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.

90.
94.

FAX to Jim Lane, CALM Busselton

24/4/95 097-521 432

From Clive Minton at Broome B.O.

Herewith 6 pages of data — some of it partly processed and/or with comments.

So will give you knowledge of what we've got & what we still need!

Best of luck,

Clive

Biometric data

84.
93.

Adults (collected with 1 or 2 day old broods)

Family	Sex (dissection)	Bill	THL	Wing	Wt.	Plumage
1	♂	74.5	110.7	205	210	Full breeding plumage
2	♀	64.1	101.5	196	197	* Some white feathers in breast band & flesh b[illegible]
3	♂	74.6	109.4	209	203	* Some white feathers still in breast band & [illegible]
4	♂	74.2	111.2	210	241	* "
5	♂	69.1	103.9	198	209	* " [illegible]

* No active moult occurring in breast feathers.

? appearance that males are bigger than females?

all five birds had active large double brood patches ie, they had been incubating (even the heavy one).

Chicks – collected with above adults 1-3 km west of colony (probably 1-2 da[ys] after leaving nes[t])

11/4/95

Family	Bill length	Weight
1	—	23
	—	23.5
	—	25.4
2	24.4	26.3
	20.3	26.6
	20.2	26.3
	22.5	24.6
3	23.3	28.5
	25.2	27.8
	21.7	26.7
4	22.5	— (22.3 – giffard)
	19.7	— (22.5 – giffard)
	23.1	26.9
5	21.2	25.2
	22.5	26.5
	26.1	26.7

Average chick weight (only of birds in 3 chick broods) = 25.8 gm at 1-2 days after leaving nest.

Chicks – caught & released as they left the colony before reaching water ie just left nest

12/4/95

Bill length	Weight
—	28.5
	29.5
	30.5
—	24
	29
	31
—	22 (had difficulty walking / keeping up with rest of broo[d])
	26
	30
—	25.5
	27

Average chick weight (all 3 chick [broods]) = 27.6 gm at leaving col[ony] [illegible]

28 }

[Eggshell etc. must therefore weigh close to 10 gm

Chicks — caught & banded some 1 km from colony 13/4/95 (probably [illegible] days after leaving nest)

Band No.	Bill	Wt.	
11	18.8	27	} 1/2
12	22.2	31	
13	21.2	27.5	} 2/4
14	18.9	23	
15	19.1	26	} 2/2

Band No.	Bill	Wt.	
17	22.0	29.5	} 4/4
18	23.6	30.5	
19	20.5	26.5	
20	22.6	28.0	

Average chick weight
= 27.4 gm (soon after leaving colony)

88, 92.

Brood sizes

Colony 1. Lake Ballard. 1995. 87. 41.

Brood Size \ Date →	as leaving the colony 9/4	%	12/4	%	14/4	%	on water * 1-3km from colony 11/4
1 Y	0		15		16		9
2 Y	23		40		57		37
3 Y	24		55		61		29
4 Y	11		17		16		6
5 Y	2		3		3		0
6 Y	0		1		—		0
Total broods	60		131		153		81
Average brood size	2·87		2·67		2·56		2·40

344
288
56

*Probably 1-2 days after leaving colony.

Egg weights — Colony 1, Lake Ballard-19

12/4/95 (S. end of colony) Eggs within a week of hatching. 3 clutches of each clutch size

Clutch Size	Weights (gm)		
1	40	38	33.5
2	41 40	39.5 38.5	39 37
3	40.5 37 33	40 39 37	44 41.5 40.5
4	36.5 33 31.5 30	40 39 39 32.5	37 36 36 30

86.
90.

14/4/95 (S. end of colony – 5m from above sample) Eggs within a few days of hatching. 5 clutches of each size + extra 1+2 egg clutches.

Clutch Size	Weights (gm)				
1	43.5	41	39	36	35.5
2	39 39.5	39.5 38.5	34 33.5	36 34.5	34 33.5
3	40 39 39	40 40 39	41 36 38	36 33 30.5	39 38.5
4	38.5 37 35 35	39 39 38.5 37	38 38 37.5 35.5	41 38.5 36 36	38.5 36
5	40 39 34 33 28	45 42 41 38.5 38.5	38.5 37 36.5 34 28	38.5 36 35.5 35 31	46.5 46 41 41 38.5

* chilling egg.

1	35	33.5
2	40 39.5	

Average egg weights (from combination of above two sets of data

Clutch Size	No. of clutches weighed	No. of eggs weighed	Average egg weight (gm)	% 40g or >
1	10	10	37.5	30%
2	9	18	37.3	17%
3	8	24	38.4	37%
4	8	32	36.5	6%
5	5	25	37.6	32% or 20% if 5 clutch is omit

Differences between heaviest & lightest eggs in a clutch

85.89.

Clutch Size	Difference									Average
2	1	6	2	0·5	1	0·5	1·5	0·5	0·5	1·5
3	7·5	3	3·5	1	1	3	5·5	0·5		3·1
4	6·5	7·5	7	3·5	2	2·5	5	2·5		4·6
5	12	6·5	9·5	7·5	8					8·7

84
88

Nest changeovers

1pm 9/4/95
1½ hour period. 60 birds watched returning to colony & commencing incubating. 58 returned to unoccupied nest. 2 displaced already incubating birds i.e. a changeover. I suspect most of the birds had just left the nest for a drink time to drink, cool down & wet their feathers (it was a warm afternoon).

9am 12/4/95
1 hr. period. 14 Birds watched. 11 did changeovers at the nest. 2 went to unattended nests. One wandered around for 20 mins looking for nest (even briefly sat on x 1 egg unoccupied nest). I then gave up following it. It is possible its mate had deserted the colony with the chick leaving only an addled egg & a puzzled mate!

Conclusion – incubation changeovers do take place though not regularly & in what proportion of nests is not clear.

Water depth

At marked beside island. 4pm 14/4/95. 51 cm (depth of water)

Incubation period

83.
87.

Estimates

① Main gridded area.

Hatching commenced on April 3rd. Birds apparently incubating on first aerial survey (March 12th). Assume incubation commenced March 12th. Therefore incubation period 23 days (if count the day on which incub commenced + day on which hatching started – otherwise 22 days).

② Area where we marked c. 250 mainly one + two egg clutches on March 15th.

Assuming mainly 3 or 4 egg clutches then average clutch complete start of incubation would have been Mar 17th.

Hatching of this area (1st Mark-Lambell) mainly took place April 6, 7 + 8th – average day 7th.

Incubation period average 22 days (counting day of hatching) – day 21–23 days.

I visited this area on 9th April & the only marked eggs I could find were

Egg marking #	Single addled egg + eggshells of hatched chicks	Two addled eggs + eggshells of hatched chicks	3 egg	4 egg	Other
1	4	3		1*	
2	3		1	1	3E+2Y●
3			✱	✱	1E+1Y†
4	1				

*3 eggs were chipped (this gives incubation period of 23 days counting start day on the day of hatching)

† It is possible some older chicks had 'run off'; we thus don't know the full clutch size. Still potentially consistent with a 23 day max. incubation period if hatching commenced on previous day.

● Two of the three eggs were chipped. Assuming incubation started on laying of 5th egg on 18/3 then incubation period is 23 days

All other marked eggs / clutches had already hatched & gone so

Presumably these measurements are at the upper end of the range.
I suspect therefore period is c. 21–23 days.

82.
86.

Status of originally gridded squares after main hatching

Complete photorecord (2 per square) taken + approx. count of eggs etc. made of each of 15 gridded areas. 14/4/95 Colony 1. Rabbit Island.

Grid	Currently occupied nests 1E	2E	3E	4E	Other	Dead chicks	Added eggs	"Dumped" eggs
3HG		4	1		3E+1Y	5	58	6
2IH		1	1			6	76	—
DJI		2	2		1E+2Y	3	73	50
EKJ		1		1		8	53	56
FLK		1	5		2E+1Y	13	73	—
HNM	3	1				9	55	20
IION					1Y	3	68	57
IJPO			2		1E+1Y	4	64	37
JKQP	1	1	3		1E+1Y	11	60	46
KLRQ		3**	2		1Y	14	57	22
MNTS			5*			4	80	17
NOUT		1	1		1E+2Y	3	78	13
OPVU		2	3			8	62	41
PQWV		1	3			5	58	—
QRXW		2	2		2E+1Y	10	56	33

* eggs chipping in these nests.

Addled eggs = eggs apparently left unhatched in a scrape

"Dumped" eggs = eggs in clusters, not in a scrape

These figures are accurate to ± 10% (probably better) & should be corroborated / improved by detailed examination of the photos as they become available. I did the counts without the plastic tape in place & there were might be some inaccuracies at boundaries. Tape was in place for the photos.

All of the nests still occupied would not have been present on the original 15/3/95 photos.

E+Y refers to contents of a single nest ie. just hatching.

Currently occupied nests were readily identifiable in most cases by an accumulation of nesting material around the periphery of the nest + a still perfect scrape + hot eggs!

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.

80.

Claire — Conversation of .. April 95

091 935 600 ← Broome Bird Observatory phone number. 14/02/2014

- data to be posted to Grant (exchange)
- - write up ASAP (me, Grant + Claire)
- ~~outline + ... chapters +~~
- original pegged area - took 2 photos of each of 15 quadrats. Fri last week. (Fri 14/4?)
  - don't need to do again.
- ~~also counted addled eggs~~, dead chicks, + active nests.
- me to exactly measure up Colony 1 once receded. (guesses 20,000 nests)
- Colony 2 80 × (20 × 5 = av 15) = 1200
  = 12000 nests. −15 000
  ↑ also measure exactly.

- ✳ do aerial survey - other colonies.
  - could find no chicks > 2 days old even 11 days after hatching started.
- additional boat fuel - proper engine oil ✳
  at least 2 jerry cans.
- indirect evidence of renesting - "4 out of 5 were males" ← took chicks off
- big unknown
  1. When do family parties start creching?
  2. What role do sexes play?

- AM genuine metabolic changes
  PM left nest death etc returned.
- what proportion of popn. are showing metabolic
- ~~no evidence~~ of more than 1 parent with chicks when leave colonies.
- rain added 13 cm (51 cm water depth at shelter on & 4 days after rain)
- banding: did not band in colony
  - didn't band any going to water
  - did catch broods going to water for measurement purposes.

(2)

- faith = footprints cause they
- banded 10 chicks (4 females) on water.
  scooped with plankton net — easiest way.
- ✱ if took whole brood parent left (disappeared) + did not reappear
- 5-10 min to weigh measure, band, leg flag glue. ↑ bill length.
  table 2,
- keep = = night, return to brood.
- drop youngsters you have done before catching the rest 2.

- flags : - open minimum + push on
  - dab of glue between ends
  - hold glued tab for 1-2 mins. - be v. careful it doesn't move.

- need more bird bags ✱

- do 20-40 to day near colony of can't corral.
- expect survival to be very high.
- 7-7.5 mm on "knee".
- did 10 in 2 hours.
- Flag on right tibia (of the bird) band on left
- Egg print at Freedom
  first bedroom = sleeping quarters and = kitchen — and bags to Argo.
- Argo is 30 m from where
- 1 boat next to trailer. — [illegible]
- petrol outboard motor — petrol is at station
- fuel tanks in trailer.
- electrical in or [illegible] = ABC [illegible].

- lots of good water on [illegible]
- 2 [illegible] at [illegible]

- weighed 10 clutches of 1 – 5
  one clutch all 5 eggs over 40 gm (→ 48

- leaving Broome Th May 3/4 → [illegible]

- not thru Helgoland

  20–25 May.

- 3.4
  2.8
  2.4 2 days later.

- 2000 per day leaving [illegible]

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'.

74. 75.

13/4/95

FAX TO: JIM LANE
CALM BUSSELTON

FAX NO: 097 - 521432

FROM: R.E. JOHNSTONE

Western Australian museum
Francis Street Perth
Western Australia 6000
Telephone (09) 328 4411
Facsimile (09) 328 8686

Date:

Your Ref:

Our Ref:

Dear Jim,

Here are the details of our Banded Stilt survey. We flew over Lake Goongarrie, Lake Marmion, Lake Ballard and the central arm and northern portion of Lake Barlee.

Lake Marmion.
About 500 - 1000 birds on the north end, (one loose group of about 500 another of 300 and several smaller groups).

Lake Ballard.
On the eastern end of Lake Ballard we located your main site with c. 3 - 5000 pairs.
About 4 km further west at 29°27'S. 120°58'E we located another breeding colony (your site 2) with about 2 - 3000 pairs.
Further west at 29°23'S 120°51'E we located another small colony of 500 - 1000 pairs.
Also near the western end of Ballard (on map) there was a group of 500 - 1000 birds which appeared to be breeding on a small circular island. They lifted and returned quickly.

Lake Barlee.
On central northern portion of Lake Barlee at 29°07'56"S 119°32'20"E we found another small colony of about 1000 pairs all sitting at one end of a small island.

Branches:
Western Australian Maritime Museum
Cliff Street, Fremantle
Western Australia 6160
Telephone (09) 431 8444
Fax (09) 430 5120

Fremantle Museum
Finnerty Street, Fremantle
Western Australia 6160
Telephone (09) 431 8444
Fax (09) 430 5120

Geraldton Region Museum
Marine Terrace
P.O. Box 112, Geraldton
Western Australia 6530
Telephone (099) 21 5080
Fax (099) 21 5158

Albany Residency Museum
Residency Road, Albany
Western Australia 6330
Telephone (098) 41 4844
Fax (098) 41 4027

Museum of the Goldfields
P.O. Box 25
Kalgoorlie, Western Australia 6430
Telephone (090) 21 8533
Fax (090) 91 2791

~~73.~~ 74.

I will send you details of specimen stomach contents etc at a later date. As I mentioned over the phone I would be grateful if you could 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.
3. Collect a series of different age chicks.

Our WAM collections of this species are poor so anything you can get will be useful.

Best Wishes
Ron Johnstone.

Ron J. says (7/6/95) he has range (from full chest band to zero chest band) of adults that were incubating on his visit (10-12 birds)

He also has c 4 chicks.

telephone conversation of 7/6/95

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'.

(2) 72.
72a

2000 pairs on
– 3000 pairs on 2nd biggest island.

– eggs for incubation for handbook.

– got birds – just a trace of band & were moulting – collected small series. (2 clutches + ?)

– food – chicks forming small creches – 5 chicks alone, 2 just alone – others were perched & too smelly to return.

Phone call from Ron Johnstone 11/4/95 (P) 72.
73

Ron Johnstone
Phil Stone (Mermaid) ← his caravan
Nick Kolichis

Flew on 7/4/95 Mermaid Bedwell, central area Bedout
Rosemary (central)

Rested Mermaid 1000 birds feeding parties.

3 km west – on ground
another further west – order of couple of 1000 birds.

small colony in central area of Bedout.

has notes from: (4) 69.
70.
John Darnell – Port Hedland
50 – 60,000 80% [illegible]

(12/4/95)
had one day only on Bedout
– kayaks (single)

–

Headlands – taken this

Phil Stone took "video CAM"

They took photos

Cold squalls.

Creches of 50–100 birds.

(3) 70.
71.

(a) nest scrapes – please measure 10–12 scrapes & distance apart.

(b) collect chicks at various stages. – fridged – plastic bags.

(c) collect eggs from group

forward fresh

– partial banded bird rolled egg back to (6) large cluster (with foot) tried to sit on it.
~~(Front of 210) (……)~~

(5) (4) Kayaks? 68. 69.

Hoard of

x Crows came off 2nd island at Ballard

Wedge L.

Ballard Lake
Central Cross

29° 07' 56" S

119° 32 20

1000 hands.

Furthest West on Ballard "Small"

29° 23' 40"

120 51 41 E.

Mannin – mostly near N end – W of
by 3 shaped island (viewed
reading → 427 2739. from N).

---

(6) 67. 68.

West end of Ballard

Simpsons Well

2 tracks ~ + families

Will check his lat + longs
+ fax me if incorrect.

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 <u>not</u> match photos to <u>individual</u> 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.

FILM	DATE	CAMERA	
1	30/3 - 1/4	-	aerial (by Grant) and Crossroads Lake camp.
2	1/4 - 2/4	-	1/4: 3 – 22, 10 quadrats on 1st Island 2/4: 23 – 26, 4 legging quadrats on 1st Island
3	~~31/3~~ 1/4 - 2/4	-	1 – 28, Crossroads Lake + moving to Camp Island ~~31/3~~ 31/3 29 – 38, Adult Dusk shot by Grant 2/4
4	29/3 -	-	29/3: 1 – 4, drive to Kalgoorlie ~~31/3~~ 31/3: 5 – 24, 10 quadrats on 1st Island (with pink tape) 31/3: 25 – 28, 4 quadrats on Island 1 1/4: 29 – 32, 4 quadrats on Island 2
5	3/4 only	—	3/4: 1 – 30, 15 quadrats on 1st Island 3/4: 31 – 34, 4 legging quadrats on 1st Island
6	4/4 only	new	4/4: 1 – 11, 10 quadrats on 2nd Island 4/4: 13 – 33, 10 quadrats on 1st Island
7	Wed 5/4 only	new	5/4: 3 – 21, 10 quadrats on 2nd Island 5/4: 22 – 38, 10 quadrats on 1st Island
8	2/4 – 5/4	old	2/4: 4 – 23, 10 quadrats on 1st Island 2/4: 24 – 27, island birds 4/4: 28 – 31, 4 legging quadrats on 1st Island 32, blank 5/4: 33 – 36, 4 legging quadrats on 1st Island 5/4: 37, last of legging quadrats on 1st Island
9	Fri 7/4 only	old	7/4: 1 – 7, borrods on water 7/4: 8 – 29, 10 quadrats on 2nd Island 7/4: 30 – 35, scenic of 2nd Island
10	6/4 → 7/4	new	6/4: 1 – 20, 10 quadrats on 2nd Island 6/4: 21 – 28, 4 legging quadrats on 1st island 7/4: 29 – 37, distant shots of island 2
11	7/4 only		
12	7/4 only		

200 ASA

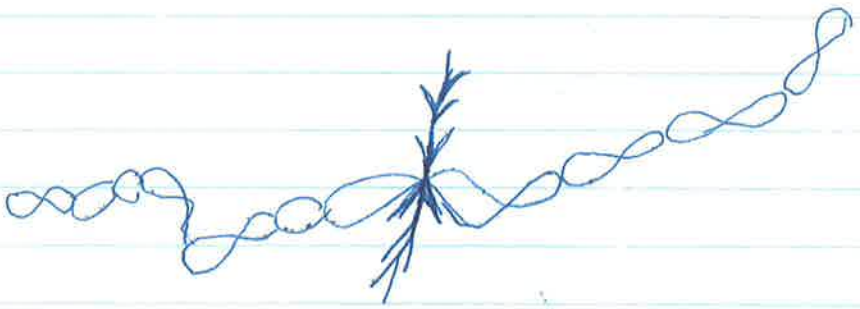
See follow on of this side

(6/6/95)

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.

QUADRANTS

DATE	10 (15) Hatching Quadrants on 1st Island		4 laying quadrant on 1st Island		10 laying quadrant on ~~2nd~~ 2nd Island	
1/4	2 : 3-22	(20 plants)	4 : 29+32	(4 plants)	—	
2/4	8 : 4-23	(20 plants)	2 : 23-26	(4 plants)	—	
3/4	5 : 1-30	(30 plants)	5 : 31-34	(4 plants)	—	
4/4	6 : 13-33	(21 plants)	8 : 28+31	(4 plants)	6 : 1-11	(11 plants)
5/4	7 : 22-38 and 8 : 37	(18 plants)	8 : 33-36	(4 plants)	~~9 : 2-39~~ 7 : 3-21	(19 plants)
6/4	—		10 : 21-28	(8 plants)	10 : 1-20	(20 plants)
7/4	—		yet to be processed?		9 : 8-29	(22 plants)
31/3	4 : 5-24	(20 plants)	4 : 25-28	(4 plants)	—	



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.

...995.04.07 [4104] BaSt eggs 1.1-2.4, photod 1995.04.08 [JAKL].bmp

...995.04.07 [4105] BaSt eggs 3.1-4.5, photod 1995.04.08 [JAKL].bmp

...995.04.07 [4106] BaSt eggs 5.1-6.4, photod 1995.04.08 [JAKL].bmp

...995.04.07 [4107] BaSt eggs 7.1-8.5, photod 1995.04.08 [JAKL].bmp

995.04.07 [4108] BaSt eggs 9.1-9.3, photod 1995.04.08 [JAKL].bmp

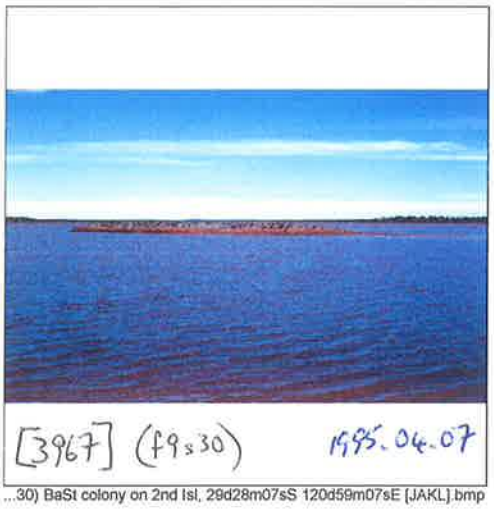
These 36 BaSt eggs
were taken to Curtin University
for DNA analysis.

These eggs were collected
from - - - - colony
on Lake Ballard
on Fri 07/04/1995
and photographed by JL in Perth on Sat 08/04/1995.

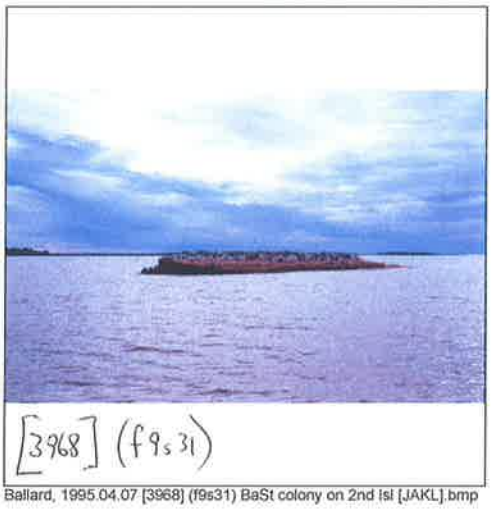
13/02/2012

Photos of 2nd BaSt breeding colony on Lake Ballard, while approaching by boat on 07/4/1995.

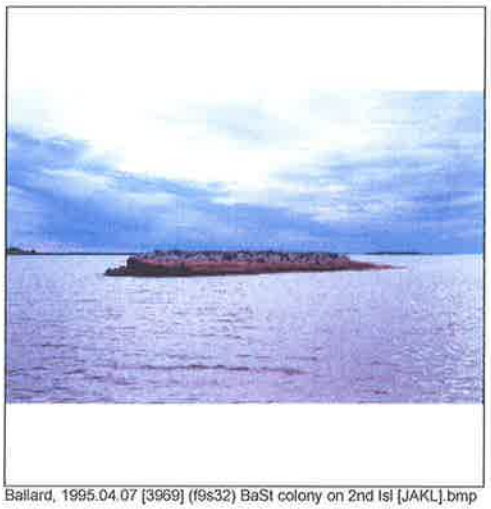
Seems odd that cloud in photo 3967 is very different from cloud in photos 3968-72, though note that they were taken from different directions. Also seems odd that photos 3968-72 were taken while *approaching* island, yet photos 3945-3966 (i.e. *earlier* photos) were of quadrats on this island on the 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.



