



K2C Bird Monitoring

First Survey 18 April 2010

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Background

K2C is a community partnership aiming to help landholders conserve and reconnect woodlands and grasslands. An important link in the centre of the K2C landscape is the property “Scottsdale”, owned by Bush Heritage Australia (BHA). Monitoring is an essential part of understanding the ecological outcomes of conservation programs. BHA undertakes ecological monitoring on their own properties, however as a result of conservation actions occurring on other K2C properties there is a need to monitor outcomes in the wider landscape.

Birds are one of the simpler and more convenient forms of biota to monitor. Birds are relatively easily observed, are well-researched, and are of interest to a large number of skilled and willing volunteers. In 2009 BHA approached the Canberra Ornithologists Group (COG) to assist in a project to monitor birds on K2C properties in the area surrounding Scottsdale. The main aims of the project were to monitor birds in woodland and grasslands on properties where conservation actions were being undertaken, and to provide feedback to landholders of these properties.

COG is the largest birdwatching group in south-eastern NSW with a membership of several hundred, based mainly in Canberra. COG is conducting several long term bird monitoring projects of its own and has many skilled and experienced members. The Group agreed to make the K2C bird surveys a part of the annual field outings calendar for 2010 with one survey day in autumn and one in spring. This report presents results from the first survey day on Sunday 18 April, and includes some logistical information to assist in the organisation of future surveys. A detailed analysis of the results has not been undertaken as it would be more informative after a number of surveys have been completed.

Survey sites

The survey was planned so that all sites could be covered in a morning by small teams of birdwatchers, with a post survey gathering of the volunteers for lunch near Bredbo. The sites therefore needed to be within reasonable distance of Bredbo or between Bredbo and Canberra where most of the volunteers were travelling from.

Properties for potential inclusion in the project were selected from a list maintained by the K2C facilitator. A letter was sent by email to those landholders who had undertaken or were planning some conservation action on their property, inviting them to participate in the survey. The letter was followed up with a phone call, and from those who responded favourably a property visit was arranged.

Areas of grassy box woodland or native grassland where conservation action was being undertaken were assessed for suitability as survey sites. Ease of access for the volunteers was an important consideration. Some otherwise suitable sites were not included in the project as they were too remote or required experienced 4wd skills and capability to reach. Some owners could not be contacted or properties visited in time for the first survey. These properties remain on the list for future visits and may be included in the next survey.

During the property visits, when a site of conservation action was chosen, where possible it was matched with a control site, that is, one in similar vegetation where the conservation action was not being undertaken. Selecting a control site was not possible for many sites, particularly those on properties where the whole property was under the conservation management, for example complete removal of grazing stock.

Sites were not marked in the field but a GPS reading was taken, the site was mapped on Google Earth and detailed directions were prepared to assist volunteers in finding the sites. Sites were labeled by the property name (first 3 letters) and a number. Property rather than landholder name was used in case of changes in ownership. Some properties weren't available for a visit or weren't suitable for the first survey but may still be included in future.

A total of 38 sites on 23 properties were included in the first survey (Table 1). The majority of sites (28) were located in remnant grassy woodlands of Yellow Box and/or Apple Box, and most of these sites (21) were protected from stock grazing. Two of the protected woodland sites were being enhanced, one with direct-seeded understorey, and one with tubestock plantings of overstorey species. The ground cover varied from completely exotic (African Lovegrass) to mixed native/exotic, or mostly native.

Four sites were located in grassland. Two sites were 'treatment' sites, where weeds were being controlled to restore native grassland, and the other two sites were control sites.

All six sites classed as revegetation were tubestock plantings. One of these plantings was 15 years old, the remainder were all less than one year old and the plants were less than 0.5 metres high. Ground cover at these sites ranged from native pasture to completely exotic, either African Lovegrass or broad-leafed weeds. Two sites included a couple of remnant trees within the plantings.

