

PEST RISK ASSESSMENT

Red-fronted parakeet

Cyanoramphus novaezelandiae



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About this Pest Risk Assessment

This pest risk assessment is developed in accordance with the *Policy and Procedures for the Import, Movement and Keeping of Vertebrate Wildlife in Tasmania* (DPIPWE 2011). The policy and procedures set out conditions and restrictions for the importation of controlled animals pursuant to s32 of the *Nature Conservation Act 2002*.

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I. Summary

The red-fronted parakeet (*Cyanoramphus novaezelandiae*) is a medium sized parrot with bright green plumage, dark-blue outer upperwing and crimson forecap. The historical distribution of this species centred on New Zealand and extended north to New Caledonia, south to Macquarie Island, west to Lord Howe Island and east to Kermadec and Chatham Islands. It is now extinct on the New Zealand mainland but recorded on many nearshore and offshore islands (Higgins 1999).

Populations currently exist on the Kermadec islands, Three Kings, some Hauraki Gulf islands, Kapiti Island, Stewart Island and surrounding islands, Chatham Islands, Snares, Antipodes Island and Auckland Islands. It is now extinct on Lord Howe Island and Macquarie Island (Birdlife International 2008).

The red-fronted parakeet has been re-introduced in New Zealand from privately held stock. Successful releases include Tiritiri Matangi Island, Cuvier Island and Whale Island, where they have established (Higgins 1999).

The natural distribution of red-fronted parakeet includes areas similar in climate to Tasmania and there is therefore potential for this species to establish in Tasmania. If the red-fronted parakeet established in Tasmania it is likely to compete with the orange-bellied parrot, blue-winged parrot eastern rosella and green rosella for food and nest hollows. They could also compete for nest hollows for a range of small native species such as the swift parrot, musk lorikeet, owlet nightjar and tree martin.

The establishment of the red-fronted parakeet in Tasmania also has the potential for some impact on agricultural industries as the species is known to be capable of utilising various commodities such as cereal grains, oilseeds, grain legumes, fruit and vegetables.

Risk assessment using the Bomford model (2008) determined that there is a 'moderate' likelihood of the red-fronted parakeet establishing wild populations in Tasmania and that there is a 'serious' risk of an established population causing harm to the environment.

The red-fronted parakeet is listed as Vulnerable by the IUCN as it is known from fewer than ten locations within a small and declining range (Birdlife International 2011). It is also listed on Appendix I to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), restricting the commercial international trade in specimens of these species. As the red-fronted parakeet is a CITES listed species, international trade in specimens of this species is subject to regulation under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

In Tasmania the red-fronted parakeet is currently listed as a controlled animal under the *Nature Conservation Act 2002*. A permit is required to import this species but they can be held without a permit to possess wildlife.

2. Introduction

2.1 NAME AND TAXONOMY

Kingdom:	Chordata
Class:	Aves
Order:	Psittaciformes
Family:	Psittacidae
Genus:	<i>Cyanoramphus</i>
Species:	<i>Cyanoramphus novaezelandiae</i>



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Sub-species: Extant subspecies of *Cyanoramphus novaezelandiae* are: New Zealand red-crowned parakeet (*C. novaezelandiae novaezelandiae*); Chatham Island red-crowned parakeet (*C. novaezelandiae chathamensis*); Kermadec red-crowned parakeet (*C. novaezelandiae cyanurus*) and Reischek's parakeet (*C. novaezelandiae hochstetteri*).

The taxonomy of this species is confused and there is conflicting literature (P Scofield pers. com.). We have treated the above subspecies as one species for the purposes of this assessment.

Common names: Red-fronted kakariki, red-crowned parakeet, New Zealand parakeet, red-fronted New Zealand parakeet, Norfolk Island parakeet, and green parrot (Norfolk Island). Maori names include kakariki, porete, kaka-wariki, powhaitere and kawariki.

Known hybrids: Hybridises with the yellow-crowned parakeet, *Cyanoramphus auriceps*, on the Auckland Islands, Chatham group and Mangere Island (Higgins 1999).

Close relatives: · Yellow-crowned Parakeet (*C. auriceps*), orange-fronted parakeet (*C. malherbi*), Chatham parakeet (*C. forbesii*), Antipodes parakeet (*C. unicolor*), Norfolk Island green parrot (*C. cookii*), New Caledonian parakeet (*C. saisseti*). The black-fronted parakeet (*C. zealandicus*) and the Macquarie Island parakeet (*C. erythrotis*) are extinct.

2.2 DESCRIPTION

The red-fronted parakeet, *Cyanoramphus novaezelandiae*, is a medium sized parrot (length 25-27cm, wingspan 32-38cm, weight: males 80g and females 70g) with a long tail and predominately green plumage (Higgins 1999). It is recognisable by its distinctive, bright green plumage with dark-blue outer upperwing and diagnostic crimson forecap and eye-stripe and small patch on the sides of the rump. The bill is white to pale blue-grey and the legs and feet are grey to dark grey or pale brown. The sexes are alike in plumage but the female is slightly smaller, with a smaller narrower bill. There is no seasonal variation in the plumage (Higgins 1999). This bird has a unique and unusual voice, which is sometimes likened to the bleating of a goat (Encyclopedia of Life 2011).

