 07 (photo 3946): Nest tags 32-37,39,41,47-49,50,52,55-57,60,66,68-70 distinguishable. Some are just outside the quadrat. All are red perm. pen on white plastic tags. Punt visible close by.

Quadrat '1-4' on May 03 (photo 4119): Nest tags badly faded. None legible.

Quadrat '1-4' on May 03 (photo 4120): Nest tags badly faded. None legible.

Quadrat '1-4' on Apr 06 (photo 3991): Nest tags 1-16,20,22-25,47,49,50 distinguishable. All are black perm. pen on white plastic tags. Some are just outside the quadrat.

Quadrat 'UVWX' on Apr 07 (photo 3985): Nest tags 2,3,5,11,12,14,16,19-22,24,25,33-41,45-47,50 distinguishable. All are black perm. pen on white plastic tags. Some are just outside the quadrat.

Quadrat 'UVWX' on Apr 07 (photo 3960): Nest tags 2-5,11,12,14,16-19,21,22,24,25,35-41,46,47 distinguishable. All are black perm. pen on white plastic tags. Some are just outside the quadrat.

Quadrat 'UVWX' on May 03 (photo 4139): Nest tags badly faded. None legible.

Quadrat 'UVWX' on May 03 (photo 4140): Nest tags badly faded. None legible.

Photos suggest JL took photos of quadrat '1-4', then marked nests (70-32, using white tags) with numbers in test pen, both sides of tags (as recorded their warmth) in each nest. Then photo'd eight nests (2 photos each, from N & S sides), & recorded eggs (& counted eggs (8 recorded their warmth) in each nest). Then photo'd eight nests (2 photos each, from N & S sides), & counted eggs (8 recorded their warmth) in each. Then photo'd **quad UVWX** (quad with black pen) in quadrat '1-4' (1-50, using white tags with black pen) in **quad UVWX**. All work 15/07hrs & 15/08hrs. This assumes of work doesn't exactly match description in field notes (tape transcription).

Note that in phone chat (date?) with JL after CM's April visit, CM gave estimated nestling area dimensions and no. of nests in 2nd colony, but there is no mention in his fax of 24/04/1995 to JL. When did he visit 2nd colony? **Check+for+Quadrat+Photo** [Done 17/2/14 - None]. GP measured some nests and nest spacings on 2nd colony on 11/4 so CM probably with him. Compare their observations / measurements.

Note that on 8/4, R.Jo & co. kayaked to '1st (met our team') and 2nd colonies. **On 2nd colony collected incubating BaSt adults, chicks & eggs (= Disturbance). Took photos and Viewcam' (PS).**

Note that in phone chat (date?) with JL after CM's April visit, CM gave estimated nestling area dimensions and no. of nests in 2nd colony, but there is no mention in his fax of 24/04/1995 to JL. When did he visit 2nd colony? **Check+for+Quadrat+Photo** [Done 17/2/14 - None]. Ahaa! GP measured some nests and nest spacings on 2nd colony on 11/4 so CM probably with him. Compare their observations / measurements.

JL counted broods coming of 2nd colony / observed 2nd colony from distance, but did not go onto 2nd colony so no photos taken of quadrats (or marked nests).

JL photo'd on 2nd colony today (7/4).

1st Colony - All Numbered Eggs / Nests - Banded Stilt, Lake Ballard, 1995.

JL = Jim Lane, CM = Clive Minchin, MR = Mari Reni, GP = Grant Pearson, ML = Mark Lamble (ABC Team), ACh = Andrew Chapman, RJo = Ron Johnstone (WAM).

JL1, JL2, CM1, CM2, etc. indicates the order in which each individual photographer took his photos.

20', 30' indicates number of photos taken in each quadrat.

pink = pink tape, ob = orange-brown tape, ct = coloured tape (used in beginning to mark borders of pegged quadrats).

Numbers in square brackets, e.g. [4376-71], are individual photo numbers and scanned copies of these, with numbers as allocated by JL. All are held by JL.

Note, regarding eggs, that 'marked' probably means numbered in all instances where this term has been used.

Unless indicated otherwise, this Table is based on JL's notes and some from CM in 1995.

Monitoring

Colony	1st Colony	1st Colony	Monitoring started on 15th March	Monitoring started on 15th March	Monitoring of Nests / Eggs	1st Colony	1st Colony	Comments	Monitoring of Adults on Nests (and one count of eggs)	1st Colony
Date	15th March									
Date & monitoring area description	CM, MR, JL & GP marked (on 15/3) all eggs in all nests in hatching quadrat H1ON on 1st Colony.	CM, MR, JL & GP marked (on 15/3) all eggs in all nests in hatching quadrat H1ON on 1st Colony.	CM, MR, JL & GP numbered (on 15/3) '1', '2' or '3' indicating clutch size; all eggs in c.200-250 nests to south & west of 'W' pg, i.e. outside quadrats, on 1st Colony.	CM, MR, JL & GP marked (on 15/3) all eggs in all nests in hatching quadrat H1ON.	Pegged 15 hatching quads in PM. Marked every egg in every nest* in H1ON & NOUT. CM, JL both used 25mm lenses. Photo'd later in PM. Outside quads, marked eggs in c.200-250 nests*, 1*, 2* etc according to number in clutch.					
Mar 15	CM2 2p [4376-71] ob. See also [3635-37] for numbered eggs.	CM9 2p [4391-92] ob. See also [3635-37] for numbered eggs.	JL, GP did not record nest contents or take photos. Did CM?							
Mar 31	JL9 2p [3783-84] pink	JL9 2p [3715-16]			JL photo'd 10 of the 15 quads (including NOUT* but not H1ON). Prob 28mm lens. Photo'd 1625-1644hrs.					
Apr 01	JL9 2p [3715-16]				Coloured tape not used. Prob. used 28mm lens. JL photo'd 1641-1648hrs.					
Apr 02	JL9 2p [3919-20]				JL photo'd 10 quads. 25mm lens. Photo'd 1636-1644hrs.					
Apr 03	JL 2p [3817-18]	JL 2p [3811-12]			JL photo'd 1617-1622hrs. HATCHING STARTED TODAY.					
Apr 04	JL4 3p [3847-49]				JL photo'd in different sequence, S to N along western quads, then N to S along eastern quads. Photo'd >1612-1623hrs.					
Apr 05	JL4 3p [3889-90]				JL photo'd in same sequence as yesterday. Photo'd >1630hrs.					
Apr 06					JL did not photo hatching quads today.					
Apr 07		?			JL did not photo hatching quads today.					
Apr 08					Note that today (8/4), RJo & co. kayaked to 1st ('met our team') and 2nd colonies.					
Apr 09					See CM's fax (24/4/95) to JL for nest contents notes. Today (9/4) CM visited area where eggs in c.250 nests were numbered on 15/3 and noted contents. GP writes '1300 hrs' to [1st] colony [with CM].					
Apr 14	CM 2p [4407-98] ct and inside	CM 2p [4407-98] ct and inside	CM made written recording nest contents. See 'Comments' column in photos.		JL took notes & inspected site for numbered nests. Coloured tape used to mark quadrat boundaries. Still some incubation, but CM says 'Don't need to do again'.					
Apr 28					See CM's fax (24/4/95) to JL for nest contents notes. Coloured tape used to mark quadrat boundaries. Still some incubation, but CM says 'Don't need to do again'.					
May 04					JL visited 1st colony. No 'stills'. Took some photos? Checked scanned photos 15/3/2014. Name found.					
May 12					JL made some 'triangular tessellation' nest spacing measurements in 10 hatching quadrats (deserted). Took some photos? Checked scanned photos 15/3/2014. Name found.					
Jun 09					ML film about ... deserted [1st] colony.					

Photo 4022 is of adult BaSt sitting / not sitting on nest 31 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4023 is of adult BaSt sitting / not sitting on nest 31 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4024 is of adult BaSt sitting / not sitting on nests 23,26,27,28,29,20,31 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4083 is of adult BaSt sitting / not sitting on nests 2,4,5,6,7,8,9,15,16 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4084 is of adult BaSt sitting / not sitting on nests 3,4,10,11,12,13,14,15,17,18 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4085 is of adult BaSt sitting / not sitting on nests 13,17,18,19,20,21 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4086 is of adult BaSt sitting / not sitting on nests 21,23,24,25,26,27,28 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4087 is of adult BaSt sitting / not sitting on nests 27,30,31 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

Photo 4088 is of adult BaSt sitting / not sitting on nests 2,3,4,5,6,7,8,9,10,14,15,16 (and other un-numbered nests). Date-currently-on-photo-as-1995-04-04. Date of photo is 1995-04-07.

So the photos listed above collectively include nests 2-21,23-31. So missing nests are 1 & 22.

TO-DO: Using the photos - sketch a 'panorama' view of the layout of the above nests (4-34) - DONE 15MAR2014. SEE NEARBY IN THIS RNCR.

TO-DO: Work out details of the above photos (4022-24, 4088-87, 4089). First place to look would be JL's field notes. DONE! THEY WERE ALL TAKEN ON 1995-04-07.

Period 17/3/2014

Arrangement of the 15 hatching quadrats was: ABCDEF
GHJKL
MNOPQR
STUVWX

So photos of rear halves of quadrats PAWV & QRWX might include the area where eggs were numbered in c.200-250 nests on 15th March.

2nd Colony - All Numbered Nests - Banded Silt, Lake Ballard 1995.

JL = Jim Lane, CM = Clive Minton, GP = Grant Pearson, ML = Mark Lamble (ABC Team), ACh = Andrew Chapman, RJo = Ron Johnstone (WAM).

JL1, JL2, CM1, CM2, etc. indicates the order in which each individual photographer took his photos.

'2p' indicates number of photos taken in each quadrat.

Numbers in square brackets, e.g. [3973-74], are individual photo numbers (of original 35mm transparencies and scanned copies of these, with the numbers as allocated by JL. All are held by JL.)

Note, regarding eggs, that **marked** probably means **numbered** in all instances where this term has been used.

Unless indicated otherwise, this Table is based on JL's notes & some from CM in 1995.

