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I object to the Spicers Creek Wind proposal for many reasons:

The claims that this industry proposes does not expose the true environmental impacts including cumulative affects.

POLLUTION AND WASTE

It is wreckless to build large scale industrial infrastructure on Australian biodiverse landscapes without having a plan for the developers to pay upfront, the full bond to pull down and recycle the turbines and wind blades. The industry standard, depending on the size of the turbines is about $660,000 which does not include inflation. What will Australia look like in a thousand years time.
This is a rather recent photo of turbine blades from North Queensland. They are from Windy Hill Wind and are only 20m wide. Whether these turbine blades have been stored for a rainy day, awaiting recycling inventions, there will still be an enormous cost that will need to be borne by someone! It is unconscionable to just leave this to tomorrow's problem. A token bond is also unacceptable, that may endeavour to obtain social license.

New infrastructure, like wind turbines, which themselves have devastating ecological repercussions... "70% of remaining forest worldwide is within 1km of the forest's edge, subject to the degrading effects of fragmentation. A synthesis of fragmentation experiments spanning multiple biomes and scales, five continents, and 35 years demonstrates that habitat fragmentation reduces biodiversity by 13 to 75% and impairs key ecosystem functions by decreasing biomass and altering nutrient cycles.

Effects are greatest in the smallest and most isolated fragments, and they magnify with the passage of time. Fragmentation experiments—some of the largest and longest-running experiments in ecology—provide clear evidence of strong and typically degrading impacts of habitat fragmentation on biodiversity and ecological processes....the experiments here reveal ongoing losses of biodiversity and ecosystem functioning two decades or longer after fragmentation occurred." the fragmentation and isolation of wildlife populations. Roads may limit the access of animals to vital resources, therefore decreasing the area of available habitat, and may potentially limit the movement and dispersal of individuals, fragmenting populations and consequently reducing gene flow. The barrier effect of roads on animal movement depends primarily on road width and the intensity of its use.

Wide roads with heavy traffic loads have the greatest impact on animal movement. Tracks in parks and reserves are likely to have less impact on animal movement." Although after completion of the construction of the wind turbines, one would expect there to be less traffic; however, let's not forget that much of the haulage roads will be heavy industrial widths. The haulage roads required for wind turbines are ecologically devastating in fragmenting and degrading forests and farms, and separation of ecosystems. Another paper from Victoria stated: "Exotic vegetation was found to extend about 50 m from the road.

Traffic noise and light penetration varied according to topography and vegetation cover, but averaged of 350 m and 380 m, respectively, from the road. Mammal surveys indicated there was an increase in species richness once traffic noise reached ambient levels (40 dB) and traffic light penetration ceased. Bird surveys resulted in the identification of four species (9%) that only occurred within 150 m of the road (edge species) and 21 species (58%) that only occurred at distances of 150 m or more from the Epsom Barnadown Road (interior species). A core habitat area for bird species was identified at about 900 m from the road. It was found that the average width of forest in the Bendigo Regional Park impacted by the Epsom-Barnadown Road was 1800 m, which translates to an area of 1.8 km^2 per kilometre of road."

For Spicer's Creek Wind development there may be some overlap due to the fact the roads are not straight, but basically that would mean almost the entire project area would be affected by edge effects, causing loss of biodiversity, habitat degradation, microclimate effects, and more invasive species, yet The proponent claim outrageously that there would be a net positive effect due to "protection" of forest areas not impacted directly by the wind turbines and roads. ROAD IMPACT ON WILDLIFE

There presumably will be multiple access points into the Spicers Creek Wind proposal area by all the large haul trucks and other vehicles for the construction and maintenance of the wind farm. Inevitably there will be deaths and trauma to considerable numbers of wildlife as they try to cross the road. wind farm developer to destroy habitat and cause the extinction of this related species, and no-one is supposed to raise a whimper.

WIND TURBINE EFFECTS BATS

Its well documented that wind turbines have catastrophic effects on bats. Its thought that the bats die as a result of extreme pressure changes adjacent to spinning turbine blades.

