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**KAKAPO BOOMING ACTIVITY,  
LITTLE BARRIER ISLAND  
JANUARY - MARCH 1989**

by

T.C. Greene

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# **KAKAPO BOOMING ACTIVITY, LITTLE BARRIER ISLAND JANUARY JANUARY - MARCH 1989**

by

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## **ABSTRACT**

The 1989 summer was an active one for kakapo on Little Barrier Island. Although the season was unusually short, large of feathers and droppings found in association with track-and-bowl systems suggests mating may have occurred. There is also evidence for the continued development of a stable, centralised lek arena on Little Barrier Island.

## **1. INTRODUCTION**

Two years after the release of kakapo on Little Barrier Island, sporadic booming was heard from a number of birds during a two to three week period between March and April 1984 and again over a similar period in 1985. The following year (1986), however, was a "full booming season" during which a number of males were heard booming continuously throughout the night from January to April. It was during this period that the majority of the present booming sites were developed, but despite the high degree of activity, no evidence was found to suggest that successful breeding had occurred. Moorehouse (1986) suggests that this may have been the result of a failure by females to reach the nutritional threshold required for successful breeding. As expected, 1987 was a non-booming year, although a severe drought at the time probably had some effect on the lack of activity (Handford 1987). The 1988 season was an active and extended one. Activity at sites was recorded between January and the end of April, but was not continuous because of disruption caused by cyclone Bola early in March. For the first time on Little Barrier Island, feathers were found in association with active track-and-bowl systems, raising the possibility that breeding had been attempted.

This report describes the results of three visits to Little Barrier Island to monitor the 1989 booming season as part of the Department of Conservation's continuing programme of monitoring the Little Barrier Island kakapo population.

## **2. METHODS**

Three field trips were made to Little Barrier Island during January (17.1.89 -February (14.2.89 -2.3.89) and March (14.3.89 -29.3.89) 1989 (a total of 50 days).

Known booming sites (Figure 1) were visited on a regular basis during each of these trips and any activity (grubbing at sites, trimmed vegetation, feathers, droppings, etc.) was noted. Three or four short upright sticks and two crossed sticks were placed in active bowls or scrapes so that further activity could be detected by their disturbance. Other potential booming sites were visited and all tracks walked were examined for signs of fresh feeding, droppings and feathers. When weather conditions were suitable, nights were spent camped near active sites listening for booming. A rough estimate was also made during every visit of the relative abundance of fruits, flowers, and seeds that may have been potential food sources (Table 2).

### 3. RESULTS

The dates of checks on all known and tagged sites and an assessment of freshness of activity at these sites is shown in Table 1.

#### 3.1 System activity – January

By the time that first checks of booming sites were made in mid-January, 18 of the then 43 known sites showed some evidence of having been visited within the previous two weeks. By the end of the month this had increased to 22 sites, 10 of which (sites 7, 9, 12, 20, 21, 24, 25, 27, 31, 40) were being visited on a reasonably regular basis. It soon became obvious that the majority of activity was being concentrated on the central summit ridge (i.e. track 18 between the Summit and Kiriraukawa) with only a few active exceptions on the ridges radiating from the centre of the island (e.g. sites 12 and 31). This was a pattern that was to persist throughout the three month monitoring period.

Two new scrapes were found during January. The first was located just below and to the north of the summit (Hauturu) during the first visit to the top of the island. A considerable area had been cleared of vegetation (including a small *Weinmannia silvicola* shrub that had been chewed to the ground) and the soil intensively grubbed. Because of this scrape's proximity to site 7 on the summit (approx. 5 m) it was assumed to be part of this system and was referred to as such for the rest of the study. The second scrape, which was substantially smaller, was located on the summit of Orotere (track 8) and given the numbered tag 44.

By the end of the month there had been a noticeable increase in the amount of activity such as grubbing, the amount of feeding sign and the number of droppings near a number of booming sites. By 1.2.89 the first of the feathers began to appear with 7 down feathers being found at site 25.