Table 1 Number of bird survey sites in each vegetation type, level of grazing and ground cover class

Veg type	Stock grazing		Ground cover			Total
	Yes	No	Native	Mixed	Exotic	
Remnant woodland	7	21	17	6	5	28
Grassland	1	3	1	0	3	4
Revegetation	0	6	1	2	3	6
Total	8	30	19	8	11	38

Survey participants

Volunteer birdwatchers were recruited from the Canberra Ornithologists Group. Teams of two or more observers were formed so that there was at least one experienced birdwatcher in each team. Teams were allocated four or more sites to survey on the morning. Each itinerary was planned so that the surveys could begin at 8am and the team could be finished and back at Bredbo by 1pm.

Twenty-three COG members volunteered, and were divided into nine teams with up to four in a team. The itinerary for each team is shown in Appendix 1. Most participants were experienced in this type of survey and were very familiar with the local birds. Several newcomers or less confident birdwatchers were able to improve their bird identification skills and became familiar with the survey methods by taking part in the survey.

Survey methods

Each site was surveyed using the standard method used by Birds Australia for the Atlas of Australian Birds, which is a 20 minute survey of a 2 hectare site. The shape of the 2ha varied from circular (c. 80 metre radius) to rectangular (100x200 m) to more linear (50x400 m) depending on the nature of the site. All birds seen or heard using the site were counted.

Species observed outside the 2ha site or outside the 20 minute survey period were recorded on a separate datasheet. The volunteers were encouraged to record all species observed on the property outside of the survey sites to compile an overall list for the property.

Bird Survey Results

On the survey morning, 84 bird species were recorded in the sites and during general observation on the properties. This total included 13 waterbird species, mostly recorded from two large dams. Of the 71 landbirds, 41 are considered to be woodland-dependent species in the region (Reid 2000, Reid and Cunningham 2008), seven are listed as threatened species in NSW and four are exotic species.

In the 38 survey sites, 59 species were recorded. Results are given for the different vegetation types. Appendix 2 contains a list of all species recorded during the morning, the number of records in sites of different vegetation types and the number of records from outside the survey sites.

Remnant woodlands

Across the 28 sites in remnant woodlands 56 species were recorded. The number of species per site ranged from 1-23 species, mean 11.5 (s.e. +/- 4.6). Honeyeaters were a feature of the remnant sites, with five species out of the 9 most frequently recorded being honeyeaters (Table 2).

Table 2 Number of sites and reporting rate for the 12 most frequently recorded species in 2ha sites in remnant woodlands.

Species	Number of 2ha sites	Reporting Rate%
Striated Pardalote	21	75
Red Wattlebird	20	71
White-eared Honeyeater	20	71
Yellow-faced Honeyeater	18	64
Spotted Pardalote	17	61
Australian Magpie	16	57
White-naped Honeyeater	16	57
Weebill	13	46
Noisy Miner	11	39
Crimson Rosella	10	36
Eastern Rosella	10	36
White-throated Treecreeper	10	36

Four of these honeyeaters are migratory or partially migratory in the region, and the survey morning fell in the middle of the autumn migration period. In terms of abundance, the four most abundant species across the 2ha remnant sites were all migratory. Yellow-faced and White-naped Honeyeaters accounted for the majority of migrating birds (Table 3).

Table 3 Total abundance and number for sites of the 10 most abundant species in 2ha sites in remnant woodlands.

Species	Total abundance	Number of 2ha sites	Reporting Rate%
Yellow-faced Honeyeater	1295	18	64
White-naped Honeyeater	212	16	57
Red Wattlebird	162	20	71
Striated Pardalote	87	21	75
Weebill	57	13	46
White-eared Honeyeater	55	20	71
Spotted Pardalote	52	17	61
Noisy Miner	41	11	39
Australian Magpie	40	16	57
Crimson Rosella	39	10	36

Two of the remnant sites are being supplemented with revegetation, one with direct seeding of overstorey and understorey species, the other with tubestock plantings of primarily overstorey species. Both treatments have only occurred in the last year and the revegetation has yet to influence the habitat structure of the sites. Treatments at other sites (removal of stock grazing, weed control, etc.) have also been implemented recently and are unlikely to have yet influenced the habitat for birds.

