

Distribution, Habitat and Status of the King Quail *Coturnix chinensis victoriae* in Victoria: The Importance of French Island, Western Port Bay

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Summary

King Quail *Coturnix chinensis* are poorly known inhabitants of heathy and swampy vegetation of northern and eastern Australia. Although the species' conservation status has possibly remained unchanged in most of its Australian range, it appears to be extinct in South Australia and may also be in decline in Victoria. The decline of the species in south-eastern Australia is probably attributable to loss of preferred habitat as a result of wetland drainage, inappropriate fire regimes, extended drought, land development and the impact of introduced predators. The species is now rarely reported in Victoria except at a few key localities, and French Island in Western Port Bay appears to be its stronghold in Victoria. The restricted nature of suitable habitat in the state, and the paucity of Victorian distribution and breeding records, support the current assessment that this species is rare and threatened. Sympathetic land management for the species on French Island should maintain the existing small populations of King Quail in Victoria for the immediate future.

Introduction

Species or subspecies of the genus *Coturnix* are native to all continents except the Americas. Australia has three species (Stubble Quail *C. pectoralis*, Brown Quail *C. ypsilophora* and King Quail *C. chinensis*), all of which have been reported from Victoria. The subspecies of the King Quail naturally occurring in Australia is *C.c. victoriae* Matthews 1912 (Clayton *et al.* 2006).

There is documented evidence that the Asian subspecies of King Quail *C.c. chinensis* was introduced to Victoria on at least three occasions from the early 1860s (Table 1). This activity would account for some of the early Melbourne sightings of the species near urban areas. It is not known whether any of these releases resulted in self-sustaining populations, or what effect these introductions had on naturally occurring populations of native King Quail at that time.

It is possible that some recent sightings of King Quail in or near urban centres are aviary escapes (of the Chinese subspecies, as the bird is widely kept and easily

Table 1
Documented releases of King Quail in Victoria.

Date	No.	Locality	Reference
1862	6♂	Melbourne (?)	McCance (1962)
1864	80	'near Melbourne'	Ryan (1906); Le Souef (1965)
1864	70	Phillip Island	Ryan (1906); Le Souef (1965)
1872	60	Phillip Island	Ryan (1906)

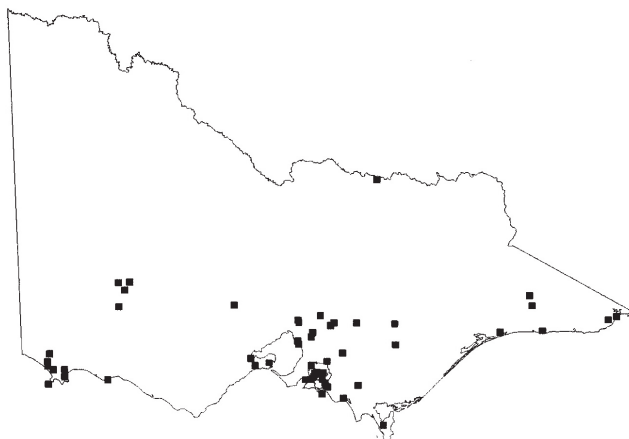


Figure 1. Distribution of all known records of King Quail in Victoria (source: DSE 2005).

maintained in captivity). In Victoria King Quail have been recorded from a number of widely separated localities, mainly in the south of the state (Figure 1). All but a few of these records have been from dense, low vegetation near the coast. Other Victorian records from atypical habitat (e.g. dry forests) are also possibly of escaped aviary birds (Emison *et al.* 1987).

The King Quail is a poorly known inhabitant of damp, swampy vegetation of northern and eastern Australia. Although its range has apparently remained unchanged north of Sydney, it appears to be now extinct in South Australia (Garnett & Crowley 2000) and may also be in decline in Victoria. This decline in south-eastern Australia can be attributed to loss of preferred habitat to drainage, inappropriate fire regimes, extended drought and land development, and to the impact of introduced predators, mainly feral Cats *Felis catus*. The King Quail is currently classified as 'Endangered' in South Australia and 'Critically Endangered' in Victoria (DSE 2003), but it has never received any major conservation attention by land managers.

