

NSW SCIENTIFIC COMMITTEE

Preliminary Determination

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Preliminary Determination to support a proposal to list 'Decline in woodland and forest birds due to aggressive exclusion by abundant Noisy Miners' as a KEY THREATENING PROCESS in Schedule 3 of the Act. Listing of Key Threatening Processes is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. The Noisy Miner *Manorina melanocephala* (Latham 1802) is a large (24-28 cm, 70-80 g), sedentary, highly aggressive honeyeater (family Meliphagidae) endemic to eastern Australia (Higgins *et al.* 2001). The natural habitat of the Noisy Miner is the woodlands and open forests of eastern Australia from far north Queensland to Tasmania, with densities of 0.01-0.05 birds per ha reported in relatively undisturbed areas (Higgins *et al.* 2001). In NSW the Noisy Miner is found throughout the coastal plains, foothills, ranges and tablelands (up to 1200 m), as well as on the inland slopes and plains of the semi-arid zone (Higgins *et al.* 2001).
2. The Noisy Miner favours open, lightly timbered areas and habitat edges and so has benefitted from the large-scale vegetation changes that accompanied the European settlement of Australia (Higgins *et al.* 2001; Catterall *et al.* 2002; Parsons *et al.* 2006; Grey *et al.* 2007; Hannah *et al.* 2007; Howes and Maron 2007; Taylor *et al.* 2008; Maron 2009; Oldland *et al.* 2009; Grey *et al.* 2010; Maron *et al.* 2011). This includes forest and woodland clearance and fragmentation, as well as a reduction in understory vegetation by livestock grazing, invasion of exotic grasses and altered fire regimes. As a consequence, Noisy Miners have increased in abundance (Higgins *et al.* 2001; Catterall *et al.* 2002; Low 2002; Szabo *et al.* 2010), occurring at densities of up to 10 birds per ha (Higgins *et al.* 2001). In NSW, an index of abundance (reporting rate) for Noisy Miners increased by 15% between the first (1977-1981) and second (1998-2002) national bird atlases (Barrett *et al.* 2007). Since this is a common species comparison across bird atlas surveys is considered valid.
3. Noisy Miner colonies now dominate many small (<20 ha) forest and woodland patches, woodland habitat with little shrub layer, forest edges, vegetation corridors, urban bushland and 'leafy' parks and gardens throughout much of southeastern Australia (Dow 1977; Loyn 1987; Catterall *et al.* 1991; Catterall 2004; Hastings and Beattie 2006; Parsons *et al.* 2006; Clarke and Oldland 2007; Maron 2009; Grey *et al.* 2010). In larger woodland patches (>50 ha), Noisy Miners can penetrate up to 300 m from the edge, depending on habitat type and tree density (Clarke and Oldland 2007).
4. Noisy Miners can form large complex colonies of up to several hundred individuals which cooperate in most activities including breeding and territory defence (Higgins *et al.* 2001). Noisy Miners tend to dominate the habitat they occupy often comprising more than 50% of all birds present in fragmented woodland and open forest (Loyn 1987; Clarke and Oldland 2007; Maron and Kennedy 2007; Mac Nally *et al.* 2012), as well as urban areas (Catterall *et al.* 2002; Piper and Catterall 2003; Parsons *et al.* 2006). Through their cooperative aggressive behaviour Noisy Miners physically attack and actively drive away birds of similar or smaller size from areas they occupy (Dow 1977). This aggressive exclusion often results in Noisy Miners being the only small-medium sized bird species present in occupied habitat (Dow

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1977; Grey *et al.* 1997, 1998; Piper and Catterall 2003; Clarke and Oldland 2007; Howes and Maron 2009). An analysis of data from across south-eastern Australia has shown that Noisy Miner densities of 0.8 birds per ha, or larger, is strongly negatively correlated with the abundance of small to medium sized native birds (Mac Nally *et al.* 2012). The removal of Noisy Miners from habitat patches results in the recolonisation of the area by small to medium sized birds (Grey *et al.* 1997, 1998; Debus 2008) even before any change in habitat condition or structure occurs. These observations indicate that the link between abundant Noisy Miners and impoverished bird communities is direct and causal.