Grasslands

As expected, the four grassland sites were very low in bird numbers. The only species recorded was the Australasian Pipit and only at two of the sites, one the native grassland site, the other a mixed native/exotic grassland. No birds were recorded in the fully exotic grasslands.

Revegetation

Five of the six revegetation sites were planted less than one year ago and the plantings are yet to influence the habitat at the site. In these sites 12 species were recorded with the number of species per site ranging from 0-7. The species were typical of open paddocks (Brown Quail, Australian Magpie, Common Starling) or very early succession revegetation (Superb Fairy-wren, Yellow-rumped Thornbill). However, at one of these sites which included a couple of remnant trees within the plantings, three significant species were recorded; Hooded Robin, Diamond Firetail and Southern Whiteface.

The most advanced revegetation site was a 15 year old planting, included to provide a measure of the habitat value for birds once revegetation does develop. Twelve species were recorded at this site including species of shrubby bushland (Brown Thornbill, White-browed Scrubwren, Grey Fantail, Rufous Whistler) and three species of honeyeater migrating through.

Threatened species

Eight Threatened species, all listed as Vulnerable in NSW, were recorded on the survey day, with one more Vulnerable species recorded at a site during the initial property visits.

Glossy Black-Cockatoo

During the survey morning there was one record of Glossy Black-Cockatoo. Three birds were seen flying over the survey site on the property “Cockatoo” c. 10 km south-east of Michelago. The survey site is at the foot of a large granite hill which supports extensive stands of the cockatoo’s food tree *Allocasuarina verticillata*. The sighting is significant because the cockatoo is rarely recorded in the ACT-Queanbeyan area, and hasn’t been reported from the Monaro area before, although it can be more regularly seen closer to the coast where there are extensive stands of *Allocasuarina littoralis*. The sighting is an indication that the Glossy Black-Cockatoo could occur over a larger part of this landscape if sufficient stands of mature *Allocasuarina* were present. (Photo: Stuart Harris)



Gang-gang Cockatoo

The Gang-gang Cockatoo is not uncommon in the K2C region. It typically spends the summer breeding months in the tall wet forests of the mountains, in winter moving out into the drier forests and woodlands. There were two records of the Gang-gang; one in remnant box woodlands on the eastern slope of the Murrumbidgee River, and one in open habitat near Michelago where the birds were feeding on a favourite autumn food, the fruit of the introduced Hawthorn. (Photo: Peter Fullagar)

Brown Treecreeper

The Brown Treecreeper is listed as a Vulnerable species in both the ACT and NSW. In the ACT it has almost disappeared from the lowland Yellow Box- Redgum woodlands, and is most reliably found in the southern part of the ACT, including Namadgi NP. In surrounding NSW it is most commonly reported to the south of the ACT in the Williamsdale to Bredbo region. In the K2C surveys the Brown Treecreeper was recorded at 7 sites on 5 properties, with all sites in remnant woodlands with native or mixed groundcover.

(Photo: Helen Fallow)



Speckled Warbler

The Speckled Warbler is listed as Vulnerable in NSW but not the ACT. It inhabits woodlands and dry forests where the ground cover includes litter, logs, tussocky grasses, some shrubs and open patches.

In the surveys the Speckled Warbler was recorded at 5 sites all in woodlands.

(Photo: Helen Fallow)

Varied Sittella

The Varied Sittella is listed as Vulnerable in NSW and the ACT. It is a species typically of dry woodlands but is also found in forests and grassy woodlands. It forages in the bark along tree branches, particularly dead branches.

The Varied Sittella was not recorded during the K2C survey but was found at one site during the initial property visit.

(Photo: David Cook)



Scarlet Robin

The Scarlet Robin has only recently been listed as Vulnerable in NSW, and is not yet listed in the ACT although evidence suggests it is declining there also (Bounds et al 2010). In the K2C region the Scarlet Robin inhabits open forests and woodlands, with some movement in the autumn to more open habitats. In the survey the Scarlet Robin was recorded at 9 sites, 8 remnants and 1 revegetation site which contained two mature stringybark trees.

