Chapter 5

Fauna and aircraft

Introduction

5.1 In addition to the effect of wind turbines and industrial noise on human health, wind turbines have a range of other detrimental environmental impacts on the surrounding environment that require attention. Term of reference (g) of this inquiry directs the committee to examine the 'effect that wind towers have on fauna and aerial operations around wind turbines, including firefighting and crop management'.[1] This chapter will examine the following issues:

- modification of sensitive ecosystems through land clearing activities and interference in the flight zones of native birds leading to serious injury and death;
- impacts on visual amenity;
- interference with aerial firefighting activities, resulting in increased destruction of native vegetation and habitat during fire events; and
- interference with crop management activities (including aerial application of fungicides and herbicides that result in downgrading of crop quality and yields (hence decreasing farmer's profits. and local economies).

Fauna

5.2 The impact of wind farm development and operation on native fauna, in particular native birds and bats, has been raised by many witnesses and submissions to the committee. In its submission, Save the Eagles International described wind turbines as '"ecological traps"—population sinks that attract and kill millions of birds and bats year after year'.[2]

5.3 There are a wide range of estimates as to the extent of fatalities caused by wind turbines on aerial fauna. Ms Emma Bennett noted that 'only a limited number of studies' had been conducted into the impact of wind farms on bird mortality, and that estimates indicate that '2 000 to 8 000 birds [are] annually killed across all wind farms in Australia'.[3] The Australia Institute contends that the 'average death rate is 1–2 birds

1 Term of reference (g)

2 Save the Eagles International, *Submission 326*, pp [5–6].

3 Ms Emma Bennett, *Committee Hansard*, Melbourne, 9 June 2015, p. 33.

per turbine per year'.[4] Considering that there are currently 2 077 turbines in Australia, these estimates seem to correlate.[5]

5.4 However, a report on bird and avifauna mortality commissioned by AGL Energy for its Macarthur Wind Farm found that 10.19 birds were killed by each turbine in a 12 month period. This equates to over 1 400 birds killed at the Macarthur Wind Farm alone and over 21 000 if extrapolated across the country. Despite the apparent thoroughness of this monitoring exercise—4 surveys in 12 months—the authors of the report were concerned that the 'estimates of mortality, however, are considered to be inaccurate due to the frequent removal of carcasses by scavengers.'[6]

5.5 Notwithstanding the debate over the number of mortalities, some submitters argued that the number of deaths caused by wind farms were insignificant compared to the 'higher rate of avian mortality that results from collisions with automobiles, transmission towers and power lines, as well as the damage done by domestic and feral cats which cause significantly more deaths'.[7] The committee shares the concerns of many submitters that information on the subject of avifauna mortality at windfarms is unclear and that more research in this area is required with special consideration of those bird species which are endangered.

5.6 Many submitters noted the high prevalence of native birds in areas surrounding current and proposed wind farms. In her submission to the committee, Councillor Marjorie Pagani noted that the region adjacent to the proposed Mt Emerald Wind Farm in northern Queensland is a haven for many species of birds and bats:

> Our region (and my own property) is home to abundant raptor and other bird life, and quolls, including the rare northern spotted quoll. These have all been observed on my property. The containment of mass destruction of habitats has not been sufficiently explained in the developer applications. Nardellos Lagoon, a few kilometres from the centre of the range, is a significant breeding area for Sea Eagles, Saris Cranes, Brolgas and a major habitat for black swans. The range is a major migratory bird flight path, for not only the raptors, but also the flying foxes. The developer has admitted

4 The Australia Institute, *Submission 67*, p. 3. See also: South Australian Government, *Submission 59*, p. 9; Ms Kim Forde, *Submission 65*, p. [4]; Ms Emma Bennett, *Submission 267*, pp [2–3].

5 Number of turbines, see Chapter 1.

6 Dr Matthew Wood, Australian Ecological Research Services, *Macarthur Wind Farm, Bat and Avifauna Mortality Monitoring* (Prepared for AGL Energy), June 2014, p. ii, https://stopthesethings.files.wordpress.com/2014/09/macarthur-bat-and-avifauna-mortality-monitoring-report-full.pdf (accessed 1 July 2015).

7 The Australia Institute, *Submission 67a*, p. 24. See also: Ms Emma Bennett, *Committee Hansard*, Melbourne, 9 June 2015, p. 33; Wallace P. Erickson, Gregory D. Johnson and David P. Young, 'A Summary and Comparison of Bird Mortality from Anthropogenic Causes with an Emphasis on Collisions', *USDA Forest Service General Technical Report*, PSW-GTR-191, 2005, p. 1039. A number of submissions disagree with this proposition. See, for example: Mr Michael Crawford, *Submission 316b*, p. 7.

> the flight path of these birds is at the height of the proposed turbines. It has not acknowledged either the migratory species, nor the Nardellos breeding lagoon in its report, nor has it acknowledged the extensive cropping in the area and the bird numbers from that perspective.[8]

5.7 Mr Alan Cole, a farmer in the Yass region of southern NSW highlighted a number of the key species currently found at his farm, part of the proposed site for the Yass Valley Wind Farm:

> My farm sits in a valley located between the Black Range and Mt Bowning just west of Yass. This valley is a raptor hotspot, with numerous species of raptors including Wedge Tailed Eagles, Little Eagles, Sea Eagles (from Burrinjuck Dam) and Peregrine Falcons (to name a few) frequent the area. Whilst only two of these species are considered endangered, it is my opinion that the Epuron proposed WINDPEG's for the Black Range have the potential to decimate local populations of these raptors.[9]

5.8 Several submissions and witnesses highlighted two bird species that are particularly vulnerable—the brolga (*Grus rubicunda*) and the Superb Parrot (*Polytelis swainsonii*).