5. Abundant Noisy Miners are often associated with vegetation remnants suffering from 'eucalypt dieback' (rural tree decline), and patches with high densities of sap-sucking psyllid bugs that secrete a protective sugary coating ('lerp') (Ford and Bell 1982; Howes and Maron 2007; Grey 2008). Small woodland patches monopolised by dense colonies of Noisy Miners show increased frequency of damaged leaves, defoliation and crown dieback (Ford and Bell 1982; Grey 2008). It seems likely that Noisy Miners contribute to habitat degradation by excluding smaller insectivorous birds that would otherwise consume herbivorous or sap-sucking insects (Loyn *et al.* 1983; Loyn 1987; Grey 2008; Grey *et al.* 2010). If Noisy Miners are removed, insectivorous birds quickly return (Grey *et al.* 1997, 1998; Debus 2008) and a significant decrease in the level of leaf damage caused by herbivorous and sap-sucking insects and a steady improvement in overall tree health has been observed (Grey 2008). The related Bell Miner (*Manorina melanophrys*) is associated with eucalypt forest dieback in eastern New South Wales with 'Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners' listed as a Key Threatening Process under the *Threatened Species Conservation Act* 1995.

6. A range of threatened woodland and forest bird species listed under the *Threatened Species Conservation Act* 1995 are adversely affected by aggressive exclusion by abundant Noisy Miners including:

Critically endangered species

Regent Honeyeater	<i>Anthochaera phrygia</i>
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Endangered species

Swift Parrot	<i>Lathamus discolor</i>
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Vulnerable species

Speckled Warbler	<i>Chthonicola sagittata</i>
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>
Varied Sittella	<i>Daphoenositta chrysoptera</i>
Little Lorikeet	<i>Glossopsitta pusilla</i>
Painted Honeyeater	<i>Grantiella picta</i>
Hooded Robin (south-eastern form)	<i>Melanodryas cucullata cucullata</i>
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>
Turquoise Parrot	<i>Neophema pulchella</i>
Gilbert's Whistler	<i>Pachycephala inornata</i>
Scarlet Robin	<i>Petroica boodang</i>
Flame Robin	<i>Petroica phoenicea</i>
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>
Diamond Firetail	<i>Stagonopleura guttata</i>

ESTABLISHED UNDER THE THREATENED SPECIES CONSERVATION ACT 1995

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For example, Noisy Miners have been reported destroying an active Regent Honeyeater nest, as well as driving the adults away from the nest site (Higgins *et al.* 2001). In addition, Regent Honeyeaters were one of a number of bird species that were only reported from a woodland remnant following the removal of Noisy Miners (Grey *et al.* 1997). Similarly, a significant negative association was found between Swift Parrot occurrence and Noisy Miners in woodland on the western slopes of NSW (Saunders and Heinsohn 2008).

These and other bird species are primarily impacted by their active exclusion from areas of otherwise suitable habitat (Mac Nally *et al.* 2012), which limits feeding, breeding and dispersal opportunities and therefore ultimately population size and persistence. Noisy Miners prefer forest and woodland on productive sites, which are now scarce in areas where agricultural clearing has targeted fertile soils (Oldland *et al.* 2009). Such sites, even small patches, may otherwise support high diversity and abundance of woodland birds, including threatened and declining species (*e.g.* Fischer and Lindenmayer 2002; Debus *et al.* 2006; Maron 2007). Since fertile sites support nutritious foliage and high densities of invertebrates (Recher *et al.* 1996), they also potentially support high breeding productivity of threatened and declining woodland birds. This is because food supply is one of the most significant factors affecting nest success (reviewed by Fulton 2008).

7. The aggressive exclusion of woodland and forest birds by abundant Noisy Miners adversely affects many threatened ecological communities listed under the *Threatened Species Conservation Act*, by contributing to their degradation. Listed ecological communities known to be impacted by abundant Noisy Miners include White Box – Yellow Box – Blakely’s Red Gum Woodland (Debus 2008) and Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions (Maron *et al.* 2011). However, Noisy Miners are also likely to negatively impact all other listed eucalypt-dominated grassy woodland communities on the NSW coastal plain, tablelands, inland slopes and plains, as well as remnants of many listed eucalypt forest communities, including those in urban areas. Small and/or linear remnant patches on productive sites are likely to be most highly impacted. Through the active exclusion of other birds (often insectivores and nectivores), ecosystem function in the listed communities can be compromised by increased insect herbivory (see point 6) and potentially reduced pollen/seed dispersal.