Juveniles are very similar to adults with a slightly smaller crimson forecap, the crimson patch on the sides of the upper rump are much smaller, and the pale underwing bar is very prominent and slightly longer. Young juveniles are best distinguished by the colour of the bare parts; the bill is

wholly pink or pink at the base grading to grey at the tip and the legs and feet are a paler pink-grey (Higgins 1999).

There are several colour variations in the plumage of the red-fronted parakeet, most being the replacement of green plumage with some other colour. Yellow colour morphs are rare in the wild but common in captivity, in which the green plumage is replaced by pale yellow but the red and blue markings are unchanged (Higgins 1999).

All subspecies and ages possess a diagnostic crimson forecap and eye-stripe extending behind. The subspecies *C. n. cyanurus* has bluer flight feathers with a greenish tail. *C. n. chathamensis* has a bright emerald face, *C. n. hochstetteri* is larger and more yellowish. Of the other *Cyanoramphus* species, *C. cookii* is very similar to *C. novaezealandiae* but larger, and *C. saisseti* is more yellowish, the red is lighter and brighter (del Hoyo et al).

The yellow-crowned parakeet, *Cyanoramphus auriceps*, differs in having a yellow or orange-yellow crown-patch and an orange frontal band. Hybrids between red-fronted parakeets and yellow-crowned parakeets vary considerably. Some are very similar to the red-fronted parakeet but with orange bordering on red on the crown. Others are very similar to the yellow-crowned parakeet but with faint yellowish-orange spots behind the eyes. Most are intermediate between the two species with a narrow red band on the forehead, orange crown and small reddish-orange patches behind the eyes and on the side of the rump (Higgins 1999).

There have currently been 2 forms of mutation recorded in captive red-fronted parakeets: Pied: interspersed patches of yellow and green on the body, and Lutino: completely yellow body with appropriate crown (SGEB 2011).

2.3 CONSERVATION AND LEGAL STATUS

The red-fronted parakeet is now extinct from mainland New Zealand, leaving only fragmented populations across off-shore islands. European settlement and conversion of forest to farmland probably contributed significantly to this bird's decline, with clear-felling, logging and burning of forests drastically reducing available habitat. The disappearance of this species from the mainland is also attributed to nest predation from introduced predators, such as rats, cats, stoats and weasels, in addition to competition for food and breeding sites from introduced birds and the brush-tailed possum (*Trichosurus vulpecula*). The red-fronted parakeet was formerly persecuted for damaging crops and gardens (BirdLife International, 2008, Encyclopedia of Life 2011).

CONSERVATION STATUS

The red-fronted parakeet is listed as Vulnerable by the IUCN as it is known from fewer than ten locations within a small and declining range. The extinction of the New Zealand mainland populations effectively isolated the remaining island populations, and their effective population sizes are now several orders of magnitude smaller (Birdlife International 2008).

The red-fronted parakeet, *Cyanoramphus novaezealandiae*, is listed on Appendix I to the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). The commercial international trade in specimens of species listed on Appendix I is restricted by CITES.

LEGAL STATUS AUSTRALIA

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* regulates the export and import of species included in the Appendices to CITES under Part 13A. International trade in specimens of the red-fronted parakeet is therefore subject to regulation under this legislation.

In Tasmania the red-fronted parakeet is currently listed as a controlled animal under the *Nature Conservation Act 2002*. A permit is required to import this species but they can be held without a permit to possess wildlife.

3. Biology and Ecology

3.1 LIFE HISTORY

Red-fronted parakeets live in permanent pairs that frequently join with other pairs and their young, and have been observed to form small flocks in the autumn and winter (Encyclopedia of Life 2011). Breeding appears to be related to climate, conditions and seasonal availability of food, and has been recorded in all months of the year, with main periods of laying varying throughout the range. On islands around New Zealand they generally breed in October to February. On Norfolk Island laying is recorded in all months; on Kermadec Island they lay mainly in October and November; on Chatham Island most eggs are laid October to December; and in the Antipodes nests are found from November to March (Higgins 1999).

Red-fronted parakeets nest in a tree hollows or cavities in limbs, trunks and stumps of living or dead trees. In areas lacking suitable tree hollows, they will nest in holes in cliffs, banks, root-mass of fallen trees, in rock crevices, tunnels in the dense crowns of ferns and matted vegetation, and in burrows of petrels and prions (Higgins 1999). The nest chamber is a roughly circular depression in the darkest corner of the hollow or cavity, lined with material from the surrounding substrate such as dry powdered wood and earth, feathers and plant material.