5.9 The brolga is one of only two types of crane found in Australia. The NSW Office of Environment and Heritage notes that the brolga population 'is very sparse across the southern part of its range' and that the brolga is regarded as being a 'vulnerable' species in both NSW and Victoria.[10] Mrs Susan Dennis, President of the Brolga Recovery Group, concurs noting:

> The brolga is considered to be significantly prone to future threats which are likely to result in its extinction; it is very rare in terms of abundance. There are fewer than 500 remaining in south-west Victoria.[11]

5.10 Mrs Dennis outlined the impact that wind farms have on brolgas.

> There are three ways that wind energy facilities can impact on the brolga: direct collision, barrier effects and, the most critical of all, displacement from habitat. The brolga simply cannot afford to be displaced from an already limited habitat. It can be quite clearly seen in the maps that there are groups of wind energy facilities proposed and constructed in important

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8 Ms Marjorie Pagani, *Submission 340*, p. [5].

9 Mr Alan Cole, *Submission 73*, p. [6].

10 A vulnerable listing means that the species is facing a 'high risk of extinction in the wild'. See: NSW Office of Environment and Heritage, *Threatened Species: Brolga – profile*, http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10382 (accessed 29 June 2015); Victorian Department of Sustainability and Environment, *Advisory List of Threatened Vertebrate Fauna—2013*, p. 11, http://www.depi.vic.gov.au/__data/assets/pdf_file/0019/210439/Advisory-List-of-Threatened-Vertebrate-Fauna_FINAL-2013.pdf (accessed 29 June 2015).

11 Mrs Susan Dennis, President, Brolga Recovery Group, *Committee Hansard*, Melbourne, 9 June 2015, p. 38.

> brolga habitat. The current evidence is that the brolgas are likely to be displaced up to eight kilometres. So where do they go? Brolgas tend to use the same habitat areas over many years, so it is not just a case of creating a wetland somewhere else and hoping the brolgas will go there. Clearly, there are no offset plans that can compensate for stolen habitat. And when wind energy facilities are so close together in brolga habitat, there cannot be a zero net impact and the requirement to avoid any cumulative impact is clearly impossible.[12]

5.11 Mr Hamish Cumming, formerly a Brolga Recovery Group secretary, told the committee that the issue relating to brolgas and wind turbines is one of displacement:

> Studies have been done in America and Australia that show that the turbines are displacing cranes—and brolgas are a crane—for a distance of up to 14 kilometres but regularly a distance of six kilometres. Since the Macarthur wind farm started—and I try to use all these people's own reports; they are the best thing to use—their reports have said that 45 wetlands were abandoned in the first 12 months, and 25 of them were potential breeding wetlands, and no brolgas have successfully nested within six kilometres of turbines.[13]

5.12 The Superb Parrot is another species that is under threat from wind farm development and operation. Similar to the brolga, the Superb Parrot is listed as a vulnerable species under the federal *Environment Protection and Biodiversity Conservation Act 1999* and at a state level in the ACT and NSW.[14] The Victorian Government has taken one step further, listing it as an endangered species.[15] In his submission, Mr Cole observes:

> The Yass District happens to enjoy the natural range of one of the most beautiful and rare parrots found in NSW; the Superb Parrot.
>
> It is understood that this threatened species is starting to recover from the population loss it has experienced from habitat destruction. Of great concern for the future of this species is the potential impact of wind turbines in central NSW. The proponents of WINDPEG's tend to trivialise these potential impacts.[16]

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12 Mrs Susan Dennis, President, Brolga Recovery Group, *Committee Hansard*, Melbourne, 9 June 2015, p. 38.

13 Mr Hamish Cumming, *Proof Committee Hansard*, Portland, 30 March 2015, p. 52. See also: Mr Hamish Cumming, *Submission 31*, p. 6.

14 Australian Government Department of the Environment, *Polytelis swainsonii—Superb Parrot* in *Species Profiles and Threats Database*, 2015, http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=738 (accessed 3 July 2015).

15 An endangered listing means that the species is facing a 'very high risk of extinction in the wild'. See also: Victorian Department of Sustainability and Environment, *Advisory List of Threatened Vertebrate Fauna—2013*, p. 11.

16 Mr Alan Cole, *Submission 73*, p. [6]. See also: Mr John McGrath, *Submission 314*.

5.13 The committee notes that the Superb Parrot is subject to the same threats as the brolga—'direct collision, barrier effects and, the most critical of all, displacement from habitat' as outlined by Mrs Dennis above. Mr John McGrath states that 'the greater Boorowa area is a known breeding ground for the Superb Parrot' and that any development in this area must consider wind turbines as a key threatening process.[17]

5.14 The committee is also concerned about the impact of land-clearing activities related to wind farm development that result in the direct and indirect deaths of fauna—birds, bats and other invertebrates. The Waterloo and District Concerned Citizens Group noted that the Waterloo Wind Farm has resulted in the 'loss of habitat of native and endangered birds and animals, particularly eagles and other raptors'[18] The Tarwin Valley Coastal Guardians described the horror of finding four dead koalas over a 4–6 week period as a result of land clearing to install a transmission line.[19] One of these dead koalas can be seen in Figure 6.1 below. Mr John McGrath shared his concerns about unexpected deaths in his submission:

> We remain mystified as to why perfectly healthy and heavy Wedged Tailed Eagles fall out of trees dead or are found in local paddocks in the same condition dead. A fact that we believe as a family needs further investigation.[20]