A full description of the King Quail, its biology and some conservation information is provided by Marchant & Higgins (1993), but there have been no other state conservation assessments of King Quail, particularly in southern Australia. The aim of this paper is to provide a critical account of the status of the King Quail in Victoria; briefly discuss the species' habitat preferences, its current distribution and reported breeding localities; and to discuss the importance of French Island (Western Port Bay) as a stronghold for King Quail in Victoria.

Methods

Data sources (both published and unpublished) were critically examined for all references to King Quail in south-eastern Australia. Data were sourced from the following:
records from Friends of French Island members;
personal observations of certain Victorian bird observers (Chris Chandler, Des Quinn, Paul Peake);
requests to bird observers on the Birding-aus Internet chatlist; and

examination of King Quail data in the Atlas of Victorian Wildlife (electronic fauna database). The last-named source includes data from:

Birds Australia atlases;
the *Atlas of Victorian Birds* (Emison *et al.* 1987);
the RAOU (now Birds Australia) Historical Atlas and Nest Record Scheme;
Department of Sustainability & Environment Wildlife Survey Team records from Land Conservation Council reports;
general observations submitted to the Atlas of Victorian Wildlife;
Department of Sustainability & Environment pre-logging surveys;
Museum Victoria records; and
literature records.

All known data sources are referenced in the tables in this report and (for published records) in the reference list.

Habitat

The recorded habitat for the King Quail in Australia (Marchant & Higgins 1993; D. Quinn pers. comm.) includes:

- (a) very dense vegetation of grass, shrubs, ferns or herbs, in damp or swampy sites (density of vegetation is apparently critical);
- (b) heath of greater than 80% foliage cover;
- (c) thickets in low woodlands; and
- (d) dense aquatic vegetation on the verges of freshwater swamps and over floodplains.

Trees may or may not be present in King Quail habitat, but the canopy must be open enough to allow development of dense undergrowth. There are a few records of the species from unusual habitats (e.g. pine plantation: Payne 1930), but observers in these habitat types note that the species is rare and '...not usually seen' even in these locations (Payne 1930).

Northern Australian populations of King Quail appear to use additional habitats, compared with those in southern Australia. For example, in Queensland Nielsen (1996) recorded the species 'About farmland on the Atherton Tableland' and 'In grassy *Allocasuarina* forest and sometimes wetter grasslands around swamps'. In Cooloola National Park (Queensland) McFarland (1988) recorded King Quail from ecotone and wet microhabitats of sites unburnt for 2.5 to 7.5 years and noted that, at this locality, they '...prefer the thicker wetter vegetation of middle-aged heathlands.' It is clear that appropriate fire regimes are an important environmental component in providing suitable habitat. In southern Australia fires at intervals of less than 3 years are thought to be detrimental, although the birds have been recorded using recently burnt heath (where their plumage provides perfect camouflage) on French Island (M. Douglas pers. comm.; D. Quinn unpubl. data).

On French Island the main habitats occupied by King Quail are dense *but short* heathland (especially wet heathland) and sedge beds around swamps (Quinn & Lacey 1999; G. Lacey pers. comm.). From recent sightings of the species on French Island, suitable habitat can be described as Ecological Vegetation Class (EVC) 8, Wet Heathland (Oates & Taranto 2001). EVC 8 is a low, generally treeless heathland sometimes with emergent eucalypts and dominated by a range of sedges, grasses and shrubs. The dominant flora at a recently burnt King Quail site on French Island was Zigzag Bog-sedge *Schoenus brevifolius* (G. Lacey pers. comm.) and medium shrubs of Scented Paperbark *Melaleuca squarrosa* and Prickly Tea-tree *Leptospermum continentale*. Lacey (pers. comm.) also noted that King Quail

habitat includes sedge beds on swamp margins, but does not seem to include the drier Sand Heathland (EVC 6).