Eggs are broadly elliptical, smooth, lustreless and white. The average clutch size is 7 and incubation is by the female only for a period of 18-21 days. Both parents care for the young and the fledging period varies throughout the range from 5-7 weeks. After fledging the young remain near the nest for the first two weeks and then begin to feed themselves and form family groups. There is usually only one successful breeding attempt in a season (Higgins 1999).

The age at first pairing and breeding in the wild is unknown, although one juvenile female, only one week after reaching independence, was seen repeatedly with an adult male and behaving as a mated pair. In captivity they are said to first breed when less than one year old (Higgins 1999).

The maximum recorded longevity for this species is 12.4 years in captivity (AnAge 2011).

3.2 HABITAT REQUIREMENTS AND PREFERENCES

Red-fronted parakeets are found in a wide variety of habitats ranging from the Tropics to Subantarctic, including dense temperate rainforests, coastal forest, scrubland, forest edges and open areas. They may also occur in some habitats much modified by clearance or browsers. On Meyer Island (Herald Group, Kermadec Is) this species is abundant in coastal shrub, stunted forest and steep rocky slopes vegetated by low shrubs, herbs, sedges and a variety of salt tolerant species. On Macauley Island it is abundant in dense highly modified vegetation of sedges and scattered trees. On Norfolk Island it occurs in tall dense remnant rainforest and other native vegetation, and is also recorded in *Eucalyptus* plantations and from orchards and gardens. On the Chatham Islands they mostly inhabit grassland in winter and move to forest during summer. On Subantarctic islands (Auckland Islands and Antipodes Islands) the red-fronted parakeet is most common in low open vegetation such as sedges and tussocks (Higgins 1999).

Roosting sites must have dense cover. They roost in holes in trees, rock crevices, burrows and overhanging rocks and vegetation, and in thick vegetation such as epiphytes, tussocks, sedges or ferns. They loaf in trees or on the ground in areas sheltered from wind, either in direct sunlight or

available shade. The red-fronted parakeet usually only breeds in native vegetation, preferring larger trees, particularly *Metrosideros*, *Vitex*, *Nothofagus*, *Olearia* and *Plagianthus* (Higgins 1999).

3.3 NATURAL GEOGRAPHIC RANGE

The historical distribution of the red-fronted parakeet was centred on New Zealand and extends north to New Caledonia, south to Macquarie Island, west to Lord Howe Island and east to Kermadec and Chatham Islands. In New Zealand it was formerly widespread but the range is now much reduced. It is now extinct on the mainland (recent records are now believed to be cage escapes/releases or vagrants from offshore island populations) but recorded on many nearshore and offshore islands (Higgins 1999). Past population estimates suggest the total population was in excess of 20,000 individuals, but historically the island populations were part of an effectively panmictic population. When the mainland linking populations became extinct, the island populations became isolated, and their effective population sizes are now much reduced. Declines are likely to be taking place on Stewart Island, by inference from measured declines of other species owing to rat and cat predation (Birdlife International 2008).

Populations currently exist on the Kermadec islands, Three Kings, some Hauraki Gulf islands, Kapiti Island, Stewart Island and surrounding islands, Chatham Islands, Snares, Antipodes Islands and Auckland Islands (Birdlife International 2008).

This species was formerly abundant but is now extinct on Macquarie Island and Lord Howe Island (Higgins 1999).