Two nights were spent camped on the summit ridge during the last week of January. Despite the weather deteriorating on both occasions and the incessant noise of calling petrels, snatches of booming were heard on 27.1.89 from the summit ridge, and although no booming was heard on 29.1.89, skraaking was heard from the summit ridge and from the summit itself.

#### 3.2 System activity - February

During February, 20 sites showed some degree of activity, including a new track-and-bowl system developed this month. Of these active sites, 12 were reoccupied regularly (7, 12, 19, 20, 21, 24, 25, 27, 31, 35, 40, 45), the remainder being visited on only a sporadic basis. The other 25 sites did not display any signs of activity or of having been visited at all. Several features of the activity observed this month were considered to be of some significance. This includes 1) finding large numbers of feathers, 2) the abundance of droppings with distinct characteristics, 3) the reopening of a formerly abandoned site and the rapid development of a new one, and 4) vocalisations.

##### 3.2.1 Feathers

Within two days of arriving back on Little Barrier, a total of 106 feathers of different types (down, contour and facial-disk) were found in and around bowls and on the tracks separating them. On the first day alone (15.2.89) 77 feathers were found; 52 of these within, or scattered around, active track-and-bowl systems. The following table summarises the number and types of feathers found at these sites (D = Down, C = Contour, FD = Facial Disk).

Date	Site	Total number of feathers	Description of feathers		
			D	C	FD
15.2.89	9	4	3	1	
	7	16	13	1	2
	21	3	3		
	24	9	8	1	
	25	12	12		
	35	7	4	3	
16.2.89	45	1	1		
	20	5	3	2	
	12	10	10		
		67	57	8	2

Date	No. feathers on tracks
15.2..89	25
16.2.89	14

### 3.2.2 Droppings

In comparison with January, the increase in the number of droppings found (like feathers) was quite dramatic. Twenty-two droppings ranging from fresh to over one week old were found on tracks between the majority of active sites. Two distinct types were noted. The most common were very large (up to 6-7 cm long), loosely compacted, fibrous and full of small black seeds which were thought to have come from the fruits of an *Astelia* species which was abundant at the time (Table 2) along many of the ridges. The second type of dropping was a lot less common but of a more "classic" shape i.e. much smaller, tightly coiled with a small amount of uric acid adhering to them. Most of these looked several days old and lacked the small black *Astelia* seeds common in the other type of dropping. By the end of the month, in association with a marked decline in activity at a number of sites, those few droppings still being found on the ridges had become sticky and slimy.

### 3.2.3 Development of sites 35 and 45

It was somewhat surprising to find that site 35 had been intensively grubbed in the period between the January and February trips. Not only had there been no indication of interest in the area during January, it was the first time it had been active since the 1986 booming season, when the site was first discovered (Moorehouse 1986). Even more surprising was the rapid development of a respectable track-and-bowl approximately 20m east of site 35 (Track 18). This site was designated number 45. Both sites were consistently active throughout (Table 1).

By February, all sites being visited regularly had well developed bowls and in some cases grubbed tracks of considerable length (e.g. 20m+ at site 31, Orau).

### 3.2.4 Vocal behaviour

Three nights were spent camped on top of the island listening for kakapo during February. On only one of these occasions, however, were listening conditions anywhere

<b>Location</b>	<b>No. of birds calling</b>
Timberstack (site 8)	1
Summit (site 7)	1
Ohakiri (site 12)	1
Summit ridge (Track 18)	2
Kiriraukawa (sites 26, 27, 40)	1
Orau (site 31)	1
Track 20 (site 34?)	1
	Total 8

near favourable. Often, there would be three or four way exchanges of loud screeching calls between birds from different parts of the island. The most vocal of these birds was the one occupying site 12 on the side of Ohakiri (Table 1). These bird usually called every 2-3 minutes for most of the night often provoking a vigorous response from other birds in the near vicinity (i.e. from the Timberstack, Summit and Summit ridge).