Unlike observations from northern Australia where King Quail were apparently ‘...often seen in lucerne paddocks’ (Frith & Waterhouse 1977), there are no records of the species using such habitats in Victoria. Olsen *et al.* (1993) noted that King Quail are not migratory but are to some extent partly nomadic. This mobility would explain some records of the species (one or two birds rather than groups) from inland Victoria.

Distribution in Victoria

The range of the King Quail extends from India east to south-eastern China, and south through the Philippines, South-East Asia and New Guinea to northern and eastern Australia. In Victoria the species has been reported mostly from dense, low vegetation in coastal heathlands around Portland, French Island and far East Gippsland (DSE 2005). Sightings from heathlands farther inland (but not far from the coast) have also been reported (e.g. southern Grampians: Table 2).

There are reports of the species from elsewhere in Victoria (e.g. near Yarrawonga: Conole & Mac Nally 2000; near Lake Hume: G. Bedggood pers. comm.) and some Bass Strait islands (Marchant & Higgins 1993), but King Quail have not been reported from Tasmania (Olsen *et al.* 1993). The species has also been recorded from the Victorian High Country in the late 1950s (Leslie 1959), but there have been no further records from this area since then. As well as French Island, Conole & Mac Nally (2000) believed that heathlands in the Lower Glenelg, Grampians and Croajingolong National Parks were the stronghold of the species in Victoria, but the lack of repeat records for these localities implies that at least the western records (Glenelg, Grampians) were possibly records of nomadic birds rather than extant populations. It is likely that the Croajingolong records are part of an extant population contiguous with that in New South Wales, although the patchy nature of records, particularly in Victoria, may indicate a discontinuous habitat.

Since 1970 (when dedicated fauna surveys commenced in Victoria) the majority of King Quail records have been from French Island (Table 2), with all but one of the remaining sightings being made in southern Victoria (Figure 2). The regular French Island records of King Quail are partly a reflection of some monitoring of the species carried out by a community volunteer group (Friends of French Island). The difficulty in finding birds by unskilled observers may also contribute to the paucity of records of the species in preferred habitat in Victoria.

Some past sightings of the species have been from other coastal heaths, where they might still occur (e.g. Mallacoota, Wilsons Promontory and near Portland: Emison *et al.* 1987) and in the Wannon River flats (Grampians: Anon. 1967). There are also unconfirmed historical reports from inland Victoria (e.g. Ballarat and Benalla); these are not included in the distribution maps or tables. The larger number of sightings from 1988 to 1990 (Table 2) reflects intensive searches by various individuals and groups (e.g. Friends of French Island, Bird Observers Club of Australia). The French Island sightings were in the then State Park and on private land.

Table 2

Records of King Quail in Victoria (data from DSE 2005 unless otherwise indicated). AMNH = American Museum of Natural History; FWD = Museum Victoria, Fish & Wildlife Division; MV = Museum Victoria; NHM = Natural History Museum, London; NP = National Park; NPS = National Parks Service, Vic.

<i>Date</i>	<i>No.</i>	<i>Locality</i>	<i>Reference</i>	<i>Habitat</i>	<i>Comment</i>
1800		Mordialloc	Campbell (1900)		(Now suburban Melbourne)
1852		Mordialloc	Wheelwright (1862)		(Now suburban Melbourne)
1860		'Black Hills near Portarlington...'	Belcher (1914)		'...must be close upon extinction in our district.'
1860		Western Port Bay	NHM		
1864	6	Royal Park, Melbourne	Le Souef (1965)		'Chinese Quail'
1864	60	Phillip Island	Le Souef (1965)		
1884		Victoria	Forbes-Leith & Campbell (1884)		
2/5/1889		Kurrah Plain near Loch, W. Gippsland	North (1889)		
15/5/1890		Koo Wee Rup Swamp, W. Gippsland	Miller (1936)		
16/12/1890		Heidelberg			
Dec. 1892		Koo Wee Rup Swamp			(Now suburban Melbourne)
1898		Highton, Geelong & district	Mulder (1898)		
1901		Heidelberg	White Collection MV		
15/5/1901		Leongatha	NHM		
2/8/1901		Koo Wee Rup Swamp	AMNH		
26/6/1911		Bunyip, Gippsland	AMNH		
29/3/1912		Woori Yallock	AMNH		
22/4/1912		Woori Yallock	AMNH		
3/3/1913		Yarra Glen	AMNH		
1928		Launching Place	Howe (1928)		'Flushed on the Yarra Flats at Launching Place this season'