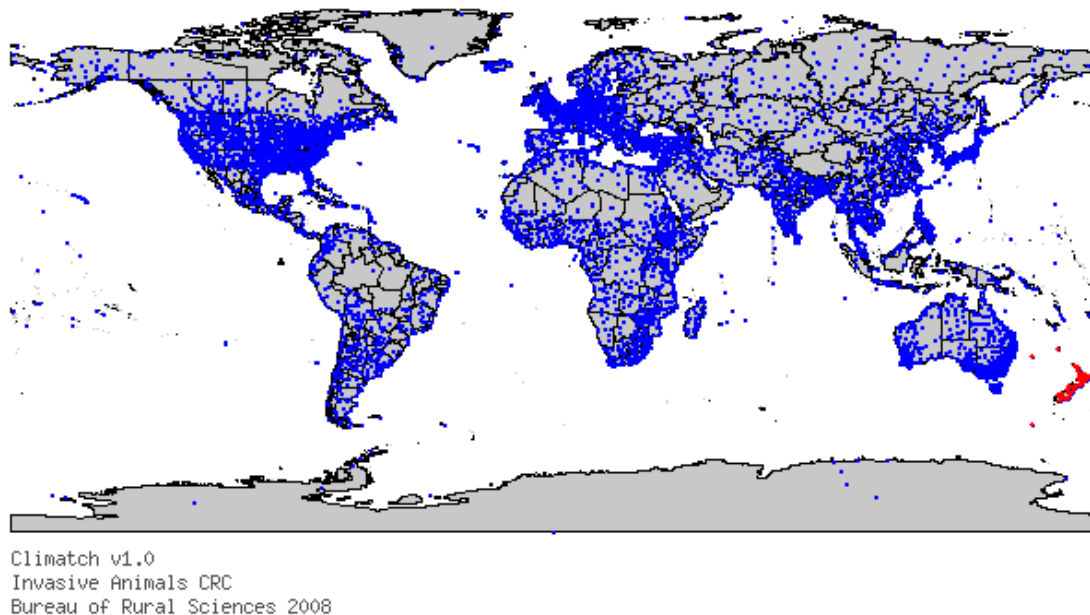


Figure 1: Global distribution of the Red-fronted parakeet (*Cyanoramphus novaezelandiae*) (Source: CLIMATCH – <http://adl.brs.gov.au:8080/Climatch/>)

3.4 INTRODUCED GEOGRAPHIC RANGE

There are many undocumented, small liberations of the red-fronted parakeet throughout New Zealand from privately held stock. Successful releases include Tiritiri Matangi Island (35 birds in 1974, 22 in 1975 and 27 in 1976), Cuvier Island (30 birds in 1974) and Whale Island (24 birds in 1986), all have become established. Unsuccessful releases occurred at Huia, Wairarapa, Waikanae and Waitakere (Higgins 1999).

3.5 POTENTIAL DISTRIBUTION IN TASMANIA

The natural distribution of red-fronted parakeet includes areas similar in climate to Tasmania. Using modelling applications by the Bureau of Rural Science (DAFF), climate is compared between the species' historical distribution and potential Australian distribution (shown in Figure 2). Tasmania has areas where the climate is highly similar (highest climate match score: 8). The Climate match score is very high (22) and there is therefore potential for this species to establish in Tasmania.

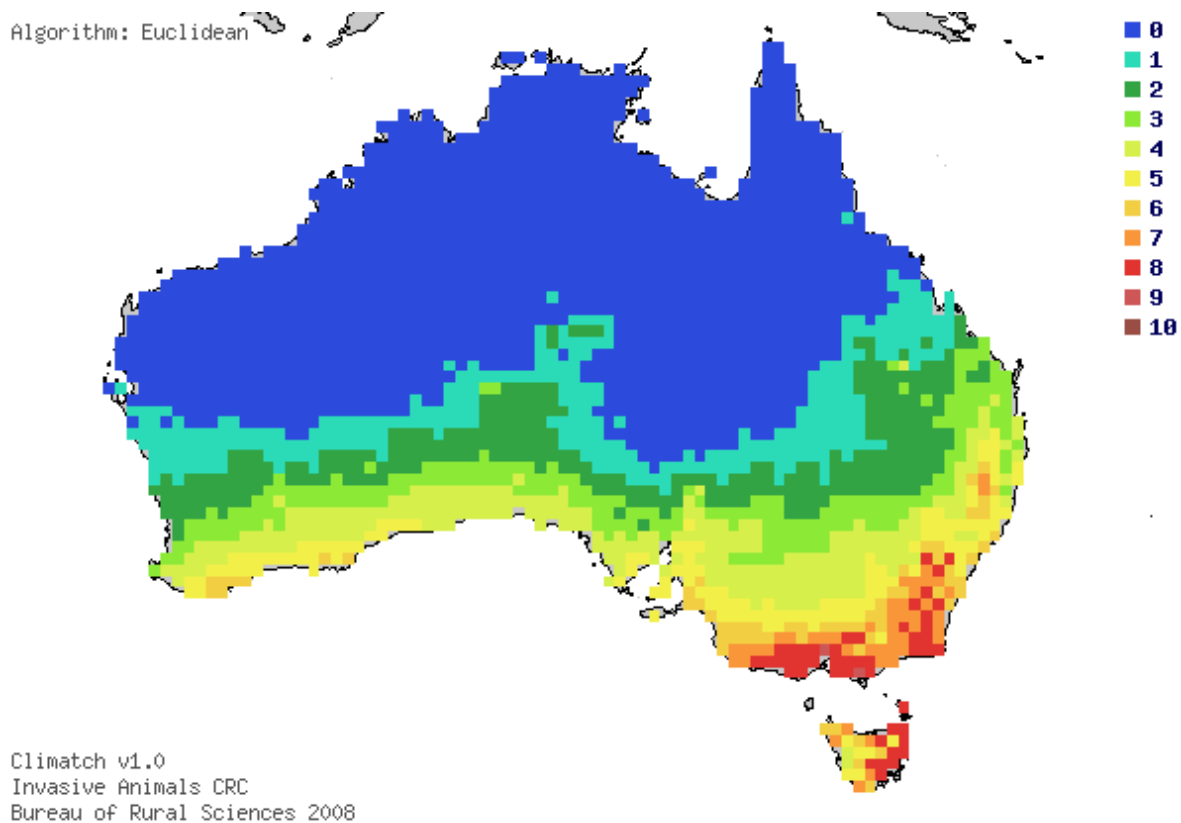


Figure 2: Climate match results showing the potential geographic distribution on the Red-fronted parakeet (*Cyanoamphus novaezelandiae*) in Australia. (Source: CLIMATCH – <http://adl.brs.gov.au:8080/Climatch/>)