Monitoring Colony	2nd Colony	Monitoring was started on 5th April	2nd Colony	Monitoring was started on 6th April	2nd Colony	Monitoring of Nests / Eggs	2nd Colony	2nd Colony Comments	
Date & monitoring area description	JL numbered (maybe) (on 5th April) nests 1-50 on 2nd colony (inside-or-outside the laying quadrat? Check (by JL on 17/3/2014) of Apr 06 photos of all 2nd Colony quadrats indicates these 50 nests, if marked, WERE NOT in any of the quadrats.	JL numbered (on 6th April) nests 32-70 in laying quadrat '1-4' of 2nd colony.	JL numbered (on 6th April) nests 1-50 in laying quadrat 'UVWX' of 2nd colony.	JL numbered (on 6th April) nests 1-50 in laying quadrat 'UVWX' of 2nd colony.	JL established & photo'd 10 laying quadrats. Eight quadrats ('1-4' to '29-32') labelled in green with square box (green) around number. Two quadrats (QRST, UVWX) 'label in black, with green box around number'. All tags lab'd both sides. All work between 1515hrs & 1542hrs. Worked W→E	These Comments relate to monitoring of the 10 laying quadrats (see another spreadsheet) on the 2nd colony, with some editing focussing on the nests that were numbered on 5th April (inside or outside the laying quadrats?) and 6th April (within laying quadrats '1-4' and 'UVWX').			
Apr 04	JL marked (or maybe didn't mark but just counted?) nests '1' to '50' & counted eggs (& recorded their warmth) in each. Broke 1 egg in nest '2'. Photos apparently not taken.	JL took 19 photos of 10 quadrats. Marked (or maybe didn't mark but just counted?) nests '1-50' (where?) & counted eggs in these. JL broke one egg in nest '2'. All work between 1507hrs & 1538hrs.	JL took 19 photos of 10 quadrats. Marked nests '1-4', then marked nests (70-82, using white tags with numbers in log pen, both sides of tag) in quadrat '1-4' & counted eggs (& recorded their warmth) in each. Then photo'd 8 quadrats (2 photos each from N/S). Then marked nests '1-50, using white tags with black pen) in quadrat UVWX & counted eggs (& recorded their warmth) in each. Then JL 2p [3991-52]. JL took 19 photos of 10 quadrats. Marked (or maybe didn't mark but just counted?) nests '1-50' (where?) & counted eggs in these. JL broke one egg in nest '2'. All work between 1507hrs & 1538hrs.	Photos suggest JL took photos of quadrat '1-4', then marked nests (70-82, using white tags with numbers in log pen, both sides of tag) in quadrat '1-4' & counted eggs (& recorded their warmth) in each nest. Then photo'd 8 quadrats (2 photos each from N/S). Then marked nests '1-50, using white tags with black pen) in quadrat UVWX & counted eggs (& recorded their warmth) in each. Then JL 2p [3991-52]. JL took 19 photos of 10 quadrats. Marked (or maybe didn't mark but just counted?) nests '1-50' (where?) & counted eggs in these. JL broke one egg in nest '2'. All work between 1507hrs & 1538hrs.	JL took 19 photos of 10 quadrats. Marked nests '1-4', then marked nests (70-82, using white tags with numbers in log pen, both sides of tag) in quadrat '1-4' & counted eggs (& recorded their warmth) in each. Then photo'd 8 quadrats (2 photos each from N/S). Then marked nests '1-50, using white tags with black pen) in quadrat UVWX & counted eggs (& recorded their warmth) in each. Then JL 2p [3991-52]. JL took 19 photos of 10 quadrats. Marked (or maybe didn't mark but just counted?) nests '1-50' (where?) & counted eggs in these. JL broke one egg in nest '2'. All work between 1507hrs & 1538hrs.				
Apr 05									
Apr 06	?	JL 2p [3973-74] (from N & S sides). Then JL marked nests 32-70 in nesting quadrat '1-4' & counted eggs (& recorded their warmth) in each.	JL marked nests '1' to '50' in nesting quadrat 'UVWX' & counted eggs (& recorded their warmth) in each. Then JL 2p [3991-52].	JL marked nests '1' to '50' in nesting quadrat 'UVWX' & counted eggs (& recorded their warmth) in each. Then JL 2p [3991-52].	JL took 19 photos of 10 quadrats. Marked (or maybe didn't mark but just counted?) nests '1-50' (where?) & counted eggs in these. JL broke one egg in nest '2'. All work between 1507hrs & 1538hrs.	Photos suggest JL took photos of quadrat '1-4', then marked nests (70-82, using white tags with numbers in log pen, both sides of tag) in quadrat '1-4' & counted eggs (& recorded their warmth) in each. Then photo'd 8 quadrats (2 photos each from N/S). Then marked nests '1-50, using white tags with black pen) in quadrat UVWX & counted eggs (& recorded their warmth) in each. Then JL 2p [3991-52]. JL took 19 photos of 10 quadrats. Marked (or maybe didn't mark but just counted?) nests '1-50' (where?) & counted eggs in these. JL broke one egg in nest '2'. All work between 1507hrs & 1538hrs.			
Apr 07	?	JL 1.3p [3945-47].	JL 10.2p [3985-86].	JL photo'd on 2nd colony today (7/4).	JL photo'd on 2nd colony today (7/4).	Note that on 8/4, RJo & co. kayaked to 1st ('met our team') and 2nd colonies.			
Apr 08						Note that in phone chat (date?) with JL after CM's April visit, CM gave estimated nesting area dimensions and no. of nests in 2nd colony, but there is no mention in his fax of 24/04/1995 to JL. When did he visit 2nd colony? Check for quadrat-photos: [Done 17/2/14 - None]. Ahaa! GP measured some nests and nest spacings on 2nd colony on 11/4 so CM probably with him. Also compare their observations / measurements.			
Apr 11									
Apr 28						From Apr 28 to May 02, JL counted broods coming of 2nd colony/ observed 2nd colony from distance, but did not go onto 2nd colony so no photos taken of quadrats (or marked nests).			
May 03	?	JL 1.2p [4119-20].	JL 10.2p [4139-40].	JL 10.2p [4139-40].	JL 10.2p [4139-40].	Very few BaSt1 adults & chicks on 2nd colony in PM. JL measured nesting area of 2nd colony in PM.			
May 13						ML filmed about ... [2nd colony].			
May 14						ML filmed about ... [2nd colony].			

Quadrat '1-4' on Apr 06 (photo 3973); No nest tags in place, Quadrat '1-4' on Apr 06 (photo 3974); No nest tags in place, but bunch (incl. # 32) visible in corner of photo. Punt visible close by, Quadrat '1-4' on Apr 07 (photo 3945); Nest tags 32-46.50 distinguishable, Four more tags just outside quadrat (two might be 47-48). One appears to be '5 something' (58?). All are red perm. pen on white plastic tags. Quadrat '1-4' on Apr 07 (photo 3946); Nest tags 32-37.39.41-47-49.50.52-55-57.60.66.68-70 distinguishable, Some are just outside the quadrat. All are red perm. pen on white plastic tags. Some are just outside the quadrat. Quadrat '1-4' on Apr 07 (photo 3947); Nest tags 32-37.39.41-47-49.52.55.57.60.61.68-70 distinguishable, Some are just outside the quadrat. All are red perm. pen on white plastic tags. Some are just outside the quadrat. Quadrat '1-4' on May 03 (photo 4119); Nest's tags badly faded. None legible. Quadrat '1-4' on May 03 (photo 4120); Nest's tags badly faded. None legible. Quadrat 'UVWX' on Apr 06 (photo 3991); Nest tags 1-16.20.22.25-45.47.49.50 distinguishable. All are black perm. pen on white plastic tags. Some are just outside the quadrat. Quadrat 'UVWX' on Apr 06 (photo 3992); Nest tags 2.3.5.11.12.14.16.19-22.24.25.33-41.45-47 distinguishable. All are black perm. pen on white plastic tags. Some are just outside the quadrat. Quadrat 'UVWX' on Apr 07 (photo 3965); Nest tags 1-16.20.22.25-42.44.45.47.50 distinguishable, All are black perm. pen on white plastic tags. Some are just outside the quadrat. Quadrat 'UVWX' on Apr 07 (photo 3966); Nest tags 2.5.11.12.14.16.19.21.22.24.25.35-41.46.47 distinguishable. All are black perm. pen on white plastic tags. Some are just outside the quadrat. Quadrat 'UVWX' on May 03 (photo 4139); Nest's tags badly faded. None legible. Quadrat 'UVWX' on May 03 (photo 4140); Nest's tags badly faded. None legible.