8. Aggressive exclusion of woodland and forest birds by abundant Noisy Miners already affects or broadly affects additional species of woodland birds recognised as declining (Reid 1999; Barrett and Silcocks 2002; Debus *et al.* 2006; Barrett *et al.* 2007; Debus 2006, 2008; Mac Nally *et al.* 2012) though not formally listed as threatened. This includes but is not restricted to:

Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>
Chestnut-rumped Thornbill	<i>Acanthiza uropygialis</i>
Southern Whiteface	<i>Aphelocephala leucopsis</i>
Dusky Woodswallow	<i>Artamus cyanopterus</i>
White-browed Woodswallow	<i>Artamus superciliosus</i>
Eastern Yellow Robin	<i>Eopsaltria australis</i>
Crested Shrike-tit	<i>Falcunculus frontatus</i>
Peaceful Dove	<i>Geopelia striata</i>
White-winged Triller	<i>Lalage sueurii</i>

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Jacky Winter

Restless Flycatcher

Rufous Whistler

Red-capped Robin

White-browed Babbler

Double-barred Finch

Microeca fascians

Myiagra inquieta

Pachycephala rufiventris

Petroica goodenovii

Pomatostomus superciliosus

Taeniopygia bichenovii

Aggressive exclusion of these species from otherwise available habitat by Noisy Miners is likely to contribute to these species that are not threatened to become threatened.

9. Three existing Key Threatening Processes contribute to the formation of habitat that favours an increase in Noisy Miner abundance: i) Clearing of native vegetation; ii) High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition; iii) Invasion of native plant communities by exotic perennial grasses. However, these Key Threatening Processes do not explain all situations where Noisy Miners actively exclude other birds. Moreover the presence of Noisy Miners is usually more strongly correlated with low bird abundance/diversity than any of these or other disturbance factors including remnant size, degree of isolation and habitat structure (Barrett *et al.* 1994; Grey *et al.* 1997, 1998; Major *et al.* 2001; Catterall *et al.* 2002; Piper and Catterall 2003; Catterall 2004; Debus *et al.* 2006; Parsons *et al.* 2006; Hannah *et al.* 2007; Maron 2007, 2008, 2009; Oldland *et al.* 2009; Grey *et al.* 2010; Maron *et al.* 2011, Mac Nally *et al.* 2012). The major causal role played by Noisy Miner in reducing bird abundance/diversity has lead to them being described as a 'reverse keystone species' (Piper and Catterall 2003) and a 'despotic, high-impact species' (Mac Nally *et al.* 2012) controlling avian assemblage structure at a landscape scale.

10. 'Decline in woodland and forest birds due to aggressive exclusion by abundant Noisy Miners' is eligible to be listed as a Key Threatening Process as, in the opinion of the Scientific Committee:

- (a) it adversely affects threatened species, populations or ecological communities, or
- (b) causes species, populations or ecological communities that are not threatened to become threatened.

Dr Andrea Wilson

Deputy Chairperson

Scientific Committee

References:

Barrett G, Ford HA, Recher HF (1994). Conservation of woodland birds in a fragmented rural landscape. *Pacific Conservation Biology* 1, 245-256.

Barrett GW, Silcocks AF (2002). Comparison of the first and second Atlas of Australian Birds to determine the conservation status of woodland-dependent and other bird species in New South Wales over the last 20 years. Birds Australia Report to NSW National Parks and Wildlife Service, Dubbo NSW.

