3. Monitoring long term trends in common Australian birds across a range of habitats in Queensland

Collared Kingfisher, Nudgee Beach (Jon Coleman)

Zebra Finch, Bowra (Jon Coleman)

Project aims

This project will establish and maintain a representative banded population sample of common indicator species across a range of key habitat types across Queensland. This is to allow the estimation of survival rates, based on MARK capture/recapture sampling and productivity rates based on juvenile/adult ratios. The long term nature of the project also allows comparison of those baseline rates over time and monitoring of trends as indicators of change. It will also allow determination of the timing of moult and breeding, as well as establishing methods to accurately age and sex species.

Methods

A series of habitat types have been targeted for the study and suitable sites have been identified and permission obtained. These sites are shown in Figure 9. A series of mist-net rides have been determined for each site and birds are caught, banded, measured and released from each location, each month. Each month exactly the same mist-net rides are used over a standard period of time between Dawn and Midday (0600-1200), mirroring the protocols for Constant Effort Site monitoring programmes used by a number of banding schemes in Europe. Where weather permits the aim is to make one visit to each habitat type, at least once every two months to ensure data is collected routinely throughout the year.

Every bird caught is banded, aged and sexed if possible and a series of biometric measurements are taken for further analysis. These are Flattened wing chord length (mm), Tail length (mm) Tarsus length (mm), Total head length (mm) Total head width (mm), Bill length to feather (mm), Bill length to skull (mm) and Weight to the nearest 0.1g. Body condition for birds will be calculated by regressing weight against the composite size measurements.

During banding periods environmental factors that may affect capture rates, such as weather conditions, actual start and finish times, variation in nets used and the presence of any flowering or fruiting plants are noted, and in addition to banding a list of all the species present at the site is collected.

Over time, the data collected on new birds and the recapture data will be used to determine survival rates in the target species along with productivity rates, abundance indices and body condition indices. The consistent nature of the data collection allows long term trends in the above parameters to be monitored and reported on for these specific sites when compared to the baseline data collected in the initial years.

In addition to collection of long-term trend data for a range of species in the communities targeted the methodology highlighted also enables the detailed examination of plumage characters, biometric variation and moult strategies in known age birds of a range of common species. This has been used to determine accurate ageing and sexing criteria for some species in which data is lacking or can be used to compare with data from other sub-specific population studies elsewhere in Australia. This work is ongoing and the same philosophy can be applied to the collection of moult data which may be lacking for some species but will also provide opportunity for examining sub-specific or geographical variation in others for species studied in more detail, elsewhere in Australia.

Finally, biometric variation has been described in many bird species and in larger species has been used to try and explain differences in lifetime reproductive success, recruitment to the breeding population and survival. The data collected will provide an opportunity to look at size variation within species captured both within and between sexes and may be a criterion that can be introduced, along with body condition index as a variable in the proposed MARK capture/Recapture survival analysis methods.