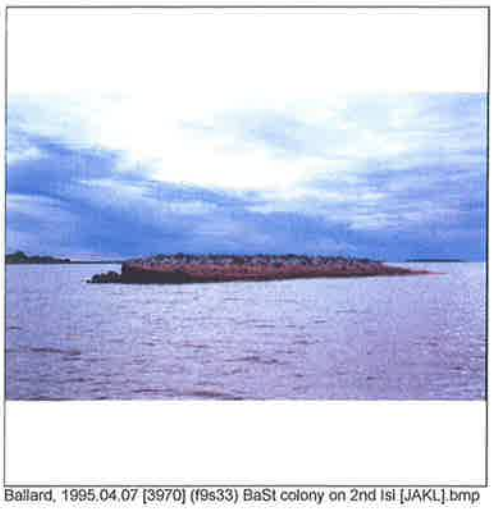
...30) BaSt colony on 2nd Isl, 29d28m07sS 120d59m07sE [JAKL].bmp



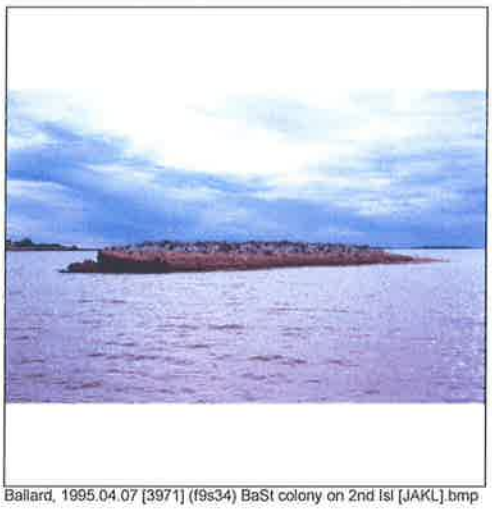
Ballard, 1995.04.07 [3968] (f9s31) BaSt colony on 2nd Isl [JAKL].bmp



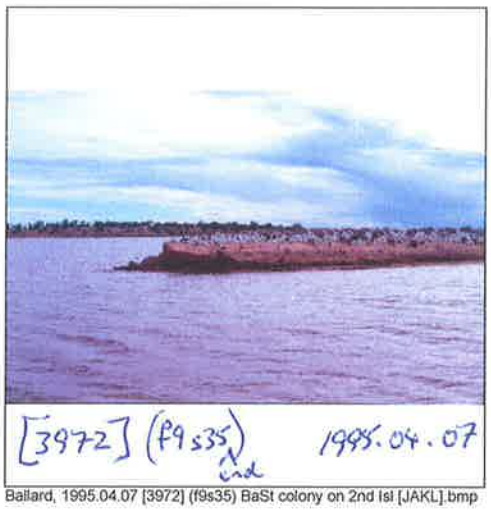
Ballard, 1995.04.07 [3969] (f9s32) BaSt colony on 2nd Isl [JAKL].bmp



Ballard, 1995.04.07 [3970] (f9s33) BaSt colony on 2nd Isl [JAKL].bmp



Ballard, 1995.04.07 [3971] (f9s34) BaSt colony on 2nd Isl [JAKL].bmp



Ballard, 1995.04.07 [3972] (f9s35) BaSt colony on 2nd Isl [JAKL].bmp

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.

[4001] 1995.04.07

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

...lony, early AM from Camp I [JAKL].bmp

[4019] 1995.04.07.

...lony, early AM from Camp I [JAKL].bmp

...C TV crew, bfast at Camp I [JAKL].bmp

...C TV crew, bfast at Camp I [JAKL].bmp

*

[4022] 1995.04.07

...St on nmbrd nests (31 vsbl) [JAKL].bmp

*

[4023]

...St on nmbrd nests (31 vsbl) [JAKL].bmp

*

[4024]

...] (s16) BaSt on nmbrd nests [JAKL].bmp

*

[4024x]

...] (s16) BaSt on nmbrd nests [JAKL].bmp

...25] (s17end) BaSt on nests [JAKL].bmp

...[4026] (f11s01) BaSt colony [JAKL].bmp

...[4027] (f11s02) BaSt colony [JAKL].bmp

...s03) BaSt colony, MLamble [JAKL].bmp

...s04) BaSt colony, MLamble [JAKL].bmp

[4030] 1995.04.07

...) BaSt chicks leaving colony [JAKL].bmp

[4031] 1995.04.07

...) BaSt colony, Mark Lamble [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...9) BaSt colony, bird of prey [JAKL].bmp

...0) BaSt colony, bird of prey [JAKL].bmp

...1) BaSt colony, bird of prey [JAKL].bmp

...olony, sound recordist Cam [JAKL].bmp

... MLamble & sound recordist [JAKL].bmp

... MLamble & sound recordist [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

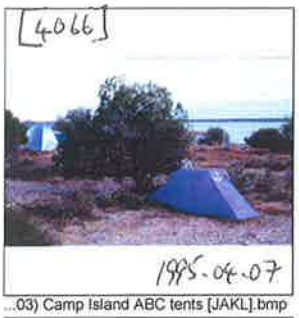
...) BaSt chicks leaving colony [JAKL].bmp

...) BaSt chicks leaving colony [JAKL].bmp

...f12s01) Camp Island shelter [JAKL].bmp

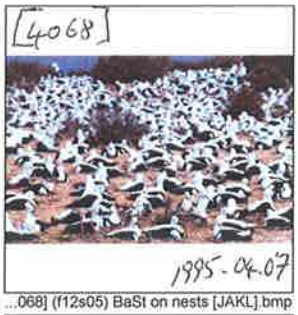
[4065]

... Camp Island ABC gear tent [JAKL].bmp



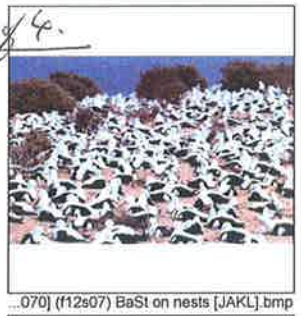
...03) Camp Island ABC tents [JAKL].bmp

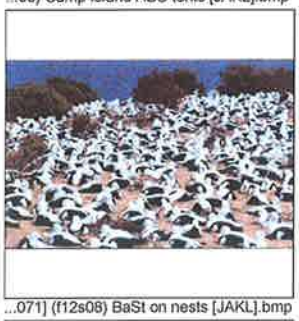

...nd ABC gear tent, MLamble [JAKL].bmp

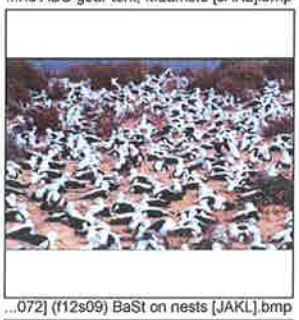


...068] (f12s05) BaSt on nests [JAKL].bmp

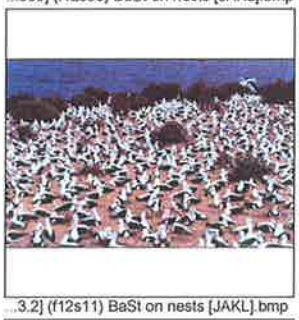

...069] (f12s06) BaSt on nests [JAKL].bmp


...070] (f12s07) BaSt on nests [JAKL].bmp

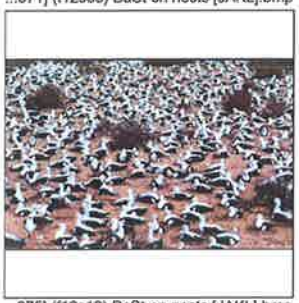

...071] (f12s08) BaSt on nests [JAKL].bmp


...072] (f12s09) BaSt on nests [JAKL].bmp


...3.1] (f12s10) BaSt on nests [JAKL].bmp


...3.2] (f12s11) BaSt on nests [JAKL].bmp

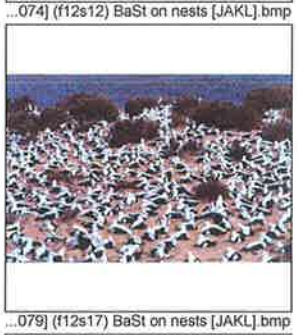

...074] (f12s12) BaSt on nests [JAKL].bmp

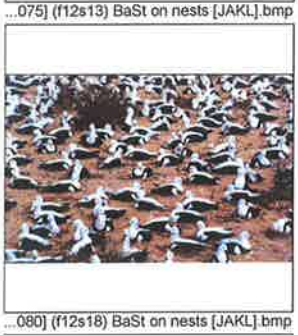

...075] (f12s13) BaSt on nests [JAKL].bmp

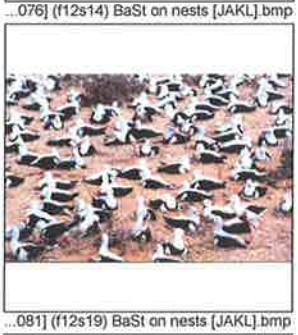

...076] (f12s14) BaSt on nests [JAKL].bmp

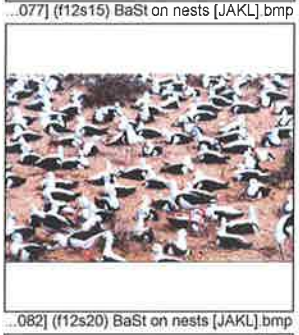

...077] (f12s15) BaSt on nests [JAKL].bmp


...078] (f12s16) BaSt on nests [JAKL].bmp

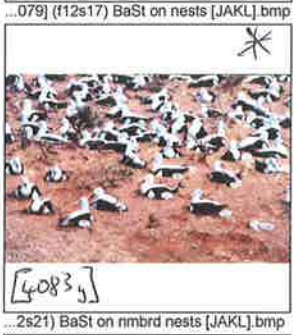

...079] (f12s17) BaSt on nests [JAKL].bmp


...080] (f12s18) BaSt on nests [JAKL].bmp


...081] (f12s19) BaSt on nests [JAKL].bmp

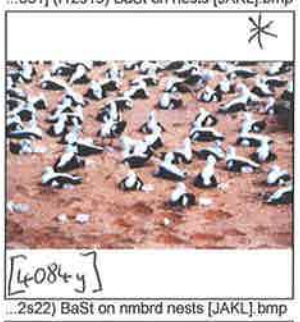

...082] (f12s20) BaSt on nests [JAKL].bmp

...2s21) BaSt on nmbrd nests [JAKL].bmp



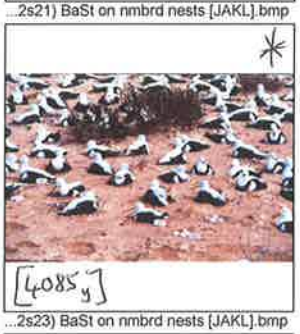
...2s21) BaSt on nmbrd nests [JAKL].bmp

...2s22) BaSt on nmbrd nests [JAKL].bmp



...2s22) BaSt on nmbrd nests [JAKL].bmp

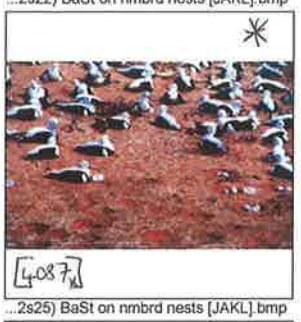
...2s23) BaSt on nmbrd nests [JAKL].bmp



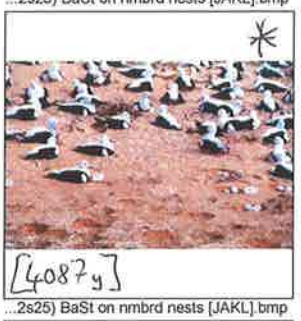
...2s23) BaSt on nmbrd nests [JAKL].bmp

...2s24) BaSt on nmbrd nests [JAKL].bmp

...2s24) BaSt on nmbrd nests [JAKL].bmp

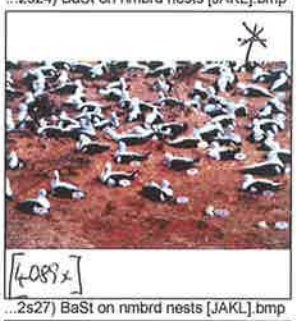


...2s25) BaSt on nmbrd nests [JAKL].bmp

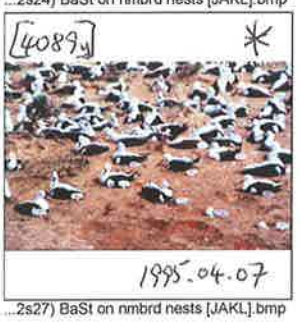


...2s25) BaSt on nmbrd nests [JAKL].bmp

...088] (f12s26) BaSt on nests [JAKL].bmp

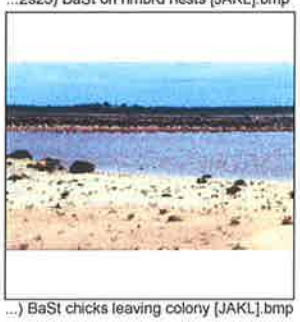


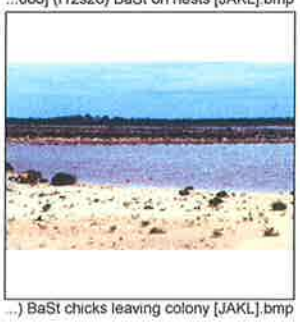
...2s27) BaSt on nmbrd nests [JAKL].bmp



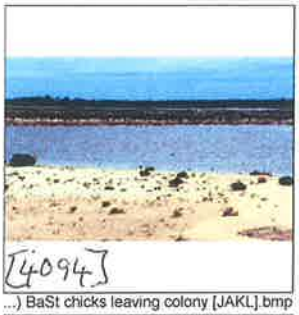
...2s27) BaSt on nmbrd nests [JAKL].bmp

...s28) BaSt colony, MLamble [JAKL].bmp


...) BaSt chicks leaving colony [JAKL].bmp


...) BaSt chicks leaving colony [JAKL].bmp

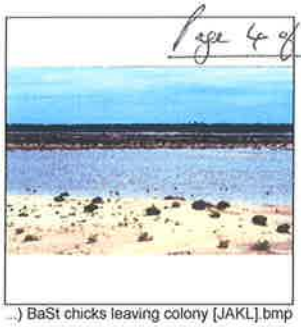
...) BaSt chicks leaving colony [JAKL].bmp



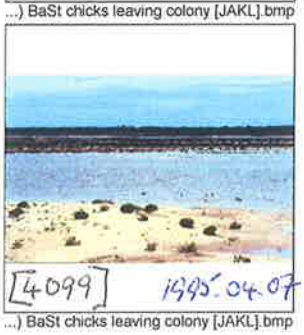
...) BaSt chicks leaving colony [JAKL].bmp


...) BaSt chicks leaving colony [JAKL].bmp


...) BaSt chicks leaving colony [JAKL].bmp


...) BaSt chicks leaving colony [JAKL].bmp


...) BaSt chicks leaving colony [JAKL].bmp



...) BaSt chicks leaving colony [JAKL].bmp

Photos 4001 – 4019 were taken from a high point on the west side of Camp Island with a telescopic zoom lens. They are of the 1st breeding colony and were taken early AM on 07/04/1995.

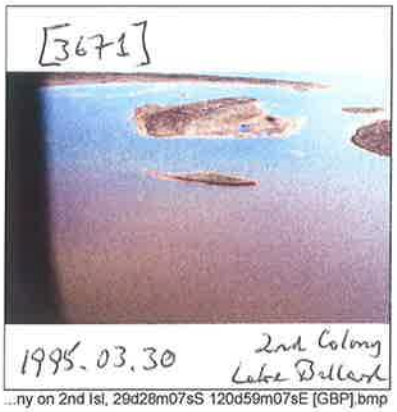
* Some of the photos are of adult BaSt sitting on individually tagged (numbered) nests. These nests were tagged to study the resting behaviour of the adult BaSt.

Mark Lemble and Cameron Miller (ABC Natural History Unit) are in some photos (filming and sound recording).

Many photos are of adult BaSt walking their chicks from nests to water's edge (and away).

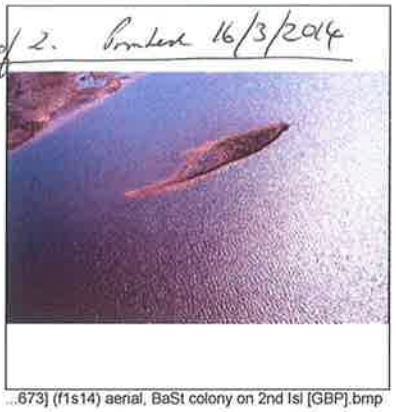
GBP's aerial photos of the 1st and 2nd BaSt nesting colonies on Lake Ballard, taken by him on 30/03/1995. Camp Island is visible in the distance in one photo.

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.



...ny on 2nd Isl, 29d28m07sS 120d59m07sE [GBP].bmp


...672] (f1s13) aerial, BaSt colony on 2nd Isl [GBP].bmp


...673] (f1s14) aerial, BaSt colony on 2nd Isl [GBP].bmp

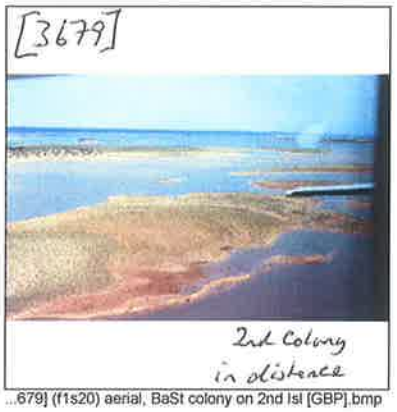

...674] (f1s15) aerial, BaSt colony on 2nd Isl [GBP].bmp


...675] (f1s16) aerial, BaSt colony on 2nd Isl [GBP].bmp

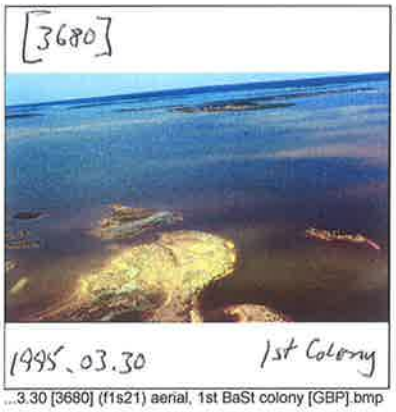

...676] (f1s17) aerial, BaSt colony on 2nd Isl [GBP].bmp


...677] (f1s18) aerial, BaSt colony on 2nd Isl [GBP].bmp

...678] (f1s19) aerial, BaSt colony on 2nd Isl [GBP].bmp



...679] (f1s20) aerial, BaSt colony on 2nd Isl [GBP].bmp



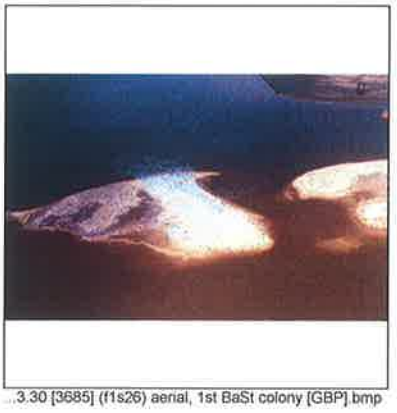
...3.30 [3680] (f1s21) aerial, 1st BaSt colony [GBP].bmp

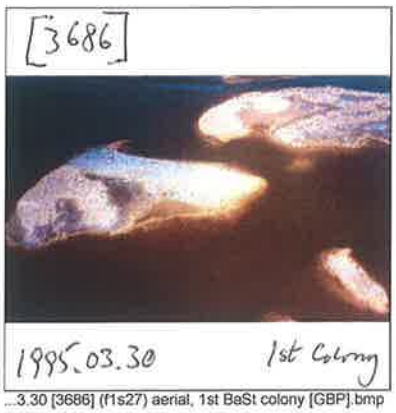

...3.30 [3681] (f1s22) aerial, 1st BaSt colony [GBP].bmp

...3.30 [3682] (f1s23) aerial, 1st BaSt colony [GBP].bmp


...3.30 [3683] (f1s24) aerial, 1st BaSt colony [GBP].bmp

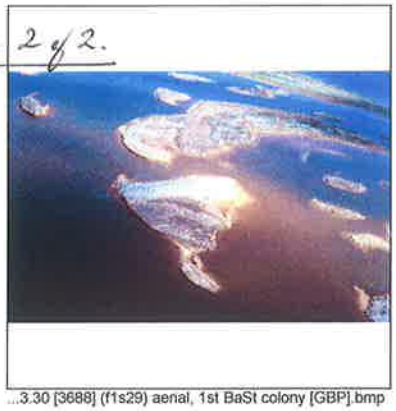

...3.30 [3684] (f1s25) aerial, 1st BaSt colony [GBP].bmp

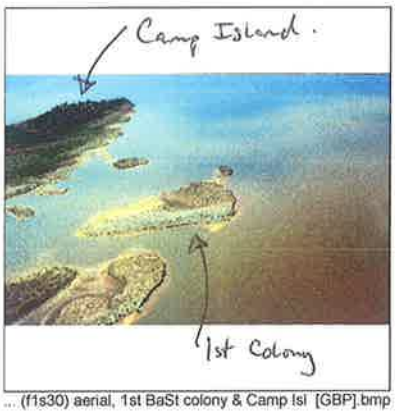

...3.30 [3685] (f1s26) aerial, 1st BaSt colony [GBP].bmp



...3.30 [3686] (f1s27) aerial, 1st BaSt colony [GBP].bmp

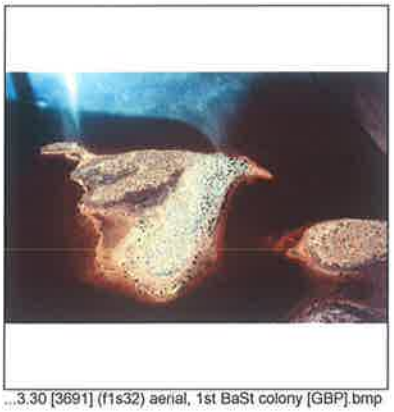

...3.30 [3687] (f1s28) aerial, 1st BaSt colony [GBP].bmp


...3.30 [3688] (f1s29) aerial, 1st BaSt colony [GBP].bmp



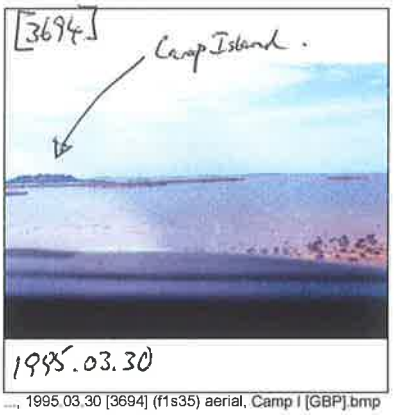
... (f1s30) aerial, 1st BaSt colony & Camp Isl [GBP].bmp


...3.30 [3690] (f1s31) aerial, 1st BaSt colony [GBP].bmp


...3.30 [3691] (f1s32) aerial, 1st BaSt colony [GBP].bmp

...3.30 [3692] (f1s33) aerial, 1st BaSt colony [GBP].bmp


...3.30 [3693] (f1s34) aerial, 1st BaSt colony [GBP].bmp



..., 1995.03.30 [3694] (f1s35) aerial, Camp I [GBP].bmp

All photos taken by GBP of 1st and 2nd island colonies (BaSt) on Lake Ballard on 30.03.1995.