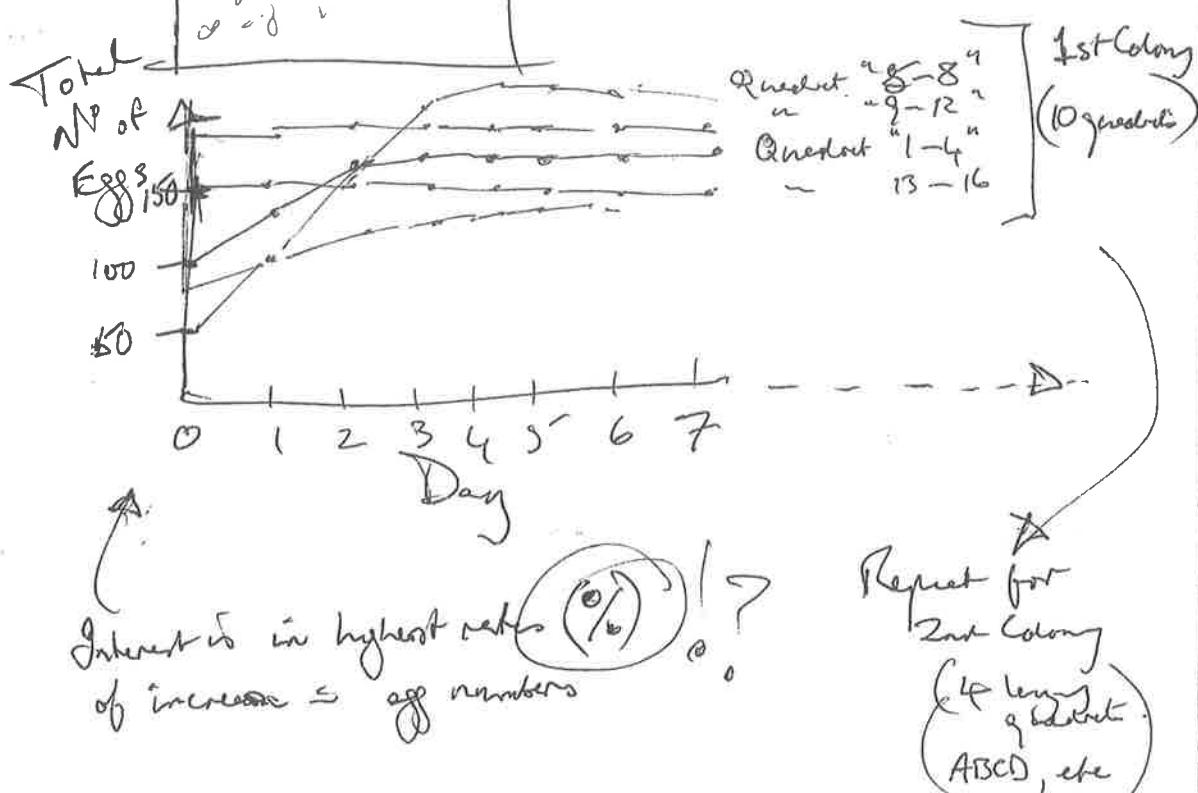
**Three pages (scribblings en route from Perth to Wellington NZ) by JL
(on 23/02/2014) exploring some of his thoughts about possible ways of
extracting & analysing data from the hatching and laying quadrats on
the 1st & 2nd BaSt colonies on Lake Ballard in 1995.**

23/2/2014

LAYER RATE

Logging a defect "(-4)" (for example)

$$\begin{array}{r}
 2 \times 2 = 4 \\
 \times 10 \\
 \hline
 = 40 \\
 \times 3 \\
 \hline
 = 120
 \end{array}$$



- N° of nests in degs 0, 1, 2 etc ?
How define? "Identifiable"?
- N° of "clusters" of eggs ?
- N° of "stays" ? "dumps" ?

If affected by motion sickness please use this bag

* No. of nests with 1 egg, 2 eggs, etc
(Several lines on one graph)

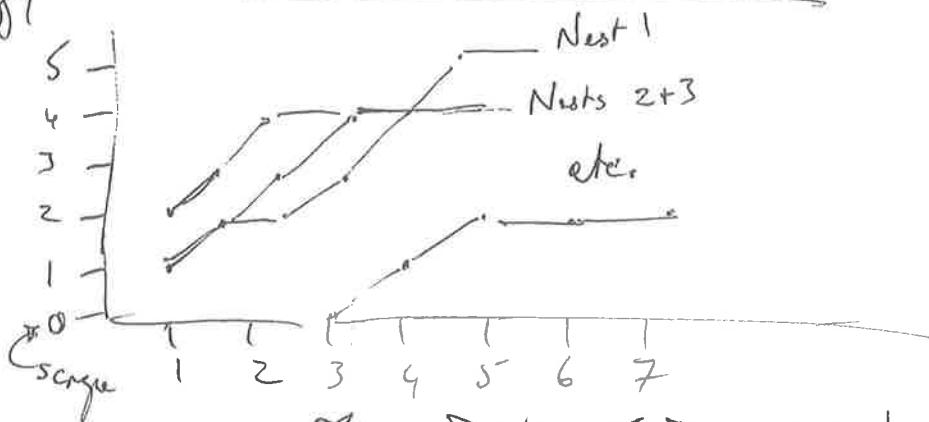
270

23/2/2014 R

Page 2 of 3

Egg/nest

LAYING RATE CON'D



Days Date of Days since 1st egg
referred?

all nests

Some nests (those
that started with
one egg.)

- Start by looking at nests with numbered eggs
- Then look at all numbered nests.
- Then \sim quadrats - $(10 + 4 = 14)$

Laying
Quadrats.

These scribbings are thoughts
of JAKL while flying with
to Sydney & Wellington (NZ)
on Sun 23/2/2014

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They are exploratory ideas
about various possible forms
of acronyms of the 1995 Lake Bellard
hatching quadrat (& laying)
photos.

23/2/2014
ff

Page 3 of 3

Best - Laying
Quadrats

Nests with One Egg (Requires ID of individual nests)

Days until 2nd Egg Layed	Count	Total	% of Total
1	111 11 etc.		
2	111 etc.		
3	1 etc.		
No further eggs	11 etc.		
Decreasing Egg number	11 etc.		
Repeat for Nests with Two Eggs, Three Eggs etc. (Holsteggs, Zero eggs?)			
" " " "	with		

Calculate average/median/SD days (decimals thereof)

To lay 2nd egg. Then to lay 3rd egg, etc.

Subsample each quadrat? ^{eggs} only the front half or
quarter of each quadrat? (overcomes visibility issues)

A 'Timeline of Nesting Colonies (2) Monitoring on Lake Ballard in 1995', prepared by JL on 18/2/2014 and printed and annotated on 16/3/1995.

This needs some more work if it is to be complete and authoritative.

TIMELINE OF NESTING COLONIES (2) MONITORING ON LAKE BALLARD IN 1995

Mar 12 GP & CM discovered and photo'd 1st colony from fixed wing aircraft.
Grant Larson Clive Marmion

Mar 15 Helicopter trip (JL, GP, CM, MR) to 1st colony. Pegged (pegs A-X) and photographed ... 15 nest monitoring quadrats (5m x 2.5m). Numbered ('1', '2' or '3' indicating clutch size) all eggs in c.200-250 nests to S&W of 'W' peg. Marked all eggs in all nests in HION & NOUT quadrats. Photo'd colony from air.

Mar 30 GP & ML discovered 2nd colony by fixed-wing aircraft and photo'd both this and 1st colony from air. GP's audio-tape recording 'wiped'.

Mar 31 JL photo'd hatching (ABHG, etc.) and established & photo'd laying (ABCD, etc.) quadrats (2x2m) on 1st colony.

Apr 1 JL photo'd 10 of 15 (GP visually checked other 5) hatching quadrats & 4 laying quadrats on 1st colony. ML was on 1st colony.

Apr 2 JL photo'd 10 of 15 hatching & 4 laying quadrats on 1st colony. GP left for Perth.

Apr 3 JL photo'd 15 hatching & 4 laying quadrats on 1st colony. Numbered 5 nests (#1-5). Trapped & colour-banded 2 nesting BaST (on nests numbered 1-2). Numbered another 26 nests (#6-31) & counted eggs in all 31 (#1-31). Recorded chest bands of adults on numbered nests.

Apr 4 JL recorded & sketched chest bands of adults on numbered nests on 1st colony. Established & photo'd 10 laying quadrats ('1-4' → '29-32', QRST, UVWX) on 2nd colony. Photo'd 10 hatching & 4 laying quadrats on 1st colony. Hatching first seen today, but recall hearing cheeping yesterday, so hatching started on 1st colony on April 3rd.

Apr 5 JL recorded adults sitting on numbered nests on 1st colony. Photo'd 10 laying quadrats on 2nd colony. Numbered (apparently) nests 1-50 on 2nd colony and counted eggs in these. Photo'd 9 (missed one) hatching & 4 laying quadrats on 1st colony.

Apr 6 JL (filming in PM) sees chicks leaving 1st colony and JL encounters chicks on water. JL numbered nests 32-70 'on' laying quadrat '1-4' of 2nd colony & counted eggs in these. Took photos of 10 laying quadrats on 2nd colony. Also counted eggs in nests 1-50 of laying quadrat UVWX on 2nd colony. Photo'd 4 laying quadrats on 1st colony. Counted eggs in nests 1-31 of 1st colony. Appears did not photo hatching quadrats in 1st colony.

Apr 7 JL photo'd laying quadrats on 1st and 2nd colonies. Collected 36 eggs (which colony?) for DNA. JL left Ballard on 7th and Kalgoorlie on 8th.

Apr 8 JL (in Perth) measured & photo'd the 36 eggs to be DNA analysed. GP (at Ballard) writes 'Hatching of the main pegged area [1st colony] completed by Fri [7/4]'.

Apr 7 RJ PS, NK flew over 1st & 2nd colonies (& others) (and Marmion) in fixed wing aircraft (Cessna flew past JL at 0920hrs). JL had asked via IK for them to vertically photo colonies. Aerial photos taken? Ian Kealey

Apr 8 RJ PS (& NK?) kayaked to 1st ('met our team') and 2nd colonies. On 2nd colony collected incubating BaSt adults, chicks & eggs. Took photos and 'Viewcam' (PS).

Apr 9 CM visited (on 9/4) area on 1st colony where eggs in c.250 nests were numbered (on 15/3) and noted contents (fax of 24/4 to JL & GP's field notes). Also counted broods leaving 1st colony. GP writes '1300[hrs] to [1st] colony [with CM]. Took photos [look for these] & inspected site for numbered eggs'. ML filming on 1st colony.

Apr 10 No mention of activities this day in CM's fax (24/04/1995) to JL.

Apr 11 CM &? collected, measured & weighed adults & chicks that had left 1st colony. Counted broods that had left 1st colony. GP measured some nests and nest spacings at 2nd colony.

Apr 12 CM weighed eggs on 1st colony. Counted broods & weighed chicks leaving 1st colony.

Apr 13 CM measured, weighed, banded & flagged chicks that had left 1st colony.

* This printout is of this Word Doc as at 18/02/2014 9:53AM and could possibly be updated on the basis of work done ~~as per the notes~~ on BaSt material by JL since then. J 16/3/2014

Apr 14 CM weighed eggs on 1st colony. Photo'd, counted & recorded contents of nests in 15 hatching quadrats on 1st colony (near end of nesting; CM advised JL 'Don't need to do again'). Counted broods leaving 1st colony.