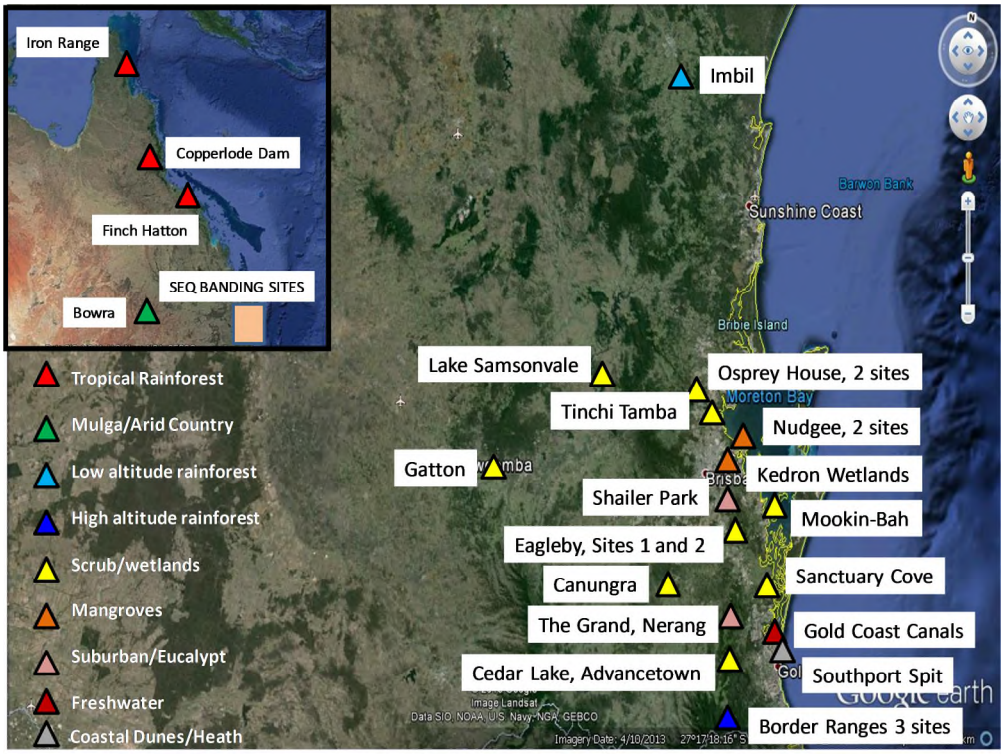

Figure 9. Banding locations used in this project

Table 1. The number of birds banded and retrapped in 2017, compared with totals for 10 years from 2006 to 2016

Species	Banded 2006 - 2016	Banded 2017	Total Banded	Total Retraps
Duck, Plumed-whistling	1	0	**1**	0
Duck, Pink-eared	1	0	**1**	0
Duck, Maned	64	3	**67**	63
Duck, Pacific-black	50	2	**52**	28
Teal, Chestnut	9	3	**12**	0
Hardhead	2	0	**2**	0
Brush-turkey, Australasian	10	4	**14**	52
Scrubfowl, Orange-footed	2	0	**2**	0

Species	Banded 2006 - 2016	Banded 2017	Total Banded	Total Retraps
Quail, Brown	29	7	**36**	1
Quail, King	0	1	**1**	0
Ibis, Australian-white	2	0	**2**	1
Ibis, Straw-necked	6	0	**6**	0
Heron, Striated	3	0	**3**	0
Egret, Cattle	1	0	**1**	0
Heron, White-faced	1	0	**1**	0
Egret, Little	1	0	**1**	0
Goshawk, Brown	4	1	**5**	0
Rail, Buff-banded	4	1	**5**	0
Swamphen, Purple	14	7	**21**	8
Moorhen, Dusky	9	3	**12**	0
Native-hen, Black-tailed	0	9	**9**	0
Button-quail, Painted	4	0	**4**	0
Gull, Silver	44	6	**50**	0
Dove, Spotted	180	10	**190**	37
Cuckoo-dove, Brown	9	4	**13**	0
Dove, Emerald	49	24	**73**	54
Bronzewing, Common	7	4	**11**	1
Pigeon, Crested	65	12	**77**	27
Pigeon, Wonga	2	0	**2**	1
Dove, Diamond	57	4	**61**	0
Dove, Peaceful	194	84	**278**	69
Dove, Bar-shouldered	107	11	**118**	68
Fruit-dove, Wompoo	0	1	**1**	0
Fruit-dove, Superb	1	1	**2**	0
Fruit-dove, Rose-crowned	3	0	**3**	0
Bronze-cuckoo, Horsefield's	6	3	**9**	0
Bronze-cuckoo, Shining	35	11	**46**	3
Bronze-cuckoo, Gould's	4	0	**4**	0
Bronze-cuckoo, Little	4	0	**4**	0
Cuckoo, Pallid	1	0	**1**	0
Cuckoo, Chestnut-breasted	3	0	**3**	0
Cuckoo, Fan-tailed	42	13	**55**	7
Cuckoo, Brush	11	1	**12**	1
Frogmouth, Tawny	2	0	**2**	0
Nightjar, Spotted	1	0	**1**	0
Nightjar, White-throated	1	0	**1**	0
Nightjar, Large-tailed	1	0	**1**	0
Owlet-nightjar, Australian	2	1	**3**	0
Dollarbird	0	1	**1**	0
Paradise-kingfisher, Buff-breasted	51	0	**51**	6
Kookaburra, Laughing	66	14	**80**	30