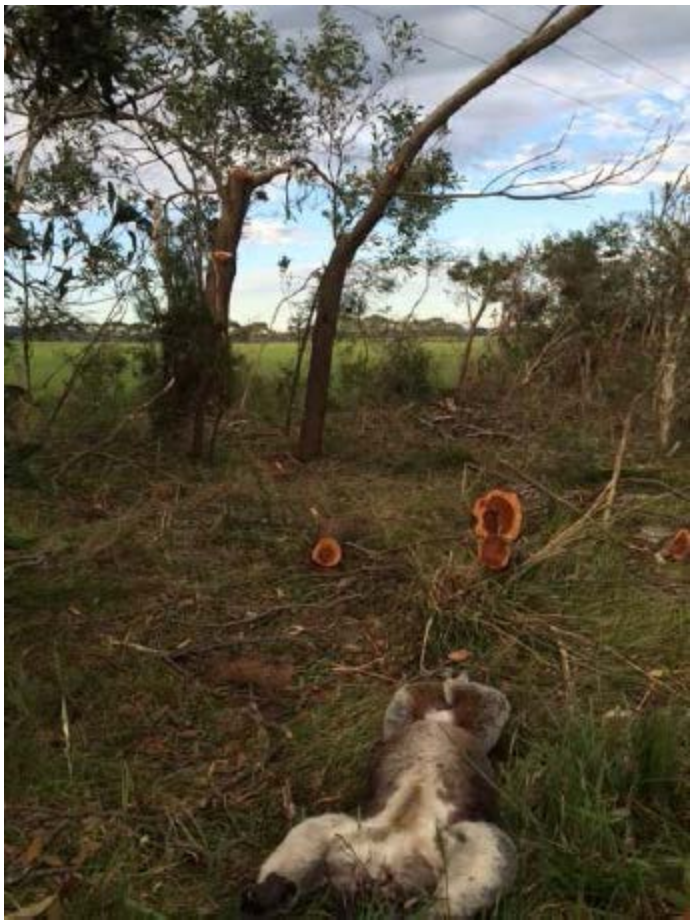
17 Mr John McGrath, *Submission 314*, p. 4. See also: BWTAG, *Submission 227a*, p. 6.

18 Waterloo and District Concerned Citizens Group, *Submission 21*, p. [2].

19 Tarwin Valley Coastal Guardians, *Submission 45*, p. 45.

20 Mr John McGrath, *Submission 314*, p. [3].

Figure 5.1: One of four dead koalas allegedly found by local residents at a construction site associated with the Bald Hills Wind Farm



Source: Tarwin Valley Coastal Guardians, *Submission 45*, p. 45.

Inadequacy of bird and bat surveys

5.15 The committee has received evidence about the poor knowledge base that exists within the environmental consultancies that prepare and submit environmental approvals and management plans on behalf of wind farm proponents, and the planning and environmental agencies that regulate and approve wind farm development.[21] This section will discuss examples of avifauna surveys conducted in conjunction with wind farm development.

5.16 The bird survey conducted by Brett Lane and Associates as part of the environmental approvals process for the Bald Hills Wind Farm was reviewed by Dr Lucas Bluff in a report to the Tarwin Valley Coastal Guardians. This report quoted the Victorian Government's independent Planning Panel as describing the bird survey as 'a relatively low survey effort'. Not only was the total number of hours completed for the bird survey manifestly inadequate, the quality of the survey work was also

21 Tarwin Valley Coastal Guardians, *Submission 45*, p. [65].

questioned.[22] Most of the survey work was undertaken between 8.00am and 5.00pm, clearly not in line with best-practice with the panel indicating that 'you really need to start predawn and finish after dusk'.[23] Finally, Dr Bluff states that an inappropriate survey spatial design was chosen and implemented. Dr Bluff is quite plain in his concluding observations on the bird survey:

> It has been acknowledged that the timing of Lane's survey work was flawed, and that the result of this error is to reduce the apparent utilization of the site by birds and potentially to miss movement patterns of some species altogether. Therefore, the risk that the development would pose to birds is unambiguously higher than that claimed by Lane.[24]

5.17 Many of the same issues were apparent in the bat survey. A review of the bat survey by the Planning Panel highlighted that a species known to the area and of high conservation concern—the Bentwing Bat—was not located during these surveys with the Panel acknowledging 'that Lane's bat survey work was insufficient to quantify the presence of Bentwing bats at the site, and recommended extended monitoring of the bat population and of bat kills'. An expert on these bats, Dr Belinda Appleton, was more direct stating that:

> The proposed wind farm should not be approved until the necessary investigations into effects on bat mortality have been carried out.[25]

5.18 This is not the only incidence where the results of a fauna survey have been called into question. The fauna surveys conducted for wind farms in the Boorowa area, in southern NSW, were appraised by Mr John McGrath:

> Brett Lane and Associates basically self-admitted that they did [no] more than small walk t[h]rough's of the area of some of the proposed conglomeration of 360 wind towers stretching from the Hume Highway just North of Yass through to the Rye Park Rugby area.
>
> From my memory they claimed that they did a "walk through" in May of small portions of this proposed conglomerations of towers and stated that there were no Superb Parrots *Polytelis swainsonii*—That's exactly correct there are no Superb Parrots in residen[ce] in the Boorowa area in May, the birds arrive from their Northern haunts in preparation for breeding in very late August mid-September whereupon they build themselves up physically for breeding by feasting on the blossom of the Yellow Box *Eucalyptus melliodora*, then after a hectic period breeding of less than 4 months viz laying, setting on their eggs[,] hen[s] only being fed mainly by the cock bird, raising their chicks to fledging, fledging their chicks they all then

22 Tarwin Valley Coastal Guardians, *Submission 45*, p. [59].

23 Tarwin Valley Coastal Guardians, *Submission 45*, p. [60].

24 Tarwin Valley Coastal Guardians, *Submission 45*, p. [62].

25 Tarwin Valley Coastal Guardians, *Submission 45*, p. [62].

> depart again for their Northern haunts in mid-January the next year. The greater Boorowa area is a known breeding ground for the Superb Parrot.[26]