(Photo: Stuart Harris)

Flame Robin

Like the Scarlet Robin, the Flame Robin has only recently been listed as Vulnerable in NSW, and is not yet listed in the ACT. In summer and early autumn the Flame Robin is most common in the higher altitude woodlands and forests of the K2C region. During autumn the robins move to lower woodlands and grasslands where they may be quite conspicuous through the winter.

In the K2C surveys Flame Robins were recorded on 6 properties during general observations, but not in any of the survey sites.

(Photo: Stuart Harris)



Hooded Robin

The Hooded Robin has a similar status and distribution in the region as the Brown Treecreeper. It is listed as Vulnerable in both the ACT and NSW, and in the ACT it has almost disappeared from the lowland Yellow Box- Redgum woodlands. It is more regularly found in the southern part of the ACT, and areas surrounding this in NSW.

During the K2C surveys the Hooded Robin was recorded at 7 different sites across 6 properties, confirming the importance of this region for the species. One of the sites was a revegetation site with two remnant trees included, the other sites were all woodland remnants with groundcover varying from mostly native to mixed native/exotic, but none with a fully exotic groundcover. *(Photo: Geoffrey Dabb)*

Diamond Firetail

The Diamond Firetail is a bird typically of open woodland and grasslands. It needs a variety of grasses to sustain its diet of seeds throughout the year, and some shrubs or dense cover for shelter and nesting habitat.

The Diamond Firetail was recorded at 10 sites; 7 remnant woodlands and 3 revegetation sites.

(Photo: Helen Fallow)



Discussion

The total of 71 landbird species recorded during the survey morning represents a large proportion of the species which could be expected to be detected during such a survey in this area. The number and abundance of Threatened and declining species was particularly encouraging.

For species such as the Hooded Robin, Diamond Firetail, Brown Treecreeper and Southern Whiteface which are becoming rarer in the ACT and further to the north and west, the Williamsdale to Bredbo part of the K2C region appears to be somewhat of a stronghold. This may be due to the relatively extensive tracts of native vegetation remaining in the region, and despite land clearing and weed invasion, the good quality and extent of grassy box woodlands. However this is not a reason for complacency but rather for optimism that appropriate conservation actions may still assist the retention of these species in the landscape.

The large areas of remnant vegetation in the K2C region are predominantly wet mountain forests or dry forests on unproductive soils. As is the case in other Australian landscapes the productive soils have been largely cleared or modified for agricultural purposes, and it is the vegetation of these soils that support many of the threatened and declining species. Hence K2C is concentrating on protecting and restoring the more threatened vegetation types of native grasslands and grassy woodlands.

The Hooded Robin in south-east NSW has been found to be particularly demanding in its requirements for large areas (>100ha) of suitably complex woodland habitat (Watson *et al* 2001). Hooded Robins were recorded on at least 6 properties in the survey, which may hopefully indicate that a viable population exists in the area, and give reason for optimism that restoring and linking suitable habitat might allow the existing population to expand to properties where it is currently not recorded.

Similarly Diamond Firetails were recorded on several properties spread across the survey area, indicating a widespread distribution. A record from as recently as 1986 reports a flock of 200 Diamond Firetails near Michelago (Gibson 1986). Nowhere near that number of birds has been reported since, however with restoration of suitable habitat maybe the local population of firetails could build up again.

Linking suitable habitat to allow population movements across the landscape has its challenges for some species. A critical habitat feature for the Brown Treecreeper is the presence of standing dead trees or stumps and fallen timber, and the species may persist for some time in small remnants of suitable habitat. However it requires a very well-connected landscape for dispersal, and will eventually die out of isolated remnants with little chance of recolonisation.