Note that in phone chat (April 1995) with JL after this trip CM gave estimated dimensions and no. of nests in 2nd colony, but there is no mention in his fax of 24/04/1995 to JL. GP visited 2nd colony on 11/4 so CM probably visited with him on this date.

Apr 27 JL flew over 1st (no BaSt present) and 2nd (BaSt still sitting) colonies. **No photos taken?** Didn't fly over Marmion. JL & ACI to Camp I. in PM.

Apr 28 JL visited 1st colony. No stilts. Numbers on the '31?' tagged nests 'completely faded'. Counted broods leaving 2nd colony.

Apr 29 JL counted broods leaving 2nd colony.

Apr 30 JL observed BaSt adults & chicks on 2nd colony from a distance. *Adult nesting behaviour*

May 1 JL counted broods leaving 2nd colony.

May 2 JL counted broods leaving 2nd colony.

May 3 JL observed BaSt adults & chicks on 2nd colony from a distance in AM. Very few were left in PM. Measured nesting area of 2nd colony in PM.

May 4 JL made some 'triangular tessellation' nest spacing measurements in 10 hatching quadrats (deserted) of 1st colony. Also measured diameters of 32 nests (not in a quadrat) on 1st colony. JL & ACI left for Perth this day.

Alan Clarke

**** STILL TO CHECK** *Andrew Chapman*

May 9? ML & ACh flew over Ballard (&?). All BaSt had left 2nd colony. **Did ACh take notes?**

May 12 ML 'filmed about ... deserted [1st] colony'.

May 13 ML 'filmed about ... [2nd colony]'.

May 14 ML 'filmed about ... [2nd colony]'.

Jun 6 ACh & IK flew over Ballard (& Marmion). No new nesting. No flightless chicks

Jun 9 GP & ACh measured & photo'd (now deserted) nesting area on 1st colony.

**** STILL TO CHECK**

Aug 22 ACh & ..? flew over Ballard (& Marmion). No nesting seen. **Check date.**

Sep 14 GP collected water level recorder but did not visit colonies (or Marmion).

NOTES:

1. This Table is primarily about monitoring of the 1st and 2nd nesting colonies on Lake Ballard. Other information in this Table is for context and may be incomplete. See other RMCRs.
2. See another Table in this RMCR for lists of quadrats photographed each day.
3. Other BaSt nesting colonies (additional to the '1st' & '2nd') on Lake Ballard were found and photo'd from the air in 1995 but were not monitored and so are not mentioned in this Table.
4. Numerous estimates made at various times by various observers of the number of adults / nests / nesting pairs in the Lake Ballard and Lake Marmion BaSt colonies are scattered through various field notes, field reports (?), faxes, published articles, etc. and have yet to be assembled.
5. JL = Jim Lane, GP = Grant Pearson, ACI = Alan Clarke, ACh = Andrew Chapman, IK = Ian Kealley, CM = Clive Minton, MR = Marj Reni, ML = Mark Lamble (ABC), RJ = Ron Johnstone (WAM), Phil Stone (PS), Nick Kolichis (NK).
6. In most instances, only the principal investigator's name appears above, to save space here.
7. **** STILL TO DO** Extract dates / observations from ABC film tapes and editing transcripts?

TIMELINE OF NESTING COLONY (1) 'MONITORING' ON LAKE MARMION IN 1995

*Excel
Spreadsheets*

**** STILL TO CHECK**

Mar 12th GP & CM flew over Lake Marmion in fixed wing aircraft. No colony seen.

**** STILL TO CHECK**

Mar 30th. Did GP & ML fly over Marmion? GP's audio-tape recording 'wiped'. Photos?

Apr 7th RJ, PS, NK flew over Lake Marmion (and Ballard) in fixed wing aircraft. No colony seen.
What do '427 2739' and 'nested [?]' in record of phone conversation with JL on 11/04/1995 refer to?

Jun 6th ACh & IK flew over Marmion (& Ballard). Did not find colony. Saw BaSt chicks.

Jun 12th ACh discovered and photo'd nesting **colony** from air (at 1400hrs according to GP's report). Flew over GP & ACl towards colony to indicate compass bearing (300^0) to it.

Jun 13th GP & ACl followed ACh's compass bearing to nesting **colony**. They measured (began at 0846hrs) and photo'd main nesting area (and 'satellite colonies) and recorded observations of nest numbers, dimensions, spacings & contents including some BaSt eggs and live & dead chicks, BaSt adults and chicks nearby and potential predators / scavengers (raptors). Took plant samples from colony island. Recorded coordinates of colony as '29.44.36, 121.29.13'.

**** STILL TO CHECK**

Aug 10th ACh & ..? collected Argo and trailer from campsite. Check date.

**** STILL TO CHECK**

Aug 22nd ACh & ..? flew over Marmion (& Ballard). No nesting seen. Check date.

A chain of emails (13-19/04/2000) between CDTM, GBP and JL in which, inter alia, JL advises GBP and CDTM that: ‘We did collect eggs for DNA work [from Lake Ballard in 1995] and they went to Murdoch Uni [Incorrect, they went to Curtin University! JL 12/02/2014]. Results were not forthcoming. ‘In the end I decided we should wait for another breeding effort in WA and collect more, to send to a different DNA lab’.

To: iSMTP@CALM.COMO.1@Servers[<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

clive@3.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?

Wrong! It was Curtin University.

12/02/2014

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 -----

(my mistake R.)

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: Jim Lane@BUSS.SID@CALM
From: Grant Pearson@WOOD.SID@CALM
Cc:
Subject: re: fwd: Various
Attachment:
Date: 19/Apr/2000 11:20 AM

Beside sub

Jim

Thanks for the notes. I'll advise Clive.

I used Kodak professional T400CN black and white film and I left the Hoya uv filter on due to the haze present. The information i got was that it would make little difference but i left it on anyway.

I planned to visit Vasse on the 4th and 5th of May.

Ian Coxsall from Bunbury aero club (97254377) is very good and the new c172 is nice. The cost of flying to Perth from Bunbury may be the same as driving these days. Otherwise big Pete from Royal Aero Club Jandakot is still alive and flying!

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: Jim Lane@BUSS.SID@CALM, on 18/04/2000 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:

*It was
Wrong
Curtin University
2/2/2014*

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

140
Wrong! It was
Curtin University
12/02/2014

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.

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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,

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: 'Egg laying, incubation and hatching success data to be extracted from daily photographic monitoring of quadrats established in 1995 [Lake] Ballard breeding colonies'.

The Science Project Plan refers inter alia to this work (accomplished and proposed) in somewhat more detail.

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 Pernson*

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:

9

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, Goongarie, Marmion and Carey determined.
 - Precise location of new breeding site on Goongarie 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:

8,

a) Operating (including requests for ED / NC Division funding):
\$3,000 See special note at Item 10 below.

b) Chemistry Centre:
\$0

8. EXTERNAL FUNDING RECEIVED OR EXPECTED TO RECEIVE, AND SOURCE:

There is a strong possibility of significant, external, in-kind support (\$1,000s) being provided by the mining industry and/or other sources in the event that suitable rainfall occurs in 1999/2000 or subsequent years.

9. COMPLETION DATE FOR THIS WORK (mm/yy):

Depends upon timing of rainfall events and level of funding and in-kind support obtained. Rainfall events suitable for successful breeding appear to occur once in 3-10 years.

10. ANY OTHER INFORMATION RELEVANT TO BUDGET REQUEST:

CALMScience funding (\$3,000) is being sought for 1999/2000 to enable a *rapid response* in the event (<50% probability) that a potentially-suitable rainfall event occurs. These funds would be used for an initial aerial survey. External funds would be sought to support follow-up work in the event that breeding colonies with a high likelihood of success are located.

11. ENDORSEMENT BY PROJECT LEADER:

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)

Email exchange (04-08/06/1999) between Michael Yung, Research Scientist [computing] of CALM, and JL referring to '... the program I [MYu] wrote for bird-nests counting using the triangulation ['triangular tessellation'?] method'.

JL writes 'I borrowed the Husky ['Husker Hunter'?] from Andrew [Burbidge] for a short period in 1995 and returned it to him [unused?] soon after'.

See instructions headed 'Program BIRD NEST, in Husky Basic' by 'Michael Yung, 1 Oct [1991]', early in this RMCR, for related info.

To: Jim Lane@BUSS.SID@CALM
From: Mike Yung@WOOD.SID@CALM
Cc:
Subject: re: The Husky Hunter computer
Attachment: BEYOND.RTF
Date: 08/06/1999 11:15

Thank you very much.

F H Yung, Michael,
Research Scientist, WRC, Dept of CALM, WA
phone: 94055171, email: mikey@calm.wa.gov.au
fax : 93061641

From: Jim Lane@BUSS.SID@CALM, on 08/06/1999 11:14:

Thanks for the background Mike. I will be more than happy to acknowledge you as the main author of the program.

Regards.

From: Mike Yung@WOOD.SID@CALM, on 08/06/1999 10:01:

Yes, the program was written by Dave Ward initially as a 1.5 page program for testing purposes only. Then I spent more than 4 weeks on it to make it user friendly enough so that it can be used in the field, the program became about 6 times longer. This type of program development usually takes 80 % of the time to make it usable, while the other 20 % makes only the basic skeleton of it. Thus I am the main author of this program.

That is the reason why Andrew Burbidge acknowledged me in one of his publications. He is the first user in the field.

Cheers.

F H Yung, Michael,
Research Scientist, WRC, Dept of CALM, WA
phone: 94055171, email: mikey@calm.wa.gov.au
fax : 93061641

From: Jim Lane@BUSS.SID@CALM, on 04/06/1999 16:32:

Gidday Mike

I borrowed the Husky from Andrew for a short period in 1995 and returned it to him soon after.

I thought the program had been written by Dave Ward?? Do let me know if this is not correct.

Have a good weekend.