16/3/2014

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).

50

The University of Western Australia

University Librarian
Arthur Ellis, BA, FLA, AALIA

Biological Sciences Library
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AUTHOR: Biological journal of the Linnean Society
Vol. 52 1 (1994) pp. 31-48

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

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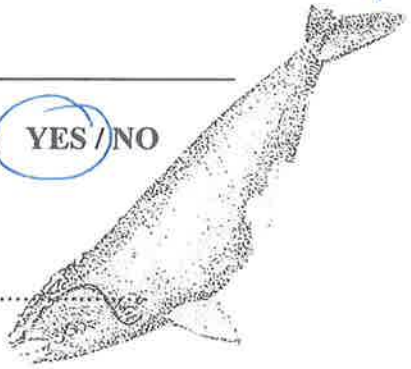
BUSSELTON DISTRICT
FAX NO: (097) 521 432

42.



TO: LISA WRIGHT **URGENT:** YES / NO

AT: WOODVALE

..... **Fax No.** .....

FROM: JIM C.

DATE: 20/3/95

Your Ref: .....
Local Ref: .....

Would you please obtain a photocopy of
BELLCHAMBERS, K., and G. CARPENTER (1992).
Nat. Hist 4: 42–48 (title unknown)
for me by Wed noon. Thanks.

No. of pages inc. this page: 1

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

Instructions headed 'Program BIRD NEST, in Husky Basic' by 'Michael Yung, 1 Oct [1991]'.

M Yung 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.

Program BIRD NEST, in Husky Basic, Michael Yung, 1 Oct 91

Changes from the previous version:

This version stores one data set for you for each program Run.

After one Run for a Colony, you may choose to Start the program again for another Colony, for which you must then give a different data set name when prompted, otherwise the latter will overwrite the former.

Notes: (1) Use a new filename for each data set.
(2) Bring at least 8 reserve batteries.
(3) Make sure you have enough unused memory :

- Each data set uses at least 2 kilo bytes.
- Each number you enter occupies 7 bytes.
  During a run, it uses a scratch file which is as large as your data set you are taking. You must also allow for this.

To Run the program :

Step

(1) Switch on the Husky computer

(2) You must Start the program Run at the System Prompt only. This is at the screen just after the Husky trademark screen.
At the prompt sign > , key-in :

```
> CONT BRDNST11.HBA        <CR>
```

Then the program will prompt you along to enter data until you choose to End the Run.

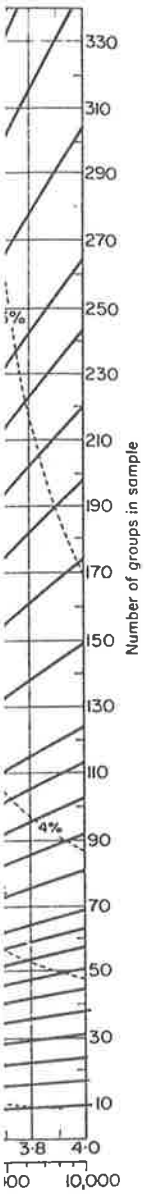
This way of starting the Run has the advantage that if you switch the machine off or change the batteries and switch it on again, the program will continue from where it was.

(3) When you stop the program, you will see the word READY.

DO NOT Start the program again here as the screen suggests that you can ! You must get back to the System Prompt by pressing [control 8] (2 keys together), then start the program Run as above for the next data set.

<end>

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.



uals (N),
x) in the

APPENDIX L

Pairs of random co-ordinates from 1 to 100

Select co-ordinates systematically; e.g. begin column 4, row 27 and take every 7th pair. Do not select "by eye".

x	y	x	y	x	y	x	y	x	y	x	y	x	y
98	03	91	50	48	07	33	26	12	72	56	16	42	36
56	06	03	45	71	88	05	53	56	59	31	85	96	18
98	68	89	41	08	92	98	61	65	100	78	12	66	10
96	06	13	43	38	51	85	13	34	87	98	81	88	77
09	02	71	71	51	83	04	41	70	39	95	66	67	98
54	80	19	28	78	12	03	10	48	21	03	35	95	39
40	69	56	38	68	73	54	08	09	04	72	93	90	54
100	31	39	27	95	28	68	50	71	30	80	81	22	30
96	74	73	13	82	17	39	90	56	33	85	79	47	19
51	22	81	60	13	38	56	50	97	50	32	25	73	87
94	36	05	62	26	40	59	77	40	33	08	64	69	63
07	15	62	97	48	77	25	19	17	78	97	96	33	56
15	90	31	13	43	15	23	02	39	46	80	66	58	61
04	02	97	38	80	40	55	85	90	14	26	02	78	35
39	37	32	11	96	59	68	45	60	22	03	30	58	70
29	45	81	99	32	24	69	31	35	27	98	59	34	78
28	10	45	74	18	64	37	31	37	11	64	72	47	42
23	26	11	84	43	47	66	42	100	84	98	02	33	11
75	09	14	66	89	58	33	65	12	08	76	66	97	30
46	14	40	25	61	21	76	32	60	60	97	28	86	62
22	17	44	48	55	80	43	33	60	09	53	58	54	80
86	56	41	94	30	85	28	31	67	85	14	96	68	47
91	25	07	12	41	92	97	19	62	95	32	22	13	26
46	66	64	27	62	40	82	80	48	79	24	32	22	17
29	12	80	71	13	50	03	68	88	09	30	28	19	36
29	41	27	06	78	66	65	16	12	75	04	73	16	77
43	30	54	68	51	57	24	65	61	73	42	70	78	43
66	40	02	92	66	86	02	72	48	06	83	27	03	28
96	11	83	52	19	83	79	16	71	42	24	77	93	22
31	89	38	61	51	78	04	75	85	64	82	77	78	76
64	27	01	01	79	68	40	64	48	69	33	14	23	68
34	40	21	66	73	52	06	27	14	83	04	51	15	39
84	39	32	29	63	99	62	40	09	11	50	09	58	71
76	28	04	59	86	28	100	97	54	52	60	73	57	35
61	23	38	64	97	96	50	64	50	58	93	09	48	50
62	48	48	33	93	41	38	54	35	69	91	67	61	96

x	y	x	y	x	y	x	y	x	y	x	y	x	y
09	70	82	82	40	24	46	86	38	58	49	92	36	93
81	34	63	100	06	06	90	74	72	22	67	95	18	87
58	67	94	51	97	81	66	21	04	69	54	50	88	53
39	50	60	52	65	99	87	05	68	50	56	23	09	72
36	85	98	01	16	91	46	90	16	47	11	28	12	96
62	90	26	45	62	03	11	88	20	50	77	55	85	94
77	54	59	81	92	27	11	05	39	58	35	96	38	64
32	55	10	85	45	51	33	94	92	17	02	84	53	44
12	48	08	56	100	81	24	89	15	64	49	90	40	76
85	10	36	01	05	06	15	19	46	86	75	27	02	17
90	26	78	38	12	68	05	64	48	28	92	42	95	17
78	04	32	59	07	79	57	49	58	92	34	59	35	76
60	86	60	14	52	16	77	82	52	62	71	63	26	29
96	06	87	39	16	01	24	10	55	98	61	63	77	80
28	89	60	58	89	84	50	100	44	67	32	15	46	40
30	29	06	49	51	99	44	37	46	44	68	49	37	56
95	74	01	28	08	12	90	57	30	80	50	93	61	65
01	85	58	57	69	99	50	74	89	99	92	20	93	43
10	91	76	56	88	91	44	04	62	03	21	68	21	96
05	33	72	49	59	45	32	74	17	27	13	81	95	20
04	43	68	98	84	27	75	73	19	79	25	76	97	86
05	85	03	02	65	45	76	18	93	74	83	79	69	92
84	90	04	47	48	28	100	17	17	18	61	58	04	31
28	55	04	78	93	18	54	95	42	37	48	84	61	06
89	83	36	13	18	26	69	99	35	63	07	28	85	93
73	20	71	100	45	62	25	47	26	41	46	13	21	74
10	89	88	80	26	22	47	46	98	10	32	25	15	69

Appendix L is taken from Table No. 33 of Fisher and Yates, "Statistical Tables for Biological, Agricultural and Medical Research", published by Oliver and Boyd, Ltd., Edinburgh, and by permission of the authors and publishers.

a = y-intercept,
α = the index of
b { = regression co
= the index of
β = the angle of
m = the mean =
n = the number
N = the number
ϕ = physiograph
S = the number
s^2 = variance
s = standard dev
t = time
θ = temperature
x = the independ
χ^2 = chi-squared
y = the depende
$>$ = greater than
$<$ = less than
$\geqslant$ = greater than
$\leqslant$ = equal to or
$\pm$ = plus or minu
$\overset{\times}{\div}$ = times or div

JAK LANE
AUGUST 1978

)

aphed by

Introduction to Experimental Ecology

A Student Guide to
Fieldwork and Analysis

T. LEWIS M.A., Ph.D.

and

L. R. TAYLOR D.Sc.

Rothamsted Experimental Station,
Harpenden, Herts, England

ACADEMIC PRESS
LONDON · NEW YORK

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.

ATTN: Jim Lane

40

20/3/95

RAOU NEST RECORD SCHEME
COLONIAL BREEDING RECORD SHEET

OBSERVER: Observer No:	ADDRESS Telephone No:	Off. Use Only

STATE:	LOCALITY: Map Used:	Lat. 'S Altitude m	Long. 'E Block size:

LAND USE OF COLONY	01 ☐ Industrial	03 ☐ Residential	05 ☐ Recreational/roadsides	07 ☐ Agricultural
	02 ☐ Wood production	04 ☐ Rangeland	06 ☐ Unmanaged crown land	08 ☐ National park or reserve

YEAR	Standard Time: ☐ Summer Time: ☐	Percentage coverage of colony by observer	0 – 25%	25 – 50%	50 – 75%	75 – 100%

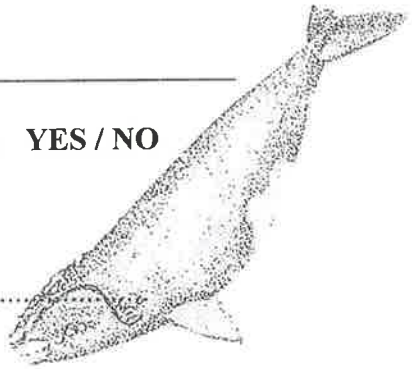
	MONTH	DAY	TIME	NO. OF ADULTS	NUMBER OF NESTS UNDER CONST.	WITH EGGS	WITH YOUNG	WITH E & Y	CONTENTS UNKNOWN attended	unattended	DEPENDENT YOUNG OUT OF NEST
SPECIES: Latin: RAOU No:											
SPECIES: Latin: RAOU No:											
SPECIES: Latin: RAOU No:											
SPECIES: Latin: RAOU No:											
SPECIES: Latin: RAOU No:											
SPECIES: Latin: RAOU No:											

DESCRIPTIONS — Is there additional information overleaf on: (indicate species being referred to)

01 ☐ habitat
02 ☐ nest plant species
03 ☐ nest building stages/method
04 ☐ nest material
05 ☐ eggs
12 ☐ this sheet linked to others (staple together)
06 ☐ behaviour of adults/young
07 ☐ nearby nests of species not on sheet
08 ☐ banding data
09 ☐ stages of development of young
10 ☐ more than two birds attending nest or young
11 ☐ other
15 ☐ water level
16 ☐ data on clutch sizes

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).

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



TO: KAELENE **URGENT: YES / NO**

AT: WOODVALE

..... **Fax No.** .....

FROM: JIM L.

DATE: 20/3/95 **Your Ref:** .....
Local Ref: .....

Please email draft [redacted] and place copy [redacted] in my Region tube for Wed.
(and fax to me in Bsn if completed today)
Thanks.

No. of pages inc. this page: 5

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

Of the 70 species of wader which have been recorded in Australia (55 regularly), it is one of the eight resident endemic species.

There are estimated to be 250 000 Banded Stilts in Australia (Watkins 199). Some 60-70% of these live in Western Australia, the remainder being in South Australia and Victoria.

Breeding has only been recorded about 20 times (Higgins 1993) since it was first proved in 1930 (at Lake King in W.A. and at Lake Callabonna in S.A.). All but three of these attempts have been in Western Australia, with Lakes Barlee, Ballard and Marmion most favoured. The last known breeding occurred at Lake Barlee in 1992 and at Lake Torrens (S.A.) in 1989.

The Banded Stilt is one of the least studied species of wader in Australia. In particular its breeding biology is little understood. This is because breeding takes place in remote locations, which are especially inaccessible after the heavy rains which precede such events. In fact most breeding records relate to colonies found after

~~DRAFT~~ Single Space plse 29

BANDED STILT RESEARCH PROGRAMME - LAKE BALLARD, MARCH/APRIL 1995

(drafted by C.D. Tinton) ~~following discussion with [illegible]~~

Background

A See folios 3-10 of this file for Clive's handwritten originals of this.

The Banded Stilt is unique amongst the 214 species of wading birds in the world in that it

(a) nests colonially

(b) rears its chicks in crêches

(c) only nests intermittently - when inland salt lakes become flooded by exceptional rains

Of the 70 species of wader which have been recorded in Australia (55 regularly), it is one of the eight resident endemic species.

There are estimated to be 250 000 Banded Stilts in Australia (Watkins 199). Some 60-70% of these live in Western Australia, the remainder being in South Australia and Victoria.

Breeding has only been recorded about 20 times (Higgins ~~1984~~ 1993) since it was first proved in 1930 (at Lake King in W.A. and at Lake Callabonna in S.A.). All but three of these attempts have been in Western Australia, with Lakes Barlee, Ballard and Marmion most favoured. The last known breeding occurred at Lake Barlee in 1992 and at Lake Torrens (S.A.) in 1989.

The Banded Stilt is one of the least studied species of wader in Australia. In particular its breeding biology is little understood. This is because breeding takes place in remote locations, which are especially inaccessible after the heavy rains which precede such events. In fact most breeding records relate to colonies found after

breeding has finished (often abandoned in mid-breeding because of declining water levels/food supplies) or at the chick stage (often roaming many kilometres from the actual breeding site).

The discovery of a nesting colony on Lake Ballard on 12th March 1995, only 15 days after the commencement of a three day 'wet' from the aftermath of cyclone "Bobby", provides a unique opportunity to study the breeding process throughout the full cycle. The aerial survey showed several thousand (3-5000) birds apparently already with nests but there was another 5000+ birds (mostly in pairs) on adjacent parts of the lake which seem likely to join the colony in the near future. The colony is thus still at the formative stage.

There are many scientific reasons why the systematic study of a Banded Stilt breeding event should be undertaken. Basic information such as even the period is still not known. And for a species where the majority of the world population lives in one area (the southern half of W.A.) and is subject to vagaries of the climate for rare breeding opportunities it is important to determine breeding success and lay the foundations for future survival measurements - and to determine the factors governing these.

It is important also, from a conservation viewpoint, to assess the predator impact at a Western Australian breeding colony. Historical information suggests this has in the past been very low. However at Lake Torrens (S.A.) in 1989 there was a huge influx of Silver Gulls during the breeding event and this resulted in severe egg losses (and some chicks too) - the last two thousand nests were totally predated because the Banded Stilts were outnumbered by gulls. The Silver Gull population in Australia has increased enormously over the past 50 years and may well pose a long-term threat to the Banded Stilt (at least at South Australian locations).

Objectives

The broad objective should be to collect all practicable data on the breeding event, with a particular emphasis on the special adaptations developed by the Banded Stilt to maximise its breeding productivity in the limited 'window of opportunity' which it seeks to exploit.

The specific parameters which should be studied/measured/assessed include (not in order of priority):

a) Courtship, pairing, nest site selection (within a colony).

b) Plumage of breeding birds, especially early in the event.

c) Frequency of laying and commencement of incubation (and egg protection prior to incubation).

d) Clutch size and nest density.

e) Incubation period and 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~~ and ex-pair copulation frequency.

h) Crêche formation - initial formation and development over the fledging period.

i) Fledging success.

j) Re-nesting attempts.

k) Predator activity at the colony and subsequently on chick crêches.

l) Food availability/water level/salinity.

m) Dispersal after breeding (by banding/colour marking adults and chicks).

n) Survival/mortality rates (by banding/colour marking of adults and chicks).

o) The practicability of visits by other ornithologists, film crews etc. to the breeding site without undue disturbance ~~[illegible]~~ of nesting birds.

Fieldwork programmes

The initial visit by Jim Lane, Grant Pearson, Marj Reni and Clive Minton on 15th March can make initial observations and measurements on many of the specific study objectives (a, b, part of c, d, part of e, k, l, and o).

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 period/hatching success).

It is desirable that a scientist be made available to undertake the detailed study over the whole nesting cycle. This would involve extended periods of observation and activity at the breeding colony, preferably commencing whilst new pairs are still arriving and especially covering the hatching period (likely to be extended). Subsequent follow up during the fledging period could be done more intermittently by boat and/or from the air.

It is also desirable that occasional (aerial and/or ground) surveys be made of Lake Barlee to determine breeding activities there and their outcome.

This breeding event is likely to continue until the end of April, and longer still if any re-nesting occurs.

Publication

Results should be published in both the scientific literature (e.g. Emu), and in more widely circulated "popular" journals. If the ABC decides to make a half hour documentary then this will provide further dissemination of the information gained of this spectacular Banded Stilt breeding phenomena.

stet

References

Watkins, D. (199_). A national shorebird plan for Australia - WWF and RAOU Publn.

Marchant, S. and P.J. Higgins (Eds) (1993. Handbook of Australian, New Zealand and Antarctic Birds. Vol II Raptors to Lapwings. Oxford University Press, Melbourne

alphabetic order

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 ...'.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Form CLM 808

(19)

To:

Your Ref:
Our Ref:
Enquiries:
Phone:

Subject:

Grant

Romney Pls check all seabirds, Herons, Ibis, Egrets. Problems fax Jim as per fax. Thnks D 20/3

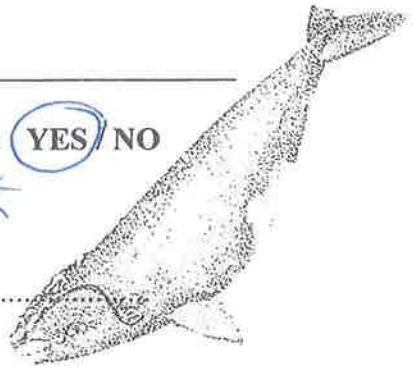
As discussed, please have someone (Romney) search through recent issues (~~[illegible]~~ last 10 years?) of "CORELLA" (1404K), "FIELD ORNITHOLOGY (JOURNAL OF)" (back to 1980) and "COLONIAL WATERBIRDS" (all issues) for scientific papers that describe methodologies for censusing nests and eggs; and for determining laying rates, incubation periods and hatching success etc of colonial nesting ~~[illegible]~~ seabirds and waterbirds (eg gulls, terns, pelicans — particularly those nesting close together in thousands on low flat islands). ~~photocopy first~~

If few papers, photocopy each in entirety →

CONTD

45

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



TO: GRANT PEARSON **URGENT:** (YES) / NO

AT: WOODVALE

Fax No. .....

FROM: JEM L.

DATE: 20/3/85

Your Ref: .....
Local Ref: .....

as discussed

No. of pages inc. this page: 3

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

"FIELD ORNITHOLOGY (JOURNAL OF)" and

"COLONIAL WATERBIRDS" for scientific

papers that describe methodologies for censusing nests and eggs, and for determining laying dates, incubation periods and hatching success etc of colonial nesting ~~waterbirds~~ seabirds and waterbirds (eg gulls, terns, pelicans — particularly those nesting close together in thousands on low flat islands).

~~Photography first~~

If few papers, photocopy each in entirety →

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Form CLM 808

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(13)

Your Ref:
Our Ref:
Enquiries:
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Subject:

Grant

As discussed, please have someone (Ronny) search through recent issues (~~last 10~~ last 10 years?) of "CORELLA", "FIELD ORNITHOLOGY (JOURNAL OF)" and "COLONIAL WATERBIRDS" for scientific papers that describe methodologies for censusing nests and eggs, and for determining laying dates, incubation periods and hatching success etc of colonial nesting ~~waterbirds~~ seabirds and waterbirds (eg gulls, terns, pelicans — particularly those nesting close together in thousands on low flat islands).

~~Photocopy~~ first few papers, photocopy each in entirety →

CONT'D

43.

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Form CLM 80B

To:

(2)

Your Ref:
Our Ref:
Enquiries:
Phone:

Subject:

Could put in my pigeon hole for Wed AM.

If many pages, photocopy front pages (or abstract) only and place in my pigeon hole for Wed AM.

Any queries before or during, telephone me at Busselton today (uncontactable tomorrow)

Cheers

J.

20/3 2.15 pm.

"Corella" "16(4)/123-6.

P.S. I already have WATERMAN + READ (1992) Description ... of the Australian Pelican ... on Lake Eyre south in 1990

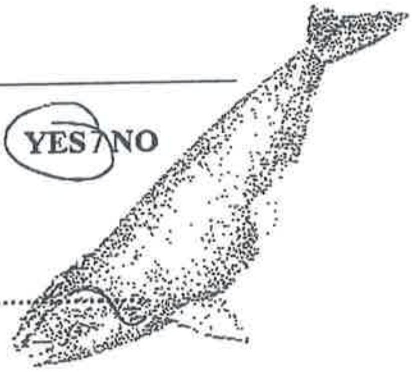
Fax (20/03/1995; cover sheet & last page only) from JL to GBP with inter alia a list of equipment for GBP to obtain for next trip to Lake Ballard.

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.

36.

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



TO: GRANT PEARSON **URGENT:** ~~YES~~ / NO (YES circled)

AT: WOODVALE

Fax No.

FROM: JIM L.

DATE: 20/3/95

Your Ref:
Local Ref:

As discussed, please have someone (pay if necessary) reliably repair the green, single touring kayak.

No. of pages inc. this page: 6

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

FAXED

5

Y

Rope
S/pickets x 4
Poles
String
Tarp x 2
Water 1 x 20 ltrs,3 x 5 ltrs
Table ,chairs x 4
Cutlery 4 sets each supply own
Cups 4, plates 8 "
Pots, billy etc
Fire grate and utensils

keep heavy & bulky gear to a minimum

Also

- Get an extra 10 rolls of Ektachrome 64 ASA (or similar)
- Obtain a thermometer (max/min?) so we can monitor ambient ~~temperature~~ (air) temperature through the day (and night).
- Bring a copy of Williams' Aquatic Invertebrate Identification Guide (there should be an old copy in my office)
- ~~Also~~ borrow a copy of Sainty's (spelling) little identification book for aquatic plants in Australia (maybe Stuart or Greg Langley?)
- Jim – white markers approx 100 short (30-40 cm) wooden stakes with white tops. (We will number these with a broad felt marker pen so that we can read the numbers from our photos)

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?'.

25.

Tony Grant
Worth

GRANT

- Film 10 rolls 36 64 ASA Ektachrome

- look at my quadrat plots
  - can see the eggs — all nests?
  - all other plots OK?

- GBP do paired wing relations — when? Thurs?

- have bands for adults? (colour bands)

- Thermometer.

highlighting pens.

- Field guide — invertebrates (Williams)
  - aquatic plants.

- Scale (eggs + birds)

- Stakes - white tops - felt marker pens.

~~[illegible]~~

598.33 HAL ← "Waders" by Hale

Questions to ask ?