Species	Banded 2006 - 2016	Banded 2017	Total Banded	Total Retraps
Kookaburra, Blue-winged	1	0	**1**	0
Kingfisher, Forest	12	5	**17**	3
Kingfisher, Collared	39	1	**40**	7
Kingfisher, Sacred	120	15	**135**	24
Kingfisher, Red-backed	1	0	**1**	0
Kingfisher, Azure	59	10	**69**	30
Kingfisher, Little	7	1	**8**	1
Bee-eater, Rainbow	4	0	**4**	0
Falcon, Brown	0	1	**1**	0
Cockatoo, Yellow-tailed Black	0	1	**1**	0
Galah	26	6	**32**	8
Corella, Long-billed	11	0	**11**	0
Corella, Little	21	48	**69**	0
Cockatoo, Sulphur-crested	46	19	**65**	4
King-parrot, Australian	28	0	**28**	2
Parrot, Red-winged	5	2	**7**	0
Bonnet, Blue	0	1	**1**	0
Parrot, Mulga	3	7	**10**	0
Rosella, Crimson	0	1	**1**	0
Rosella, Pale-headed	55	4	**59**	24
Ringneck, Australian	19	26	**45**	1
Parrot, Bourke's	12	12	**24**	1
Parrot, Blue-winged	0	1	**1**	0
Lorikeet, Rainbow	814	82	**896**	72
Lorikeet, Scaly-breasted	42	11	**53**	0
Budgerigar	2	0	**2**	0
Pitta, Noisy	49	5	**54**	4
Catbird, Green	26	6	**32**	1
Catbird, Spotted	4	0	**4**	0
Bowerbird, Regent	16	1	**17**	0
Bowerbird, Satin	12	9	**21**	8
Bowerbird, Spotted	20	46	**66**	0
Treecreeper, White-throated	24	7	**31**	11
Treecreeper, White-browed	10	4	**14**	1
Treecreeper, Brown	62	38	**100**	16
Fairy-wren, Lovely	11	0	**11**	1
Fairy-wren, Variegated	176	36	**212**	209
Fairy-wren, Superb	148	27	**175**	100
Fairy-wren, Splendid	93	40	**133**	6
Fairy-wren, Red-backed	183	26	**209**	117
Fairy-wren, White-winged	25	0	**25**	1
Honeyeater, Dusky	164	28	**192**	35
Honeyeater, Scarlet	314	25	**339**	2

Species	Banded 2006 - 2016	Banded 2017	Total Banded	Total Retraps
Honeyeater, Green-backed	7	0	**7**	0
Spinebill, Eastern	85	21	**106**	12
Honeyeater, Pied	3	0	**3**	0
Honeyeater, Brown	995	136	**1131**	256
Honeyeater, New-Holland	25	28	**53**	7
Honeyeater, White-cheeked	2	0	**2**	0
Honeyeater, Striped	17	13	**30**	1
Honeyeater, Tawny-breasted	26	0	**26**	3
Friarbird, Little	22	2	**24**	0
Friarbird, Noisy	30	8	**38**	0
Honeyeater, Blue-faced	65	6	**71**	98
Honeyeater, Brown-headed	25	1	**26**	0
Honeyeater, White-throated	120	8	**128**	46
Honeyeater, White-naped	30	3	**33**	4
Chat, Crimson	0	5	**5**	0
Honeyeater, Spiny-cheeked	191	136	**327**	5
Honeyeater, Yellow-faced	398	54	**452**	113
Miner, Bell	0	6	**6**	0
Miner, Noisy	509	18	**527**	316
Miner, Yellow-throated	32	32	**64**	0
Honeyeater, White-fronted	2	0	**2**	0
Honeyeater, Mangrove	156	4	**160**	59
Honeyeater, Singing	140	101	**241**	9
Honeyeater, Grey-headed	11	11	**22**	0
Honeyeater, White-plumed	927	223	**1150**	195
Honeyeater, Graceful	56	0	**56**	0
Honeyeater, Yellow-spotted	128	0	**128**	18
Honeyeater, Lewin’s	605	135	**740**	453
Pardalote, Spotted	30	14	**44**	1
Pardalote, Striated	37	19	**56**	11
Redthroat	1	0	**1**	0
Warbler, Speckled	6	4	**10**	3
Scrub-wren, White-browed	427	76	**503**	656
Scrub-wren, Yellow-throated	236	53	**289**	176
Scrub-wren, Large-billed	304	56	**360**	251
Scrub-wren, Tropical	96	0	**96**	9
Weebill	18	1	**19**	0
Gerygone, Brown	43	10	**53**	5
Gerygone, Mangrove	491	14	**505**	146
Gerygone, White-throated	12	1	**13**	3
Gerygone, Fairy	44	7	**51**	8
Thornbill, Brown	111	33	**144**	46
Thornbill, Inland	43	15	**58**	8