A potential example of this is demonstrated by the presence of the Brown Treecreeper at the property Te-Chi, where remnant tree cover is restricted to 2 ha of Apple Box and Candlebark near the house and the nearest patch of similar woodland is at least 1km away. Two Brown Treecreepers were recorded during the survey, both in the 2ha remnant but also far out into the surrounding grassland where a few dead trees and stumps remained. Reconnecting the isolated remnant to similar woodland for the Brown Treecreeper to be able to disperse will require more than just the traditional concept of a tree planted corridor, and in fact the species prefers open woodland habitat without dense tree and shrub cover (Doerr *et al* 2006). Reinstating sufficient deadwood into the landscape to assist Brown Treecreeper movements would be an interesting and novel restoration challenge!

An over-riding influence on bird abundance and composition at woodland sites may prove to be the presence of the Noisy Miner, an aggressive colonial honeyeater known to drive away other birds, particularly small species. Noisy Miners were recorded at 11 of the survey sites, ranging in abundance from 1-10. It has been found that eucalypt plantings which include Acacia species in the understorey are less likely to have Noisy Miners (Hastings and Beattie 2006, Lindenmayer *et al* 2010). One of the K2C woodland sites where Noisy Miners are present has been direct seeded with Acacia species which are just beginning to grow. It may take several years yet but monitoring this site may hopefully demonstrate an improvement in the small bird population as the Acacias grow.



The Noisy Miner, an aggressive honeyeater of remnant woodlands. (Photo: Stuart Harris)

Monitoring the birds in sites of conservation action will hopefully demonstrate to landholders the benefits of habitat protection and restoration. However, many of the treatments (removal of stock, weed control, revegetation, etc.) have only recently been initiated, and any differences between treatment and control sites may not be apparent for several years, or even for decades.

The bird monitoring project is also important as a reason for communicating with landholders and providing feedback to them. It could also be used to provide motivation for more action, including targeted action, eg. 'include Drooping Sheoke in plantings for Glossy Black-Cockatoos', 'connect 100ha of woodland in this area for the local Hooded Robins', 'restore native grasses for the Diamond Firetail', 'retain and reinstate deadwood for the Brown Treecreeper'.

Considerations for future surveys

A few more sites could be added to the survey, particularly from those properties on the list which were not able to be part of the first survey. Consideration could be given to including a few more control sites, particularly in woodland remnants which are still being grazed by stock. However caution is needed not to include so many sites that the number of sites outstrips the number of volunteers available (see below).

The K2C surveys have been initiated with the aim of being a long term monitoring project. How long the monitoring continues depends on the availability and willingness of the birdwatchers, so management of the volunteers is crucial to the success of the project. Some other long term bird monitoring projects undertake surveys quarterly (COG woodland bird monitoring, Cowra woodland



bird project), however this was considered to be too demanding for the pool of potential COG volunteers, many of whom are involved in these and other projects. K2C surveys are currently planned to be biannual (autumn and spring), however if sustaining the volunteer effort becomes difficult it is recommended that the surveys be reduced to annual (spring).

After the first survey the volunteers were treated to lunch at Scottsdale shearing shed, provided for by Bush Heritage Australia. The post-survey lunch is an important social and information-sharing part of the survey, and will assist in encouraging the birdwatchers to volunteer for future surveys.

The second survey is scheduled for Sunday 17 October. This is one week after the K2C Biodiversity and Farming Fair in Bredbo, which represents an opportunity to promote the bird surveys as an interesting and important part of the K2C project.

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Appendix 1. Itinerary for teams in first K2C survey

Team	8.00	8.30	9.00	9.30	10.00	10.30	11.00	11.30	12.00	12.30	13.00
1 (4 people)	Bredbo	Mt Oak						leave	Hilcrest		Scottsdale
2 (2)	Guises Ck				leave	Prospect Hill				finish up	Scottsdale
3 (2)	Millpost				leave	Ingelara				finish up	Scottsdale
4 (2)	The Creek'		Cockatoo					leave	Warriwillah	finish up	Scottsdale
5 (2)	Stonehouse				leave	Tallulah				Gungoandra TSR	Scottsdale
6 (3)	Bredbo	Te-Chi	Thistlebrook		Strike-a-light TSR		Tanya Hobbs			finish up	Scottsdale
7 (4)	Bredbo	Scottsdale									Scottsdale
8 (3)	Gundharwa			Silver Gum	Illilanga					finish up	Scottsdale
9 (1)	Bredbo	Valley View			Paddington Hills		Scheele's			finish up	Scottsdale

Appendix 2 Bird species recorded during the first K2C survey, status and number of sites in different vegetation types.