From: Mike Yung@WOOD.SID@CALM, on 04-Jun-99 10:11 AM:

You may remember the program I wrote for bird-nests counting using the triangulation method. I believe you are still having the computer and have used my program at some stage in the field.

If you write any publications or internal reports, which used data taken with my program, please remember to acknowledge me. Andrew Burbidge has done so in one of his publications more than a year ago.

Regards.

F H Yung, Michael,
Research Scientist, WRC, Dept of CALM, WA

Email (02/08/1997) from JL to GBP asking that he sort and label his slides (35 mm photos) from Lakes Ballard, Marmion and Barlee. Explains why JL labelled some slides with '1K', '2K', etc.

Note that all of GBP's work photos are now – 2014 – in JL's possession and have been scanned (digitised) by JL.

To: Jim Lane@buss.sid
From: Grant Pearson@WOOD.SID@CALM
Certify: N
Subject: re: Ballard, Marmion, Barlee photographs
Date: Saturday, August 2, 1997 at 12:24:30 pm WST
Attached: ATTRIBS.BND

28.

No problem . will advise Keiths availability.

Original Text

From: Jim Lane@buss.sid@CALM, on 2/08/97 11:48 AM:

I have re-numbered the photos of yours that I took on Thursday.

I found that after prising open the mount with a pocket knife it was possible to read the number on the film strip without taking the film strip from the mount, but only if I used a strong overhead light, e.g. a desk lamp, to read it.

The slides I took on Thurs were from two different films. Fortunately they were different types of films. One had a number and the word "Kodak ..." on each exposure. The other only had the number. The first type I labelled "1K", "2K" etc. The second type I labelled "1", "2", etc. and after doing all of them I was able to sort them into the correct sequences.

I suggest you do yours the same way, including the labelling.

I will be at Woodvale on Thurs 21 and Fri 22 to spend more time on the Stilt stuff with you and Alan and to do your appraisals (yours if you can arrange Keith Morris). Please sort and label as completely as you can all your slides for me to look at then.

Jim
2/8/97

J Is this labelling still to be done ?
12/02/2014 .

Happy Mail!

**Note (23/06/1997) from Michelle Handley (this is the correct spelling) to
JL and photocopies of print photos of nesting BaSt and BaSt nesting
quadrat 13-16 ('13, 14, 15, 16') (photo number 3832 of JL's collection,
dated 04/04/1995), both taken by JL on Lake Ballard in April 1995.**



**WWF World Wide Fund
For Nature Australia**

ACN 001 594 074

56.
Level 3
79 Stirling St, Perth, WA
GPO Box U1946
Perth WA 6845
Telephone: (09) 228 3227
(09) 220 0678
Fax: (09) 228 3227
Email: wwfperth@ozemail.com.au

Jim, I wasn't sure who to post this to so thought I'd forward it to you. It's for cost of photo duplicates made - for postage. I will send prints to you shortly. Cheers, Michelle
With Compliments
23/6/97



**WWF World Wide Fund
For Nature Australia**

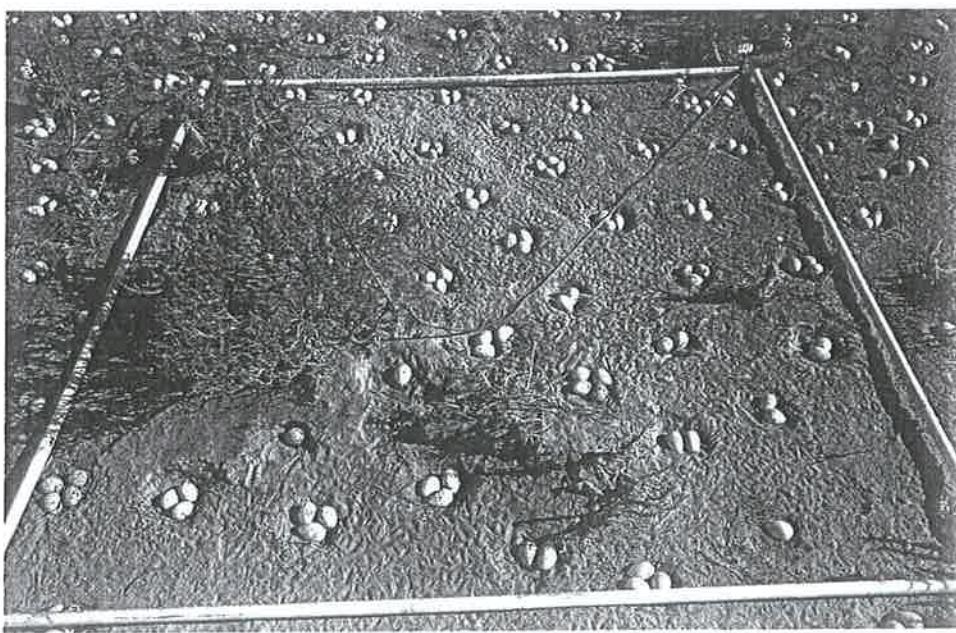
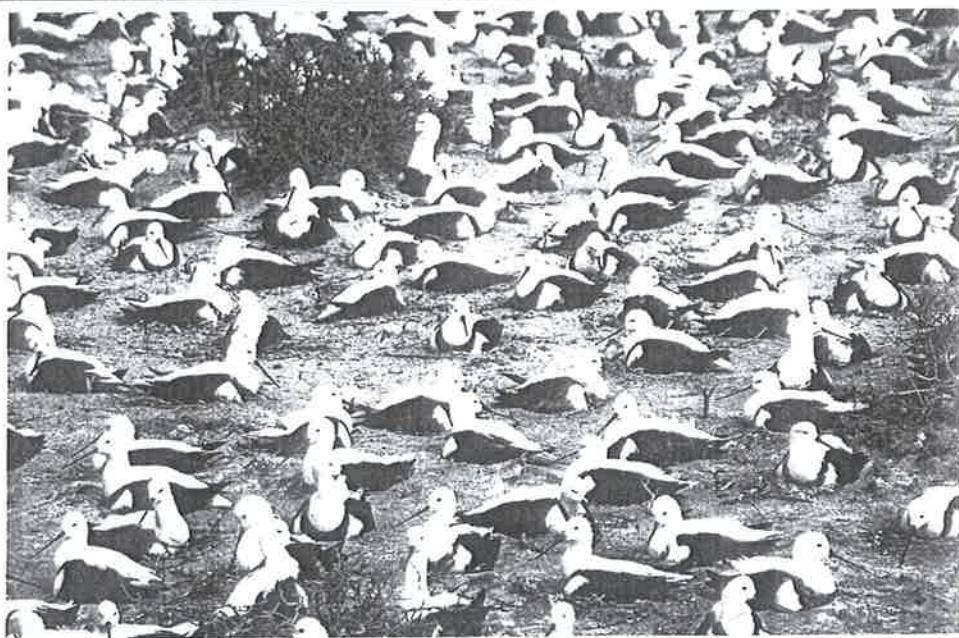
ACN 001 594 074

79 Stirling St, Perth, WA
GPO Box U1946
Perth WA 6845
Telephone: (09) 228 3227
(09) 220 0678
Fax: (09) 228 3227
Email: wwfperth@ozemail.com.au

Jim, I wasn't sure who to post this to so thought I'd forward it to you. It's for cost of photo duplicates made - for postage. I will send prints to you shortly. Cheers, Michelle
With Compliments
23/6/97

Michelle Handley

J 12/02/2014.



(Scanned)
 slide
 № 3832
 taken on
 04/04/1995
 Questet 13-16.

12/02/2014
 J

26

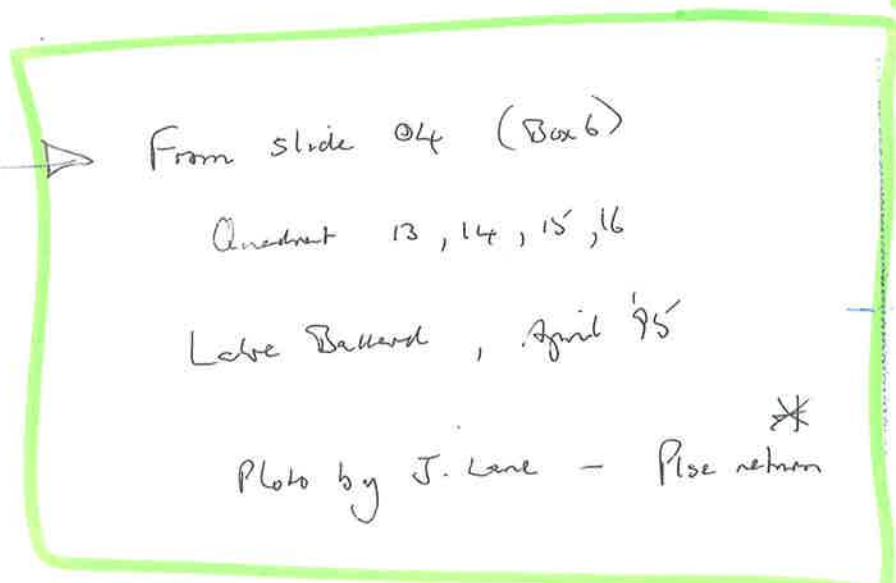
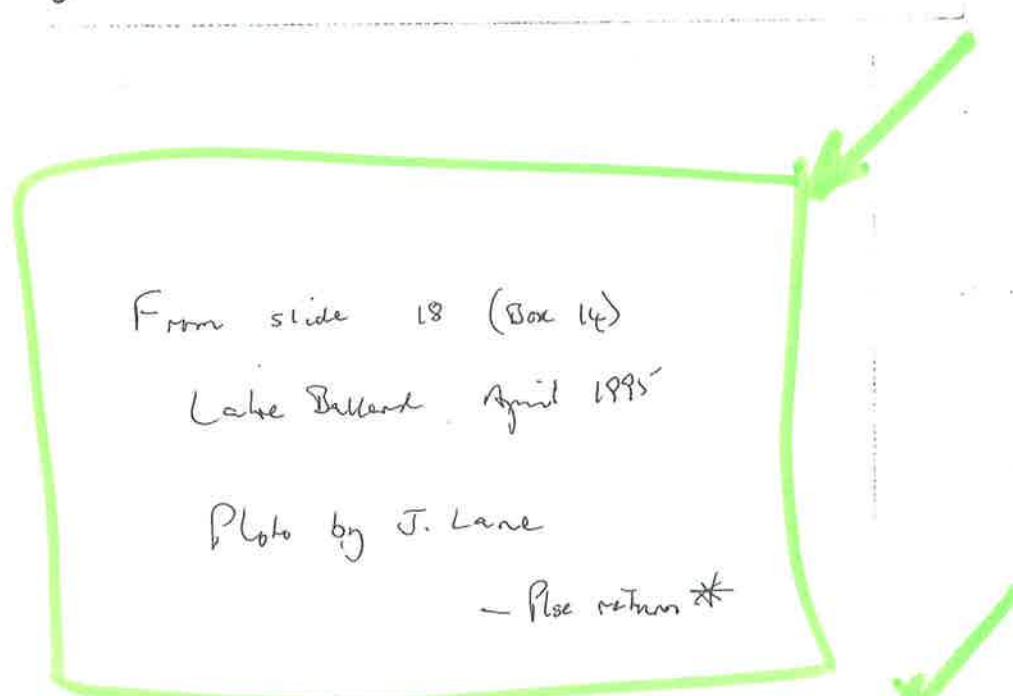
49.