Although booming was heard on the other two nights spent on top of the island, listening conditions were marginal (a persistent feature of an unseasonably wet and windy summer), with only snatches of booming and skraaking able to be heard above the background noise of wind and petrels. Booming was only able to be confirmed from the summit (site 7) and that area of the summit ridge consisting of sites 19, 20 and 21.

Vocalisations were heard once in February during daylight hours. A brief snatch of "chinging" was heard at 1035hrs on 20.2.89, from the head of the valley east of track 7 and below sites 24 and 25 after a night when small amounts of skraaking and booming were heard in this area.

By the end of the month the amount of sign (specifically feeding, feathers and droppings) had fallen away to almost nothing even though there was evidence that a number of birds were still visiting their track-and-bowl systems.

### **3.3 System activity - March**

Only 14 sites showed any degree of activity during the March visit, the remaining 31 sites showing no sign of activity at all. None of the active sites was visited more than three times, four were only visited twice (7, 10, 34, 35) and ten were visited only once (12, 13, 14, 15, 19, 20, 31, 40, 41, 45). Of those sites that were visited only once, several had been active on only rare occasions or had not been previously visited this season (sites 13, 14, 15, 41,). All of these sites are located on tracks 4 and 5 although in some instances (e.g. sites 13 and 14) activity had been quite intensive, little attempt at bowl formation was apparent. This suggests that there had been only a short period of activity at these sites, probably as a bird (or birds) returned to its usual home-range.

Most of the little sign found (feeding, feathers, droppings) was located on those ridges radiating from the central summit area (Hamilton track, Thumb track and tracks 4, 5 and 20). This, and the decline in activity in the central booming arena, seems to indicate the general departure of male birds for their winter home-ranges. By 21.3.89 all activity at track-and-bowl systems appeared to have ceased.

## 4. DISCUSSION

### 4.1 Number and location of active birds

From observations made of the 45 known sites, an accurate assessment of the number of active males using specific sites, or groups of sites, each month can be made. Such an assessment is based on the number of sites active each month (Table 1), vocal activity and to a lesser extent, feeding sign and droppings. Obviously there is some room for error when designating a group of track-and-bowl sites in close proximity to one another, or sites that may be some distance apart (e.g. sites 8 and 9), as the exclusive "property" of an individual bird. This assessment also relies on the assumption that those birds calling repeatedly throughout the night were males. These provisos accepted, the following table describes both the number and location of active male birds.

Sites	Number and location of active male birds		
	Jan.	Feb.	Mar.
7	1	1	1
8, 9, 10	1	1	1
19, 20, 21	1	1	-
24, 25	1	1	-
35, 45	-	1	1
26, 27, 40, 37	1	1	-
31	1	1	-
12	1	1	1
34	-	1	1
No. active birds	7	9	5

Although daily checks of site activity provided much of the above information, vocalisations, especially in February, added much to the accuracy of these assessments (see 3.2.4).

Unlike the 1988 season (Dowding 1988), the number of active birds has not remained constant throughout a somewhat shorter season than usual. Activity seems to have increased from the beginning of the year, peaked about the beginning of February, then rapidly decreased throughout the rest of February and into March. Similarly, there is little evidence for movement of males between "systems". Male birds appear to have become more system attached, preferring to move only short distances between sites within a system (e.g. 19, 20 and 21). The willingness to display from a specific set of sites, the concentration of activity on the central ridge between the summit and Kiriraukawa, the rapid reoccupation and development of a system on the central summit ridge (sites 35 and 45) and the almost complete abandonment of sites on radiating ridges (especially the Whekauwhekau complex and tracks 4 and 5), indicates yet another step in the development of traditional "home" systems for at least 8 individual male kakapo and the overall development of a stable, centralised lek arena on Little Barrier Island.