Species	Banded 2006 - 2016	Banded 2017	Total Banded	Total Retraps
Thornbill, Chestnut-rumped	70	39	**109**	4
Thornbill, Yellow-rumped	9	13	**22**	2
Thornbill, Yellow	7	3	**10**	1
Whiteface, Southern	3	8	**11**	2
Babbler, Grey-crowned	4	3	**7**	0
Babbler, Hall's	21	13	**34**	3
Babbler, Chestnut-crowned	20	35	**55**	4
Logrunner	23	7	**30**	6
Whipbird, Eastern	102	11	**113**	66
Quail-thrush, Chestnut-breasted	1	2	**3**	0
Boatbill, Yellow-breasted	12	0	**12**	0
Woodswallow, White-breasted	13	0	**13**	0
Woodswallow, White-browed	3	0	**3**	0
Woodswallow, Black-faced	4	0	**4**	0
Woodswallow, Little	1	0	**1**	0
Butcherbird, Black	7	0	**7**	2
Butcherbird, Grey	51	12	**63**	24
Butcherbird, Pied	32	23	**55**	7
Magpie, Australian	61	4	**65**	101
Currawong, Pied	18	6	**24**	5
Cuckoo-shrike, Black-faced	9	0	**9**	0
Cuckoo-shrike, Barred	4	0	**4**	1
Cicadabird	3	2	**5**	0
Triller, White-winged	8	0	**8**	1
Triller, Varied	42	6	**48**	12
Sittella, Varied	9	9	**18**	0
Bellbird, Crested	4	3	**7**	0
Whistler, Grey	13	0	**13**	0
Whistler, Golden	383	89	**472**	238
Whistler, Rufous	258	53	**311**	97
Shrike-thrush, Little	460	24	**484**	311
Shrike-thrush, Grey	167	11	**178**	56
Figbird, Australasian	140	20	**160**	3
Oriole, Olive-backed	35	11	**46**	1
Oriole, Green	7	0	**7**	0
Drongo, Spangled	34	6	**40**	2
Wagtail, Willie	112	29	**141**	15
Fantail, Grey	386	73	**459**	66
Fantail, Rufous	383	62	**445**	95
Monarch, Spectacled	212	28	**240**	149
Monarch, Black-faced	19	2	**21**	1
Monarch, Black-winged	4	0	**4**	1
Monarch, White-eared	19	2	**21**	6