Lake Bemis - Island 6

G. Pearson inspecting telescope
+ trapid + sweep net

2/7/92

Photo by J. Lane over Bsn. — Please return to JL.



Fax (14/10/1996) from CDTM to JL that reads, inter alia, 'Re slides [35mm photos]. I don't think I need the banding ones [for a BaSt presentation CDTM was to give in New Zealand 'next week']. And I don't think I've got anything that you haven't'.

14/10/96

Fax to Tim Lane CALM Russellton 097-521-432

14/10/96

How thoughtful of you to send me the two OHPs. Many thanks. I will use them in New Zealand later this week! It also seems to me that a photocopy (not OHP) of the sheets of data you showed in your talk would also be useful to me. They may contain some facts I don't remember & will also ensure we tell the same story. Could you fax them to me please?

Re slides. I don't think I need the banding ones. And I don't think I've got anything that you haven't. If I do come across something I'll copy it to you.

Great to see you & to meet Garrett. I have you both on the 'provisional' list for Aug - Oct 1998!

Best wishes, Clive

03-9589-4901

Fax sent by: 613 9589 4901

Two of the ‘overheads’ that JL projected during his presentation (on behalf of JL, CDTM *et al.*) at the ‘Southern Hemisphere Ornithological Conference’ (SHOC) in Albany, WA, on 07/10/1996.

One is a map showing the path of Cyclone Bobby and the dates (25-28/02/1995) of its movement across WA.

The other is headed ‘Lake Ballard – Main Colony – 1995 Breeding Cycle. It contains JL’s calculations / estimates of the number of days taken by each stage (including site selection, scrape formation, laying, incubation and hatching) in the breeding cycle and the number of days from ‘lake full’ to ‘lake dry’ (calculated to be approx. 200 days, from approx. 1st March to 16th Sept 1995).

Overlects used to give

Banded Shelt

Teller to

Shm. Hm. Or. Engen

7/10/96

at Albany

THE BANDED STILT

CLADORHYNCHUS LEUCOCEPHALUS

IN

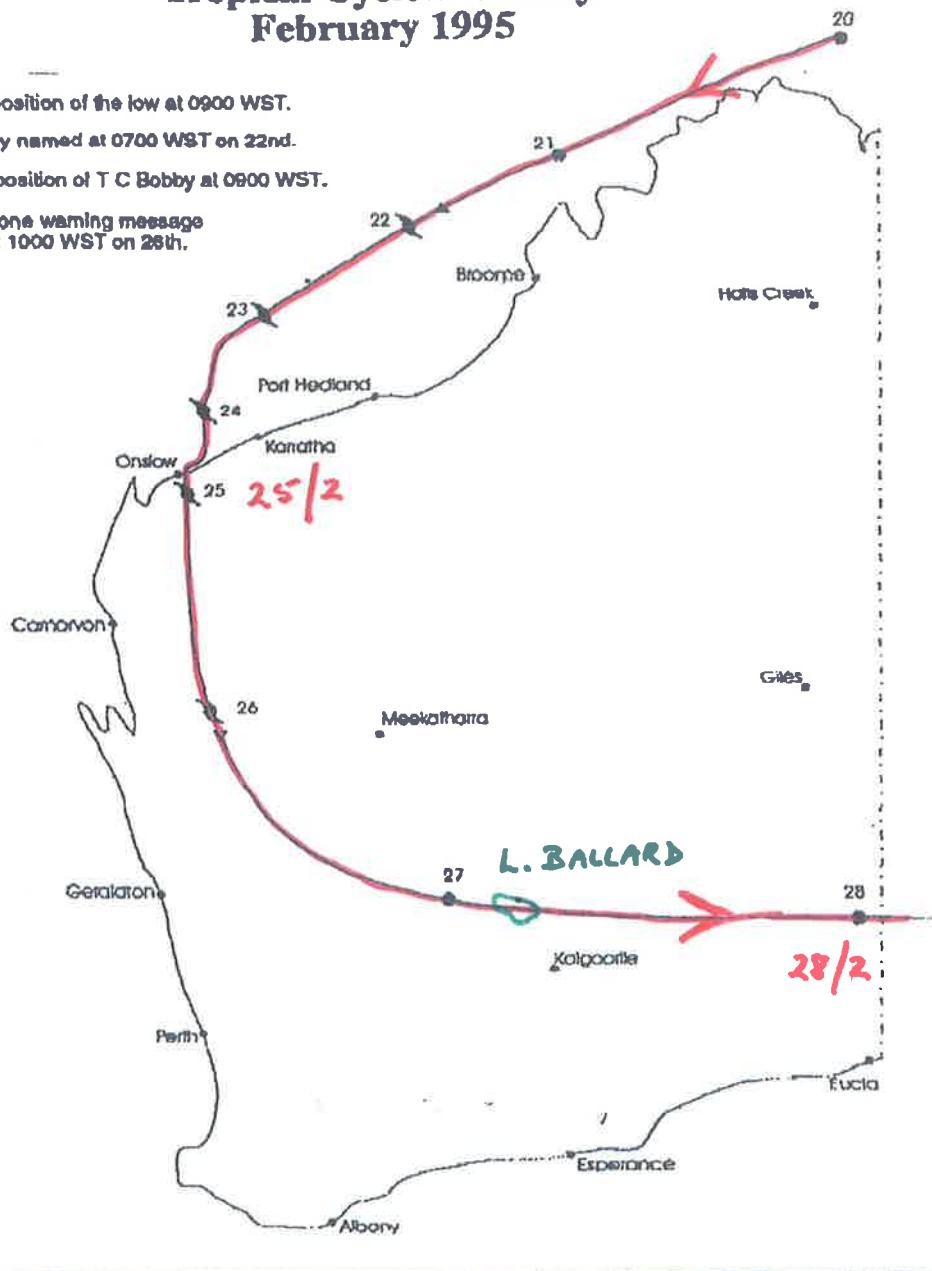
WESTERN AUSTRALIA

OR

“BONKING IN THE BRINY”

Tropical Cyclone Bobby February 1995

- Approx. position of the low at 0900 WST.
- ▲ T C Bobby named at 0700 WST on 22nd.
- ◀ Approx. position of T C Bobby at 0900 WST.
- ▼ Last cyclone warning message issued at 1000 WST on 28th.



LAKE BALLARD - MAIN COLONY

1995 BREEDING CYCLE

<u>STAGE</u>	<u>DURATION (DAYS)</u>	<u>COMMENT</u>
CYCLONE TRAVEL FROM NW COAST TO BALLARD	4	Cyclone weather reached NW coast on 21/2, Ballard on 25/2.
RAIN ON DRY LAKE	4	Rainfall from 25-28/2 was 0.38m. Water level peaked c. 1/3.
500-1000 km MIGRATION, PAIRING, COPULATION, SITE SELECTION, SCRAPE FORMATION, START LAYING	first birds 14-18 last birds 30-34	c. 14 days from start of rain at Ballard to first egg laid (10/3). (c. 18 days from cyclone reaching NW coast).
LAYING	2 - 4	c. 16 days between first and last birds laying.
INCUBATION	22 - 24	Probably begins with 2nd last egg.
HATCHING	1 - 2	99% of hatching was completed within 11 days (3-14/4).
FLEDGING	44	Chicks leave nest within 1-2 days of hatching. First chicks flying on 17/5. All flying by 6/6.
LAKE FULL -> DRY	c. 200	Lake filled c. 1/3; dried c. 16/9.

TIME REQUIRED FOR MIGRATION & BREEDING

FIRST BIRDS	82 - 86 DAYS
99% OF COLONY	93 - 97 DAYS
LAST BIRDS	< 102 DAYS

List of slides (photos) used in Banded Stilt talks given by JL to the SHOC at Albany on 07/10/1996 and the RAOU WA Group in Perth on 25(?)/09/1996. Some of these photos were:

- aerial photo of Ballard colony on 15/03/1995;
- marking out of nesting quadrats and marking of individual eggs on 15/03/1995;
- Quadrat NOUT with eggs on 01/04;
- Quadrat 13-16 with eggs and '1m frame' on 2nd colony on 04/04;
- eggs;
- Quadrat NOUT with eggs & chicks on 04/04;
- eggs & chicks in nests on 05/04;
- 'Photo ID: Blank. Close-up of adult + 1 chick in nests (Mark Lamble)' [Find photo. Possible to work out where & when?];
- 'nests washed away (5.95)', and
- '[three other] nesting islands from air (30/3)'.