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- Barrett G, Silcocks A, Barry S, Cunningham R, Poulter R (2003). 'The new atlas of Australian birds.' (RAOU: Melbourne)
- Barrett GW, Silcocks AF, Cunningham R, Oliver DL, Weston MA, Baker J (2007). Comparison of atlas data to determine the conservation status of bird species in New South Wales, with an emphasis on woodland-dependent species. *Australian Zoologist* **34**, 37-77.
- Blakers M, Davies SJF, Reilly PN (1984). 'The atlas of Australian birds.' (Melbourne University Press: Melbourne)
- Catterall CP, Green RJ, Jones DN (1991). Habitat use by birds across a forest suburb interface in Brisbane: implications for corridors. In 'Nature conservation 2: The role of corridors' (Eds DA Saunders and RJ Hobbs) pp 247-258. (Surrey Beatty: Sydney)
- Catterall CP (2004). Birds, garden plants and suburban bushlots: where good intentions meet unexpected outcomes. In 'Urban wildlife: More than meets the eye' (Eds D Lunney and S Burgin) pp 21-31. (Royal Zoological Society of NSW: Sydney)
- Catterall CP, Piper SD, Goodall K (2002). Noisy Miner irruptions associated with land use by humans in south-east Queensland: causes, effects, and management implications. In 'Landscape health in Queensland' (Eds A Franks, J Playford, A Shapcott) pp 117-127. (Royal Society of Queensland: Brisbane)
- Clarke MF, Oldland JM (2007). Penetration of remnant edges by Noisy Miners (*Manorina melanocephala*) and implications for habitat restoration. *Wildlife Research* **34**, 253-261.
- Debus SJS (2006). The role of intense nest predation in the decline of Scarlet Robins and Eastern Yellow Robins in remnant woodland near Armidale, New South Wales. *Pacific Conservation Biology* **12**, 279-287.
- Debus SJS (2008). The effect of Noisy Miners on small bush birds: an unofficial cull and its outcome. *Pacific Conservation Biology* **14**, 185-190.
- Debus SJS, Ford HA, Page D (2006). Bird communities in remnant woodland on the New England Tablelands, New South Wales. *Pacific Conservation Biology* **12**, 50-63.
- Dow DD (1977). Indiscriminate interspecific aggression leading to almost sole occupancy of space by a single species of bird. *Emu* **77**, 115-121.
- Fischer J, Lindenmayer DB (2002). Small patches can be valuable for biodiversity conservation: two case studies on birds in southeastern Australia. *Biological Conservation* **106**, 129-136.
- Ford HA, Bell HL (1982). Density of birds in eucalypt woodland affected to varying degrees by dieback. *Emu* **82**, 202-208.
- Fulton GF (2008). A possible territorial and nesting association between Pied and Grey Butcherbirds *Cracticus nigrogularis* and *C. torquatus* and the Yellow-throated Miner *Manorina flavigula*. *Corella* **32**, 30-34.

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- Garnett ST, Szabo JK, Dutson G (2011). 'The action plan for Australian birds 2010.' (CSIRO Publishing: Melbourne)
- Grey MJ (2008). 'The impact of the Noisy Miner *Manorina melanocephala* on avian diversity and insect-induced dieback in eucalypt remnants'. PhD thesis, La Trobe University, Melbourne.
- Grey MJ, Clarke MF, Loyn RH (1997). Initial changes in the avian communities of remnant eucalypt woodlands following a reduction in the abundance of Noisy Miners, *Manorina melanocephala*. *Wildlife Research* **24**, 631-648.
- Grey MJ, Clarke MF, Loyn RH (1998). Influence of the Noisy Miner *Manorina melanocephala* on avian diversity and abundance in remnant Grey Box woodland. *Pacific Conservation Biology* **4**, 55-69.
- Grey MJ, Oldland J, Clarke MF (2007). Microhabitat preference of the Noisy Miner *Manorina melanocephala*. Abstracts, p. 65, Australasian Ornithological Conference, Perth, December 2007.
- Grey MJ, Clarke MF, Taylor R (2010). The impact of the Noisy Miner (*Manorina melanocephala*) on woodland birds, and possible mitigation strategies: a review with recommendations. Report to Department of Sustainability and Environment, Victoria from La Trobe University, February 2010.
- Hannah D, Woinarski JCZ, Catterall CP, McCosker JC, Thurgate NY, Fensham RJ (2007). Impact of clearing, fragmentation and disturbance on the bird fauna of eucalypt savanna woodland in central Queensland, Australia. *Austral Ecology* **32**, 261-276.
- Hastings RA, Beattie AJ (2006). Stop the bullying in the corridors: can including shrubs make your revegetation more Noisy Miner free? *Ecological Management and Restoration* **7**, 105-112.
- Howes A, Maron M (2007). Woodland bird diversity and Noisy Miners in Brigalow Belt forests. Abstracts, p. 66, Australasian Ornithological Conference, Perth, December 2007.
- Howes A, Maron M (2009). Interspecific competition and conservation management of continuous subtropical woodlands. *Wildlife Research* **36**, 617-626.
- Higgins PJ, Peter JM, Steele WK (2001). 'Handbook of Australian, New Zealand and Antarctic Birds. Volume 5: Tyrant-flycatchers to Chats.' Oxford University Press, Melbourne.
- Low T (2002). 'The new Nature.' (Viking: Melbourne)
- Loyn RH (1987). Effects of patch area and habitat on bird abundances, species numbers and tree health in fragmented Victorian forests. In 'Nature conservation: The role of remnants of native vegetation' (Eds DA Saunders, GW Arnold, AA Burbidge, AJM Hopkins) pp 65-77. (Surrey Beatty: Sydney)
- Loyn RH, Runnalls RG, Forward GW, Tyers J (1983). Territorial Bell Miners and other birds affecting populations of insect prey. *Science* **221**, 1411-1412.