5.19 Adjacent landholders to the Moorabool wind farm in Victoria, Mr and Mrs John and Sue Dean noted the inadequacy of flora and fauna assessments:

> Flora and Fauna studies were faulty. No level 2 survey was undertaken for the Wedge Tailed Eagle. No specific survey was undertaken for the Growling Grass Frog. No survey undertaken for the Powerful Owl and no consideration given to the flight path of the Yellow Tailed Black Cockatoo. In fact, there were only desk top studies done for most of the rare and threatened species and no EES was requested by the Planning Minister.[27]

5.20 In its submission to the committee, the Bodangora Wind Turbine Awareness Group (BWTAG) raised a number of concerns about the Flora and Fauna Assessment conducted for the Bodangara Wind Farm. These concerns focus on the inadequacy of the biodiversity assessment and include:

- insufficient detail provided to support the assessment of impacts on native flora and fauna;
- insufficient detail provided with regard to avoidance measures;
- inadequate details provided with regard to options for mitigating impacts on biodiversity; and
- the EA [Environmental Assessment] does not include a detailed offset proposal.

BWTAG found that there appears to be insufficient data in the Flora and fauna Assessment to 'support the conclusions of the impact assessment'. These concerns were also shared by the NSW Office of Environment and Heritage.[28]

5.21 In its defence. the proponent asserts that a more detailed assessment is not required as the wind farm site is 'an "overcleared" agricultural landscape' of low ecological value. However, BWTAG argues that the value of the remnant scattered paddock trees is 'constantly being underplayed':

> Removal of a single tree from an over-cleared landscape can have detrimental impacts to landscape connectivity for some threatened woodland birds (see Doerr et al.'s (2011) work on Brown Treecreepers and threshold distances for crossing gaps between habitat). Furthermore, wind turbines have been found to reduce bird breeding habitat up to 500m (Pearce-Higgins et al. 2009), thus appropriate buffers should be applied to habitat supporting threatened species.[29]

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26 Mr John McGrath, *Submission 314*, p. 4.

27 Mr and Mrs John and Sue Dean, *Submission 63*, p. 1.

28 Bodangara Wind Turbine Awareness Group, *Submission 227a*, pp 1–2.

29 Bodangara Wind Turbine Awareness Group, *Submission 227a*, p. 2.

5.22 The collection of data detailing the delicate interactions between landscape and fauna is integral to the developer's understanding of the impact of any changes that the wind farm development will impose on the environment—no matter how minuscule the developer may perceive these changes to be. BWTAG states:

> While intensive surveys to inform potential impacts are expensive, [BWTAG] agrees that a balance must be met to obtain robust, scientifically backed assessments of impacts. However, in the absence of data, the precautionary principle should be applied.[30]

National Wind Farm Guidelines

5.23 The previous section has highlighted the real risks posed to fauna, particularly to avifauna, by the development and operation of wind farms. The committee has received evidence detailing considerable inconsistencies in the conduct of environmental assessments leading to insufficient and incomplete data-sets.

5.24 In its interim report, the committee has recommended that the Commonwealth Government implement National Wind Farm Guidelines to provide a 'consistent, transparent and sustainable regulatory framework for the development, monitoring and compliance of wind farms'. These would establish minimum standards on a range of planning and development issues including on standards relating to avifauna.[31]

5.25 Mr Richard Sharp noted that many of these inconsistencies exist between state and national recovery plans resulting in the arbitrary inclusion or exclusion of certain species from environmental assessments:

> I am of the opinion that there is scope to provide better information concerning the effect that wind towers have on fauna, especially birds or reptiles. For example, the national recovery plan for the Superb Parrot does not identify wind towers as a threat and yet wind farm developers are often required to consider this threatened bird species during their design and planning phases. Another example, concerns the White-breasted Sea Eagle. In Tasmania, the effect of wind towers on this large bird of prey is identified in the state recovery plan which highlights this particular species is at threat due to the high incidence of and potential for fatalities and injuries from collisions with wind towers. Given that the White-breasted Sea Eagle is a nationally protected migratory species that inhabits the coastline and inland Australia, it is disappointing that wind farm developments on the mainland do not, as a mandatory requirement, give due consideration to the White-breasted Sea Eagle.[32]

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30 Bodangara Wind Turbine Awareness Group, *Submission 227a*, p. 2.

31 Senate Select Committee on Wind Turbines, *Interim Report*, June 2015, pp 2 & 9. See Recommendation 3.

32 Mr Richard Sharp, *Submission 100*, p. [2].

5.26 In addition, when certain species are included there does not seem to be a standardised approach to the planning and conduct of fauna surveys.

> Even if the department guidelines for buffering brolga habitat areas from wind turbines were the best guidelines in the world, without any requirement for proponents to use complete datasets of known brolga breeding, flocking and feeding sites they are useless. We have seen that time and time again. This systematic underestimation of both the number of brolga in a given area and the number of flights taken can only lead to the demise of the brolga. In addition, no cumulative studies have been undertaken. Each wind energy facility has its own dataset and, even if the same consultants do the research for multiple wind energy facility proposals, the data cannot be shared due to commercial-in-confidence issues.[33]

5.27 The committee highlights the considerable work already undertaken in establishing the Draft National Guidelines that were released in 2010. Chapter 3 of this report has highlighted the history of this process and how these national guidelines may be developed in a more holistic sense to capture all aspects of the planning and development process.