(Solis bl.)
(79)

+ sequence

② Slides used for Banded Stilt talk
to Stn. Head. Orr. Congress 7/10/96

① Slides used for Banded Stilt talk
to RAON Party Monday 25 (?) September 1996

Sequence	Plate ID	Subject	②
1	486 L	Stilts	✓
2	• "22"	Lele Billed stilt (15/3/95)	✓
3	• "09"	" " " - 2 stilt (15/3/95)	✓
4	• "06"	" " " 1st colony (15/3/95)	✓
5	• "21"	Helicopter at Kali (15/3)	✗
6	• "25"	Camp Island nest (15/3)	✓
7	• "34"	Helicopter on Camp Island (15/3)	✓
8	• "37"	GBP carrying canoe case (15/3)	✗
9	• "05"	GBP + CDTM approaching island (15/3)	✓
10	• "07"	• " " + Mag Rani next to nesting birds (15/3)	✗
11	• "18"	nesting stilt (4/95)	✓
12	• "33"	stilt take off ^{nesting} island (15/3)	✓
13	• "30"	stilt return to nests (15/3)	✓
14	• "10"	GBP + CDTM photograph nesting birds (15/3)	✗
15	• "09"	washing / preening / drinking stilt (15/3)	✗
16	• "17"	2 stilt ^{back} feathers up, in water (15/3)	✓
17	• "22"	2 stilt drinking (15/3)	✓
18	• "25"	2 stilt copulating - water (15/3)	✓
19	• "26"	~ ~ ~ - - -	✗
20	• "19"	~ ~ ~ - - -	✓
21	• "29"	~ ~ ~ - - -	✓
22	• "20"	~ ~ ~ on land ~	✓
23	• "13"	Glenn + Mag Rani mark out quadrat (15/3)	✗
24	• "22"	pink banded quadrat of nests + eggs (15/3)	✓
25	• "31"	eggs (numbered) in nests + peg (15/3)	✓
26	4 "04"	Trailer + 2 punts + Argos + Great (4/95) (29/3)	✗
27	1 "36"	composite nest to Common Lele (4/95) (31/3)	✗
28	3 "04"	punts with gear entering Common Lele (31/3)	✗
29	Stilts	punts of gear crossing in in (31/3) — Mute Lantle photo	✗
30	3 "05"	loading punt onto trailer (31/3)	✗

Sequence ②	Sequence ①	Photo ID	Subject
✓ 19	31	3 "08"	Argo putting pock out of Crossover Lobe - (31/3) ✓
✗	32	3 "23"	" " " between lobes (31/3) ✗
✓ 20	33	3 "11"	Argo launching pock into Lobe Bellard. (31/3)
✓ 21	34	3 "28"	Walking pock of gear into " " (31/3)
✗	35	blank	unloaded gear at Camp Island - Mark Lambie photo
✗	36	3 "25"	Viewing 1st colony from Camp Island (31/3)
✗ ✗	37	11 "04"	Mark Lambie ^{nesting birds} filming (4/95)
✗	38	11 "32"	Campbell - sound recording (4/95)
✗	39	- - -	Mark + Campbell breakfast at fire (4/95)
✗	40	12 "04"	Mark sleeping outside tent (4/95)
✓ 22	41	Box 2 "19"	Quadrat NOUT - eggs in nests - (1/4)
✗	42	Box 6 "04"	Quadrat 13 14 15 16 - 1 in frame - eggs (4/4) ^{2nd colony} .
✗	43	"09"	3 eggs + markings (collected) - (8/4)
✗	44	"05"	Chickles of 3 + 4 eggs (n) - (8/4)
✓ 23	45	Box 6 "19"	Quadrat NOUT - eggs in nests - (4/4) - ^{a few} _{chicks} ?
✓ 24	46	Box 6 "20"	" " - eggs + chicks <u>closeup</u> (4/4)
✗	47	Box 6 "21"	" " - ^{1 chick} - (4/4)
✓ 25	48	Box 7 "28"	" " - mainly chickles in nests (5/4)
✗	49	"04"	Closeup of <u>chick + egg in nest</u> (5.95)
✗	50	"09"	" " - 1 chick + 3 eggs " " (5.95)
✓ 26	51	"14"	" " - 3 chickles in 1 nest (5.95)
✗	52	Blank	Closeup of Adult + 1 chick in nests (Mark Lambie)
✗	53	11 "22"	Adult leading chickles towards shore (4/95)
✓ 27	54	11 "24"	" " - - - - - - - - - - (4/95)
✓ 28	55	11 "25"	" " defending chickles at shoreline (4/95)
✓ 29	56	11 "19"	" " pushing another chick away " " (4/95)
✓ 30	57	11 "09"	" " leading 2 chickles into water (4/95)
✓ 31	58	9 "01"	2 adults + 7 chickles on water (7/4)
✗	59	9 "04"	more " " " " - - - - (7/4)
✗	60	9 "05"	1 struggling chick behind family on water (7/4)

Sequence (2)	① Sequence	Photo ID	Subject
X	61	"01"	Creche of large chicks - Lake Wakat (from air)
X	62	"08"	Alon Clarke standing in punt - search for chicks
X	63	"11"	" " Speeding in punt - - - - -
X	64	"25"	" " slow in shallow water - - - - -
✓ 32	65	"29"	Scouring chicks up with plantation net -
✓ 33	66	"32"	" " - - - - - - - - -
✓ 34	67	"33"	" " - - - - - - - - -
X	68	"24"	" " - into punt " - -
✓ 35	69	"26"	chicks in holding tub in punt .
X	70	"04"	me holding / bending chick (in punt) .
X	71	"25"	me bending chick " " "
✓ 36	72	"21"	Alon hand holding flagged/banded chick .
X	73	"01"	Cloud cover (5.95)
X	74	"31"	nest washed away (5.95)
X	75	"	"Agincourt Island" from air .
X	76	1 "17"	another nesting island from air (30/3)
X	77	1 "09"	yet " " " - - - - (30/3)
X	78	1 "11"	" " " - - - - (30/3)
X	79	1 "14"	air photo of truck on bed of lake .

'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: 'clutch size'; hatching success'; 'individual colour mark[ing] [i.e. proposed marking of nesting adults]' and 'eggs collected – DNA'.

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

- ~~descr~~ breeding cycle 1994
- common in conservancy
- get you looking for leg-fl

0 cm on 4/6/94

Banded Shrike - 7.9, 7.8, 8.7
Habitat is savanna, etc.
Distribution is OVERLAP

↑
Wrong!

First described in 1811

6-8 eggs recorded

Clutch size

15 quadrats
2.5 x 5 m

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

hatching success - 2000 chicks hatched = 2 hrs.

Fluffy success

Individual colour marks

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

Total ≈ 650 (700?) birds
Banded
Meermin

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

475 leg flagged?
Banded
Meermin

Sightings - 1 Little Raven (24 km of road) 24/10/95 -
1 Rook 21/1/96 -

1 Dampier Swift 7/3/96 -

3 Pure Wedge-tailed 28/2/96 -
1 Horned Lark 19/96 -

Egg collected - DNF

Predations - Little crow (mainly dead, 2 live)
Wt Eagle (1 live)
Cat (potential)
Not Squirrels.

Waterfowl on'Connor Lake breeding.

ABC future

↑

RECENT JOTTINGS MADE IN PREPARATION FOR TALK

AT "STHN - ITEM. OWN. CONGRESS", Albany 7/10/96

sweep rate?

Water depth: 4
datalogger

Seabirds:

PBT %: 7.9, 7.8, 8.7
REB

Sweep samples:
gut samples:

estimate ~ 50 cm - on 15/3

(400)

"back to max level" on 10/4 (after 70 mm rain)
51 cm on 14/4 (at N side Camp I)
54 cm on 28/4
44 cm on 4/5

0 cm on 14/9

4
wrong!

Clutch size

15 quadrats
2.5 x 5 m

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

hatching success - 2000 chicks hatched = 2 hrs.

fluffy success

Individual colour marks

Banded - [10 (chick) + ?
200 (Total)]

Total ~ 690 (700) birds
Bullard
Meinman

Leg Flagged - [10 (chick) + 170
195 + 260 + 20 = 475]

500 flagged?
Bullard
Meinman

Sightings - 1 Little Tern (24 km of total) 24/10/95 -

1 Rottnest 21/1/96 -

1 Dumper Slat 7/3/96 -

3 Pine Islet sightings 28/2/96 -

1 Yarralup

19/96

Eggs collected - DNA

Predations - Little eiders (mostly dead, 2 live)

WT Eagle (1 live)

Cat (potential)

Not seen.

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].

The many paragraphs / sentences / words relating to nesting (those aspects that come within the scope of this RMCR) have been highlighted in green (by JL on 10/02/2014).

This document is an incomplete draft but does give a useful account (overview) of the work that was done in 1995. Better to work from the relevant source documents, all of which are in this RMCR.

This printout appears to be of "STILTSEM"
(Date Modified 16/05/1996 5:02 PM) 10/01/2014

BANDED STILT CLADORHYNCHUS LEUCOCEPHALUS SEMINAR

This material compiled 14-16 May 1996 in preparation for seminar at Woodvale on Fri 17 May.

- Info in this document has been drawn from my BaSt files (Vol 1 gone thru carefully, Vol 2 less so, stopping just before reaching transcript of Clive comments while viewing uncut stilt footage from Ballard), also from the 2 Wingspan articles (Vol 5 Nos. 2&3), also my work diary.
- Still need to: redo Vol 2, go thru my notebooks, get data that Grant, Alan and Andy have yet to give me, get water analysis results, do sweep and gut contents, do photos of nest quadrats, data from logger (I think Grant has sent it to me).

The Banded Stilt is: *Cladorhynchus leucocephalus* Slide of stilt
description? *Cladorhynchus leucocephalus*

only found in Australia, monospecific genus, member of .. family
distribution, numbers

wt 220-260
cm (longest)

first discovered in 18.. by .. at ..

breeding a mystery until 1930 when recorded at.. by .. colony size ..

since then, breeding recorded at .. (sites, distribution) Only about 20 nesting events ever recorded (3 in SA and rest in WA). Most nesting attempts only found when chicks mobile or breeding over (deserted colonies).

breeding actually witnessed on few occasions, due to difficulty of finding and gaining access to colonies
Chicks on road at Menzies. (1400 walked thru town?, 500 killed on road?)