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- Mac Nally R, Bowen M, Howes A, McAlpine CA, Maron M (2012). Despotism, high-impact species and the subcontinental scale control of avian assemblage structure. *Ecology* **93**, 668-78.
- Major RE, Christie FJ, Gowing G (2001). Influence of remnant and landscape attributes on Australian woodland bird communities. *Biological Conservation* **102**, 47-66.
- Maron M (2007). Threshold effect of eucalypt density on an aggressive avian competitor. *Biological Conservation* **136**, 100-107.
- Maron M (2008). Size isn't everything: the importance of small remnants to the conservation of woodland birds in Australia. *Australian Field Ornithology* **25**, 53-58.
- Maron M (2009). Nesting, foraging and aggression of Noisy Miners relative to road edges in an extensive Queensland forest. *Emu* **109**, 75-81.
- Maron M, Kennedy S (2007). Roads, fire and aggressive competitors: determinants of bird distribution in subtropical forests. *Forest Ecology and Management* **240**, 24-31.
- Maron M, Main A, Bowen M, Howes A, Kath J, Pillette C, McAlpine, CA (2011). Relative influence of habitat modification and interspecific competition on woodland bird assemblages in eastern Australia. *Emu* **111**, 40-51.
- Oldland J, Taylor RS, Clarke MF (2009). Habitat preferences of the Noisy Miner (*Manorina melanocephala*) – a propensity for prime real estate? *Austral Ecology* **34**, 306-316.
- Parsons H, Major RE, French K (2006). Species interactions and habitat associations of birds inhabiting urban areas of Sydney, Australia. *Austral Ecology* **31**, 217-227.
- Piper SD, Catterall CP (2003). A particular case and a general pattern: hyperaggressive behaviour of one species may mediate avifaunal decreases in fragmented Australian forests. *Oikos* **101**, 602-614.
- Reid, JRW (1999). Threatened and declining birds in the New South Wales Sheep-Wheat Belt: 1 Diagnosis, characteristics and management. A consultancy report prepared for the New South Wales National Parks and Wildlife Service.
- Recher HF, Majer JD, Ganesh S (1996). Eucalypts, arthropods and birds: on the relation between foliar nutrients and species richness. *Forest Ecology and Management* **85**, 177-195.
- Saunders DL, Heinsohn R (2008). Winter habitat use by the endangered, migratory Swift parrot (*Lathamus discolor*) in New South Wales. *Emu* **108**, 81-89.
- Szabo JK, Vesk PA, Baxter PWJ, Possingham HP (2010). Regional avian species declines estimated from volunteer-collected long-term data using List Length Analysis. *Ecological Applications* **20**, 2157–2169.
- Taylor RS, Oldland JM, Clarke MF (2008). Edge geometry influences patch-level habitat use by an edge specialist in south-eastern Australia. *Landscape Ecology* **23**, 377-389.