CLIVE MINTON

- How to collect / preserve eggs for DNA analysis.
- ref. " American natural History magazine " ? (Natural History Bulletin ?)
date ?
author ?
title ?

-

- ref - techniques for colonial nesting seabirds
- ~~[illegible]~~

ANSWERS (By Telephone from Broome) FROM CLIVE MINTON

① David Bruce Galls - wide knowledge - might help.

fax ② Chris Perrons - Edward Grey Institute
Professor of Zoology Oxford.
Great Tits eggs.
how we test for mixed parentage.

③ Les Christidis - Curator Museum, Victoria.

Canal

- gear for daily sampling of aquatic invertebrates (near surface) in at least 3 areas

- 10 mm film

- Sandy — Williams

- Balances (to 400 gm) (eg 300g + 1000g)

- Data logger?

- personal computer.

- boat repairs.

Mick Smith — Wed — standardised sampling technique!

Steve Van Leeuwen 091. 86 8288
— "Bird Census techniques" — chapter on colonial birds.

Allan Burbidge?

RAOU — David Baker-Gabb — Nest Record Scheme

→ 03 882 2622

Mandy ...

Richard Major
Australian Museum — Sydney.
02 339 8111

Read
John ~~[illegible]~~ — Corella
1993
— Pelicans nesting like Egrets
— Shortcoming was not
— marking eggs.

Lisa — gulls — can't find anything
— ...

Me get
- my little RSPB bird book.
- back issue of Corella
"Field Ornithology"
Colonial waterbirds.

[illegible signature]

Introductory (explanatory pages of HANZAB)

Murdoch Uni

– Ron Wooller (09) 360 6000 ~~332 2211~~

back at work Fri 24/3/95

* incubation period
  laying rates
* hatching success
  clutch size

egg dumping / ex pair copn. frequency.

Kathryn McDonald La Trobe Uni Wodonga
060 556600 fax
or 060 556618 fax

Dept Env Mgt & Ecol.

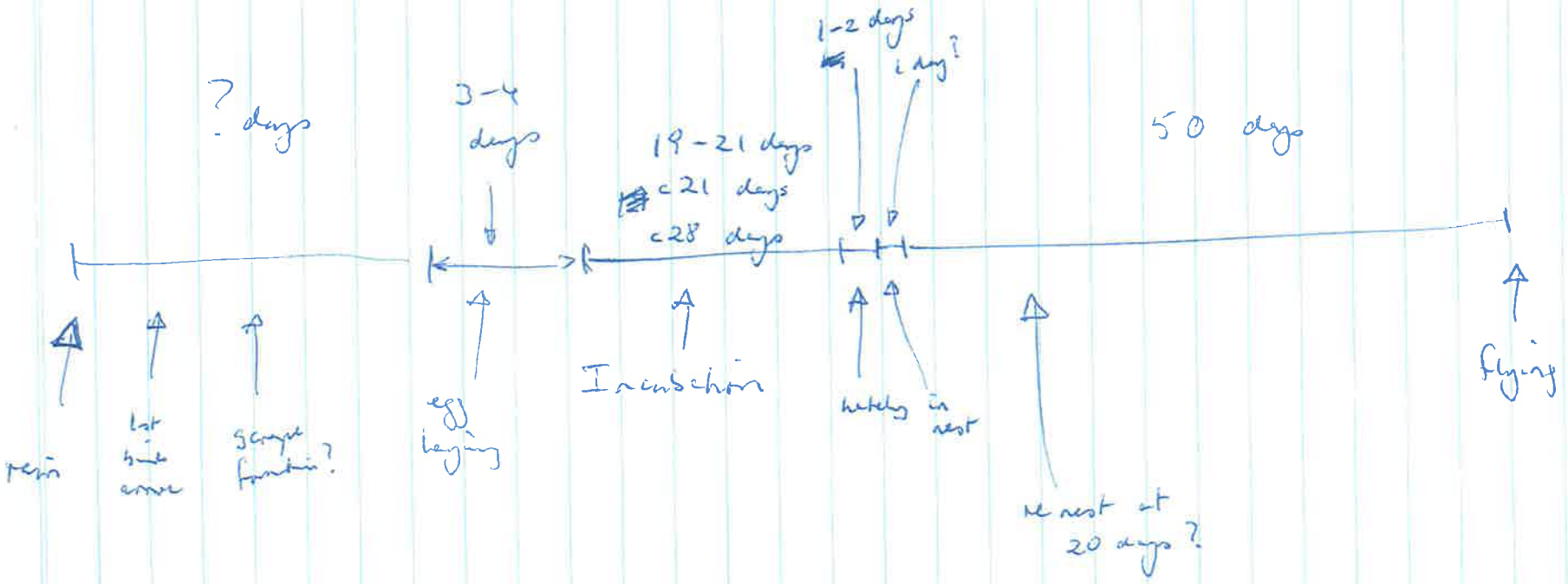
Dictionary of Birds – re laying rates incubation period etc

20.

date of mating?

nearest birds? (Storm?)

distances from.



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'.**

63.

INCUBATION PERIOD

Works out from incomplete clutches (on 15/3) plus knowledge of how many in final clutch plus laying rate (if known) plus date of hatching.

— Ok for all quadrats

need two more quadrats to confirm for most

64.

THE TRUSTED NAME IN PROPERTY SINCE 1925
SHELLABEAR & SON
ESTATE AGENTS • VALUERS • AUCTIONEERS • PROPERTY MANAGERS
386 7822
REIWA 37 STIRLING HWY., NEDLANDS (next to the post office)

Date of earliest eggs

works out from
~~dot~~

— laying rate

plus

DNA testing to see if all (of those nests with 5 eggs on 15/3) laid by one female.

? Ask Clive who does DNA

65.

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INFO TO GET

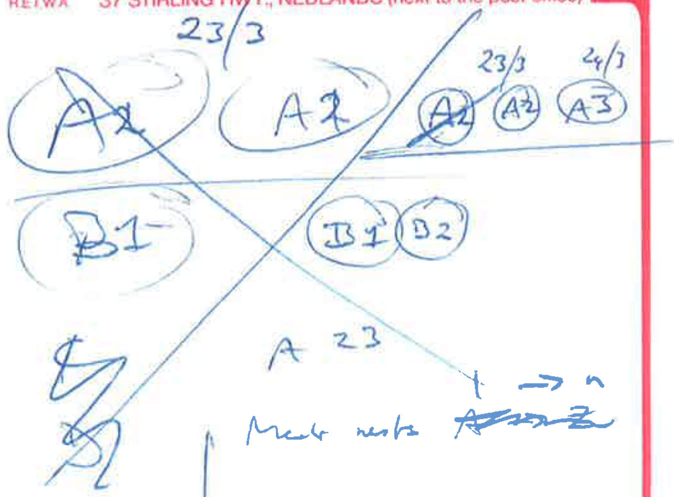
- hatching success ✓
- laying rate ✓
- incubation period ✓
- date of earliest eggs ✓

These notes made in preparation for 2nd visit (March 95)
14/5/96

WITH OUR COMPLIMENTS

61. ③

23/3



Z

62. ④

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LAYING RATE

- 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 marking or nest marking

WITH OUR COMPLIMENTS

① 59.

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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)

⇒ elapsed time to great

60. ②

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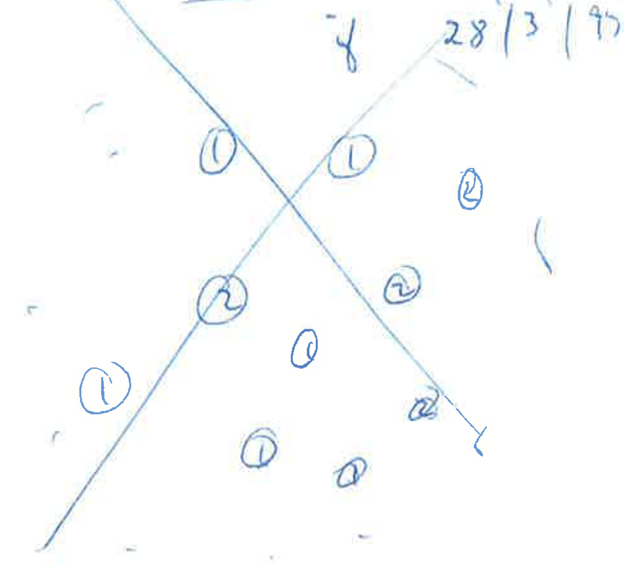
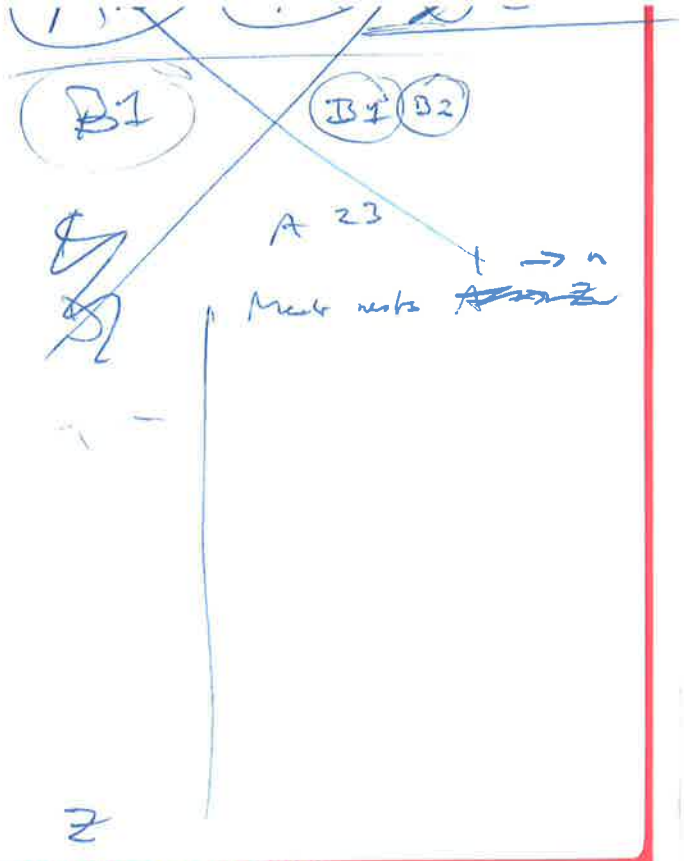
LAYING RATE

15/3/95
28/3/95



Don't continue with this



WITH OUR COMPLIMENTS

- 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 sampling or nest marking

WITH OUR COMPLIMENTS

59.

Egg 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)

⇒ elapsed time to guess
⇒ need to mark a new lot of 1 egg nests + follow them.

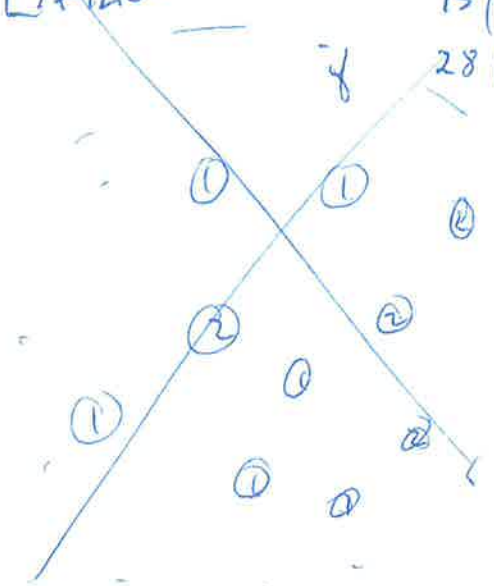
4 every day.

WITH OUR COMPLIMENTS

60.

LAYING RATE

15/3/95
&
28/3/95



Don't continue with this area — photos no good (Cross between marking and not in defined area)

WITH OUR COMPLIMENTS

And distribution 15/3 quadrat area.

57.

1st Visit 25/3

- marked every egg = every nest in each quadrat with no. of eggs = that nest
- photographed quadrat to see how many eggs ♯, nest and eggs / nest.

2nd Visit 18/3

- all clutches should be complete but possibly some new clutches
- change number
- use A → D
- use middle letter

3rd visit

use P → Z

58.

* Get to see photos of quadrats before 2nd visit!

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Hatchery 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, with more

55.

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Hatchery Success

Either:

(1) Minimum

1st visit (2) (2)

2nd visit (4) (4) (4) (4)

3rd visit (5) (5) (3) (3)

OR:

(2)

1st Visit (2) (2)

2nd Visit (4) (4) (4) (4)

(5) (5) (5) (5) (5)

56.

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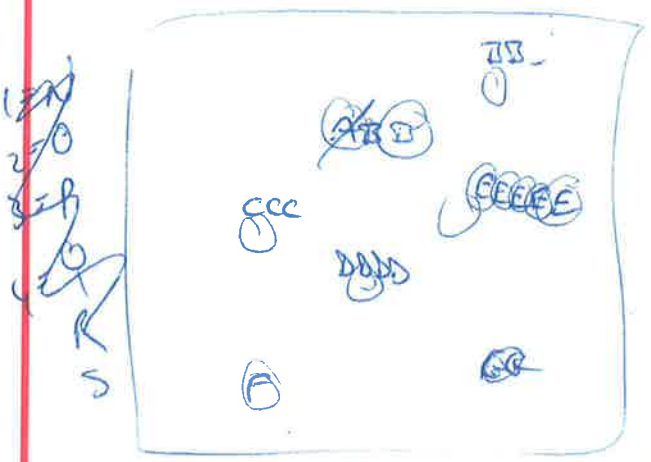


I
II
III
IV
V

1 = A
2 = D

I II

- method every egg = every nest in each quadrant with no. of eggs = that nest
- photographed quadrant to see how many eggs /, nest and eggs / nest.

2nd Visit 18/3

- all clutches should be complete but possibly some new clutches
- change number
- use A → O   use little letter.

3rd visit   use P → Z

- 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.

55.

Hatching Success

Either: Minimum

(1) 1st visit ② ③
2nd visit ②4 ③4 ④ ④
3rd visit ②④5 ②④5 ③5 ④3

OK!

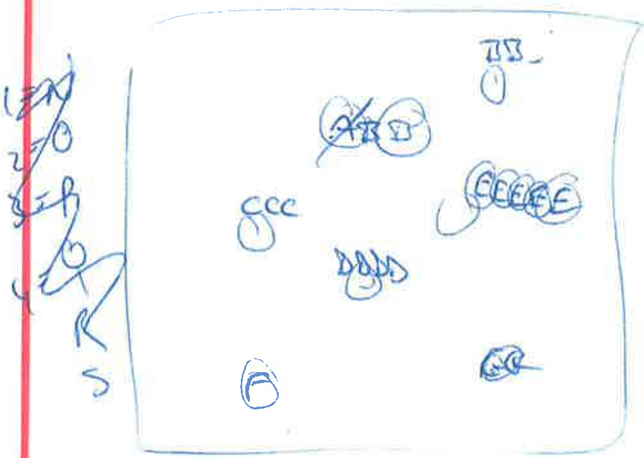
(2) 1st Visit ② ②
2nd Visit ②4 ②4 ②4 ②4
3rd visit ②43 ②43 ②43 ②43 ②43

Circle I II I etc

(ie on each visit we number each egg according to how many are in the nest on that visit.)

56.

P =



1 = A
2 = B
3 = C
4 = D
5 = E

I, II, III, IV, V

Hatching success

= % of eggs that hatched

= % of nests successful.

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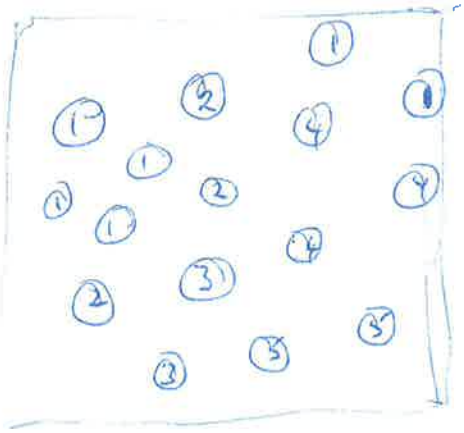
15/3/95

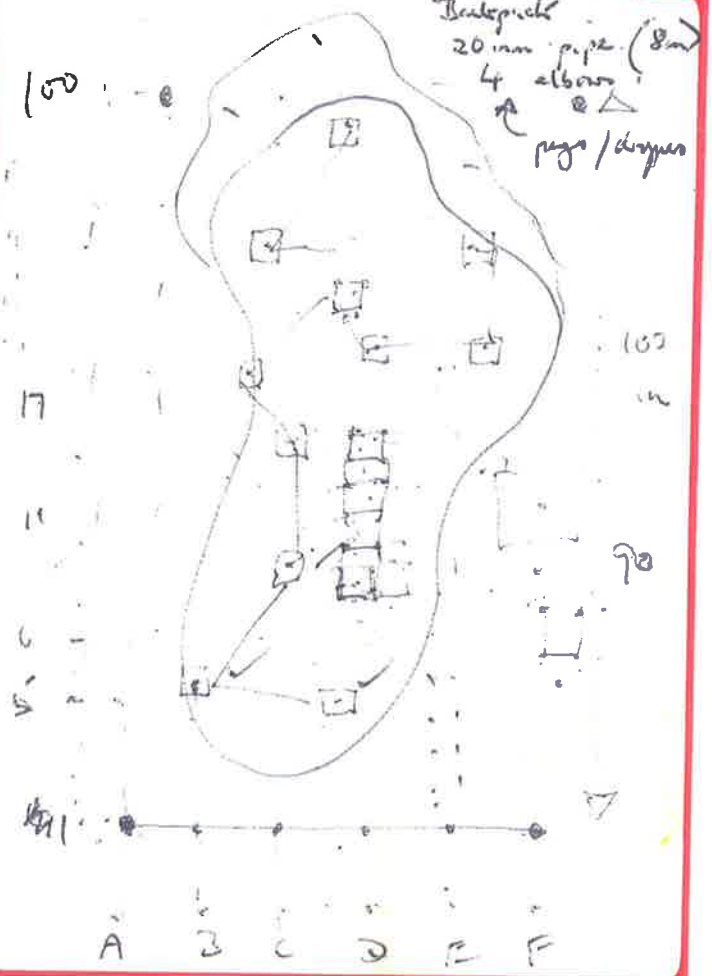


and eggs don't roll out

If no predators) no problem.

If predators, need to be able to identify which eggs predated versus which eggs hatched.

52

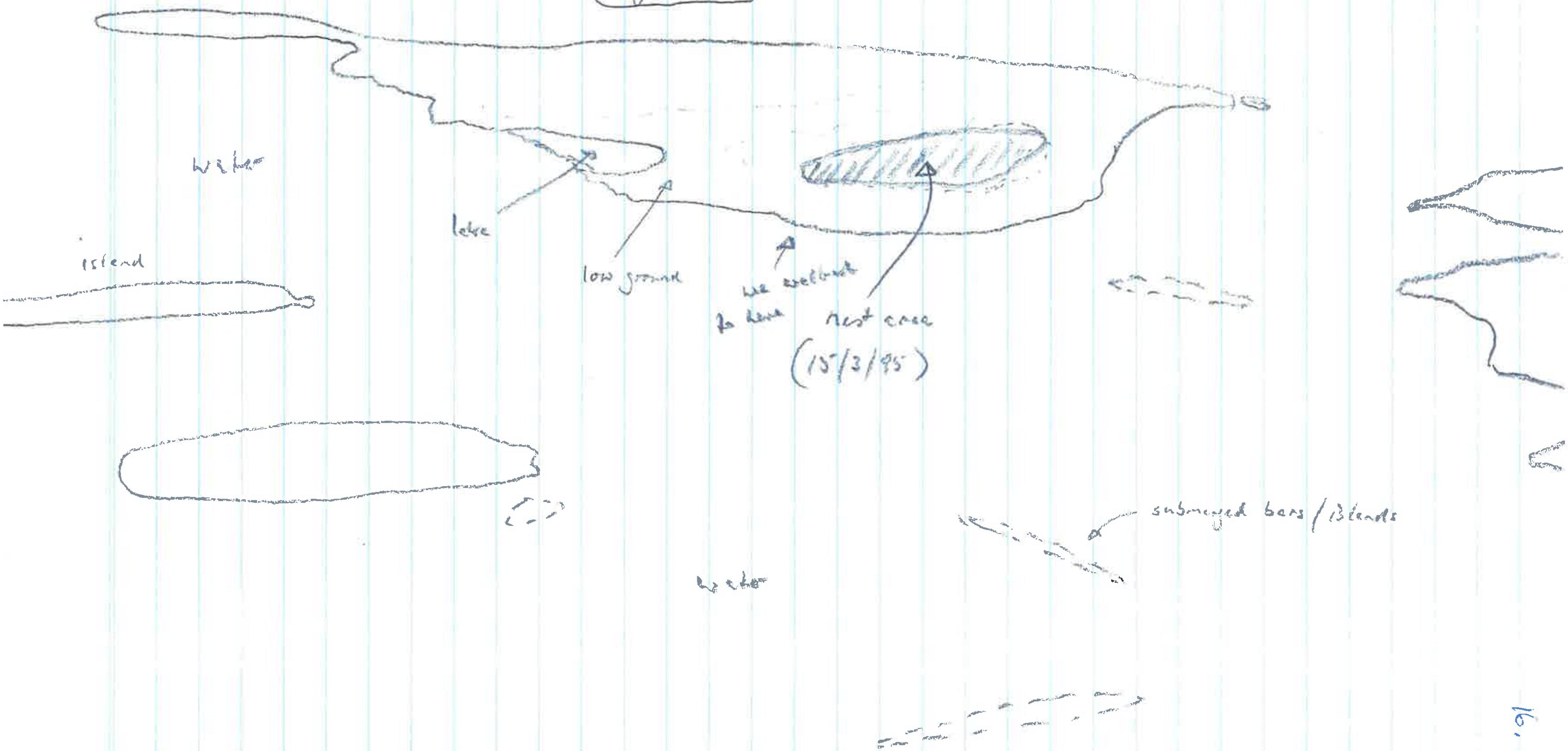


Tracings (by JL) of the boundaries of the main BaSt nesting island (i.e. the one next to 'Camp Island') and of the 'nest area (15/3/95)' as they appeared in three photos (3648-3650 in JL's scanned and original film collection) taken by JL from the helicopter on 15/03/1995.