Table 2 Contd

<i>Date</i>	<i>No.</i>	<i>Locality</i>	<i>Reference</i>	<i>Habitat</i>	<i>Comment</i>
< 1931		Foster	Barton (1931)		'... the most uncommon is ... King Quail ...'
1941		Mt Richmond, W Victoria	Learmonth (1966)		(Unpublished)
1941		Glenelg NP, W Vic.	NPS file		'... females of King Quail.'
1941		Croajingolong	Wakefield (1942)		Breeding
1948		Mannerim (Bellarine Peninsula)	Tarr (1948)		(Portland area)
1950		Moleside Creek, near Glenelg River	Learmonth journal		(Portland area)
1950		Portland	Austin (1951)		Breeding (confirmed)
1951		Moleside Creek	Learmonth journal		(High-country record)
1952		Portland	Learmonth journal		
1955/56		Bungil (Lake Hume area)	Bedgood (1959)		
< 1956		Mt Richmond (near Portland)	Beaulehole & Learmonth (1956)		
Dec. 1958		Licola-Mt Howitt area	Leslie (1959)		
Apr. 1961		Wilsons Promontory	Roy Cooper		
11/11/62	2	Mallacoota, near aerodrome	Bird Observers Club (1965)	Coastal heathland	
9/3/63		Moora Moora Reservoir	Murray Gunn		(Grampians)
7/5/66	10	Vereker Flats, Wilsons Promontory NP	Cooper (1975)	'Very dense heathland'	
1/8/67		Cape Woolamai	Hall (1967)		(Phillip Island)
31/12/67	1♂	French Island	Quinn (1969b)	'Dry heathland'	First formal record for French Island
1970		La Trobe University, Bundoora			(Suburban Melbourne)
'About 1970'	1	Southern edge Boola Boola forest, Gippsland	Loyn (1980)		
1971		Orbost (lakes)	FWD		

Table 2 Contd

Date	No.	Locality	Reference	Habitat	Comment
June 1972		Near Bass, W Gippsland	FWD		
1973		Western Port Bay	R. Loyn		
1973/74		Heifer Swamp, French Island	D. Quinn pers. comm.		'With newly fledged young in summer 1973/74'
1975		Heifer Swamp, French Island	Loyn (1975)		'... found breeding...'
Dec. 1975		Croajingolong NP			(E Gippsland)
1977		French Island			
Feb. 1980		French Island			
4/4/80	2	Grasstree Creek near Lake Bellfield (Grampians)	Baverstock <i>et al.</i> (1980)	'Swampy heath', <i>Melaleuca</i> thicket	Observed
May 1980		French Island			
May 1980		Bass area, W Gippsland			
1981		Bass area			
Sept. 1981		E of Warburton			
17/10/81		Heifer Swamp, French Island			
Dec. 1981		Woori Yallock area			(E of Melbourne)
Dec. 1981		Knox/Rowville areas			(Suburban Melbourne)
Apr. 1983		Wonthaggi area			(S Gippsland)
May 1985		French Island			
27/10/85		French Island			
30/3/86	5	French Island	D. Quinn pers. comm.		
Dec. 1986		2 km NW of Mt Wellington, French Island	Quinn & Lacey (1999)		1 intact egg
25/7/87	4	French Island			
1988	18	French Island	D. Quinn pers. comm.		
1988		12 km NE of Lakes Entrance	D. Quinn pers. comm.		(Gippsland)