3.6 DIET AND FEEDING BEHAVIOUR

The red-fronted parakeet is omnivorous, feeding mainly on plant material but also on invertebrates and marine molluscs, and will occasionally scavenge animal carrion, including birds. It prefers to feed in the canopy, but in open habitats feeds on the ground (Greene 1998). The birds forage singly, in pairs or in loose flocks of up to 30 birds, feeding at all levels from the ground to the outermost canopy, depending on the structure of the habitat. They mostly feed in the morning and afternoon, although feeding on limpets on Macauley Island (Kermadec Group) is determined by tides. They move quickly over the substrate with frequent short pauses to feed and may use their feet to scratch at the surface to expose seeds or invertebrates. They will often hold food in one foot when feeding and mainly feed by biting the food item and then chewing, crushing, peeling or husking. They are a destructive feeder and seed predator and often create large amounts of debris. Their presence is often betrayed by the continual clicking of mandibles, the steady stream of discarded fragments and occasional calls. Red-fronted parakeets need water and drink throughout the day (Higgins 1999).

Red-fronted parakeets occur throughout the year in most habitats. Adults exhibit little movement before or after breeding. Birds regularly move between islets in island groups, and can cross wide expanses of sea. There is possibly some altitudinal movement, most likely as a response to availability of food. On Little Barrier Island they move from *Leptospermum* and *Agathis-Nothofagus* forests to low coastal vegetation in April. On Mangere Island they shift from open grass habitats in winter to taller forests in summer. On Norfolk Island they visit gardens when trees are fruiting (Higgins 1999).

3.7 SOCIAL BEHAVIOUR AND GROUPINGS

Dispersal of the red-fronted parakeet is closely related to abundance of food and so varies between seasons and years. They are usually solitary or in pairs. Flocks can form at sources of abundant food in any season but are usually short lived. Most flocks are small and not often more than 5 birds. On islands with little fresh water, birds will congregate at water to drink and bathe. Once independent, juveniles will often forage with adults, forming small groups, generally close to the nest at first, then dispersing over wider areas (Higgins 1999).

Most pairs remain within fairly distinct areas before and during the breeding season, centred on regularly occupied roost and nest sites. Males are aggressive to other parakeets near the nest and females are also known to chase off intruders during the incubation period (Higgins 1999).

Roosting sites are usually traditional and invariably well concealed. They often use the same roost throughout the year. In the non-breeding season birds may roost in nest hollows and during the breeding season the male will roost close to, and possibly within, the nest. Loafing generally occurs in the middle of the day, usually in sheltered areas (Higgins 1999).

Most displays and behaviours are inconspicuous. They are usually quite while feeding, giving only the occasional soft contact call. Agonistic behaviour is generally rare in the wild and usually only involves displacement of conspecifics when in flocks at locally abundant food or near active nests. A resident male will often repeatedly attack intruders investigating their nest hollow. The approach of the male will usually cause the intruder to leave but sometimes results in an aerial fight (Higgins 1999).

When alarmed or disturbed they usually take flight, chattering loudly, and move to the nearest cover, often flying an erratic course and weaving through the vegetation at speed. Recognition, location and contact between birds is maintained through various calls. Various soft calls are given

by adults to maintain contact, and loud, prolonged chattering calls are given in flight and when alarmed (Higgins 1999).

3.8 NATURAL PREDATORS AND DISEASE

DISEASE

A serious threat to all island birds is the introduction of new disease. Island birds have often evolved in the absence of diseases common in continental bird faunas and the introduction of such diseases to island birds can be disastrous (Hill 2002).

The psittacine circovirus occurs naturally in the wild. The disease it causes (also known as beak and feather disease) is widespread and has been reported in more than 61 psittacine species, including the red-fronted parakeet (*Cyanoramphus novaezelandiae*) and the Norfolk Island green parrot (*Cyanoramphus cookii*), as well as the orange-bellied parrot, swift parrot, and many common species such as the sulphur crested cockatoo and the galah. This disease is considered a key threatening process under the EPBC due to its potential impact on rare parrot species (DEH, 2005).

The virus can affect birds of all ages, but particularly juveniles or young adults. The virus kills feather and beak cells. Symptoms of the acute form of this disease include diarrhoea and feather abnormalities, and death may occur suddenly within one to two weeks of the first symptoms. The chronic form results in feather, beak and skin abnormalities, with most birds eventually dying. The virus multiplies in the liver and can be transmitted orally or in faeces or feathers. It is one of the smallest and most resistant disease-causing viruses and probably remains alive for many years in tree hollows and other nest sites. The potential effects of the disease on parrot populations range from inconsequential to devastating, depending on environmental conditions and the general health of the parrots. The disease appears to have originated in Australia and is widespread and continuously present in wild populations of Australian parrots (DEH 2011, DEH 2005, Ortiz-Catedral et al 2010).