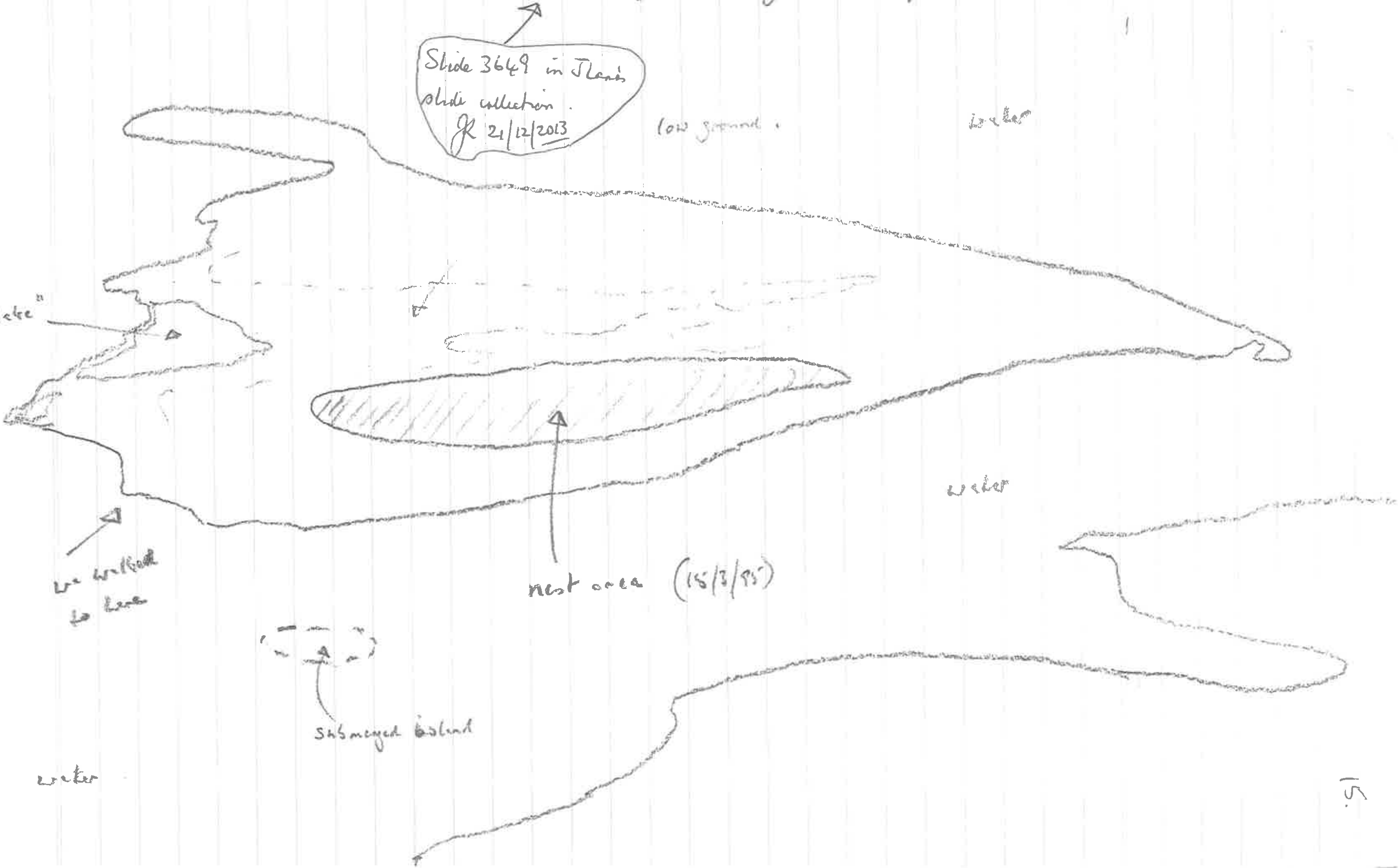
These could be used to measure the dimensions of the nest area at that time and compare with on-ground measurements made on 09/6/1995 by GBP & ACh (and any post-15/3/1995 aerial photos taken of this colony)..

SLIDE 4 (J.E.) from helicopter 15/3/95

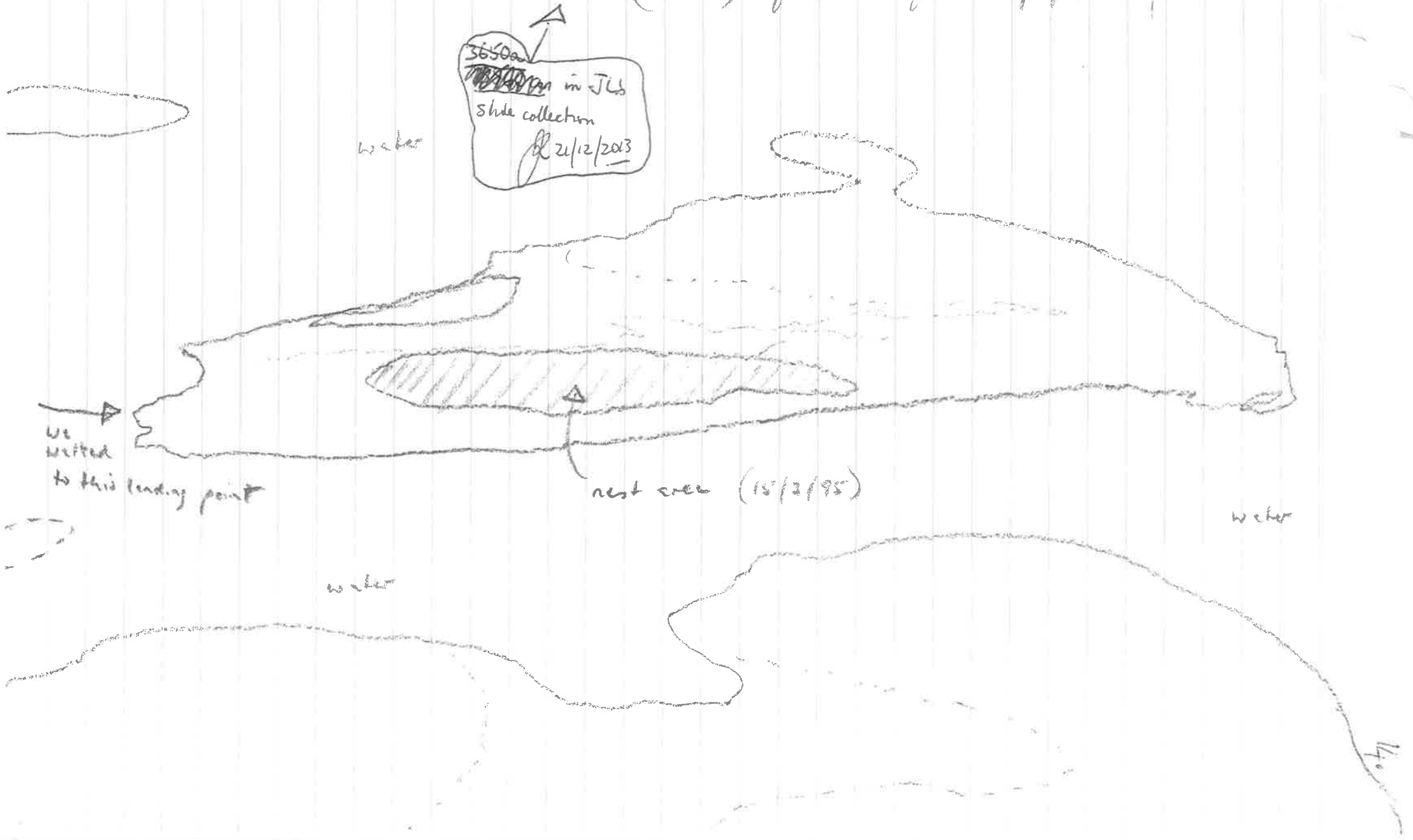
Slide 3648 in Jlan's slide collection JL 21/12/2013



SLIDE 5 (J.C.) from helicopter 15/3/85

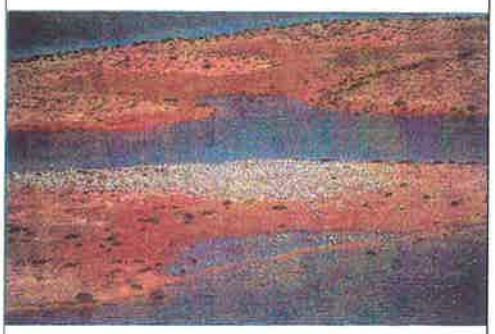


SLIDE 6 (J.C.) from helicopter 15/2/95



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'.



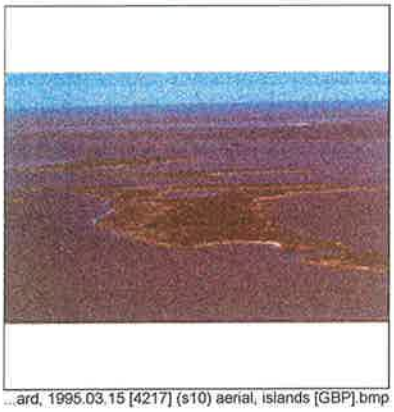
Ballard 1995, BaSt 4500 nests [CDTM, Wingspan Jun1995 scan].bmp

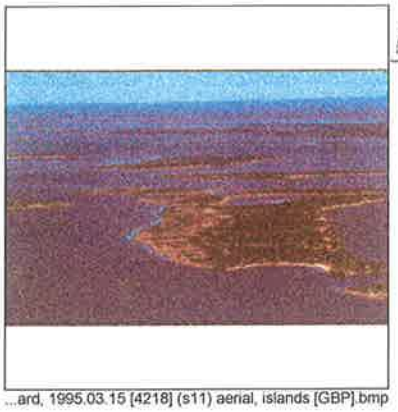
Ballard 1995, BaSt eggs [CDTM, Wingspan Jun1995 scan].bmp

...95, JAKL GBP MR peg nests [CDTM, Wingspan Jun1995 scan].bmp

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.

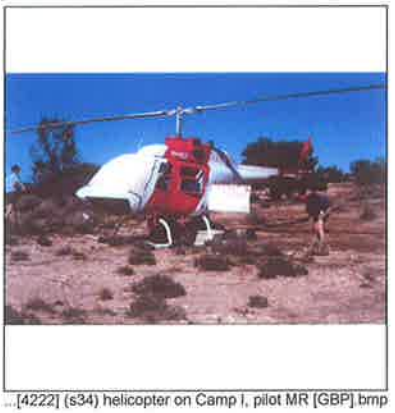

...ard, 1995.03.15 [4217] (s10) aerial, islands [GBP].bmp

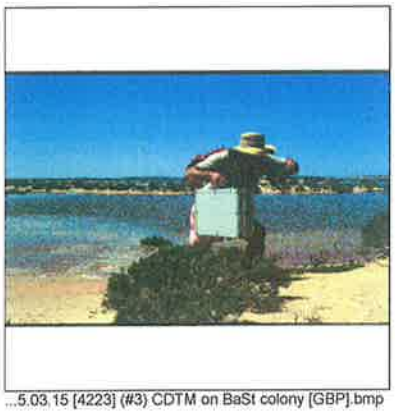

...ard, 1995.03.15 [4218] (s11) aerial, islands [GBP].bmp

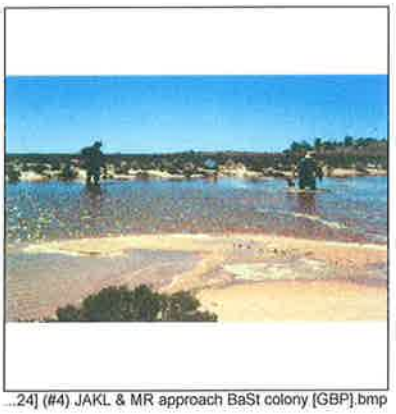

...5 [4219] (s14) aerial, BaSt colony on 1st Isl [GBP].bmp

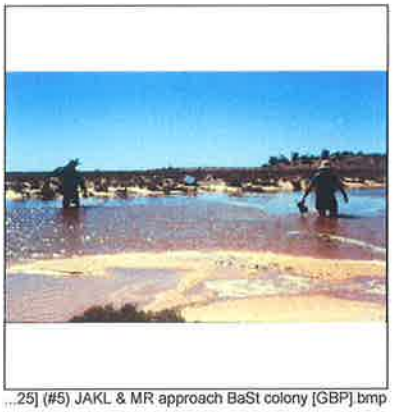

...5 [4220] (s15) aerial, BaSt colony on 1st Isl [GBP].bmp

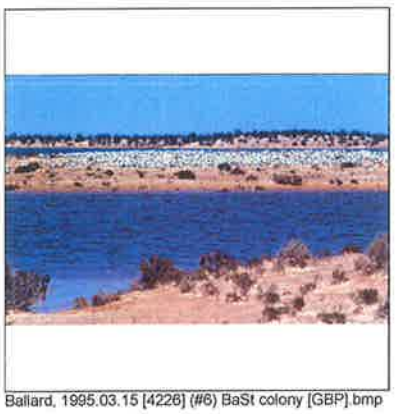

...5 [4221] (s16) aerial, BaSt colony on 1st Isl [GBP].bmp

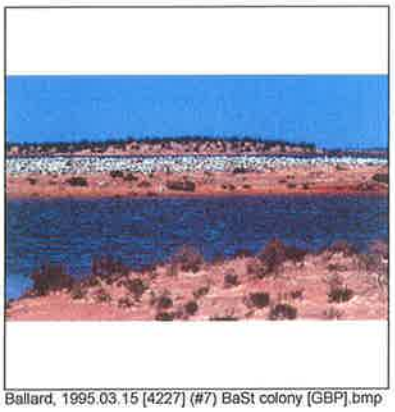

...[4222] (s34) helicopter on Camp I, pilot MR [GBP].bmp

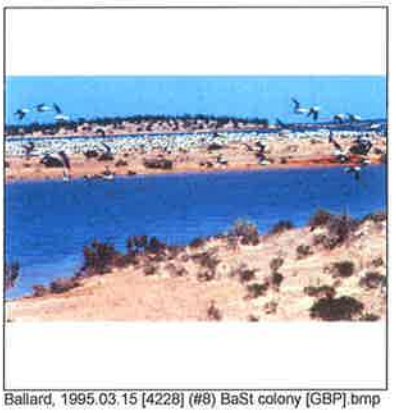

...5.03.15 [4223] (#3) CDTM on BaSt colony [GBP].bmp

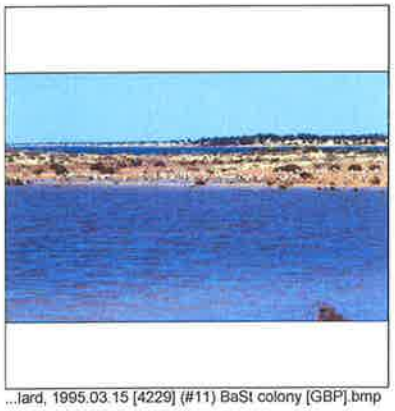

...24] (#4) JAKL & MR approach BaSt colony [GBP].bmp

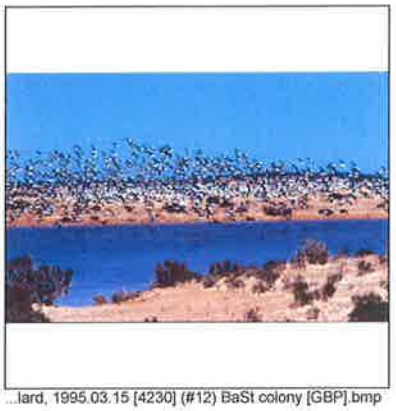

...25] (#5) JAKL & MR approach BaSt colony [GBP].bmp

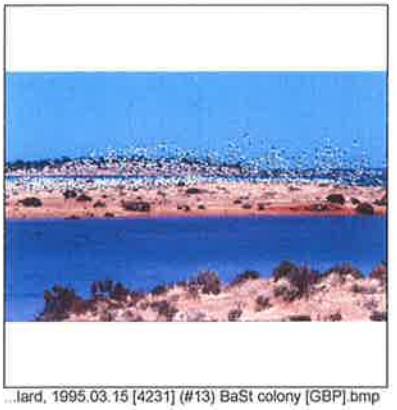

Ballard, 1995.03.15 [4226] (#6) BaSt colony [GBP].bmp


Ballard, 1995.03.15 [4227] (#7) BaSt colony [GBP].bmp


Ballard, 1995.03.15 [4228] (#8) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4229] (#11) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4230] (#12) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4231] (#13) BaSt colony [GBP].bmp

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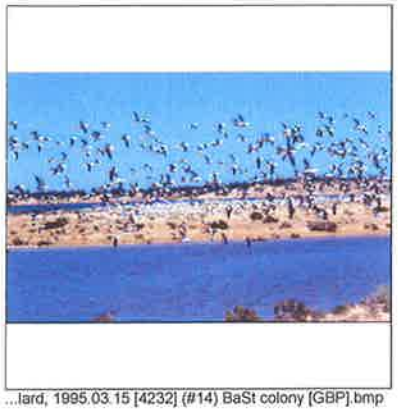
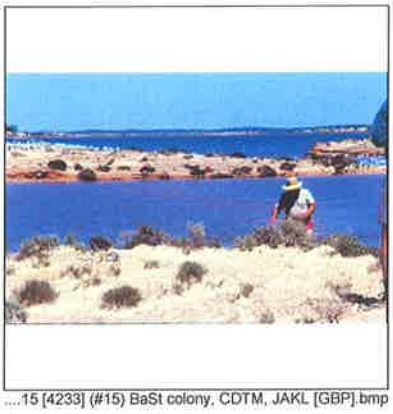
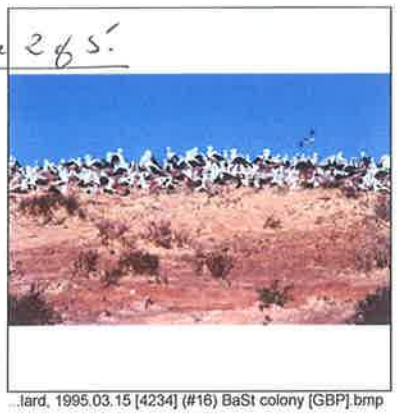


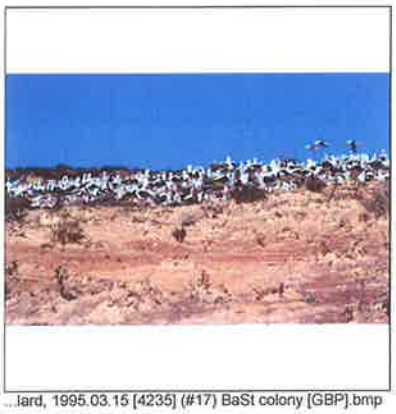
...lard, 1995.03.15 [4232] (#14) BaSt colony [GBP].bmp



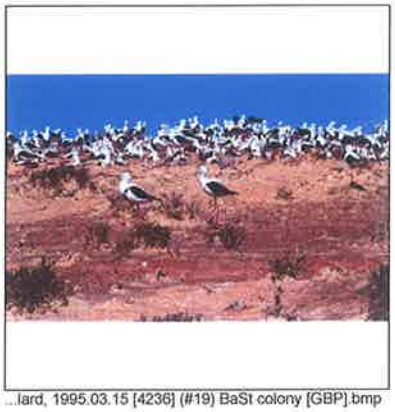
....15 [4233] (#15) BaSt colony, CDTM, JAKL [GBP].bmp



...lard, 1995.03.15 [4234] (#16) BaSt colony [GBP].bmp

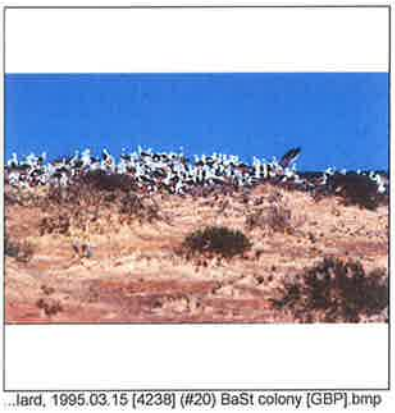


...lard, 1995.03.15 [4235] (#17) BaSt colony [GBP].bmp

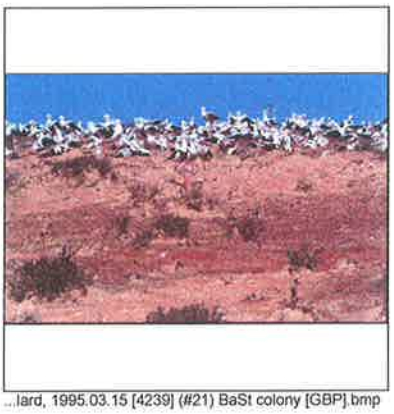


...lard, 1995.03.15 [4236] (#19) BaSt colony [GBP].bmp

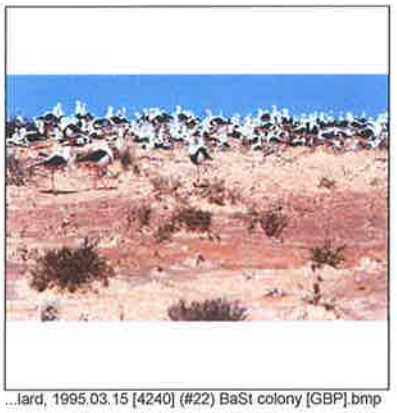
...lard, 1995.03.15 [4237] (#18) BaSt colony [GBP].bmp



...lard, 1995.03.15 [4238] (#20) BaSt colony [GBP].bmp

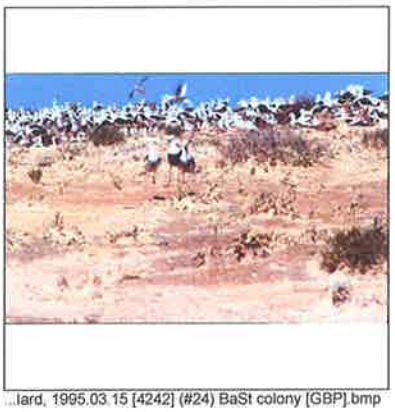


...lard, 1995.03.15 [4239] (#21) BaSt colony [GBP].bmp

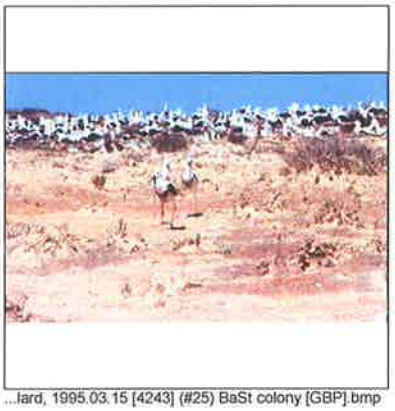


...lard, 1995.03.15 [4240] (#22) BaSt colony [GBP].bmp

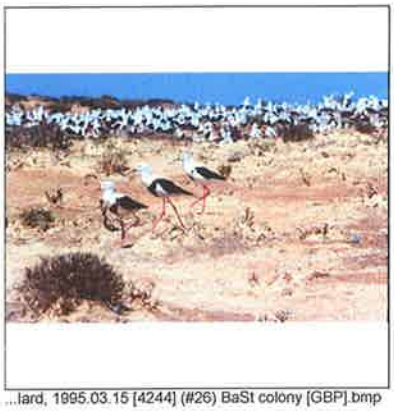
...lard, 1995.03.15 [4241] (#23) BaSt colony [GBP].bmp



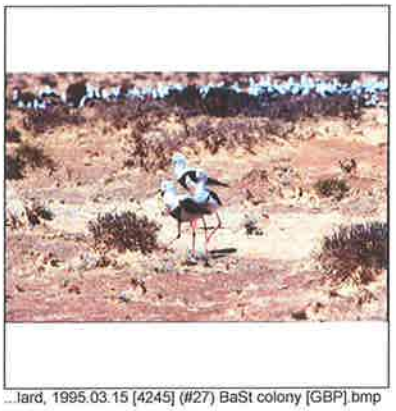
...lard, 1995.03.15 [4242] (#24) BaSt colony [GBP].bmp



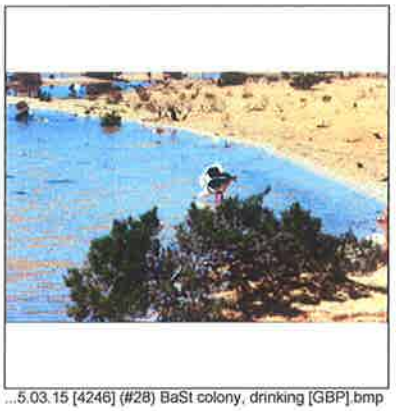
...lard, 1995.03.15 [4243] (#25) BaSt colony [GBP].bmp