Table 2 Contd

<i>Date</i>	<i>No.</i>	<i>Locality</i>	<i>Reference</i>	<i>Habitat</i>	<i>Comment</i>
1989	33	Clump Rd, French Island	D. Quinn pers. comm.; Carter (1989)	Wet heath, 'reed-filled soak', track edge	Observed
26/3/89	7	Grampians, Wannon River	Anon. (1967)	'Heath flats'	Observed
1990	9	Clump Rd, French Island	D. Quinn pers. comm.		
26/4/90	5	Lower Glenelg NP			
19/2/91		11 km E of Marlo			
8/3/91		Yalmy Rd near Snowy River			(N of Orbost)
29/12/94	5	Grampians			Breeding
1995		Callaghans La., Gordon (Ballarat)			
10/5/97	1	Duscher Swamp, French Island	Mitchell (1997)		Observed
26/3/98		Chilcott Rocks, French Island	K. Shingleton pers. comm.	Teatree	'Heard calling' (Shingleton pers. comm. per C. Izaros)
27/2/2000	2	Lower Ovens Regional Park (Yarrawonga)	Conole & Mac Nally (2000)		Observed
Jan. 2001	4	McLeod, French Island	Cooney (2003a)		
13/2/01	1♂	Powling Swamp, Port Fairy	Cooney (2003a)		
24/11/01	1♀	Off Dunkeld-Halls Gap Rd, Grampians	Cooney (2003b)		
11/4/02	1	Tankerton Rd, French Island	C. Chandler pers. comm.		Observed
17/4/02	1	The Pinnacles, French Island	C. Chandler pers. comm.		Observed
2/10/02	1	McLeod Rd, French Island			
10/4/05	4	Clump Rd, French Island	P. Peake pers. comm.	Swamp margin	
14/5/05	6	Link Rd, French Island	Author/Friends of French Island	Wet heath	Observed



Figure 2. Post-1970 records of King Quail in Victoria (source: DSE 2005).

Conservation status

Early indications of the decline or rarity of the species near Melbourne have been mentioned in the literature. The Victorian Ornithological Research Group summarised records of King Quail in Victoria up to the early 1960s (Anon. 1962) and concluded that, owing to the species' rarity, '...complete protection is warranted in Victoria'.

Wheelwright (1862) reported that, on the Mornington Peninsula, the King Quail '...was not common in our districts, and we generally found them in pairs or families, for they bred with us...' Belcher (1914) noted the rarity and likely extinction of King Quail in the Geelong district, possibly before the turn of the century. Wheeler (1970) reported that King Quail were only occasionally recorded on the Mornington Peninsula and were '...a very local bird.' Natural populations of the species are now extinct near Melbourne (DSE 2005), and recent suburban sightings are probably from aviary escapes, as the bird is widely kept in captivity.

Garnett (1992) has provided the only Australia-wide conservation assessment (now 13 years old) of the species [as *Coturnix chinensis victoriae*] as follows. Australian Capital Territory: occasional visitor; New South Wales and Queensland: presently secure; South Australia: extinct; Tasmania: absent/not recorded; Victoria: rare; Australia: presently secure. The species' range north of Sydney has apparently remained unchanged (Blakers *et al.* 1984; Tzaros 2002), although fewer observations of King Quail were made in the data-collection period for the second Atlas of Australian Birds, particularly in southern Australia (Barrett *et al.* 2002).

King Quail are presently categorised as 'Critically Endangered' in Victoria (DSE 2003). Short of extinction, this is the top conservation rating for taxa in Victoria and is several steps up from the 'Rare' category used in the past (Frood & Calder 1987; Garnett 1992). The recent upgrade in Victorian status is likely to be a reflection of the apparent extinction of the species in South Australia, the

lack of any regular records of the species for any locality other than French Island, ongoing threats in recorded habitats, and the probably small population size in Victoria. Three other quail and quail-like birds (button-quail) have been classified as threatened in Victoria (DSE 2003): Red-chested Button-quail *Turnix pyrrhotherax* ('Vulnerable'), Brown Quail ('Near Threatened') and Little Button-quail *T. velox* ('Near Threatened'), and no conservation work has been done on these taxa so far in the state.