5.28 These Draft National Guidelines represent an appropriate start from which to continue the development of a new set of National Wind Farm Guidelines. The committee notes the following key concepts from the Draft National Guidelines that should be considered as 'guiding principles' in developing the new National Wind Farm Guidelines as they relate to assessments of fauna:

- That wind farms 'not be approved in or near areas of significant wildlife habitat, breeding grounds, or transitory pathways'.[34]
- That 'locating additional wind turbines along a migratory corridor may have a cumulative impact on birds and bats. This is particularly an issue if there are species that utilise the wider area of the combined wind farms. Migratory birds may fall into this category as, while they may only be present at a site for short periods of time, they may be exposed to more wind farms.'[35]

33 Mrs Susan Dennis, President, Brolga Recovery Group, *Committee Hansard*, Melbourne, 9 June 2015, p. 38.

34 Environment Protection and Heritage Council, *Draft National Wind Farm Development Guidelines*, July 2010, p. 11, http://www.scew.gov.au/system/files/resources/8e446a1a-ab93-5f84-99d0-12d3422d2a23/files/draft-national-wind-farm-development-guidelines-july-2010.pdf (accessed 26 June 2015). See also: Ms Marjorie Pagani, *Submission 340*, p. [5].

35 Environment Protection and Heritage Council, *Draft National Wind Farm Development Guidelines*, July 2010, p. 11, (accessed 26 June 2015).

- That wind farm development and planning adopt a 'a risk-tiered approach, whereby assessment becomes more intense with increased potential for impacts.'[36]

Visual amenity

5.29 There is an expectation in rural areas that changes to landscape character and vistas will be minimal over time, largely reflecting the relatively low development requirements of the pre-dominantly farming and grazing activities of those areas. Landscapes in these rural areas are dominated by natural vistas such as forests and grasslands with occasional farming related infrastructure such as houses, sheds, livestock handling facilities and silos—all usually the equivalent of one storey—interspersed in a sympathetic manner with the landscape. The proposed development and operation of wind farms in these settings fundamentally alters the character of these landscapes.

5.30 The committee has received considerable evidence detailing the impacts that wind farm development and operation have on the visual amenity of their host sites.[37] Greg and Michelle Noel summarised the views of many submitters:

> Visual amenity will be hard to get used to as the turbines will disrupt the natural landscape qualities that we enjoy every day in this area. We built our house in a position where we could enjoy such views and now will be looking at it with turbines jutting out in the range beyond it.[38]

5.31 In his submission, Mr Keith Staff noted his concerns about the primary methodology used to illustrate to the community what a wind farm will look like—photomontages:

> These visual photomontages are displayed at public information days in an attempt to try to prove how little impact there will be on visual amenity for landholders and local communities or impacts on the Landscape and hide how dominant turbines will be when located close to properties and communities…
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> The outcomes are that communities have little idea of the size/ impacts until the massive wind towers are constructed, it is then too late for any objections.[39]

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36 Environment Protection and Heritage Council, *Draft National Wind Farm Development Guidelines*, July 2010, p. 117, (accessed 26 June 2015). Reference to the voluntary standard *Wind farms and birds: Interim standards for risk assessment*.

37 See, for example: Dr Michael Crawford, *Submission 316ss*; Ms Jacqueline A Rovensky, *Submission 89b*, pp 4–5. Tarwin Valley Coastal Guardians, *Submission 45*, p. 10. Parkesbourne Mummel Landscape Guardians, *Submission 119*.

38 Mr Greg and Mrs Michelle Noel, *Submission 390*, p. [2].

39 Mr Keith Staff, *Submission 32*, p. [4].

5.32 In this context, the committee draws attention to a submission from Mr Robert Allen in which he notes incorrect information distributed by the proponent of Sapphire wind farm in northern New South Wales. The parent company CWP Renewables has published a map of the proposed wind turbine locations in which seven turbines are pictured. The map is reproduced in Appendix 5. Mr Allen quite rightly expresses his annoyance and bemusement:

> This is highly misleading as there are actually one hundred and fifty nine turbines. And note that the map reads: The wind turbines depicted on this map represent the approximate extent of the current windfarm layout. That's a highly interesting interpretation of the word approximate! Since when is 7 an approximation of 159?[40]

5.33 In addition to the loss of views from a family home, there are tangible impacts for those seeking to sell their house and land. Some submitters spoke about the erosion of property values with some landholders reporting decreases of up to 40 per cent in land value due to the immediate proximity of a wind farm.[41] Mr Charles Barber and others have told the committee that 'it has rendered my farm unsaleable.[42]

Committee view

5.34 One of the many concerns that the committee has around environmental assessments for wind farms is the poor engagement of proponents with community groups and affected landholders on the adequacy of surveys and reports. It is common for proponents to make no attempt to assuage the concerns of these groups by stonewalling any opposition and ring-fencing environmental reports. This attitude is clearly inadequate. In many cases, additional survey work and provision of more detailed data-sets may provide comfort to the broader community that these projects are proceeding on the basis of sound science and the best available information. It is the committee's view that the establishment and implementation of National Wind Farm Guidelines will assist in maintaining coherent national minimum standards for environmental assessment (including visual amenity) that landholders, communities, government and wind farm operators can have confidence in.

Aerial activities

5.35 The National Airports Safeguarding Framework note that 'wind farms can be hazardous to aviation as they are tall structures with the potential to come into conflict

40 Mr Robert Allen, *Submission 410,* p. [3].

41 Mr Charles Barber, *Committee Hansard*, Canberra, 19 June 2015, p. 45. See also: Dr Michael Crawford, *Submission 316b*, p. 12; Ms Marjorie Pagani, *Submission 340*, pp [4–5]; Waterloo and District Concerned Citizens Group, *Submission 21*, p. [2].