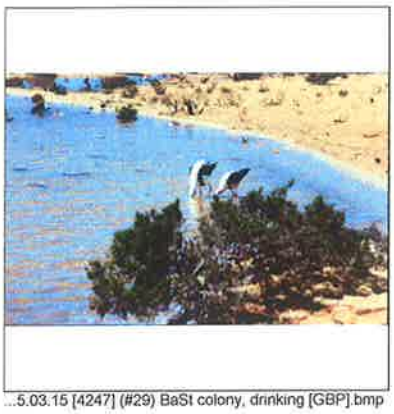
...lard, 1995.03.15 [4244] (#26) BaSt colony [GBP].bmp

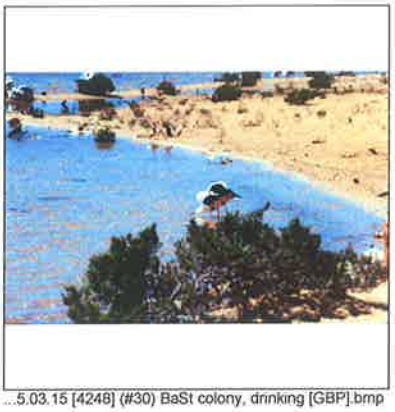


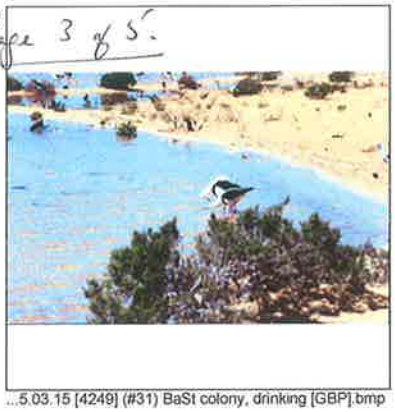
...lard, 1995.03.15 [4245] (#27) BaSt colony [GBP].bmp

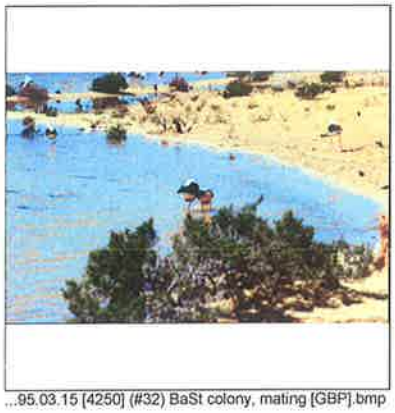


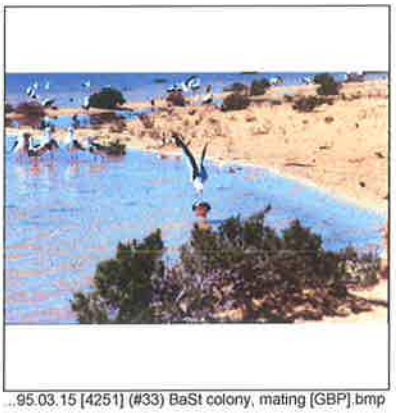
...5.03.15 [4246] (#28) BaSt colony, drinking [GBP].bmp

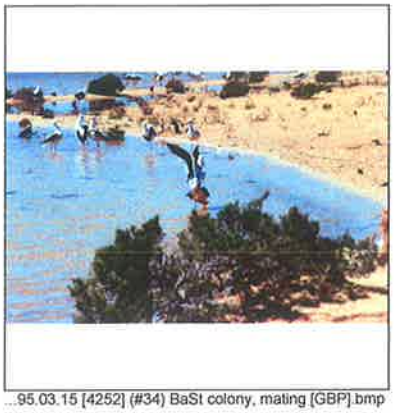

...5.03.15 [4247] (#29) BaSt colony, drinking [GBP].bmp

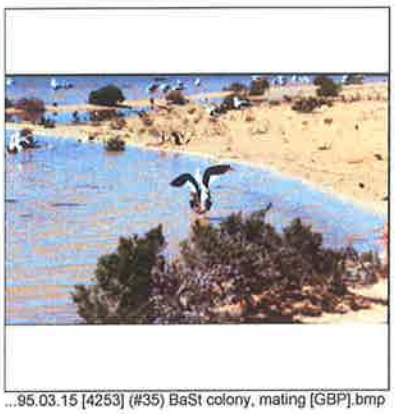

...5.03.15 [4248] (#30) BaSt colony, drinking [GBP].bmp

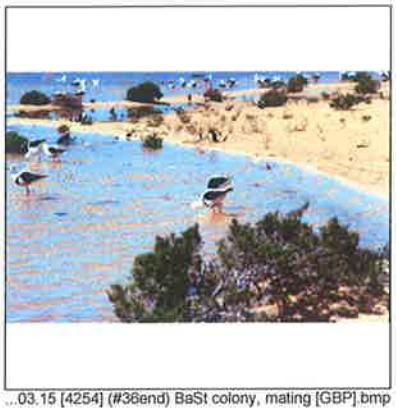

...5.03.15 [4249] (#31) BaSt colony, drinking [GBP].bmp

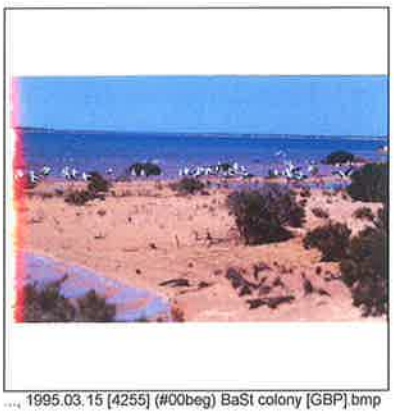

...95.03.15 [4250] (#32) BaSt colony, mating [GBP].bmp

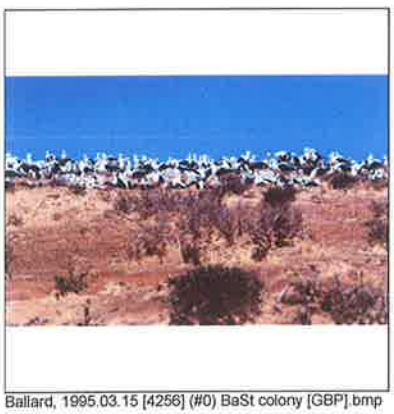

...95.03.15 [4251] (#33) BaSt colony, mating [GBP].bmp

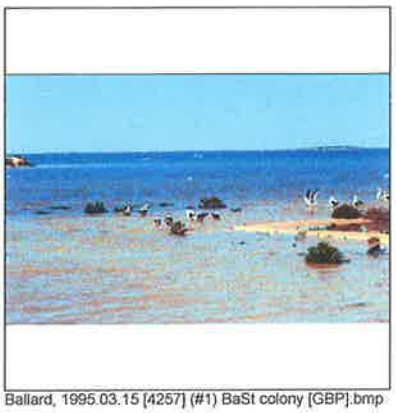

...95.03.15 [4252] (#34) BaSt colony, mating [GBP].bmp

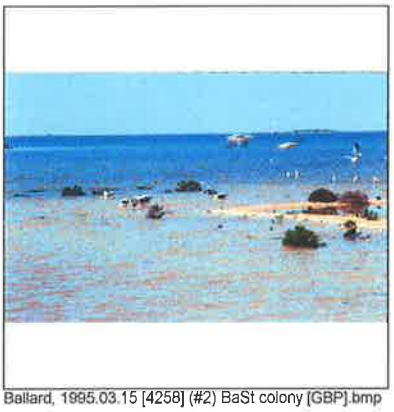

...95.03.15 [4253] (#35) BaSt colony, mating [GBP].bmp

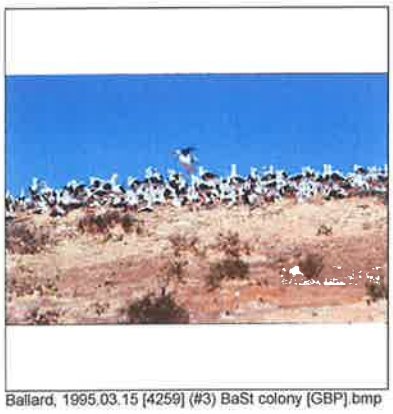

...03.15 [4254] (#36end) BaSt colony, mating [GBP].bmp

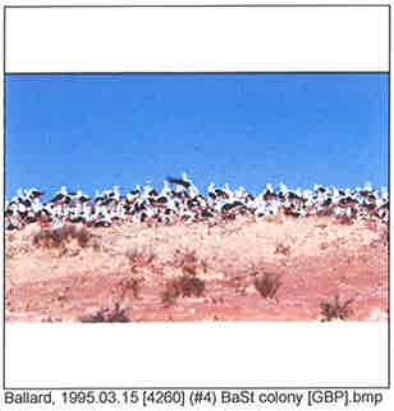

..., 1995.03.15 [4255] (#00beg) BaSt colony [GBP].bmp


Ballard, 1995.03.15 [4256] (#0) BaSt colony [GBP].bmp

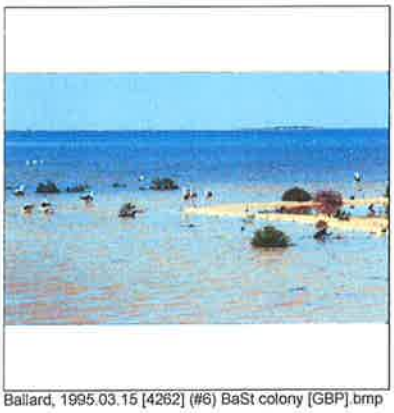

Ballard, 1995.03.15 [4257] (#1) BaSt colony [GBP].bmp

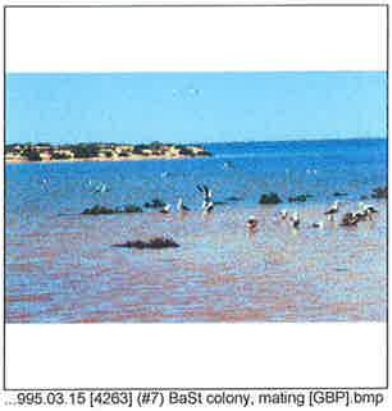

Ballard, 1995.03.15 [4258] (#2) BaSt colony [GBP].bmp

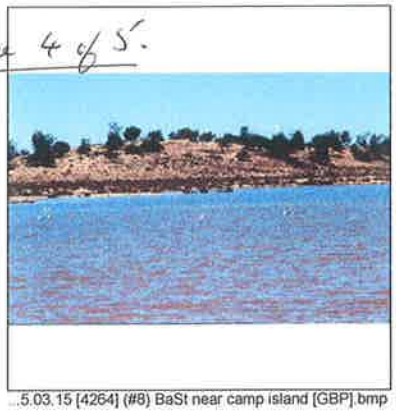

Ballard, 1995.03.15 [4259] (#3) BaSt colony [GBP].bmp

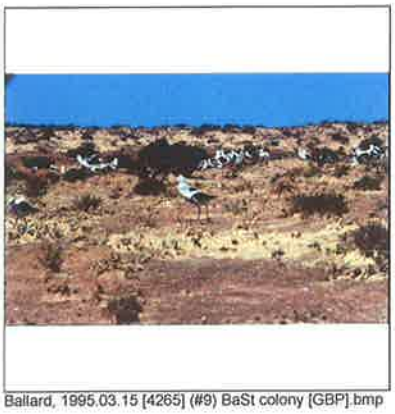

Ballard, 1995.03.15 [4260] (#4) BaSt colony [GBP].bmp

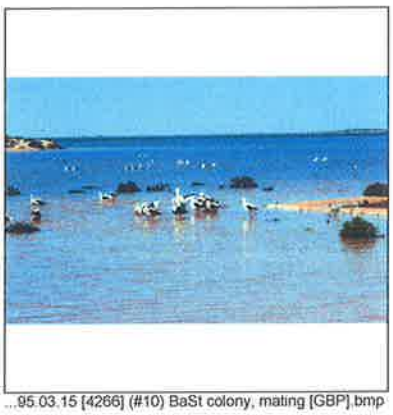

Ballard, 1995.03.15 [4261] (#5) BaSt colony [GBP].bmp

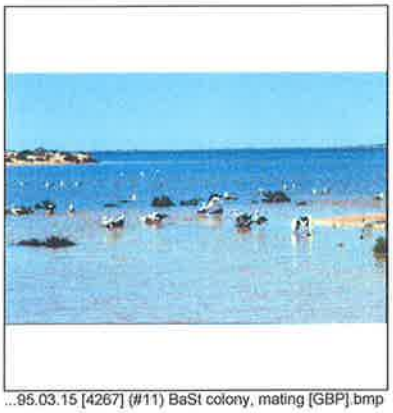

Ballard, 1995.03.15 [4262] (#6) BaSt colony [GBP].bmp

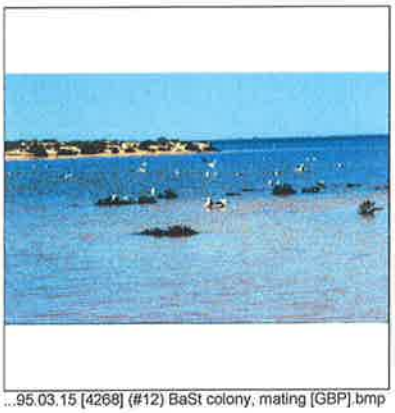

...995.03.15 [4263] (#7) BaSt colony, mating [GBP].bmp

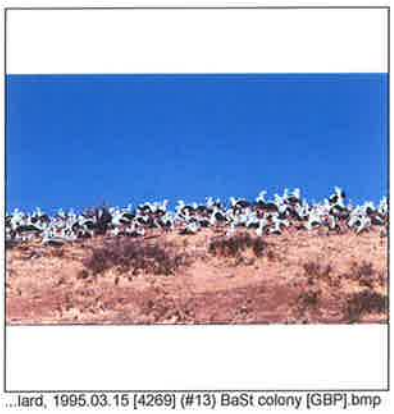

...5.03.15 [4264] (#8) BaSt near camp island [GBP].bmp

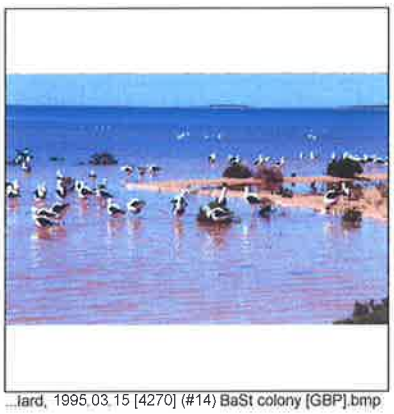

Ballard, 1995.03.15 [4265] (#9) BaSt colony [GBP].bmp

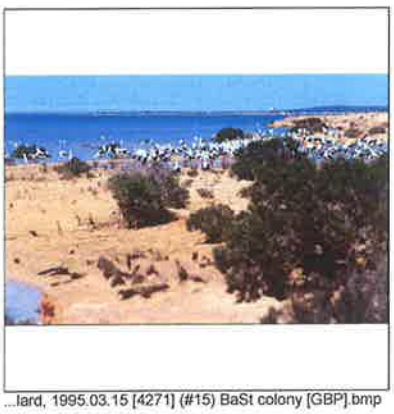

...95.03.15 [4266] (#10) BaSt colony, mating [GBP].bmp

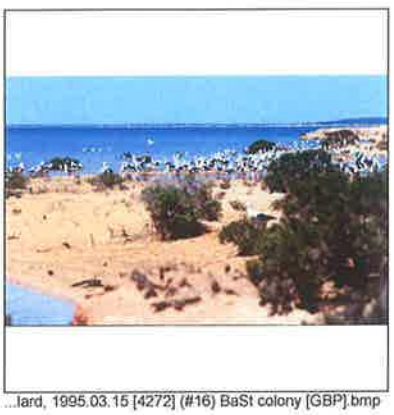

...95.03.15 [4267] (#11) BaSt colony, mating [GBP].bmp

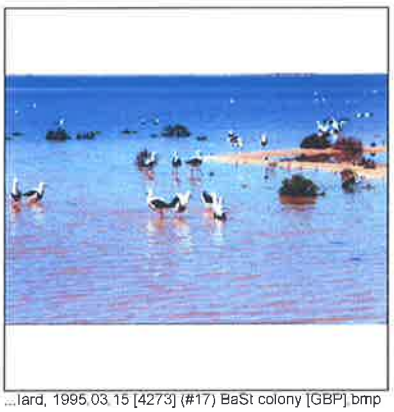

...95.03.15 [4268] (#12) BaSt colony, mating [GBP].bmp


...lard, 1995.03.15 [4269] (#13) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4270] (#14) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4271] (#15) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4272] (#16) BaSt colony [GBP].bmp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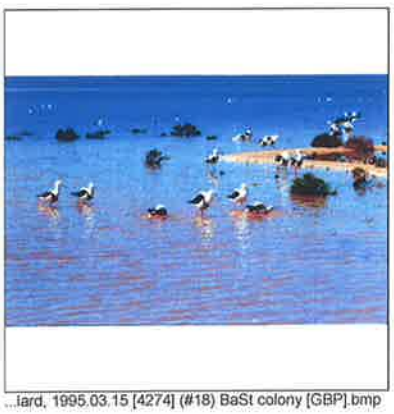
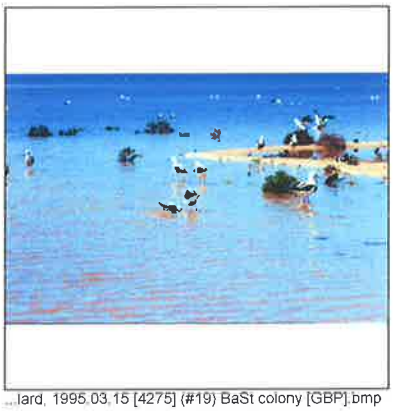
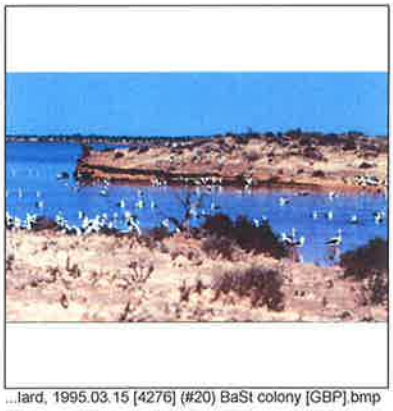

...lard, 1995.03.15 [4274] (#18) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4275] (#19) BaSt colony [GBP].bmp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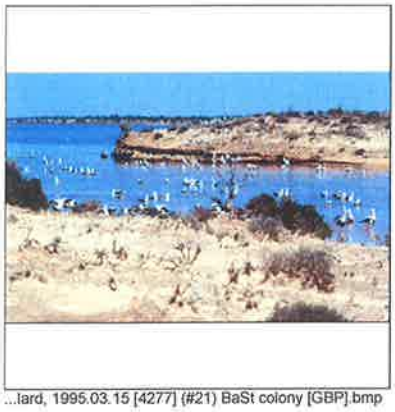
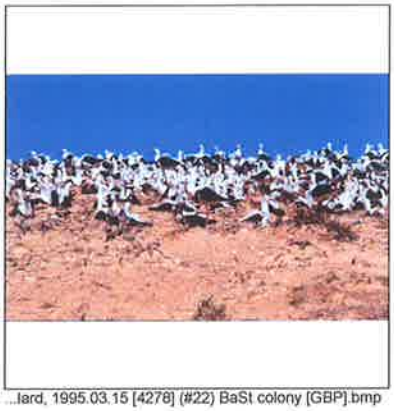

...lard, 1995.03.15 [4277] (#21) BaSt colony [GBP].bmp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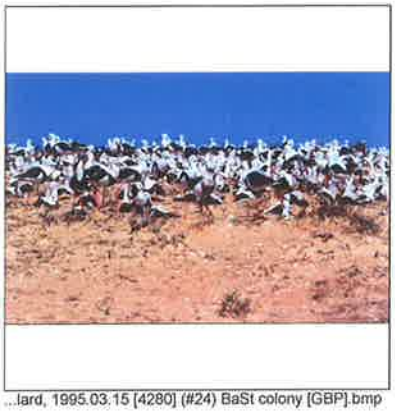
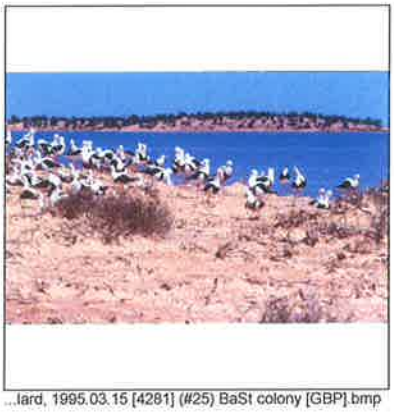
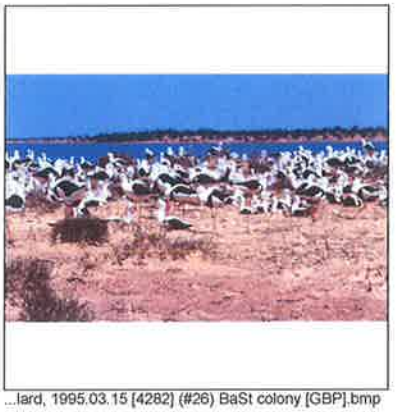
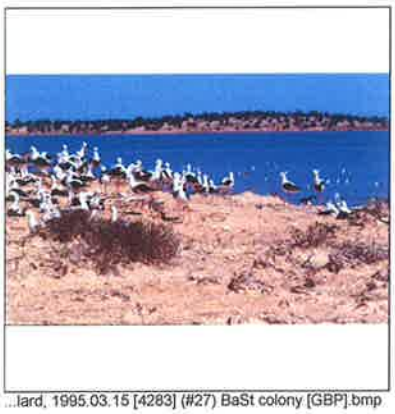
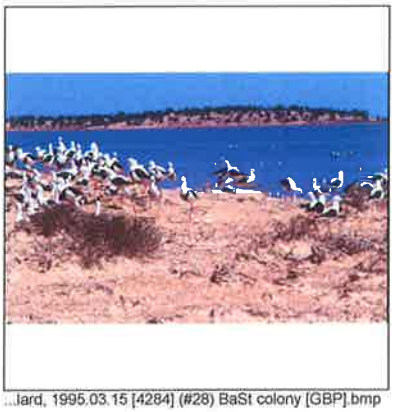
...lard, 1995.03.15 [4279] (#23) BaSt colony [GBP].bmp