These pressure changes cause blood vessels in the lungs to burst (7). It is known that wind turbines in the USA kill almost a million bats per year (8). This number is significant to many bat species, some of which are threatened and endangered. In fact a research review published 9 years ago in 2016 showed that worldwide, the biggest cause of mortality of bats is in fact wind turbines. (9) It's known that many bat species that inhabit the forests of Spicers Creek Wind proposal are endangered.
For example Mt Emerald windfarm to the north has killed many endangered spectacled flying foxes. Most bats that were killed at Mt Emerald Windfarm were Northern Freetail Bats, a species little is known about and its not known how many exist in the wild and whether their populations are declining. Surely the precautionary principle applies. However what is known is that they roost in tree hollows in old growth forests, so it is likely that they will also be impacted by forest clearing for roads and wind turbines in the protected area. There has been so much concern in the USA about bat deaths that the wind energy industry in the USA themselves brought in voluntary guidelines to halt turbines at low wind speeds when bats are most active (10). This supposedly reduces bat mortality, however because bats are long-lived and slow reproducers, and rely on normally very high adult survival rates, its unlikely, even if these measures were instituted that wind turbines will not result in a CATASTROPHIC loss of bat populations year on year, especially in natural ecosystem areas where bat populations are high, like Spicers Creek Wind proposal. “Bats play an essential role in pest control, pollinating plants and dispersing seeds. Recent studies estimate that bats eat enough pests to save more than $1 billion per year in crop damage and pesticide costs in the United States corn industry alone.” The benefits to Australian agriculture would be similar. In addition, bats play an essential role in pollinating plants and dispersing seed in ecosystems themselves. In Central Europe, wind turbines kill on average 14.3 bats per turbine per year, in the USA, the figure is 12.25 bats, in Victoria, Symbolix found 7-10.8 bat deaths per turbine per year; but Emma Bennett, with the help of dogs, found up to 20 bats killed per turbine per year (12). Generally bats are more abundant in the tropics than temperate zones, due to higher numbers of insects and more abundant flowers and fruit, and larger areas of relatively intact ecosystems, so we would reasonably expect the figures in tropical North Queensland to be higher. Even if curtailment by stopping wind turbine rotation at low wind speeds is undertaken, the reduction in mortality will be more than negated by the growth in number of wind farms planned for Queensland. The very worst action is to place them in the middle of basically intact ecosystems, and they will have catastrophic effects on bat populations. To quote Robert Bender: “If you interfere with the life of a slow breeder, you’re threatening the future of the species. And that’s what we’re doing. We’re interfering with their lives. We’re destroying their habitat, chopping down trees and warming the planet … I can’t tell you much about the wind farms but it’s just one more problem on top of other very, very serious problems. They’ve got more than enough to cope with.” Remember that globally, the biggest cause of bat mortality is in fact wind turbines. Placing wind turbines in the middle of a largely intact ecosystem will have catastrophic effects on that ecosystem due to bat deaths as well as many other damaging facets.

BIRDS In addition many birds fall victim to wind turbines. Many birds are prone to collisions and death with wind turbines, in particular large birds such as birds of prey and migrating waterbirds. Whilst it is well-known that for example cats kill many birds every year, these

are of course smaller species and often more common. Wind turbines often kill larger birds such as raptors, waterbirds, and of course migrating birds.

MICROPLASTICS It has been calculated that wind turbines shed around 60kg of microplastics per year. This has been deduced by studies of leading edge erosion. Leading edge erosion is a major cause of degradation of wind turbine blades, and often this requires replacement blades every 10 years. The discarded blades are rarely recycled but dumped in landfill. The quoted study was based on wind turbines in Norway, where ice and salt would have more effect than Spicers Creek Wind proposal. Regardless, there will be some shedding of microplastics into the project area as a result of this windfarm. Even if the level of shedding is only half that of Norway, that's still 2.5 tons of microplastics that are discarded into the Spicers Creek Wind proposal ecosystem and creek waters every year. That's 51 tons over 20 years. “25 tonnes of annual emissions in the form of micro- and nanoplastics are thus sprinkled over outfields, pastures, soils, water sources and eventually fjords and sea areas. How much of this will be Bisphenol A is uncertain, but 1 kilo of bisphenol A is enough to pollute 10 billion litres of water. That's 10 000 000 000 litres. Since 2017, the WHO has advised that drinking water should have a maximum of 0.1 micrograms of BPA pr. litre. This is 0.000 000 1 grams per litre of water.” “The pulp loss mainly consists of two-component epoxy. A turbine wing is largely made of fiberglass reinforced epoxy where epoxy makes up approx. 40% of the pulp and fiberglass make up 60%. In addition, some balsa wood, divinycell (a kind of hard foam) and some other materials are used to create the profile for the wing construction. Epoxy contains 33% bisphenol A. This amounts to approx. 13 - 15% of the total weight of a rotor blade. In other words, there is a lot of microplastic, and a large part of this is bisphenol A.” “Exposure to BPA is a concern because of the possible health effects on the brain and prostate gland of fetuses, infants and children. It can also affect children's behavior. Additional research suggests a possible link between BPA and increased blood pressure, type 2 diabetes and cardiovascular disease.” 14% of 51 tons of microplastics shedded over 20 years at Spicers Creek Wind proposal is Bisphenol A. That's 7 tons of Bisphenol A. Remember that 1 kg of Bisphenol A is enough to pollute 10 billion litres of drinking water. So significantly toxic levels of BPA are likely even if only a fraction of the BPA makes its way into watercourses. “..preliminary assessments of the effects of microplastics exposure in mammalian reproduction have emerged with the publication of peer-review articles that revealed the effects on spermatogenesis and sperm quality in exposed animal models and the indirect effects on the offspring occurring via gestational exposure. This manuscript summarizes the main ecotoxicological and health risk of microplastics in mammals, the main threat for sperm quality along the lifespan and the upcoming studies on the effects of microplastics (MPs) in male fertility in mammals.” (30) Bisphenol A is one of many endocrine disrupter chemicals. In humans, Bisphenol A exerts epigenetic effects in both male and female reproduction. In males, BPA affects spermatogenesis and sperm quality and possible trans-generational effects on the reproductive ability of the offspring. In females, BPA affects ovary, embryo development, and gamete quality for successful in vivo and in vitro fertilization (IVF). (31) The Spicers Creek Wind proposal wind farm will inevitably introduce high levels of microplastics into the ecosystem and watercourses, and this can be expected to have adverse consequences to the reproduction of all mammals in the area, as well as reptiles, amphibians, and birds. Many species have been shown to be susceptible to the introduction of endocrine disrupter chemicals which mimic the activity of endogenous