Populations of King Quail in southern Australian have declined this century (Blakers *et al.* 1984; Frood & Calder 1987; Marchant & Higgins 1993), mainly as a result of the burning, clearing and draining of swampy heathland and the edges of densely vegetated freshwater swamps. The King Quail was nominated for listing as a threatened species under the *Victorian Flora and Fauna Guarantee (FFG) Act* in 1994. The Victorian Scientific Advisory Committee (a ministerial advisory committee for the Victorian government) assessed the nomination and recommended that it be listed as a threatened species (SAC 1995), and it was eventually added to the *FFG Act* in 1995. The listing was based largely on rarity, but loss of habitat was also recognised as reducing the species' range across the state.

There are no population estimates for King Quail in Victoria or Australia (Marchant & Higgins 1993). Some ornithologists believed that the species was '...numerous in many districts where there is suitable habitat' (Frith & Waterhouse 1977). However, such statements are probably based on the species' distribution in northern Australia, as most Victorian records are of few individuals and only French Island has had any regular reports of larger groups.

King Quail are very difficult to observe in the wild because of the dense and swampy habitat that they inhabit and the difficulty of flushing them (Frith 1969). Special censusing techniques (groups walking in line through habitat, or call-playback) are required to detect the species, although the method of staking out known habitat and listening for calls towards evening (Frith & Waterhouse 1977; L. Conole pers. comm.) has been used in the past to record the presence of the species. A 2002 request by Birds Australia for information on sightings of King Quail in south-eastern Australia drew no response (Tzaros 2002; C. Tzaros pers. comm.), with no new information coming forward about the species.

French Island records

The King Quail is one of five quail and button-quail species (including Little Button-quail, Painted Button-quail *Turnix varia*, Stubble Quail and Brown Quail) recorded for French Island (Quinn 1969a, 1970; Quinn & Lacey 1999). It was described as a 'rare breeding resident...' on French Island (Andrew *et al.* 1984).

The importance of French Island as a refuge for wildlife was recognised over 30 years ago (Quinn 1971). Quinn noted that the main features contributing to the high faunal value of the Island were its isolation from the mainland and relatively undeveloped state compared with the rest of Victoria. French Island still has large areas of relatively intact vegetation, especially within the National Park (Parks Victoria 1998), so is the stronghold for King Quail in Victoria.

Since 1970 King Quail have been recorded in Victoria in only five areas: near Portland, southern Grampians, French Island, near Yarrawonga, and far East Gippsland (Figure 2). It is not certain whether the species is still present in all of these areas (except French Island). Moreover, it is possible that in some areas of

Table 3
Recorded breeding events of King Quail in Victoria.

<i>Date</i>	<i>No. eggs/young</i>	<i>Locality</i>	<i>Reference</i>
1850–1899	Unknown	Mordialloc	Campbell (1900)
2 May 1889	Unknown	Kurrah Plain near Loch, Gippsland	North (1889)
23/11/1948	7 eggs	Mannerim, Bellarine Peninsula	Tarr (1948)
1955–56	4 eggs	Bungil, NE Victoria	Bedggood (1959)
1973–76	Unknown	French Island, Western Port Bay	C. Chandler pers. comm.
8/12/73	2 chicks	W of Heifer Swamp, French Island	Quinn & Lacey (1999)
Dec. 1986	1 intact egg	2 km NW of Mt Wellington, French Island	Quinn & Lacey (1999)
29/12/94	Unknown	Grampians National Park	Atlas of Victorian Wildlife

Victoria King Quail populations may be too small to be viable in the long term (D. Quinn unpubl. data). The sightings of King Quail on French Island far exceed all other Victorian records combined (Quinn unpubl. data), and French Island probably has the most important population of the species in south-eastern Australia south of Sydney.

Breeding records in Victoria

To 2005 there have been only eight recorded breeding events of King Quail in Victoria (Table 3), although the species is believed to breed wherever suitable habitat occurs (Marchant & Higgins 1993; D. Quinn pers. comm.), but only Tarr (1948) has provided a detailed report, of two Victorian records. No breeding in Victoria has been recorded for over a decade. The cryptic nature of the species makes it extremely difficult to detect breeding in the wild, and the published accounts tend to be largely accidental.