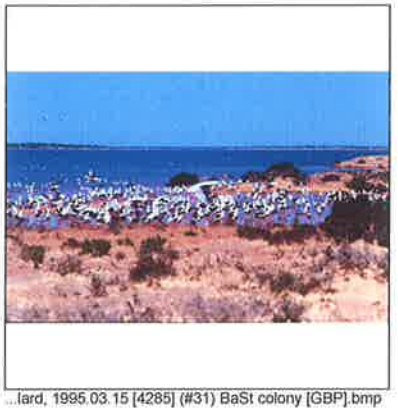

...lard, 1995.03.15 [4280] (#24) BaSt colony [GBP].bmp

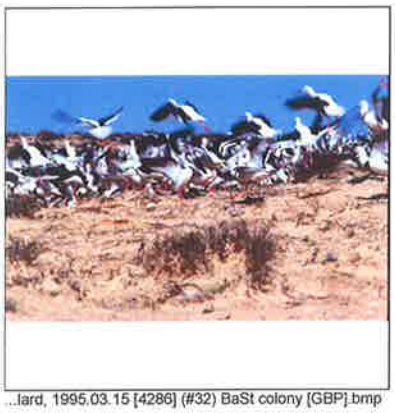

...lard, 1995.03.15 [4281] (#25) BaSt colony [GBP].bmp

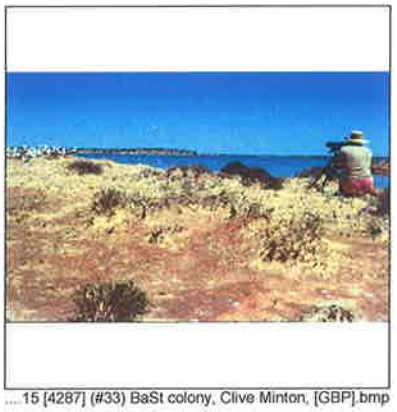

...lard, 1995.03.15 [4282] (#26) BaSt colony [GBP].bmp

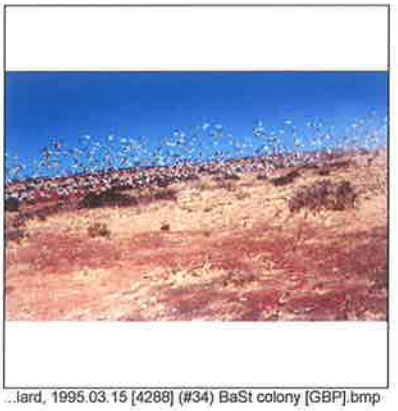

...lard, 1995.03.15 [4283] (#27) BaSt colony [GBP].bmp

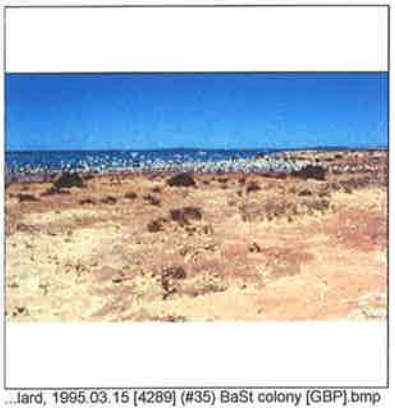

...lard, 1995.03.15 [4284] (#28) BaSt colony [GBP].bmp

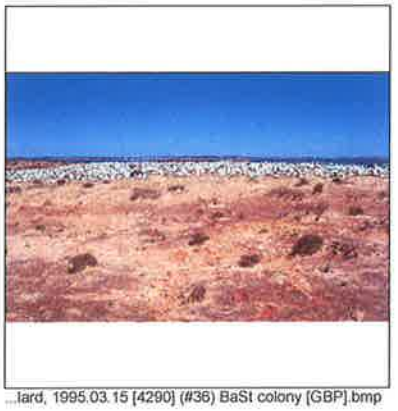

...lard, 1995.03.15 [4285] (#31) BaSt colony [GBP].bmp

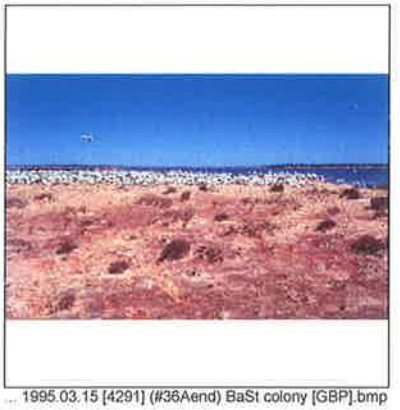

...lard, 1995.03.15 [4286] (#32) BaSt colony [GBP].bmp


....15 [4287] (#33) BaSt colony, Clive Minton, [GBP].bmp


...lard, 1995.03.15 [4288] (#34) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4289] (#35) BaSt colony [GBP].bmp


...lard, 1995.03.15 [4290] (#36) BaSt colony [GBP].bmp


... 1995.03.15 [4291] (#36Aend) BaSt colony [GBP].bmp

All of the aerial and ground photos (from takeoff at Kalgoorlie to takeoff on the return flight, but <u>except</u> 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.

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...51] (f.s20) CMinton, pilot, Marj Reni, GBP [JAKL].bmp

...3552] (f.s21) pilot, CDTM, Marj Reni, GBP [JAKL].bmp

Ballard, 1995.03.15 [3553a] (f.s22) aerial, [JAKL].bmp

Ballard, 1995.03.15 [3553b] (f.s22) aerial, [JAKL].bmp

Ballard, 1995.03.15 [3554] (f.s23) aerial, [JAKL].bmp

...f.s24) aerial, Camp I & BaSt colony distant [JAKL].bmp

...3556] (f.s25) aerial, Camp I & BaSt colony [JAKL].bmp

...3557] (f.s26) aerial, Camp I & BaSt colony [JAKL].bmp

...[3558] (f.s27) aerial, BaSt colony on 1st Isl [JAKL].bmp

...[3559] (f.s28) aerial, BaSt colony on 1st Isl [JAKL].bmp

...[3560] (f.s29) aerial, BaSt colony on 1st Isl [JAKL].bmp

...[3561] (f.s30) aerial, BaSt colony on 1st Isl [JAKL].bmp

...[3562] (f.s31) aerial, BaSt colony on 1st Isl [JAKL].bmp

...[3563] (f.s32) aerial, BaSt colony on 1st Isl [JAKL].bmp

...) Camp I, hcopter, CDTM, pilot, MR, JAKL [JAKL].bmp


...) Camp I, hcopter, pilot, CDTM, MR, JAKL [JAKL].bmp


...66] (f.s35) Camp I, CDTM, JAKL, MR, pilot [JAKL].bmp


...67] (f.s36) Camp I, CDTM, JAKL, MR, pilot [JAKL].bmp


...15 [3568] (f.s37end) Camp I, GBP wading [JAKL].bmp


...3569] (f..s01beg) adult BaSt on 1st colony [JAKL].bmp


...15 [3570] (f..s02) adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3571] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3572] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3573] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3574] adult BaSt on 1st colony [JAKL].bmp

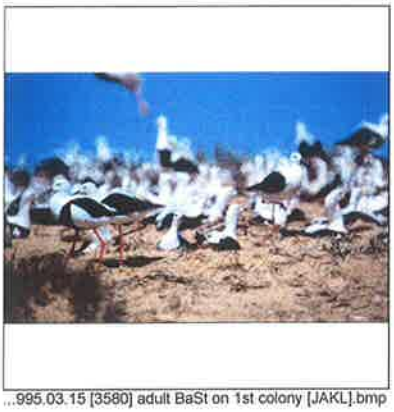

...995.03.15 [3575] adult BaSt on 1st colony [JAKL].bmp

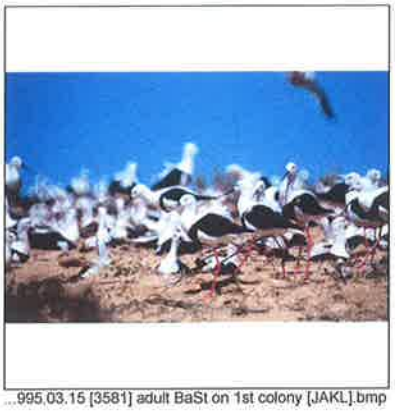

...995.03.15 [3576] adult BaSt on 1st colony [JAKL].bmp

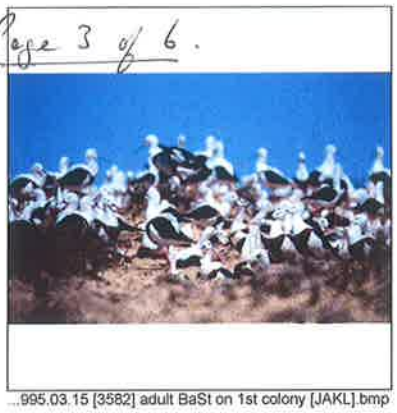

...995.03.15 [3577] adult BaSt on 1st colony [JAKL].bmp

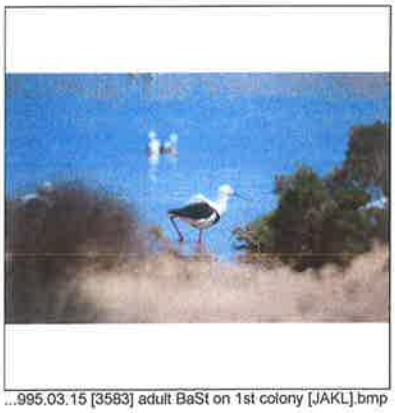

...995.03.15 [3578] adult BaSt on 1st colony [JAKL].bmp

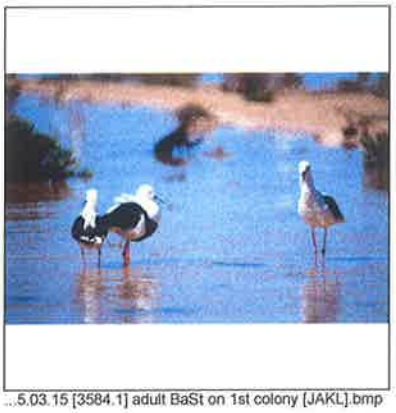

...995.03.15 [3579] adult BaSt on 1st colony [JAKL].bmp

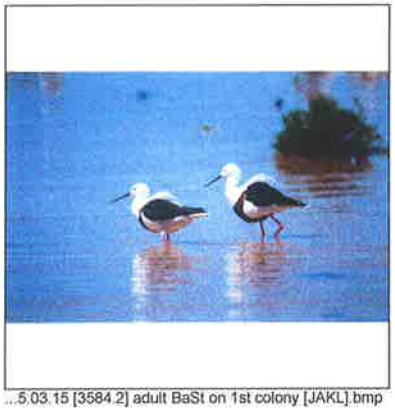

...995.03.15 [3580] adult BaSt on 1st colony [JAKL].bmp

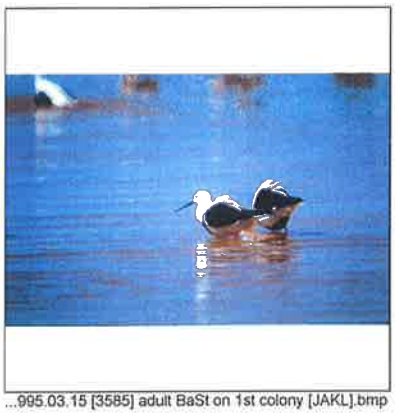

...995.03.15 [3581] adult BaSt on 1st colony [JAKL].bmp

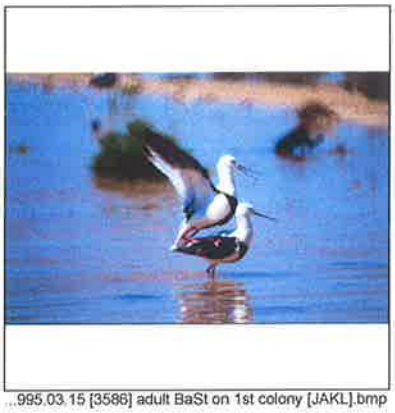

...995.03.15 [3582] adult BaSt on 1st colony [JAKL].bmp

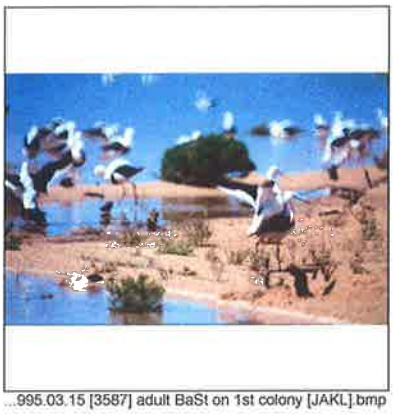

...995.03.15 [3583] adult BaSt on 1st colony [JAKL].bmp

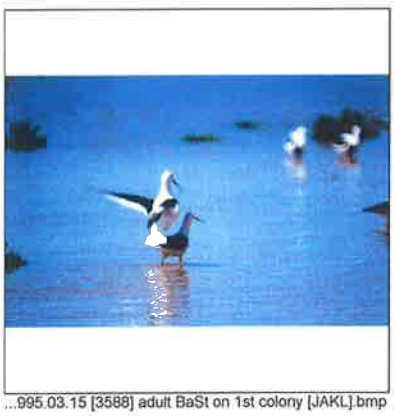

...5.03.15 [3584.1] adult BaSt on 1st colony [JAKL].bmp

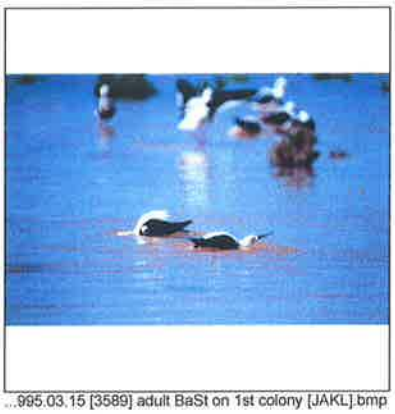

...5.03.15 [3584.2] adult BaSt on 1st colony [JAKL].bmp

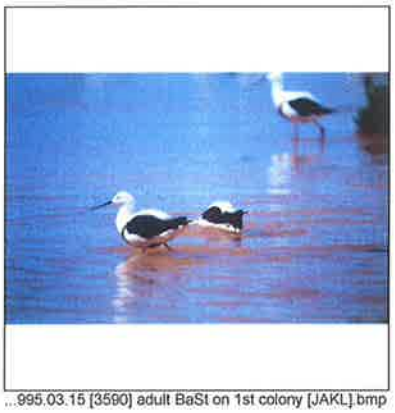

...995.03.15 [3585] adult BaSt on 1st colony [JAKL].bmp

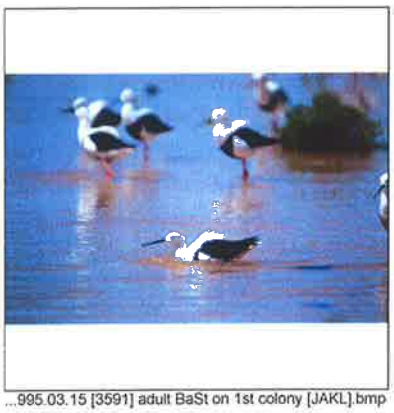

...995.03.15 [3586] adult BaSt on 1st colony [JAKL].bmp

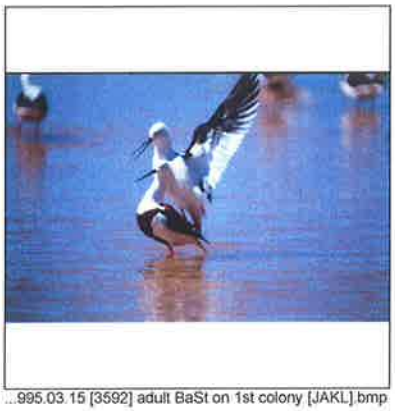

...995.03.15 [3587] adult BaSt on 1st colony [JAKL].bmp

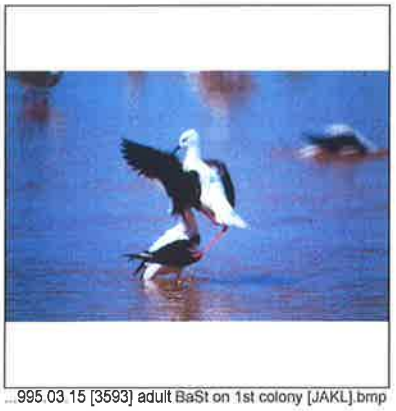

...995.03.15 [3588] adult BaSt on 1st colony [JAKL].bmp

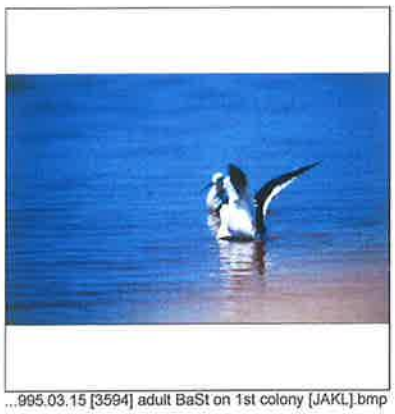

...995.03.15 [3589] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3590] adult BaSt on 1st colony [JAKL].bmp

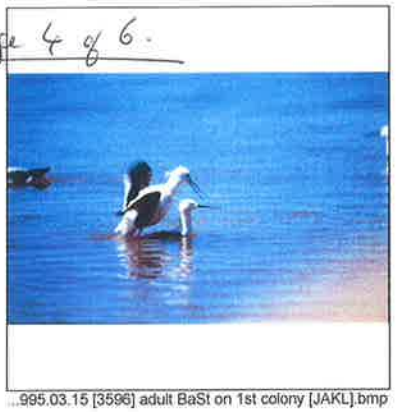

...995.03.15 [3591] adult BaSt on 1st colony [JAKL].bmp

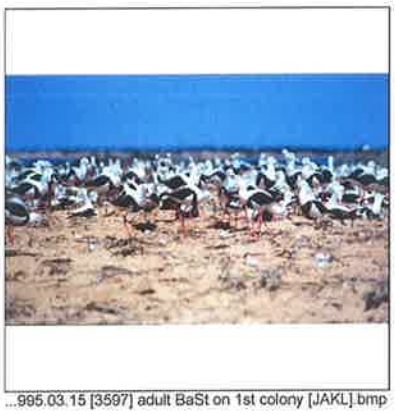

...995.03.15 [3592] adult BaSt on 1st colony [JAKL].bmp

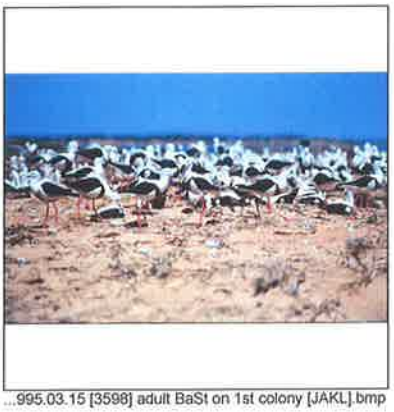

...995.03.15 [3593] adult BaSt on 1st colony [JAKL].bmp

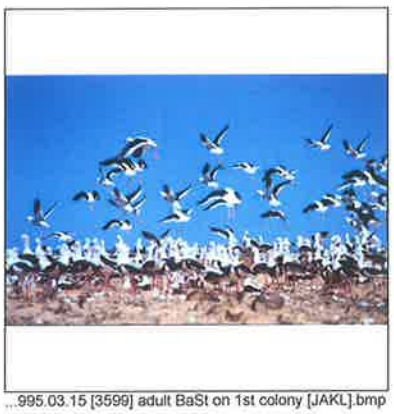

...995.03.15 [3594] adult BaSt on 1st colony [JAKL].bmp

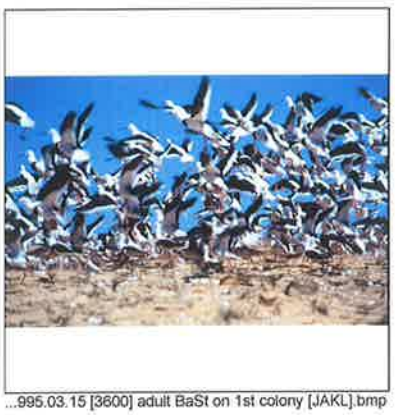

...995.03.15 [3595] adult BaSt on 1st colony [JAKL].bmp

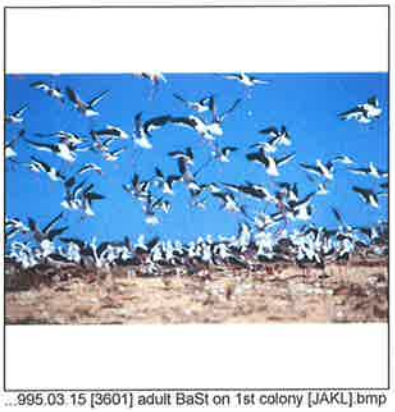

...995.03.15 [3596] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3597] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3598] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3599] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3600] adult BaSt on 1st colony [JAKL].bmp