### 4.2 Significance of feathers and droppings

The appearance of down and contour feathers in bowls on Stewart Island has usually been interpreted as a sign that mating has occurred (R. Powlesland pers. comm.). The extraordinary number of feathers found during February on Little Barrier is therefore of some interest and potential importance.

On the basis of the evidence presented in section 3.2.1 it is tempting to conclude that mating must have occurred on more than one occasion. However, like Dowding (1988), inconsistencies between observations from Stewart Island and Little Barrier Island were apparent. Although the prevalence of down feathers at some sites is puzzling, of those six sites where more than five feathers were found (7, 12, 20, 24, 25, 35) only two sites consisted entirely of down feathers (12,25), the remainder having at least one contour feather among them. Feathers may not have been restricted to the bowl because of either the physical nature of the bowl itself (i.e. low overhanging vegetation preventing two birds from occupying a bowl at once), or the high probability of feathers being blown away or at least out of the bowl on the exposed ridges (Dowding 1988). Whether feathers are actively removed by male (or female) birds as part of their display is not known.

Although moult may explain the degree of feather loss this explanation was considered unlikely for the following reasons:

- a) Most feathers were lost during the first two weeks of February, very few being found before or after this period. This is hardly a constant accumulation over time and is also a very short period for moult to occur.
- b) No wing or tail feathers were found as would be expected during a period of moult.
- c) Two distinct groups of down feathers were found on two separate occasions at site 25 -7 on 1.2.89 and 12 on 15.2.89.

Further evidence that matings may have occurred during this period of apparently intense activity is provided (at least circumstantially) by the type of droppings found at higher altitudes. Prior to and during most of February, all droppings in the vicinity of active sites were of the typically large type described in 3.2.2. However, in February, small numbers of droppings of the second smaller type were found on the ridge between the summit and Kiriraukawa. All were several days to two weeks old and fresh droppings of this type were not seen again in this vicinity in the following weeks. The possibility therefore exists that a bird, or birds, may have ventured onto the ridges from other parts of the island, stayed for only a short period of time, then departed. The likelihood that this bird, or birds, were female is quite plausible as it is possible that female birds may spend as little as one night near a track-and-bowl system over the entire breeding period (Moorehouse 1985).

### 4.3 Phenology

Moorehouse (1986) has suggested that specific feeding conditions are a prerequisite for successful breeding to occur, especially for female kakapo. It is possible that such conditions may have been met during the 1989 season only one year after another highly active season. High rainfall during the 1988 spring and heavy rain in January 1989, seem to have provided conditions suitable for rapid vegetative growth and the production of high quality foods such as fruit and seed. The abundance of these food sources may have contributed to both the rapid onset of breeding condition in birds of both sexes and the brief duration of the 1989 breeding season in comparison with previous years.

Throughout the breeding season itself, large quantities of fruits, flowers and seed were available over much of the island especially at higher altitudes. The abundance of high quality foods such as the fruits and flowers *Ixerba brexiodes*, *Quintinia acutifolia*, *Astelia* spp., *Beilschmieda tawa*, *Coprosma grandifolia*, *Phormium cookianum*, and *Rhipoginum scandens*.



## 5. CONCLUSIONS

The 1989 kakapo breeding season on Little Barrier Island was highly active, although of a much reduced duration in comparison with previous years. Although booming was heard infrequently (largely the result of unseasonal weather conditions), a period of obvious intense activity during the first two weeks of February provides several reasons to be optimistic about the outcome. Male breeding behaviour seems to be evolving towards a more stable centralised lek arena with most track-and-bowl activity concentrated on the summit ridge in favour of many sites on radiating ridges.. Most, if not all, male birds remaining on the island (approx. 8 in 1986, Hanford 1987) appear to have been active at some time during this breeding season. A number of track-and-bowl systems were found to contain feathers, and the presence of two distinct types of droppings suggests female kakapo may have at least visited the top of the island. Confirmation of successful mating is probably some months away and for this reason it remains vital that this population, now the second largest, continue to be monitored in the future.