Threats

There are few formally recorded threatening processes for the King Quail across its Australian distribution. However, in southern Australia the abundance and distribution of the King Quail have been affected by human activities. The draining and clearing of preferred habitat for pasture and cropping have removed much suitable habitat. The release of the Chinese subspecies in the 1860s and 1870s (Ryan 1906; McCance 1962; Long 1981) by the Victorian Acclimatisation Society has brought about the possibility of interbreeding with natural populations, potentially affecting the genetic integrity (Olsen *et al.* 1993).

In its 1994–95 assessment (SAC 1995) of the Victorian status of the King Quail, the Scientific Advisory Committee said:

...[the King Quail] appears to have suffered some decline in the State, with historical records of the species in areas near Melbourne which are now suburbs (Emison *et al.* 1987). Since 1970 the species has been sighted in only five small areas [and] The species' preferred habitat of swampy heathland and densely vegetated freshwater swamps has been reduced and altered by drainage, clearing, burning and increased salinity (Marchant & Higgins 1993).

Introduced predators

European settlement first occurred on French Island in 1844 (Bognuda & Bognuda 1983), and Cats may have been transported to the Island at that time. In 1999 the population of feral Cats on French Island was estimated to number between 150 and 380 individuals (McTier 2000; M. Johnston pers. comm.), but there are estimates of thousands (Parks Victoria 1998). Introduced predators (especially feral Cats) are believed to be a serious threat to the King Quail throughout its Australian range, and it is likely that Cats have some impact on King Quail and other ground-bird populations on French Island; Cats have been recorded preying on several mammal species on nearby Phillip Island (Kirkwood *et al.* 2005; M. Johnston pers. comm.). However, there is no record of a King Quail being killed by a Cat on French Island (D. Quinn pers. comm.).

Habitat loss

Loss of King Quail habitat (mainly by drainage of wetlands) in Victoria was recognised in the 1930s (Miller 1936). Habitat degradation has also occurred because of inappropriate fire regimes (e.g. Wilsons Promontory: Cooper 1975); however, the species has been observed foraging in recently burnt habitat on French Island, especially where this abuts habitat burnt longer ago (M. Douglas pers. comm.). A May 2005 survey near Link Road on French Island recorded the species in recently burnt (within the previous 12 months) Wet Heathland (pers. obs.).

Up to 95% of the Deep Freshwater Marshes (DFMs) have been lost from South and West Gippsland (Corrick 1981), including loss of King Quail habitat bordering this type of wetland. The loss of DFMs on French Island has been relatively less than on the mainland, and this has contributed to the Island being a stronghold for the species in Victoria. Historical draining of wet heaths has also removed quail habitat near Melbourne (Emison *et al.* 1987).

Habitat conservation

The King Quail is widely recognised amongst Victorian ornithologists as a rare species, occurring only in restricted pockets of suitable habitat. It prefers wet grasslands, Wet Heathland, dense low vegetation around certain wetlands, and swampy heaths (D. Quinn pers. comm.). Nearly all of the recent sightings have been from within conservation reserves on public land (e.g. French Island National Park).

The wet heaths and swamp shrublands of West and South Gippsland are poorly represented in conservation reserves in Victoria (Frood & Calder 1987). Broad Vegetation Type (BVT) Swamp Scrub is poorly conserved in Victoria, with only 28% currently reserved (Traill & Porter 2001).

Changes to natural land systems since European settlement have been dramatic. For example, 80% of Victorian wetlands are on private property (Corrick 1995), and this is where most of the loss of wetlands has occurred. French Island is one of the few areas in South Gippsland where naturally occurring DFMs can still be found (Andrew *et al.* 1984). The natural isolation of French Island and its relatively undeveloped state need to be maintained if King Quail are to continue to be a Victorian resident.

Conclusions

Although King Quail have been reported from a number of Victorian localities, current information indicates that French Island is very likely to be the only stronghold in southern Australia, with most reports of the species since 1970 being from this area. Other Victorian localities appear to hold only one or a few individuals and are some distance from French Island. Given that the Victorian population of King Quail is probably isolated from those farther north, it is therefore imperative that the southern Australian populations are adequately and sympathetically managed in conservation reserves if King Quail are to continue to be a component of the Victorian avifauna.

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