...995.03.15 [3601] adult BaSt on 1st colony [JAKL].bmp

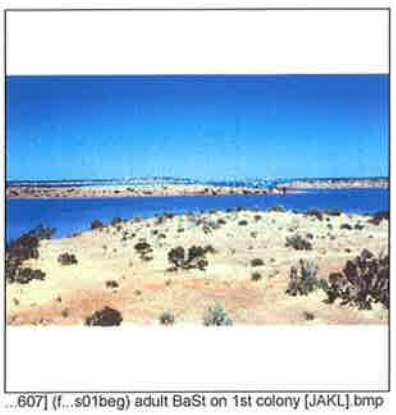

...995.03.15 [3602] adult BaSt on 1st colony [JAKL].bmp

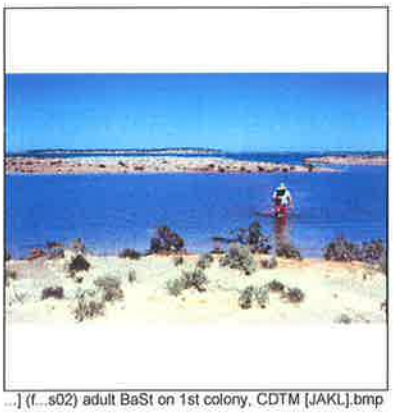

...995.03.15 [3603] adult BaSt on 1st colony [JAKL].bmp

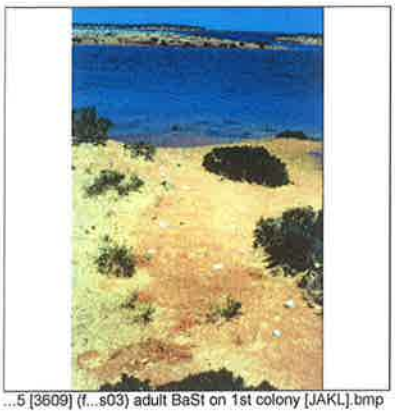

...15 [3604] (f..s37) adult BaSt on 1st colony [JAKL].bmp

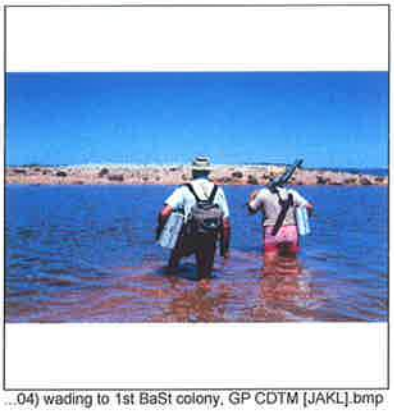

....5 [3605] (f..s38) adult BaSt on 1st colony [JAKL].bmp

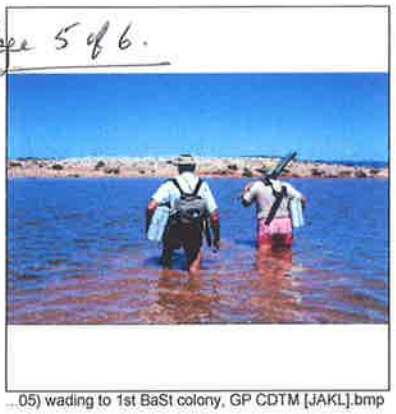

...05.1] (f...s39end) adult BaSt on 1st colony [JAKL].bmp

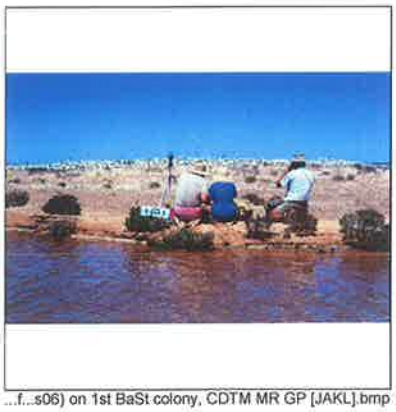

...607] (f...s01beg) adult BaSt on 1st colony [JAKL].bmp

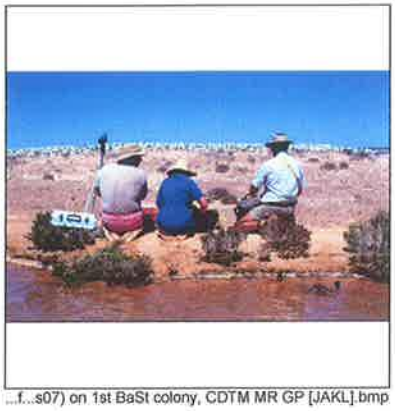

...] (f...s02) adult BaSt on 1st colony, CDTM [JAKL].bmp


...5 [3609] (f...s03) adult BaSt on 1st colony [JAKL].bmp

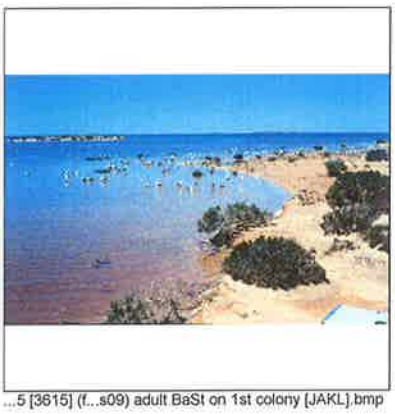

...04) wading to 1st BaSt colony, GP CDTM [JAKL].bmp

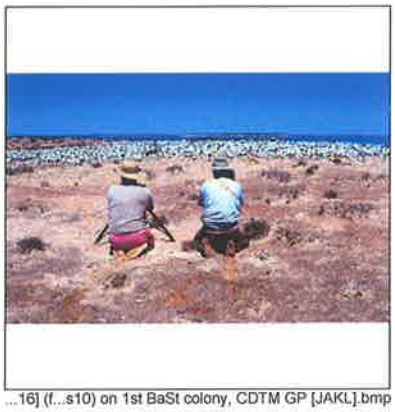

...05) wading to 1st BaSt colony, GP CDTM [JAKL].bmp

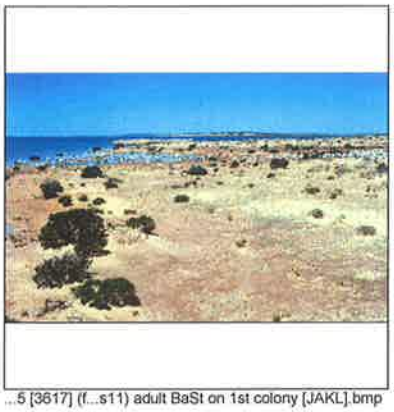

...f...s06) on 1st BaSt colony, CDTM MR GP [JAKL].bmp

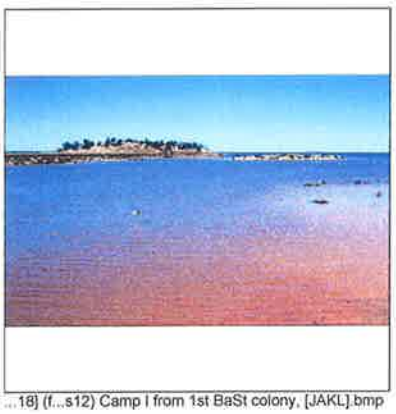

...f...s07) on 1st BaSt colony, CDTM MR GP [JAKL].bmp

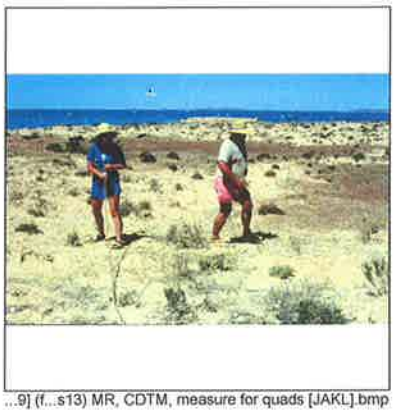

...14] (f...s08) on 1st BaSt colony, CDTM GP [JAKL].bmp

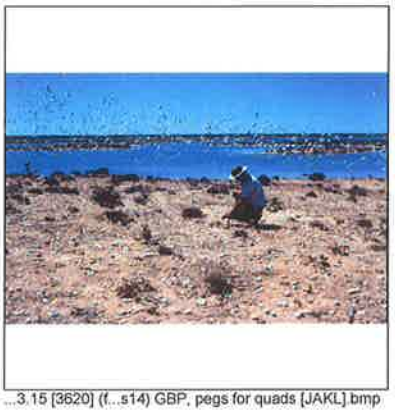

...5 [3615] (f...s09) adult BaSt on 1st colony [JAKL].bmp

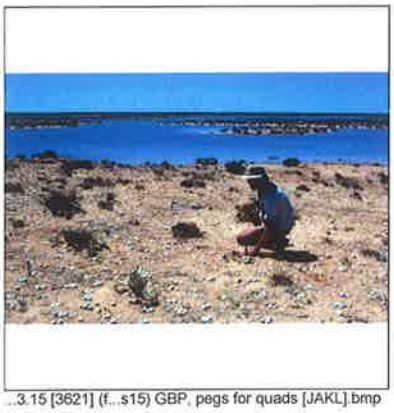

...16] (f...s10) on 1st BaSt colony, CDTM GP [JAKL].bmp

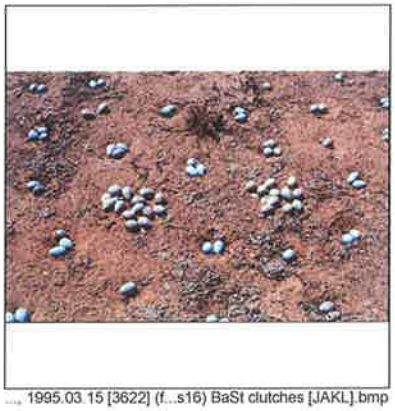

...5 [3617] (f...s11) adult BaSt on 1st colony [JAKL].bmp

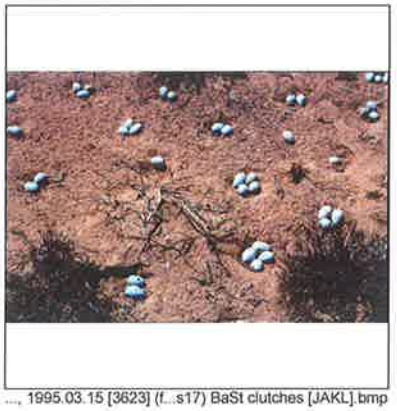

...18] (f...s12) Camp I from 1st BaSt colony, [JAKL].bmp


...9] (f...s13) MR, CDTM, measure for quads [JAKL].bmp

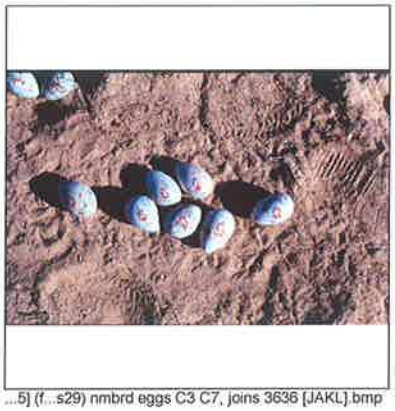

...3.15 [3620] (f...s14) GBP, pegs for quads [JAKL].bmp


...3.15 [3621] (f...s15) GBP, pegs for quads [JAKL].bmp

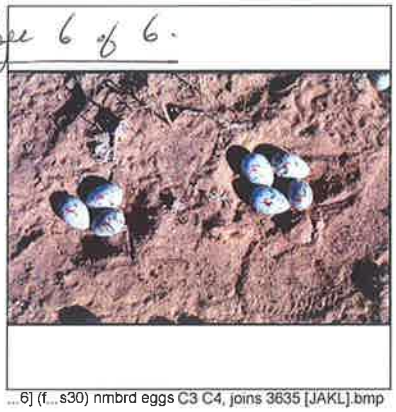

..., 1995.03.15 [3622] (f...s16) BaSt clutches [JAKL].bmp


..., 1995.03.15 [3623] (f...s17) BaSt clutches [JAKL].bmp

...5 [3634] (f...s28) Camp I, CDTM MR GBP [JAKL].bmp



...5] (f...s29) nmbrd eggs C3 C7, joins 3636 [JAKL].bmp



...6] (f...s30) nmbrd eggs C3 C4, joins 3635 [JAKL].bmp

... (f...s31) nmbrd eggs C2 C3 C5 C9, peg H [JAKL].bmp

...15 [3638] (f...s32) washing, CDTM MR GP [JAKL].bmp

...15 [3639] (f...s33) washing, CDTM MR GP [JAKL].bmp

....s34) Camp I, hcopter, MR CDTM GP pilot [JAKL].bmp

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 'Gorenge' and might be a reference to rods to be inserted into washing machine (Gorenje?) when moving haouse (JL Perth to Bsn)!

Water samples
Plankton net.

Great; CPO boots
Converge rods.
*

home. egg mark pens?

HC.
66.

Work

tape measure
film
camera lenses + camera
notebook
pens
* calipers.
~~pegs~~ + tape
compass

binoculars

Work - (overflow)
or
Boulder
in main St
5th Bldg down
Burt St

plastic bags (waterproof)

Drink

Water in al. bottles
or 2 plastic lemon drink bottle

Food

Lunch
Vero: Sandwiches.

Muesli Bars
Chocolate (Energy)
nuts / fruit.

Shelter / Warmth

Green matches
space blanket?

Sunglasses

Clothes

footwear (travel)

hat
sunscreen
shorts
shirt.

blue bag
brown bag.

toilet paper.

~~bandage~~
~~bandage~~ bandage

Cash
min. keys

wet suit boots
fins.
wetsuit top
thermal underwear top
board + string.

BUY
matches ✓
cash ✓
notebook ✓
4 slices of ham
drinks / food.
plastic bags ✓
shirt ✓
socks ✓

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'.

14/3/95

DRAFT (1) 6.

Banded Stilt Research Programme — Lake Ballard March/April 199

Background

The Banded Stilt is unique amongst the 214 species of wading birds in the world in that it

(a) nests colonially
(b) rears its chicks in crèches
(c) only nests intermittently — when inland salt lakes become flooded by exceptional rains

Of the 70 species of waders which have been recorded in Australia (55 regularly), it is one of the eight resident endemic species.

There are estimated to be 250,000 Banded Stilts in Australia (Watkins 199.). Some 60-70% of these live in Western Australia, the remainder being in South Australia and Victoria.

Breeding has only been recorded about 20 times (Higgins 1994) since it was first proved in 1930 (at Lake King in W.A. and at Lake Callabonna in SA). All but three of these attempts have been in Western Australia, with Lakes Barlee, Ballard and Marmion most favoured. The last known breeding occurred at Lake Barlee in 1992 and at Lake Torrens (S.A.) in 1989.

The Banded Stilt is one of the least studied species of wader in Australia. In particular its breeding biology is little understood. This is because breeding takes place in remote locations, which are especially inaccessible after the heavy rains which precede such events. In fact most breeding records relate to colonies found after breeding has finished (often abandoned in mid breeding because of declining water levels / food supplies) or at the chick stage (often roaming many kilometres from the actual breeding site).

The discovery of a nesting colony on Lake Ballard on 12th March 1995, only 15 days after the commencement

of a three day 'wet' from the aftermath of cyclone "Bobby", provides a unique opportunity to study the breeding process throughout the full cycle. The aerial survey showed several thousand (3-5,000) birds apparently already with nests but there was another 5000+ birds (mostly in pairs) on adjacent parts of the lake which seem likely to join the colony in the near future. The colony is thus still at the formative stage.

There are many scientific reasons why the systematic study of a banded stilt breeding event should be undertaken. Basic information such as even the incubation period is still not known. And for a species where the majority of the world population lives in one area (the southern half of W.A.) and is subject to vagaries of the climate for rare breeding opportunities it is important to determine breeding success + lay the foundations for future survival measurements - and to determine the factors governing these.

It is important also, from a conservation viewpoint, to assess the predator impact at a western Australian breeding colony. Historical information suggests this has in the past been very low. However at lake Torrens (SA) in 1989 there was a huge influx of Silver gulls during the breeding event and this resulted in severe egg losses (+ some chicks too) - the last two thousand nests were totally predated because the Banded Stilts were outnumbered by gulls. The Silver Gull population in Australia has increased enormously over the past 50 years and may well pose a long term threat to the Banded Stilt (at least at some Australian locations),

Objectives

The broad objective should be to collect all practicable data on the breeding event, with a particular emphasis on the special adaptations developed by the banded Stilt to maximise its breeding productivity in the limited 'window of opportunity' which it seeks to exploit.

The specific parameters which should be studied/measured/assessed include (not in order of priority)

(a) Courtship, pairing, nest site selection (within a colony)
(b) Plumage of breeding birds, especially early in the event
(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 eg can they successfully hatch 5 egg clutches?)
(g) DNA analysis of clutches (especially 5 egg ones) to assess egg dumping / ex pair copulation frequency
(h) Crèche formation - initial formation and development over the fledging period
(i) Fledging success
(j) Re-nesting attempts
(k) Predator activity - at the colony and subsequent on chick crèches
(l) Food availability / water level / salinity
(m) Dispersal after breeding (by banding / colour marking adults + chicks)
(n) Survival / Mortality rates (by banding / colour marking of adults + chicks)
(o) The practicability of visits by other ornithologists, film crews etc. to the breeding site without undue disturbance

Fieldwork programme

The initial visit by Jim Lane, Grant Pearson, Mary Reni and Clive Minton on 15th March can make initial observations and measurements on many of the specific study objectives (a, b, part of c, d, part of e, h, l, and o).

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 (eg to determine incubation period / hatching success).

It is desirable that a scientist be made available to undertake the detailed study over the whole nesting cycle. This would involve extended periods of observation and activity at the breeding colony, preferably commencing whilst new pairs are still arriving and especially covering the hatching period (likely to be extended). Subsequent follow up during the fledging period could be done more intermittently, by boat and/or from the air.

It is also desirable that occasional (aerial and/or ground) surveys be made of Lake Barlee to determine breeding activities there and their outcome.

The breeding event is likely to continue until the end of April, and longer still if any re-nesting occurs.

Publication

Results should be published in both the scientific literature (eg Emu), and in more widely circulated "popular" journals. If the ABC decides to make a half hour documentary then this will provide further dissemination of the information gained of this spectacular banded stilt breeding phenomena

Two pages of notes by JL headed 'Telephone Discussion with Clive Minton (at Kalgoorlie) on Monday ... February [1995] (± 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).

Telephone Discussion with Clive Minton (at Kalgoorlie) on Monday – February (± 1 day)

— incubation period

— assess productivity of pairs — Bedford – Bedler

— mark 1000s eggs (incomplete clutches) to follow up

— get – before predation (gulls)

— all on one egg today? or on full clutches – 15 days since

— all – breeding plumage or not yet

— Cindy Clapman can't
— or Helicopter JetRanger on Wed (whole day)
8 hrs. $695/hr (1 hr in and out)

— carry 4 people – + bikes +

- Sit & observe
- [illegible] eggs
- photos

Prospector [illegible] Park

Plane [illegible] at 7am

Qantas
~~[illegible]~~ 6am or 7am Ansett

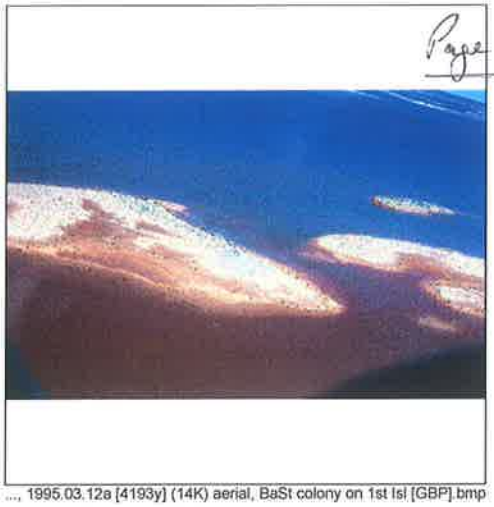
Ansett
4 pm or 8 pm Ansett.

~~$320~~ ~~$660~~ $700
.640
700
2,040

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.


..., 1995.03.12a [4193x] (14K) aerial, BaSt colony on 1st Isl [GBP].bmp


..., 1995.03.12a [4193y] (14K) aerial, BaSt colony on 1st Isl [GBP].bmp


..., 1995.03.12a [4194x] (15K) aerial, BaSt colony on 1st Isl [GBP].bmp

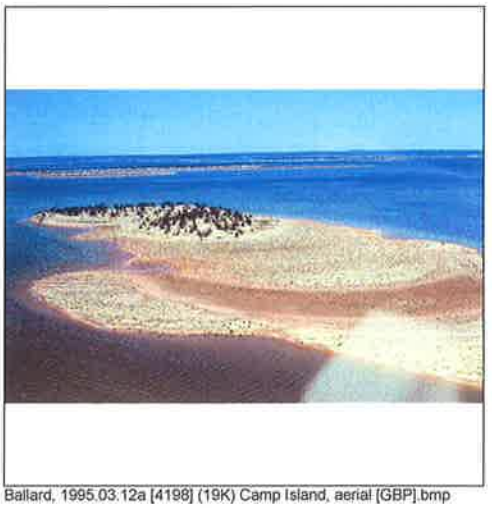

..., 1995.03.12a [4194y] (15K) aerial, BaSt colony on 1st Isl [GBP].bmp


..., 1995.03.12a [4195x] (16K) aerial, BaSt colony on 1st Isl [GBP].bmp

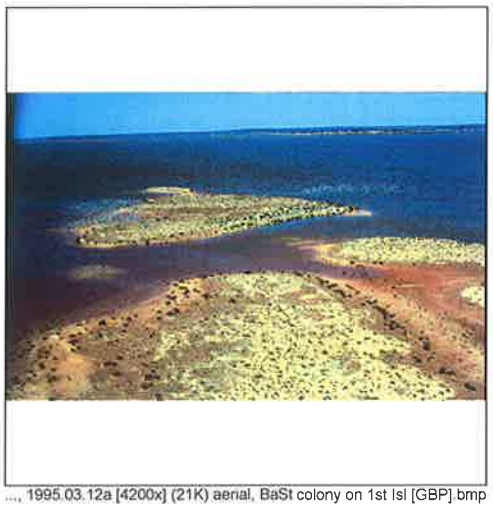

..., 1995.03.12a [4195y] (16K) aerial, BaSt colony on 1st Isl [GBP].bmp

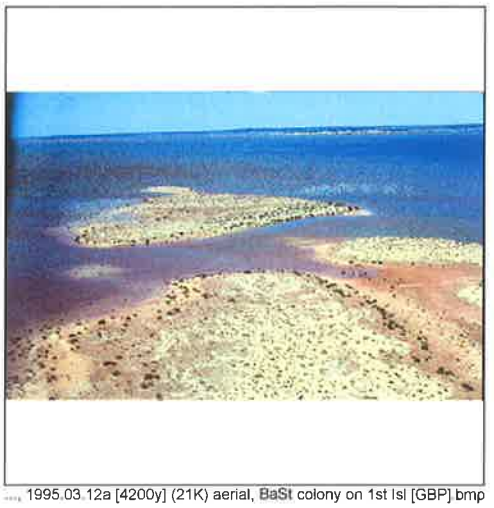

...d, 1995.03.12a [4196] (17K) aerial, BaSt colony on 1st Isl [GBP].bmp

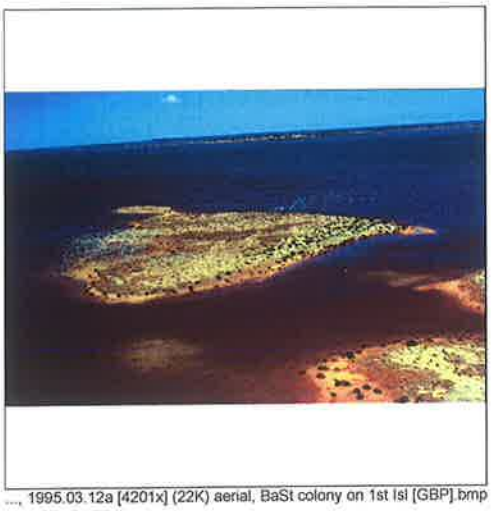

...d, 1995.03.12a [4197] (18K) aerial, BaSt colony on 1st Isl [GBP].bmp


Ballard, 1995.03.12a [4198] (19K) Camp Island, aerial [GBP].bmp


...d, 1995.03.12a [4199] (20K) aerial, BaSt colony on 1st Isl [GBP].bmp


..., 1995.03.12a [4200x] (21K) aerial, BaSt colony on 1st Isl [GBP].bmp


..., 1995.03.12a [4200y] (21K) aerial, BaSt colony on 1st Isl [GBP].bmp

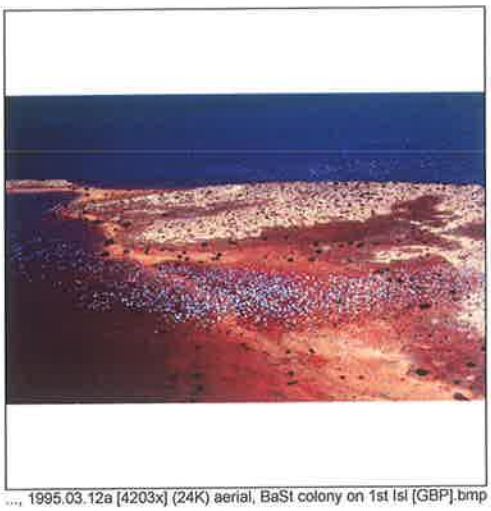


..., 1995.03.12a [4201x] (22K) aerial, BaSt colony on 1st Isl [GBP].bmp

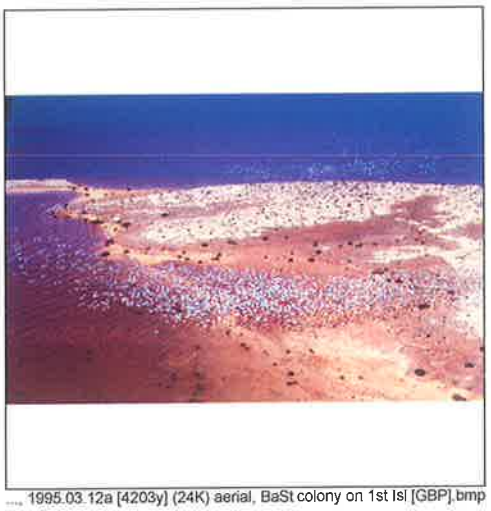
..., 1995.03.12a [4201y] (22K) aerial, BaSt colony on 1st Isl [GBP].bmp

..., 1995.03.12a [4202x] (23K) aerial, BaSt colony on 1st Isl [GBP].bmp

..., 1995.03.12a [4202y] (23K) aerial, BaSt colony on 1st Isl [GBP].bmp



..., 1995.03.12a [4203x] (24K) aerial, BaSt colony on 1st Isl [GBP].bmp



..., 1995.03.12a [4203y] (24K) aerial, BaSt colony on 1st Isl [GBP].bmp

..., 1995.03.12a [4204x] (25K) aerial, BaSt colony on 1st Isl [GBP].bmp

..., 1995.03.12a [4204y] (25K) aerial, BaSt colony on 1st Isl [GBP].bmp