steroid hormones, and thus interfere with endocrine functions, especially those related to reproduction. WIND TURBINE NOISE It is known that wind turbine noise has negative effects on habitat quality and wildlife. “However, as shown below, while the potentially adverse effects of Wind Turbine Noise (WTN) on humans are being studied and regulated by planning and building laws, the same scrutiny has not been applied to examining or reducing potentially adverse effects of WTN on wildlife. The impact of noise pollution on wildlife is still largely ignored in environmental impact assessments (EIAs) during planning processes, and there is insufficient mapping of wildlife species and their noise sensitivity, even in areas considered biodiversity hotspots.” (22) “Noise pollution influences the acoustic environment even far from anthropogenic centers, in remote areas that include critical habitats for endangered species . Noise pollution negatively impacts wildlife by disrupting mechanisms that are crucial for their survival. In particular, noise can: 1) cause physiological damage such as chronic, high levels of stress hormones , or actual hearing loss ; 2) be directly perceived by animals as a threat, causing them to increase costly anti-predatory behaviors at the expense of foraging, or flee the affected area altogether, leading to functional habitat loss ; 3) distract foragers, reducing their efficiency of finding and handling food; 4) hinder animal communication by reducing the distance at which a signal can be detected , limiting the ability of the signal to reach its intended recipient, and decreasing the amount of information that can be extracted from a signal, such as the sound of an approaching predator or potential prey. These mechanisms are not mutually exclusive, and the role that each plays in determining the impact of noise pollution varies by species. Not all species react to noise in the same way, due to differing sensitivities to noise, context, and life-history . Overall, noise pollution alters animals’ communities, reduces their overall survival and fitness, and contributes to the decline of global biodiversity.”(22) “Traffic is the most widely studied source of anthropogenic noise . ...compared the spectral properties of WTN and traffic noise, and suggested that a combination of highway noise and WTN might create a greater, more complex disturbance, rather than one masking the other. Specifically, WTN alters the natural acoustic environment by inducing airborne loud broadband sound which is within the hearing range of many animals , including most bird species. A few other studies have also looked at the effects of WTN on other wildlife with mixed results.” (22) A study of the effects of wind turbines on antipredator behaviour in California ground squirrels showed that WTN caused a higher level of alertness attributed to loss of auditory capacities. (23) It may be reasonably assumed that this caused physiological damage due to chronic high levels of stress hormones as well. It would reasonably be assumed that species found at Spicer’s Creek proposal, which inhabit the Spicers Creek Wind proposal area would also mount the same sort of response to WTN, causing reduction of life expectancy and increased predation, if, of course, they do not flee the site altogether.

It should also be noted that the Spicers Creek Wind proposal windfarm site will provide a combination of traffic noise and wind turbine noise, which will create a greater disturbance for wildlife that are present in and around the Spicers Creek Wind proposal area in low density, and rely on vocal signals to find mates.