PREDATORS

Known predators of adults and fledglings of the red-fronted parakeet include feral cats (*Felis catus*), stoats (*Mustela erminea*), brown rats (*Rattus norvegicus*), swamp harriers (*Circus approximans*) and long-finned eels (*Anguilla dieffenbachi*). On Little Barrier Island, southern boobooks take 30-40% of the fledglings. Reasons for nest failure are infestation of blood sucking mites and disturbance from other birds. Black rats (*Rattus rattus*) are responsible for the failure of breeding attempts including the death of incubating females (Higgins 1999).

On Norfolk Island predation by the black rat and cats continues to be the greatest threat to the green parrot (*Cyanoramphus cookii*). Rats eat eggs and nestlings, and predate on brooding females. Cats predate on fledglings and breeding adults. Potential natural predators of the green parrot are the hybrid Norfolk Island boobook owl (*Ninox novaeseelandiae undulata*), the marsh harrier (*Circus approximans*) and kestrel (*Falco cenchroides*) (Hill 2002).

Potential predators of the red-fronted parakeet in Tasmania are the peregrine falcon, brown goshawk, collard sparrowhawk, grey goshawk, southern boobook, Australian hobby, quolls, feral cats and rats. They may also be predated by brown falcons and the swamp harrier, although this is considered less likely.

3.9 THREAT TO HUMAN SAFETY

There have been no recorded adverse effects of Red-fronted parakeets on humans.

3.10 HISTORY AS A PEST

Red-fronted parakeets were shot and trapped on Lord Howe Island, and shot as pests of crops by early settlers or sealers on the main islands of New Zealand and on Norfolk and Macquarie Island (Higgins 1999). On Norfolk Island they were persecuted by early settlers after large numbers of parakeets damaged crops and gardens. Convicts were said to have used sticks to drive the parakeets away from ripening corn. There is no record of the red-fronted parakeet as an environmental pest.

This species is not recorded on the Global Invasive Species Database (GISD 2011).

3.11 POTENTIAL IMPACT IN TASMANIA

If the red-fronted parakeet established in Tasmania it is likely to compete with the orange-bellied parrot (*Neophema chrysogaster*), swift parrot (*Lathamus discolor*), blue-winged parrot (*Neophema chrysostoma*), eastern rosella (*Platycercus eximius*) and green rosella (*Platycercus caledonicus*) for food and nest hollows. They could also compete for nest hollows for a range of small native species such as the swift parrot (*Lathamus discolor*), musk lorikeet (*Glossopsitta concinna*), owllet nightjar (*Aegotheles cristatus*) and tree martin (*Hirundo nigricans*).

The red-fronted parakeet has a high climate match with Tasmania (score of 22) and a high percentage of the ranges of the orange-bellied parrot, swift parrot, blue-winged parrot and green rosella overlap with areas with which there is a high climate match with the red-fronted parakeet (grids with climate match scores 7 & 8). The breeding range of the orange-bellied parrot in the south-west of the state occurs in a grid with a climate match score of 7.

The establishment of the red-fronted parakeet in Tasmania has the potential for high impact on agricultural industries as the species is known to be capable of damaging commodities such as cereal grains, oilseeds, grain legumes, fruit and vegetables. There have been reports of damage to these commodities, or similar commodities, although damage levels have never been high and no major control programs against this species has ever been conducted. Agricultural areas in Tasmania overlap with areas with which there is a high climate match with the red-fronted parakeet (grids with climate match scores 6, 7 & 8). This means that the red-fronted parakeet, if established, is likely to come into contact with these commodities.

This risk assessment does not consider the potential impact on Macquarie Island, where the species was formally present but is now extinct.

4. Risk Assessment

4.1 PREVIOUS RISK ASSESSMENTS

The Vertebrate Pests Committee (2007) assessed the red-fronted parakeet as being in the Serious Threat Category. Species placed in the Serious Threat Category “...may be introduced and/or should be kept only in collections approved by the relevant state/territory authority as being primarily kept for (1) public display and education purposes, and/or for (2) genuine scientific research approved by the relevant state/territory authority, and as meeting best practice for the purposes of keeping the species concerned” (Vertebrate Pests Committee 2007).

4.2 RISK ASSESSMENT

The following risk assessment determines the risk of the red-fronted parakeet to Tasmania using the Bomford model (2008) and proposes assigned threat categories and import classifications for the species.