## 6. ACKNOWLEDGEMENTS

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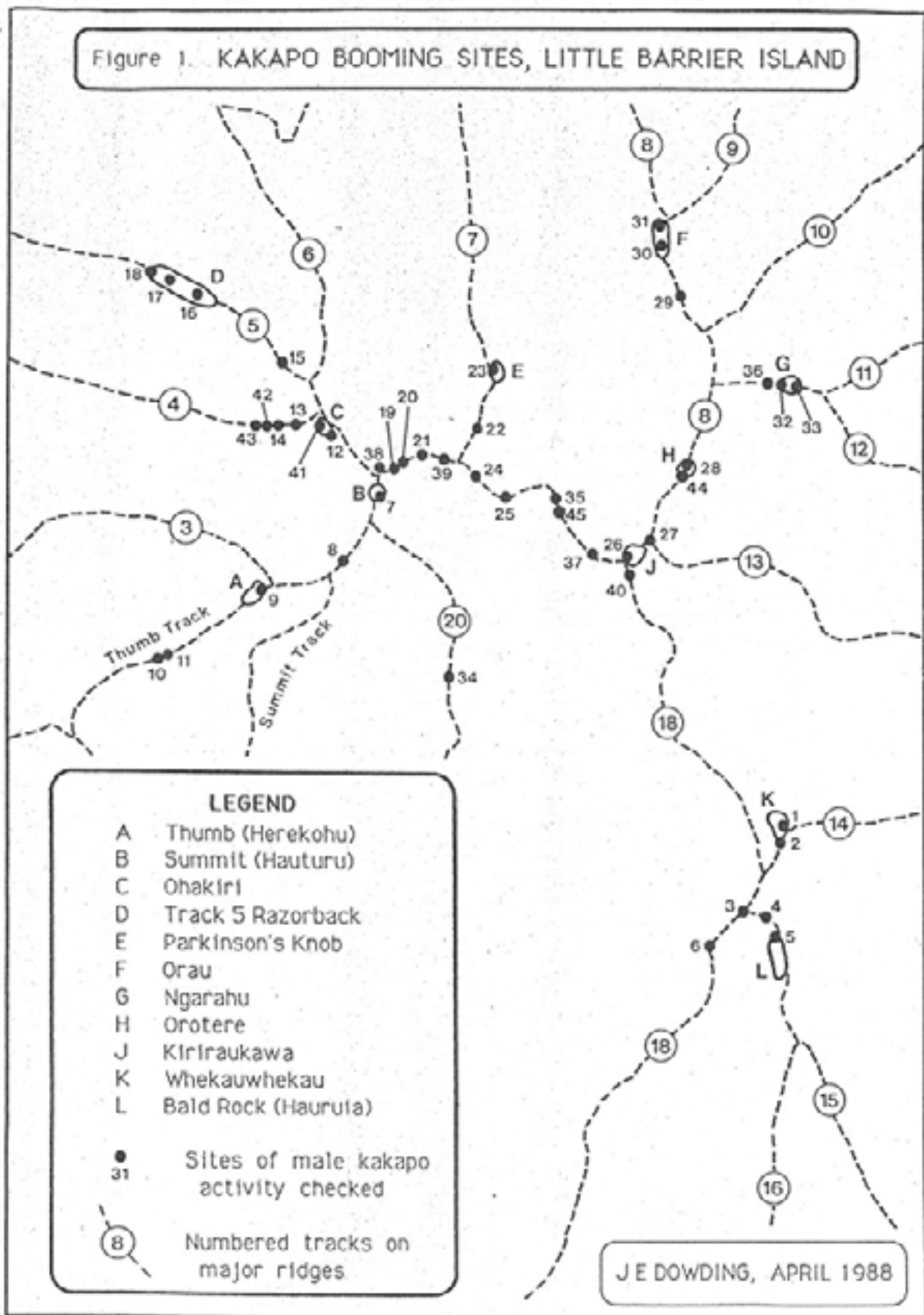


Table 1 Site activity and estimate of age.