Grant and I have taken an interest in locating breeding sites since 19.. when he and Phil Fuller found .. at Lake Barlee.

Since then we have:

Barlee in 19.. with Roger Jaensch and found ..

Primary interest is in identifying significant breeding sites and any threats, conservation needs

In Feb 95, Tropical Cyclone Bobby dumped 385 mm of rain to north of Kalgoorlie in 4 days (25-28th) of continuous rain.

Stilts left coastal sites e.g. Creery lagoon.

We planned an air survey of .. for

Clive Minton contacted us. He was passing thru Kalgoorlie on .. and interested in flying with us sharing costs.

Jeremy Hogarth of ABCTV Natural history (who Grant had met on Broome wader expedition) also contacted us to see what we were doing 'cause they wanted to film Banded Stilts nesting (waiting for .. years since meeting Clive?).

Grant flew to Kal on .. to join Clive for flight.

Sun 12 March Air survey

Grant & Clive flew Barlee, Ballard and Marmion Lakes (previous nesting locations) 150-250 km N of Kal on Sunday 12 March, 16 days after 4 days rain started. 4.5 hrs searching. 1345 "end survey"

1102 hrs leave Barlee

1123 hrs arrive Barlee

1004 start count
0950 hrs arrived Marmion
1014 - left Marmion
1018 - arrived Ballard (End)

Marmion: no birds.

Barlee: 20 000, all seemingly paired but no sign of colony. Had the least water of the three lakes.

Ballard: All birds on water were paired. 10 000 birds, half (5000) at colony (1st) of around 2000 nests. At core of colony incubation appeared to have begun.

Not equipped to gain access to colony.

Luck. Found a Jet Ranger helicopter in Kalgoorlie with a spare day. Agreed to share heli cost with Clive 50:50. (Pilot + 3 or 4 + hide; \$695/hr; 1hr each way). Clive rang me to convince of value. On Tues 14th he faxed me a draft research program.

Wed 15 March 1995, Clive Minton, Marj Reni, Grant, me. Helicopter to Lake Ballard

"Photo 6 at the north end of Marmion" between 1004 hrs + 1016 hrs
Photo 8 flooded station between 1014 + 1018 hrs
Photo 9 East end of Ballard between 1013 + (say) 1015

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!

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, fridge, 25 watt portable HF radio with sellcall, 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 layed 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), 1 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 9 May 1995
J 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..

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 ..

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)

Fax (01/03/1996) from JL to John Weatherall (OOPS! Should have been
‘Wetherall’!! JL/02/2014) at Curtin University (fax number not on fax)
asking: ‘Could you advise me of status of DNA testing of the eggs
please’.

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

FAXED

1060

TO: JOHN WEATHERALL URGENT: YES / NO

AT: CURTIN UNIVERSITY

Fax No.

FROM: JIM LANE

DATE: 1/3/96

Your Ref:

Local Ref:

We are picking up the Banded Shilt project again, after several months of other priorities, and wish to conclude, including write-up, by June. Could you advise me of status of DNA testing of the eggs

No. of pages inc. this page: ①

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

Fax (18/07/1995) from JL to Prof John Weatherall (OOPS! Should have been 'Wetherall'), at Curtin University (Fax 09 351 2342), asking 'Could you let me know how the DNA testing of the [BaSt] eggs is going please?.

FAXED

TO: PROF. J. WEATHERALL URGENT: YES / NO

AT: CURRIED UNIT

Fax No.

09 351 2342

FROM: JIM LANE

DATE: 18/7/95

Your Ref:

Local Ref:

Our field studies of Sordid Shrike breeding in the goldfields are nearly completion. Could you let me know how the DNA testing of the eggs is going please?
Collected for interest is a copy of a recent article on this work.

No. of pages inc. this page: 5

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



**Fax (dated 28/06/1995, but sent 27/06/1995) from CDTM to JL
requesting mailing address as 'I have some slides [photos] & papers to
post to you'. These were the photos (of nesting quadrats on Ballard
'Colony 1') and papers (regarding the Bellchambers / Carpenter paper)
that accompanied CDTM's letter of 27/06/1995, below.**

FAXED

MR J. LANE

DEPT. CONSERVATION AND LAND MGMT.

14 QUEEN STREET

BUNSECTON WA 6280

Cheer
Ji
28/6

Fax to Tim Lane 097-521-432

CALM Bunleton
Clive Minton

3-9589-4901 28/6/95

From

note: extracting

Could you please fax me your correct
full mailing address? I have some slides &
papers to pass to you

Best wishes,
Clive

First two pages of letter (27/06/1995) from CDTM to GBP & JL.

Accompanying this letter was:

'A copy of the draft Bellchambers/Carpenter paper on the 1989 Lake Torrens Banded Stilt breeding, together with associated correspondence', and

'Slides [35mm colour transparencies] I [CDTM] took of Colony 1 [on Lake Ballard] after the birds had largely departed [Check and add date]. These are numbered as per the relevant block, with the first photo being taken from the NW end just as you and I did. These photos should tally with the physical count data I did at the same time & which has already been sent to you [see CDTM's fax of 24/04/1995 to JL, below]. Could you please process them as you did the very first lot [cross-reference to that processing] & make your estimates of (a) number of unhatched eggs left in nests; (b) number of abandoned eggs in groups; (c) number of still occupied unhatched nests/eggs' [JL yet to do].

Melbourne 27/6/95

171.

Dear Tim & Grant,

as promised I enclose:-

(a) a copy of the draft Bellchamber / Carpenter paper on the 1989 Lake Torrens Sanderling still breeding, together with associated correspondence.

Do you agree with what I proposed to Keith?

(b) slides I took of Colony 1 after the birds had largely departed. ~~I think~~ ~~I didn't~~ these are numbered as per the relevant blocks, with the first photo being taken from the NW end just as you & I did. These photos should tally with the physical count data I did at the same time which has already been sent to you.

Could you please process them as you did the very first lot & make your estimates of:-

(a) number of unattended eggs left in nests

(b) number of abandoned eggs in groups

(c) number of still occupied unattended nests / eggs

I'm still clearing the decks here before concentrating on the paper, but all is going well.

We had a surprise on 18/6 - a long-billed Dowitcher in a small catch of godwit / knot. A first for Australia.

Will be in touch.

Best wishes,

Clive



Copy for Tim Lane 165, Balgatty Rd,
Grant Pearson Beaumaris, 3193. 170.

Dear Kirk,

Many thanks for your letter & for the enclosed copy of the original draft of your banded ^{12.6.96} full paper.

I agree with you & David Batai. Both your data & our data must be published and there should be maximum liaison & cooperation to ensure we achieve this in the optimum manner.

My initial reaction is that this would be most practicable with two separate papers, along the lines you suggest. It would be ideal if these could be published at the same time, in Emu. By liaison we could ensure they were complimentary not competitive.

Re timescale & process. We have started putting our stuff together. I envisage a draft by September & a final version going to Emu by December. Drafts would be available for you to see & refer to as they emerge.

If Graham Carpenter can't/won't pick up the ball & run with it can you not take on the task? I don't think it would be too big a task even as a "spare time" (?) task.

I will consult with Tim Lane & Grant Pearson to ensure they concur with my views. I will then perhaps give David Batai a call, as you suggest. Meanwhile I thought it best to respond direct to you & to thank you again for the information you sent.

Best wishes to you & Nicky,

Clive

Undated map of Lake Ballard, with annotations (1995) in ACI's handwriting. The following locations are marked: 'Crossover Lake (Fresh)', 'Camp Island', 'BaSt No.1 Breeding Colony', 'No.2 BaSt Breeding Colony' and 'Tripod 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 reads 'The extent of the breeding [on main breeding island of Lake Ballard] was measured and mapped [On 09/06/1995] for Camp island colony' [JL has annotated 'Grant has dimensions'].

On 13/06/1995 GBP & ACh located (using compass bearing provided by ACh following his survey flight of previous day) and visited the BaSt nesting colony on Lake Marmion. GBP reports his observations, including:

- BaSt adults;
- live chicks;
- dead chicks, possible predators (Peregrine Falcon; Wedge-tailed Eagle);
- some chicks and eggs in nests;
- 'no incubation for many hours perhaps days';
- 'measured length and breadth of colony plus several other satellite colonies';
- took photos of colony and collected vegetation samples;
- 'Much evidence of ancient nest attempts from egg shards';
- 'Coordinates of colony 29.44.36, 121.29.13'.

A copy of the last page of this report, with GBP's work hours annotated, is also here.

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

154.
155

Date: 19/6/95
To: Jim Horne
At: BSN
From: Lynton
No of Pages: (including face sheet)
Message: Copy for your consideration & queries
Thursday
Cheers
JP

Re visit to
Survey of Bellbird + Mewin from
8 - 13 June 95

(1)

155.
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 has)

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

~~QJ~~ Camp Isd... Depth. 775mm... Temp? NA... pH. 8.67...

~~QJ~~ Crossover 53cm. 12.0 8.76....

~~QJ~~ Invertebrate sweeps collected at each site

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

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

~~QJ~~ Waterlevels varied from 398^{units} 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
FaBD	2 (pr)
LiGb	1

(2)

152
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....

Arged 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

Need to confirm ACh departed
on 12/6 *JK 10/01/14*

(3)
15T
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)	wt (gms)	mt	head	bill	wing	gizzard		teste
							total	head	
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	4.17.2
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	Y	m	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		14.4
Brood patch	yes	Band	full	Belly	100%			R	-

④

150.
151.

13/6/95

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

Gyl 1 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} ~~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

256

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G Pearson
17 June 1995

	8/4	1400	→	2130	Hotel
Mon	9/4	0730	→	1900	Camp
Tue	10/4	0600	→	1900	!
Wed	11/4	0630	→	1900	
Thur	12/4	0630	→	2330	
Fri	13/4	0600	→	2345	✓