Species:	Red-fronted parakeet (<i>Cyanoramphus novaezelandiae</i>)	
Date of Assessment:	April 2011	
Literature search type and date:	See references below	
Factor	Score	
A1. Risk posed from individual escapees (0-2)	0	Low risk
A2. Risk to public safety from individual captive animals (0-2)	0	Low risk
Stage A. Risk posed by individual animals (risk that a captive or escape animal would harm people)	Public Safety Risk Score = A1 + A2 = 0	Public Safety Risk Ranking A = 0 = NOT DANGEROUS
B1. Climate match score (1-6)	5	Climate match score 22
B2. Exotic population established overseas score (0-4)	2	New Zealand: established populations on Tiritiri Matangi Is, Cuvier Is and Whale Is (HANZAB).
B3. Overseas range size score (0-2)	0	Range = 269,260
B4. Taxonomic class score (0-1)	0	Bird
Stage B. Likelihood of establishment (risk that a particular species will establish a wild population in Tasmania)	Establishment Risk Score = B1 + B2 + B3 + B4 = 7	Establishment Risk Ranking B = 6-8 = MODERATE
C1. Taxonomic group (0-4)	2	Order Psittaciformes, family Psittacidae. No native species of the same genus.
C2. Overseas range size (0-2)	0	Range = 269,260

C3. Diet and feeding (0-3)	0	Bird
C4. Competition for native fauna for tree hollows (0-2)	2	Nests in hole in tree or cliff bank, in natural fissure in rock, in burrow in ground or natural vegetation.
C5. Overseas environmental pest status (0-3)	0	No record of environmental pest
C6. Climate match to areas with susceptible native species or communities (0-5)	5	Orange-bellied parrot - Climate match grid 7 over the breeding range of OBP (over 75% of geographic breeding range). Although climate match grids 5-10 cover approx 65% of geographic range of OBP. Blue-winged parrot and green rosella - 15 grid squares score 7 & 8, 13 grid squares score 5 & 6.
C7. Overseas primary production (0-5)	2	Formerly persecuted because birds damaged crops and gardens: shot and trapped on Lord Howe Is, shot as pests of crops by early settlers in NZ and in Norfolk and Macquarie Is. Norfolk Is convicts said to drive birds away from ripening corn.
C8. Climate match to susceptible primary production (0-5)	4	More than 20% of the range of susceptible commodity overlaps grid squares with climate match score 8.
C9. Spread disease (1-2)	2	Bird
C10. Harm to property (0-3)	0	Low risk
C11. Harm to people (0-5)	0	Nil risk
Stage C. Consequence of Establishment (risk that an established population would cause harm)	Consequence Risk Score = sum of C1 to C11 = 17	Consequence Risk Ranking C = 15-19 = SERIOUS
ASSIGNED THREAT CATEGORY:	SERIOUS	
PROPOSED IMPORT CLASSIFICATION:	IMPORT RESTRICTED TO THOSE LICENCE HOLDERS APPROVED FOR KEEPING SERIOUS THREAT SPECIES	

5. References

- AnAge: Animal Aging and Longevity Database (2011) Downloaded from http://genomics.senescence.info/species/entry.php?species=Cyanoramphus_novaezelandiae Accessed April 2011.
- BirdLife International 2008. *Cyanoramphus novaezelandiae*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4. <www.iucnredlist.org>. Downloaded on 15 April 2011.
- Bomford, M. 2008. Risk assessment models for establishment of exotic vertebrates in Australian and New Zealand. Invasive Animals Cooperative Research Centre, Canberra. <http://www.invasiveanimals.com/publications/downloads/Risk-Assessment-Models-report-FINAL.pdf>
- del Hoyo J., Elliott A. and Sargatal J. eds. (1997) *Handbook of Birds of the World Vol 4: Sangrouse to Cuckoos*. Lynx Edicions, Barcelona
- Department of Environment and Heritage (DEH) 2005. Threat abatement plan for beak and feather disease affecting endangered psittacine species. ISBN 0 642 549 117 Downloaded from <http://www.environment.gov.au/biodiversity/threatened/publications/tap/pubs/beak-feather-tap.pdf> Accessed April 2011
- Department of Environment and Heritage (DEH) 2011. Beak and feather disease (Psittacine circoviral disease) Fact sheet. Downloaded from <http://www.environment.gov.au/biodiversity/invasive/publications/pubs/p-c-disease.pdf> Accessed April 2011
- Encyclopedia of Life. 2011. Fact sheet: Red-fronted parakeet. Downloaded from <http://www.eol.org/pages/1177895> Accessed March 2011
- Global Invasive Species Database (GISD) 2011. Downloaded from <http://www.issg.org/database/species/search.asp?sts=sss&st=sss&fr=1&sn=cyanoramphus+novaezelandiae&rn=&hci=-1&ei=165&lang=EN&ImageI.x=12&ImageI.y=15> Accessed April 2011
- Greene, T.C. 1998. Foraging ecology of the red-crowned parakeet (*Cyanoramphus novaezelandiae*) and yellow-crowned parakeet (*C. auriceps auriceps*) on Little Barrier Island, Hauraki Gulf, New Zealand, *New Zealand Journal of Ecology* 22(2): 161-171 ©New Zealand Ecological Society
- Higgins, P.J. (1999) *Handbook of Australian, New Zealand and Antarctic Birds, Vol 4: Parrots to Dollarbird*. Oxford University Press, Melbourne
- Hill, R. 2002. Recovery Plan for the Norfolk Island Green Parrot *Cyanoramphus novaezelandiae cookii* - F2007B0039 Birds Australia. Downloaded from <http://www.comlaw.gov.au/Details/F2007B00394> Accessed April 2011
- NZ Birds 2010. Kakariki, the red-crowned parakeet. Version 2009v1 Downloaded from <http://www.nzbirds.com/birds/kakarikired.html> Accessed April 2011
- Ortiz-Catedral, L., Kurenbach, B., Massaro, M., McInnes, K., Brunton, D.H., Hauber, M.E., Martin, D.P. and Varsani, A. 2010. A new isolate of beak and feather disease virus from endemic wild red-fronted parakeets (*Cyanoramphus novaezelandiae*) in New Zealand *Arch Virol.* Apr;155(4):613-20. Epub Feb 24. Downloaded from <http://www.ncbi.nlm.nih.gov/pubmed/20180139> Accessed April 2011
- Secret Garden Exotic Birds (SGEB). 2011. Downloaded from http://www.secretgardenexotics.com/BirdInfo/Cyanoramphus_novaezelandiae.htm Accessed April 2011