Site	JANUARY										
	18	19	20	22	23	24	26	27	28	29	30
1		n				n			n		
2		n				n			n		
3		n				n			n		
4		n				n			n		
5		n				n			n		
6		n				n			n		
7	C	n	n	A	B	n	n	A	A	n	n
8	C	B	?	n	n	n	n	n	n	n	n
9	C	n	n	n		B?	A	n	n	B	
10	n	n	n	n		n	n			n	
11	n	n	n	n		n	n			n	
12		n		n			A			A	
13		n		n			n			n	
14		C		n			n			n	
15		n		n			n			n	
16		C		n			B			n	
17		C		n			B			n	
18		C		n			n			n	
19	n	n	n	n	n	A	n	n	n	n	n
20	C	n	n	n	A	A	n	n	n	n	n
21		C	n	n	n	B	A	n	n	n	A
22			n				n		n		
23			n				n		n		
24		C	n	n	n	n		B	A	B	A
25		C	n		n	n		n	n		A
26		n	n		n	A		n	n		n
27			C		n	A		A	n		A
28			n		n			n			n
29			n		n			n			n
30			n		n			n			n
31			C		A			A			A
32			n		n			n			n
33			C		n			n			n
34			C		n						
35		n	n		n	n		n	n		n
36			n		n			n			n
37		C	n		n	B		n	n		n
38	n	n	n	n	n	n	n	n	n	n	n
39		n	n	n	n	n	n	n	n	n	n
40		C	n		n	A		A	B?		n
41		C		n			n			n	
42		n		n			n			n	
43		n		n			n			n	
44											C
45											

n= Site checked, no activity

A= Site checked, site active since last check

B= Site checked, small amount grubbing since last check

C= Site checked, site active within last fortnight

?= Possibly petrel activity

Table 1 contd.

site	FEBRUARY												
	01	15	16	17	18	19	20	22	24	25	26	27	28
1		n							n				
2		n							n				
3		n							n				
4		n							n				
5		n							n				
6		n							n				
7	A	A	A	A	A	n	n	B	n	n	n	n	n
8	A	B	n	n	n	n	n?	n	n	n	n	n	n
9	B	C	A		?		n		A	n	n		n
10	B?	C	n				n		n	n	n		
11	n	n	n				n		n	n	n		
12			A				A		A		A		
13			n								n		
14			n								n		
15			n								n		
16			n								n		
17			n								n		
18			n								n		
19	n	C	?	B	B		A	n	n	n	n	n	A
20	B?	C	A	A	A		A	A	n	n	n	n	A
21	A	C	A	A	B		A	A	n	n	n	n	A
22					n				n				
23					n				n				
24	A	C	A	A	n		B		A	n	A	n	n
25	A	C	B	B	n		A		B?	n	n	n	n
26	A	C		A	n		n		n	n	n		n
27	A	C		A	n		n		A	A	A		n
28				n					n				
29				n					n				
30				n					n				
31				A					A				
32				n					n				
33				n					n				
34	B		n							B?			
35	n	C		A	n		A		A	A	A		A
36				n					n				
37	n	C		n	n		A		A	n	n		n
38	n	n	n	n	n		n	n	n	n	n	n	n
39	n	n	n	n	n		n		n	n	n	n	n
40	A	C		n	A		n		A	A	A		n
41			C								n		
42			n								n		
43			n								n		
44				B					n				
45		C		A	n		A		A	A	A		A

n= Site checked, no activity

A= Site checked, site active since last check

B= Site checked, small amount grubbing since last check

C= Site checked, site active within last fortnight

?= Possibly netrel activity

Table 1 contd.