42 Mr Charles Barber, *Committee Hansard*, Canberra, 19 June 2015, p. 44.

with low flying aircraft'.[43] The Draft National Wind Farm Development Guidelines of 2010 also note that 'wind farms inherently involve the construction of tall structures (towers plus blades) that have the potential to impact on the safety of low flying commercial, private and defence aircraft'. The guidelines continue:

> In this respect, wind farms are similar to tall buildings, communications towers and other tall engineered structures. They differ by virtue that they are generally located in areas remote from other tall structures, and are generally deployed along ridgelines (further exacerbating the potential impacts) and they involve components moving through shared airspace. Thus, the primary impact of a wind farm is the potential safety risk it may pose to aircraft operating at low levels (below 350 metres above ground level) in vicinity of a wind farm.[44]

5.36 The Aerial Agricultural Association of Australia (AAAA), the peak body for Australia's agricultural and firefighting pilots 'believes that windfarm developments and especially wind monitoring towers are posing an unacceptable threat to aviation safety and especially aerial application'.[45] The AAAA also notes the economic threats that wind farms pose to the aerial applicator industry and the farming sector more broadly:

> They also pose an economic threat to the industry where the costs of windfarm development—including those of compensation for loss of income—are externalized onto other sectors such as aerial application.[46]

5.37 Clearly these structures will impact on the operations of aircraft involved in aerial firefighting and aerial crop management (application of fertilisers and pesticides) with these activities commonly being undertaken in rural localities.

5.38 The Civil Aviation Safety Authority (CASA) provided evidence to the committee about the limited role it plays in regulating airspace around wind farms:

> We know our responsibilities and the power of our legislation, which is very limited. For the most part, wind turbines are built away from aerodromes and certainly away from federally leased aerodromes. So the only power that we have is to make a recommendation to the planning authority about whether the turbine is going to be an obstacle and, if we

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43 Australian Government Department of Infrastructure, *National Airports Safeguarding Framework Principles and Guidelines—Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation*, May 2015, https://infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/nasf_principles_guidelines.aspx (accessed 8 July 2015).

44 Environment Protection and Heritage Council, *Draft National Wind Farm Development Guidelines*, July 2010, p. 11, http://www.scew.gov.au/system/files/resources/8e446a1a-ab93-5f84-99d0-12d3422d2a23/files/draft-national-wind-farm-development-guidelines-july-2010.pdf (accessed 26 June 2015).

45 AAAA, *Submission 20*, p. [1].

46 AAAA, *Submission 20a*, p. 1.

> decide it is an obstacle, we can make a recommendation as to whether it should be lighted and marked. That is the extent of our power.[47]

5.39 The Crookwell Aerodrome in southern NSW—where a proponent was seeking to develop a wind farm in proximity to the aerodrome—was discussed at the Canberra hearing. Prior to construction of the adjacent wind farm, representations from the AAAA led to CASA recommending an exclusion zone around the aerodrome of 3 600 metres. In this case, 11 wind turbines were not constructed in order to comply with the exclusion zone.[48] This appears to be the extent of CASA's involvement in regulating airspace near wind farms.

5.40 Mr Terry Farquharson of CASA told the committee that 'there are some indications of people who might be close to below the level of the turbines suffering or experiencing some degree of turbulence'. Further to this CASA officials admitted that more research need to be conducted in this area; however, CASA noted that they were currently not resourced to undertake this 'tricky and expensive' research.[49] Turbulence will be discussed in more detail in the crop management section.

5.41 The next section will examine specific issues relevant to firefighting and crop aircraft.

Firefighting

5.42 Some submitters expressed concerns about wind turbines posing an 'increased bush fire risk' and 'decreasing the capacity of fire services to fight bush fires'.[50] There is no question that aircraft play a key role in the mitigation and control of bushfire events across Australia.

> The use of aircraft plays an integral role in current firefighting strategies[51]…
>
> [A]erial water bombing has proved to be an integral part of rapid fire control because the aeroplane can get access to the head of the fire where no ground rig can go.[52]

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47 Mr Peter Cromarty, Executive Manager, Airspace and Aerodrome Regulation, Civil Aviation Safety Authority, *Committee Hansard*, Canberra, 19 May 2015, p. 35.

48 Mr Terry Farquharson, Deputy Director, Aviation Safety, Civil Aviation Safety Authority, *Committee Hansard*, Canberra, 19 May 2015, p. 35. See also: Ms Marjorie Pagani, *Submission 340*, p. [6]. Ms Pagani states that 'apart from the danger to crop-spraying pilots, curtailment of plant disease control, and of overspray, there are light aircraft dangers, and possible restrictions on further airport development'.

49 Mr Terry Farquharson, Deputy Director, Aviation Safety, Civil Aviation Safety Authority, *Committee Hansard*, Canberra, 19 May 2015, pp 35–36.

50 Parkesbourne/Mummel Landscape Guardians Inc., *Submission 119*, p. 6. See also: Grain Producers SA, *Submission 175*, p. 2.