Species	Banded 2006 - 2016	Banded 2017	Total Banded	Total Retraps
Monarch, Frill-necked	15	0	**15**	2
Lark, Magpie	34	2	**36**	24
Flycatcher, Leaden	31	6	**37**	1
Flycatcher, Shining	19	0	**19**	5
Flycatcher, Restless	4	0	**4**	0
Crow, Torresian	15	0	**15**	0
Crow, Little	0	1	**1**	0
Chough, White-winged	1	0	**1**	0
Apostlebird	4	1	**5**	0
Manucode, Trumpet	1	0	**1**	0
Riflebird, Paradise	4	0	**4**	0
Riflebird, Magnificent	22	0	**22**	4
Robin, White-browed	3	0	**3**	0
Robin, White-faced	231	0	**231**	49
Robin, Pale-yellow	24	6	**30**	9
Robin, Eastern-yellow	658	124	**782**	791
Robin, Hooded	11	11	**22**	1
Winter, Jacky	8	13	**21**	0
Robin, Rose	31	8	**39**	5
Robin, Red-capped	70	33	**103**	3
Scrub-robin, Northern	6	0	**6**	0
Swallow, Welcome	24	4	**28**	0
Martin, Tree	6	0	**6**	0
Reed-warbler, Australian	54	31	**85**	16
Songlark, Rufous	9	0	**9**	1
Grassbird, Little	0	1	**1**	0
Grassbird, Tawny	257	34	**291**	124
Cisticola, Golden-headed	58	11	**69**	14
Silvereye	2985	474	**3459**	860
Starling, Metallic	3	0	**3**	0
Myna, Common	5	0	**5**	0
Thrush, Russet-tailed	42	14	**56**	16
Thrush, Bassian	30	7	**37**	5
Mistletoebird	86	19	**105**	6
Sunbird, Olive-backed	2	0	**2**	1
Sparrow, House	0	15	**15**	0
Finch, Red-browed	1479	355	**1834**	649
Finch, Plum-headed	52	24	**76**	1
Finch, Zebra	454	1	**455**	21
Finch, Double-barred	580	105	**685**	59
Mannikin, Chestnut-breasted	164	18	**182**	3
Pipit, Australian	3	0	**3**	1
TOTALS	**20993**	**3979**	**24972**	**8017**

Ageing and/or sexing criteria have now been established for 199 species (an additional 5 species added in 2017) which will help in identifying juvenile numbers caught in future years. This information is available as an updated pdf file covering all the analysed species should any other researchers require this information. These species accounts also record timing of breeding, as evidenced by the presence of brood patches and cloacal protuberances in birds as well as the presence of freshly fledged juvenile birds. Moult records and timing are also included providing a snapshot of the annual cycle of each species, where enough data has been collected.

In 2017, 3,979 new bird encounters were made as part of this project, with 1,519 recaptures of previously banded birds. There have now been 32,909 new birds banded since 2006 and 8,047 recaptures (24.5% recapture rate overall) of already banded individuals (Table 1). Habitats regularly surveyed now include open eucalypt forest, tropical rainforest, sub-tropical rainforest, temperate rainforest, mangrove and freshwater wetland. Three new sites were added in 2017, an Open Forest and reedbed site at Mookin-Bah Reserve, Manly and two sites near Gatton, one open forest site near the Toowoomba ranges and one on agricultural land on Lockyer Creek.

The many recaptures from a range of species mean that future survival analysis for many commonly caught species will be possible once several years of data have been collected. To date baseline survival analysis data has been published for the White-faced Robin and Mangrove Gerygone with preliminary analysis of data for the Cape York subspecies of Little Shrike Thrush underway.

Publications arising from this study

Coleman, J.T., Macdonald, S.H. & Smith, H.J. 2009. Analysis of biometric variation in the Brown Honeyeater *Lichmera indistincta* in South East Queensland. *Sunbird* 39: 39-48.

Coleman J.T., Van Gessel, F.W. & Clayton, M. 2012. Longevity and movements in the White-faced Robin (Tregellasia leucops albigularis) in Iron Range National Park, Cape York . *Sunbird* 42: 11-23.

Coleman, J.T. & Noske, R.A. 2017. Mangrove Gerygones Gerygone levigaster are short-lived compared to other small Australian passerines. *Corella* 41: 1-7.

Coleman, J.T. & Lloyd, P. 2017. Using sexual dimorphism in morphometric traits to sex Eastern Yellow Robins *Eopsaltria australis*. *Corella* 41: 15-19.