site	MARCH							
	15	17	18	19	20	21	23	24
1		n					n	
2		n					n	
3		n					n	
4		n					n	
5		n					n	
6							n	
7	C	B	n	n	n	n	n	n
8	n	n	n	n	n	n	n	n
9	n?	n	n	n	n	n	n	n
10	C	n	n	n	A	n	n	n
11	n	n	n	n	n	n	n	n
12	A		n			n	n	n
13			C			n		n
14			C			n		n
15			C			n		n
16			n			n		n
17			n			n		n
18			n			n		n
19	C	n		n	n		n	n
20	C	n		n	n		n	n
21	n	n		n	n		n	n
22					n			n
23					n			n
24	n	n		n	n		n	n
25	n	n		n	n		n	n
26	n	n		n	n		n	n
27	n	n		n	n		n	n
28		n			n			n
29		n			n			n
30		n			n			n
31		C			n			n
32		n			n			n
33		n			n			n
34	C		n	n	?			n
35	C	n		B	n		n	n
36		n			n			n
37	n	n		n	n		n	n
38	n	n		n	n		n	n
39	n	n		n	n		n	n
40	C	n		n	n		n	n
41			C			n		n
42			n			n		n
43			n			n		n
44		n			n			n
45	C	n		n	n		n	n

n= Site checked, no activity

A= Site checked, site active since last check

B= Site checked, small amount grubbing since last check

C= Site checked, site active within last fortnight

?= Possibly petrel activity

**Table 2 Phenology for Little Barrier Island.**

During each visit to Little Barrier Island a rough estimate of the abundance of the type of fruits, flowers and seed available to kakapo was recorded. The following table lists those species of plants considered to be of potential importance to the species over the duration of the monitoring period. The relative abundance of food types are listed as:

- Abundant (\*\*\*)
- Common (\*\*)
- Present (\*)
- Rare (r)

Species	Food type	Month		
		Jan	Feb	March
<i>Agathis australis</i>	Seed			***
<i>Prumnoptitys ferruginea</i>	Fruit			r
<i>Phormium cookianum</i>	Seed	**	r	
<i>Ripogonum scandens</i>	Fruit	*	*	
<i>Freycinetia banksii</i>	Fruit	r	*	**
<i>Beilschmieda tawa</i>	Fruit	*	*	**
<i>Pittosporum umbellatum</i>	Seed	***	**	*
<i>Metrosideros albiflora</i>	Seed(green)	***	***	***
<i>M. fulgens</i>	Flowers/buds			**
<i>M. perforata</i>	Flowers		**	r
	Seed caps			*
<i>Wienmannia silvicola</i>	Flowers	*		
	Fruit		*	***
<i>Quintinia acutifolia</i>	Seed	*	***	***
<i>Ixerba brexioides</i>	Flowers	**		
	Fruit	*	**	***
<i>Dysoxylum spectabile</i>	Seed			r
	Flowers/buds			*
<i>Shefflera digitata</i>	Flowers			*
<i>Pseudopanax arboreus</i>	Fruit	**	***	*
<i>Corokia buddleioides</i>	Fruit	r		
<i>Leucopogon fasciculatus</i>	Fruit		*	
<i>Archeria racemosa</i>	Flowers	***		
	Seed		*	**
<i>Dracophyllum</i> spp.	Seed	*	**	***
<i>Myrsine australis</i>	Fruit		*	
<i>Coprosma grandifolia</i>	Fruit	**	***	*
<i>Senecio kirkii</i>	Flowers/buds		**	**
<i>Hebe</i> spp.	Flowers			**
<i>Astelia</i> spp.	Fruit	***	***	r
<i>Ghania</i> spp.	Seed	**	**	**
	Flowers	*	*	
<i>Collospermum hastum</i>	Flowers	*	*	r
<i>Pterostylis banksii</i>	Seed caps	*		
<i>Thelymytra longifolia</i>	Flowers	r		
<i>Dendrobium cunninghamii</i>	Flowers	**	*	
<i>Earina autumninalis</i>	Buds		**	
	Flowers			**