51 NSW Rural Fire Service, *Submission 97*, p. [2].

52 Grain Producers SA, *Submission 175*, p. 3.

5.43 However, the committee received a range of evidence relating to the extent to which wind turbines affect firefighting. The NSW Rural Fire Service (NSW RFS) noted that:

> Aerial firefighting suppression in close proximity to wind turbines may be inhibited at times, given that the aircraft operate under the [CASA] *Visual Flight Rules* for navigation by visual reference Pilots are necessarily required to maintain standard distances from wind turbines, as is the case with any other potential hazard such as power lines, transmission towers, mountains and valleys…
>
> This [NSW RFS] position paper concluded that wind turbines are not expected to pose increased risks due to wind turbulence or the moving blades.[53]

5.44 Mr Craig Brownlie, an Operations Officer with the Victorian Country Fire Authority gave similar evidence to the committee during the Portland hearing. Mr Brownlie acknowledged that wind turbines pose a threat as obstacles to aircraft in the same way that other anthropogenic structures do:

> Operations Officer Wayne Rigg is the CFA manager for the aerial work that we do. Basically, the air fleet that we use operates under visual flight rules. That means that they will not operate in low light or after light, or through cloud or smoke. Wayne has indicated that there are a lot of other, higher-risk areas, like power lines and the like, over wind towers. They are quite visible and they do not cause the aircraft any concern in aviation operations for CFA.[54]

5.45 The South Australian Government also agreed:

> Where vertical obstructions exist in the airspace around a fire such as power lines, weather masts, radio and television transmission towers, tall trees and wind turbines, a dynamic risk assessment is undertaken prior to the aircraft being committed to fire-bombing operations.[55]

5.46 Although indirectly related to aerial firefighting, Infigen Energy states that 'the construction of wind farms also result in all-weather tracks being built to previously difficult to access areas, thereby improving the ability of fire trucks to fight fires'. These tracks can act as 'fire breaks and facilitate fire truck deployment'.[56]

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53 NSW Rural Fire Service, *Submission 97*, p. [2].

54 Mr Craig Brownlie, Operations Officer, Specialist Response, Country Fire Authority *Committee Hansard*, Portland, 30 March 2015, p. 41. See also: pp 43–44. Mr Brownlie also noted that aerial firefighting units are not required to maintain an exclusion distance from wind turbines.

55 South Australian Government, *Submission 59*, pp 9–10. See also: Ms Kim Forde, *Submission 65*, p. [4].

56 Infigen Energy, *Submission 425*, p. 16.

5.47 Despite this, the committee has received evidence suggesting that rural fire services across the country have not properly considered these issues. Mr Alan Cole noted that the catastrophic Cobbler Road bushfire in 2013 would not have been able to be controlled if wind turbines had been installed at the top of the range at the time of the fire:

> The predominant Catastrophic Bush Fire Weather in the Yass district is dominated by severe NW [north-west] winds. The Cobbler Road bushfire of January 2013 burnt approximately 12,000 ha of farmland and travelled from the eastern edge of Jugiong over the southern end of the Black Range and into Burrinjuck Dam in an afternoon. Aerial water bombing of this fire was critical in controlling its spread and eventually containing the fire. Had the entire length of the Black Range been covered with wind turbines as per Epuron's desire and proposals these critical firefighting resources would not have been able to be deployed to the head of this fire.[57]

5.48 This view was concurred by the Noel family, landholders from South Australia:

> A huge concern is accessibility for aerial fire fighting in and around the turbines, a fire would travel a long way before the planes could get near the fire creating great risk to adjoining landholders properties.[58]

5.49 Further, Mr Cole noted that although legislation currently prevents dwellings being built in Bushfire Prone Land, that 'no such legislation regulates where [wind turbines] can be proposed on the same Bushfire Prone Land'.[59] The committee notes this legislative inconsistency.

5.50 The committee also notes that wind turbine manufacturers may have misled the rural fire services by claiming that non-combustible oil is used in turbines.[60] On notice, the Victorian CFA confirmed that combustible oil is used in wind turbines (AS1940 Combustible Class C2).[61] The Victorian CFA told the committee that it

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57 Mr Alan Cole, *Submission 73*, p. [5].

58 Mr Greg and Mrs Michelle Noel, *Submission 390*, p. [2].

59 Mr Alan Cole, *Submission 73*, p. [5]. This refers to NSW legislation drafted in response to the catastrophic bushfires in the Greater Blue Mountains Area, west of Sydney in late 2013. These legislative changes included the Environmental Planning and Assessment Amendment (Bush Fire Prone Land) Regulation 2014 under the *Environmental Planning and Assessment Act 1979* and the *Rural Fires Amendment (Vegetation Clearing) Act 2014* which amended the *Rural Fires Act 1997*.

60 See the comments of Mr Andrew Andreou, Executive Manager, Country Fire Authority, *Proof Committee Hansard*, 30 March 2015, p. 44.

61 *Answer to question on notice*, received 1 April 2015. Available on committee's website (Question No. 2)

'relies upon the manufacturers to provide information and advice as to the nature of hydraulic fluids used and their flammability'.[62]

5.51 In its submission, BWTAG expressed its concerns that the '[NSW] RFS still have no protocols in relation to fighting fires from the air in and around wind turbines'.[63]

5.52 The committee heard evidence about the inadvertent consequences that result from the placement of wind farms near operating aerodromes. Mr Jim Hutson notes that 'the Crookwell Aerodrome will no longer be considered for aerial firefighting by the NSW Rural Fire Service'. This is because the presence of the wind turbines will limit the circling area of the main aircraft used in aerial firefighting activities.[64]

Crop management

5.53 The committee received evidence suggesting that time-critical crop management activities such as the aerial application of pesticides and fertiliser are impacted by the presence of wind farms. Most wind farms are hosted along ridgelines in areas of steep terrain with aerial application sometimes being the only option to treat these crops and pastures.[65] Mr Mark McDonald, an experienced Aerial Agricultural Pilot quantified the importance of aerial application to the agricultural and horticultural industries immediately adjacent to the proposed Mt Emerald Wind Farm in far north Queensland:

> Our records show that in past years nearly all of the 13,000 ha of arable land within 5km of the wind farm site has been treated either occasionally or regularly by aircraft, including firefighting over the Lotus Glen Correctional Centre.[66]

5.54 Epuron, a wind farm owner and operator suggested that the impacts of wind farms on crop management aircraft are minimal:

> Aerial crop spraying has been reported to be ongoing within 1 km of the Cullerin Range Wind Farm with few impacts to aerial agricultural operations.[67]

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62 *Answer to question on notice*, received 30 March 2015. Available on committee's website (Question No. 1)

63 Bodangora Wind Turbine Action Group, *Submission 227*, pp 4–5.

64 Mr Jim Hutson, *Submission 30*, p. 6. See also: Ms Ann Gardner, *Submission 208*, p.[20].

65 Farmers may choose to use aerial application over ground options for a range of other reasons—even on relatively flat terrain. These reasons can include protection of the crop canopy from wheel damage, lack of ground access under very wet conditions, and to avoid soil compaction in wet conditions.