Vertebrate Pests Committee. 2007. List of Exotic Vertebrate Animals in Australia 2006.
http://www.feral.org.au/feral_documents/VPCListJan06.pdf Accessed March 2011

6. Appendices

APPENDIX A: CALCULATING TOTAL COMMODITY DAMAGE SCORE

Column 1	Column 2	Column 3	Column 4	Column 5
Industry	Commodity Value Index (CVI)	Potential Commodity Impact Score (PCIS, 0-3)	Climate Match to Commodity Score (CMCS, 0-5)	Commodity Damage Score (CDS columns 2 x 3 x 4)
Cattle (includes dairy and beef)	11	0		
Timber (includes native and plantation forests)	10	0		
Aquaculture	6	0		
Sheep (includes wool and meat)	5	0		
Vegetables	5	2	5	50
Fruit (includes wine grapes)	5	2	5	50
Poultry (including eggs)	1.5	0		
Cereal grain (includes wheat, barley, sorghum etc)	1	2	5	10
Other crops and horticulture (includes nuts and flowers)	1	2	5	10
Pigs	1	0		
Bees (includes honey, beeswax, and pollination)	0.5	0		
Oilseeds (includes canola, sunflower etc)	0.5	2	5	5
Grain legumes (includes soybeans)	0.3	2	5	3
Other livestock (includes goats and deer)	0.3	0		
Total Commodity Damage Score (TCDS)				128

APPENDIX B: ASSIGNING SPECIES TO THREAT CATEGORIES

A: Danger posed by individual animals (risk a captive or escaped individual would harm people)	B: Likelihood of establishment (risk that a particular species will establish a wild population in Tasmania)	C: Consequence of establishment (risk that an established population would cause harm)	Threat category	Implications for any proposed import into Tasmania
Highly, Moderately or Not Dangerous	Extreme	Extreme	Extreme	Prohibited
Highly, Moderately or Not Dangerous	Extreme	Serious		
Highly, Moderately or Not Dangerous	Extreme	Moderate		
Highly, Moderately or Not Dangerous	Extreme	Low		
Highly, Moderately or Not Dangerous	High	Extreme		
Highly, Moderately or Not Dangerous	High	Serious		
Highly, Moderately or Not Dangerous	Moderate	Extreme		
Highly, Moderately or Not Dangerous	High	Moderate	Serious	Import restricted to those collections approved for keeping serious threat species
Highly, Moderately or Not Dangerous	High	Low		
Highly, Moderately or Not Dangerous	Moderate	Serious		
Highly Dangerous	Moderate	Moderate		
Highly Dangerous	Moderate	Low		
Highly, Moderately or Not Dangerous	Low	Extreme		
Highly, Moderately or Not Dangerous	Low	High		
Highly Dangerous	Low	Moderate		
Highly Dangerous	Low	Low		
Moderately or Not Dangerous	Moderate	Moderate		
Moderately or Not Dangerous	Moderate	Low		
Moderately or Not Dangerous	Low	Moderate		
Moderately Dangerous	Low	Low		
Not Dangerous	Low	Low	Low	Import Permitted
Unknown	Any value	Any value	Extreme until proven otherwise	Prohibited
Any Value	Unknown	Any value		
Any Value	Any value	Unknown		
Unassessed	Unassessed	Unassessed		

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