Status: V=Vulnerable, d=declining, I=introduced, W=woodland-dependent

Status	Species	2 ha sites			Dam n=1	Outside sites n=24
		Remnant n=28	Grass n=4	Reveg. n=6		
	Brown Quail			1		
	Musk Duck				1	1
	Black Swan				1	1
	Australian Wood Duck				1	1
	Australasian Shoveler					1
	Grey Teal				1	2
	Pacific Black Duck				1	1
	Australian Grebe					2
W	Common Bronzewing	1				
W	Peaceful Dove	1				
	Crested Pigeon					4
	Great Cormorant					1
	White-faced Heron					1
	Wedge-tailed Eagle	1				7
	Nankeen Kestrel	1				3
	Brown Falcon					6
	Australian Hobby					1
	Dusky Moorhen					1
	Eurasian Coot					1
	Black-fronted Dotterel				1	
	Masked Lapwing				1	1
V	W Glossy Black-Cockatoo					1
V	Gang-gang Cockatoo					1
	Galah	6				6
	Sulphur-crested Cockatoo					3
W	Crimson Rosella	10		1		
	Eastern Rosella	10				3
	Red-rumped Parrot	8				2
W	Laughing Kookaburra	2				4
W	White-throated Treecreeper	10				3
V	W Brown Treecreeper	4				3
W	Superb Fairy-wren	2		2		9
W	White-browed Scrubwren	2		1		1
V	W Speckled Warbler	2				1
W	Weebill	13				1
W	Western Gerygone	1				1
W	Striated Thornbill	3				
	Yellow-rumped Thornbill	7		2		4
W	Buff-rumped Thornbill	3				
W	Brown Thornbill	3		1		
W	Southern Whiteface	4		1		5
W	Spotted Pardalote	17				5
	Striated Pardalote	21		1		9
W	Eastern Spinebill	2				2
W	Yellow-faced Honeyeater	18		1		8
W	White-eared Honeyeater	20		3		7
W	Yellow-tufted Honeyeater	1				
W	Fuscous Honeyeater	4		1		1

Status	Species	Remnant n=28	2 ha sites			Dam n=1	Outside sites n=24
			Grass n=4	Reveg. n=6			
	White-plumed Honeyeater	5				1	
	Noisy Miner	11				7	
W	Red Wattlebird	20		1		7	
W	Brown-headed Honeyeater	1				1	
W	White-naped Honeyeater	16		1		2	
W	Noisy Friarbird	3				1	
	Black-faced Cuckoo-shrike	5				4	
W	Golden Whistler	2				1	
d W	Rufous Whistler	4		1		2	
W	Grey Shrike-thrush	3				4	
d W	Dusky Woodswallow	5				4	
W	Grey Butcherbird	5				5	
	Australian Magpie	16		1		13	
	Pied Currawong	2				7	
W	Grey Fantail	5		1		1	
	Willie Wagtail	6			1	3	
	Australian Raven	6				8	
	Little Raven	1				1	
W	Leaden Flycatcher	1				1	
	Magpie-lark	2				4	
W	White-winged Chough					1	
W	Scarlet Robin	7					
V	Flame Robin					5	
V W	Hooded Robin	3		1		2	
d W	Eastern Yellow Robin					2	
I	Eurasian Skylark					3	
W	Silvereye	1		1		2	
	Welcome Swallow	1		1	1	6	
W	Tree Martin	1					
I	Common Starling	3		2		4	
	Mistletoebird	2					
W	Red-browed Finch					1	
V W	Diamond Firetail	5		2		3	
I	House Sparrow			1		4	
	Australasian Pipit		2			6	
I	European Goldfinch					3	



The most numerous species in the survey was the Yellow-faced Honeyeater, on migration from the mountains to the coast. (Photo: Geoffrey Dabb).