66 Mr Mark McDonald, *Submission 223*, p. [3].

67 Epuron, *Response to Adverse Comment in Submission 285*, p. [1].

5.55 Dr Kim Forde, an environmental consultant from far north Queensland agreed noting that:

> [A]erial spraying can only occur at wind speeds lower than the minimal operating regime for the turbines.
>
> Wind turbines do not operate below approx[imately] 10–15km/hr and aerial spraying should not occur above these wind speeds due to the inability to control where the chemical is targeted at higher speeds. Again, the risk of interaction has been significantly over-blown.[68]

5.56 Notwithstanding this, the committee received evidence suggesting that a more complex relationship between wind farms and aircraft exists. As acknowledged by CASA earlier in this section, wind turbines produce a wake of 'unpredicted and unpredictable turbulence'.[69] This turbulence presents two main risks to aerial operations:

> The major concerns are, firstly, the risk to safety of flying operations and, secondly, the risk of dispersal of chemicals as a result of turbulence. And of course the negative economic impacts of these on the agricultural spraying operators and on the viability of local agribusinesses which need to use these services. Whilst the Aeronautical Impact Assessment identifies that "wind shear, turbulence and downdrafts in the wake of the turbine rotors" present "a critical hazard to aircraft such as agricultural aircraft operating at low level and high weights during application of chemicals and seeding", and that wake effects may exist up to 5km from turbines, it also states there will be minimal impact on aerial operations.[70]

5.57 Mr Mark McDonald highlighted the risk that turbulence from wind turbines may have on non-target crops and the surrounding environment:

> The impact of turbulence on pilot safety is not the only risk. Turbulence also has the potential to cause off-target spray drift. Aerial agricultural operators have a legal responsibility to prevent spray drift onto neighbouring crops, which are sometimes only metres away from the crops being treated.[71]

5.58 It is clear that if the flying conditions are not safe, then these aerial operations should not be undertaken until such time as the conditions are conducive to safe flying and that only then should aerial application occur. However, the turbulence created by these wind turbines is not an intermittent weather phenomenon, instead it occurs

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68 Ms Kim Forde, *Submission 65*, p. [5].

69 Ms Marjorie Pagani, *Submission 340*, p. [6]. See also: Grain Producers SA, *Submission 175*, p. 2.

70 Mr Mark McDonald, *Submission 223*, p. [2].

71 Mr Mark McDonald, *Submission 223*, p. [3]. See also: Grain Producers SA, *Submission 175*, p. 2. The question is raised of who bears the responsibility of non-target spray drift caused by wind turbines.

whenever the wind turbines operate and is in addition to the vagaries of the weather that farmers and pilots must manage when undertaking their aerial activities. Ultimately, in areas with wind farms the optimum window for aerial application is shortened and the net result will be that farmers are not able to spray their fields and manage their crops, incurring a financial loss as a result:

> Wind turbines amongst land used for intensive grains production will irrevocably impinge upon crop management practises. Timeliness of crop nutrition, and the application of crop protection products, is critical in maximising productivity and profitability in agriculture. To this end, aerial applications of fertilisers for nutrition, and herbicides, fungicides and insecticides for crop protection and quality, are the key to efficient and rapid management decisions as weather patterns and rainfall events unfold. Imported pests, such as Italian snails, are contained by aerial baiting of large areas of land when small windows of opportunity are presented for this practice to be effective. To restrict and deny aerial access to the cropping lands of those grain producers on whose properties wind turbines are placed, or are adjacent to such structures, is an impost on grain production that ground based machinery cannot compensate for.[72]

Committee view

5.59 The committee accepts that there are a range of risks inherent in the work of pilots who conduct aerial firefighting and crop management activities. Despite this, the committee recognises that current regulation does not provide adequate protections for pilots operating aircraft in the vicinity of wind turbines. In its submission, AAAA noted that the wind industry needs to be 'as a minimum, regulated to provide a national database of tower locations for bona fide low level aviation operators and be required to be marked in accordance with NASAG (Department of infrastructure) guidelines'.[73] In addition, the committee notes the National Airports Safeguarding Framework contains a voluntary provision for obstacle lights and a section on turbulence 'in making decisions regarding the marking and lighting of wind farms and wind monitoring towers, wind farm operators should take into account their duty of care to pilots and owners of low flying aircraft.'[74]

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72 Grain Producers SA, *Submission 175*, p. 2. See also: Mr Darren Arney, *Committee Hansard*, Adelaide, 10 June 2015, p. 50. Mr Arney noted that farmers adjacent to wind turbines will experience 'significant financial loss due to a decrease in the value of their farmland due to changes in the way they are able to go about their farming'.

73 AAAA, *Submission 20*, p. [1].

74 Australian Government Department of Infrastructure, *National Airports Safeguarding Framework Principles and Guidelines—Guideline D: Managing the Risk of Wind Turbine Farms as Physical Obstacles to Air Navigation*, May 2015, https://infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/nasf_principles_guidelines.aspx (accessed 8 July 2015).

5.60 It is the committee's view that in the interests of pilot and community safety that these voluntary standards relating to obstacle marking are made compulsory for all current and future wind turbines.