Carbon Emissions

We know roughly how much materials are used to make a 2MW turbine, 1688 tons (1). For a 7MW turbine, this will be approximately 5900 tons (using an approximate multiplication of

3.5x), including 4500 tons concrete, 1000 tons of steel, 170 tons of iron, 84 tons of fibreglass, 14 tons of copper, 1.5 tons of neodymium, and smaller amounts of dysprosium, boron etc. if you tally the carbon footprint of all those materials up, that will easily give around 10 000 - 11 000 tons of CO2e. So The proponent has not factored in any other emissions costs except the carbon footprint of the materials of the turbine. So there's no emissions cost of actual manufacture of each turbine, international transport by sea (presumably Vestas – whilst hubs and drive trains can be manufactured in Geelong, most components are imported from Vestas factories in other countries (2,3)), local transport from the port, or assembly on site. In addition there's no emissions given for the actual clearing of forest, of blasting using high emissions explosives, of extensive wide roadworks, or quarrying of rock for road base and construction, of removal of earth for each turbine. So it's not hard to imagine the carbon footprint per turbine could end up easily being double what is stated, just by adding the above facets only. I will add that this study (3) showed that the foundation of an onshore wind turbine constituted 37% of its total ecological footprint. Given this, it could easily be anticipated that the extensive blasting, quarrying and roadworks necessary to install wind turbines in rugged country would easily add more significant emissions to the carbon footprint as well as ecological damage. I imagine NONE of this has been factored into the quoted emissions.

There is also an ongoing emissions cost of function & maintenance of this windfarm. All employees' vehicles are fossil-fuel powered and fossil fuels are extensively used in the ongoing maintenance and running of components, for example lubricants and replacement parts. Its anticipated that there is normally 7-11 maintenance employees per 100MW of wind power (5). So Spicers Creek Wind proposal is proposed to be 600MW, therefore there are 42-66 employees, all driving fossil-fuel powered vehicles. All will be living in Ravenshoe or further afield. They would easily be driving 60-100km per day. As a midpoint calculation, lets assume 50 employees drive on average 75km per day. A petrol Hilux averages about 11l/100km; diesel about 8l/100km, but that's on the open sealed road. Let's assume the average is a conservative 10l/100km. That means 375 litres of diesel are burnt by the windfarm employees every single day. Assuming most don't work week-ends, that is 100 000 litres of fuel per year. Each litre becomes 2.68kg CO2; that's 268 000 tons of CO2, or 5.36 million tons of CO2 over 20 years. The proponent claims only 15-30 employees will needed; even if that's the case that's still 2-3 million tons of extra CO2 unaccounted for. Where is this acknowledged in Spicers Creek Wind proposal's supposed emissions? And that doesn't include emissions costs of replacement parts, their transport, and petroleum-based lubricants necessary for every turbine's ongoing operation.

Crucially there's no consideration of emissions by destruction of wet sclerophyll forest or ongoing loss of carbon sequestration. Wet sclerophyll forest in Queensland can contain around 370 - 1800 tons of CO2 equivalent per hectare (6,7). When this is cleared, much of that carbon ends up in the atmosphere either from burning and/or decomposition. So assuming this is 1000 tons per hectare, direct emissions from forest clearing will add 1.25 MILLION tons of CO2.

RECOMMENDATION – RECOMMENDATION

I request and recommend that the precautionary principle be adopted, due to the unknown consequences that this enormous industrial proposal will have on our climate, waste and

underground water supplies. This also lies in the catchment area of the Great Barrier Reef. Should this proposal be approved, it would affect the microclimate of the area, and it goes against land care and healing country objectives.
We note that there is significant public interest in ensuring rigorous, transparent and accountable assessment of environmental risks in relation to major projects that propose to destroy and fragment landscape-scale areas of farms and wilderness due to the magnitude of impacts to local communities.

Yours sincerely,
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(7)On a Wing and Low Air: The Surprising Way Wind Turbines Kill Bats https://www.scientificamerican.com/article/wind-turbines-kill-bats/ (8)Comparing bird and bat fatality-rate estimates among North American wind-energy projects† https://wildlife.onlinelibrary.wiley.com/doi/abs/10.1002/wsb.260 (9) Multiple mortality events in bats: a global review https://onlinelibrary.wiley.com/doi/10.1111/mam.12064 (10) Bat Killings by Wind Energy Turbines Continue https://www.scientificamerican.com/article/bat-killings-by-wind-energy-turbines-continue/ (11)Bats are one of the most important misunderstood animals https://www.fws.gov/story/bats-are-one-most-important-misunderstood-animals