INQUIRY INTO THE STATUS, HEALTH AND SUSTAINABILITY OF AUSTRALIA'S KOALA POPULATION

SUBMISSION REGARDING FIRE AND KOALAS
IN SOUTH-EASTERN AUSTRALIA

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FIRE—THROUGH A LANDSCAPE of KOALA—TALK

Inquiry into the status health and sustainability of Australia's koala population

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Please accept my submission as a personal overview of what I see as an increasingly dire situation for *koalas facing logging and fire.*

1 My background

- For over twenty years I have been living in forest sharing a boundary with *Mumbulla State Forest*, east of *Bega, NSW*. Coming from an urban environment with an interest in native plants, fire and animals, I made it a goal to understand my new surroundings. The forested property has woodland encroaching on redundant grazing land of Forest red gum (*E. tereticornis*). This was prime koala country. I have imposed a new regime of management, allowing rainforest to reach out of gullies, while culling pyrophytes and holding fire. Remnant rainforests here contain such key species as Giant stinging tree, Sassafras, Muttonwood, Lilly-pilly, Scentless rosewood, Sandpaper fig, Rusty fig, Kurrajong, Mock-olive, Native clerodendrum, Sweet pittosporum and Blackfellow's hemp. The aim is to modify fire behaviour on my doorstep. *I am a keen observer*.

- As a potter sourcing most materials from the landscape, my art practice includes the study of natural clay, wood fuels and their combined effects after days of fire activity inside a tunnel kiln. Fire generally, is a strong interest.

- I am a long-standing, active member of the *Rural Fire Service*, with some degree of experience in the field. I have studied standard fire fighting procedure and have read fire histories and major reports.

- Three or four years ago, I began work as a volunteer on koala surveys, focusing my efforts primarily on the *Mumbulla* koalas. Some activity now continues on a contractual basis with DECCW. I have experience collecting commercial quantities of eucalypt seed in State Forests.

2 Terms of reference

I wish to address my submission with specific reference to:

c. knowledge of koala habitat,

d. threats to koala habitat such as logging, land clearing and poor management etc…., *with respect to knowledge of fire.*

3 Prelude

I understand *good* science begins with imagination, followed with hypotheses and testing—that interpreted results should always remain provisional. *Interpretation* is paramount—but mostly seems a little grey. Our *laboratory* is landscape itself—a changeable, dynamic system, particularly with respect to fire. The following is based on years of reading and reflecting on the past, and interpreting the past and the present in the landscape. My knowledge of koala habitat centres near *Bega*, on *Mumbulla Mountain, NSW*. A very similar geomorphology and important koala gene pool[1] are found in the *Strzelecki Ranges* of *Victoria's Gippsland*. They have more in common. About mid-way between these two koala habitats is Eden—wood-chip heaven. My humble submission offers a *serious perception of fire* in logged, fractured habitat as it directly affects koalas.

4 Introduction to Koala

I used to walk through open forest to swim at a waterhole in *Mumbulla State Forest*. The coupe was effectively clear-felled around 1995 and to this day remains thick, hazardous scrub.[2] A nearby coupe of old-growth forest on the *Wapengo creek* flats was also targeted, but evidence of koalas fortunately led to the termination of logging after a day or two. This incident was a shock introduction to the *idea* of koalas in my backyard. The idea quickly lapsed into *myth*—a possibility always—until a reported public sighting triggered action by DECCW.[3] The *Mumbulla* koalas are recognised as one of the few remaining pockets of original, endemic koala life in the southeast of Australia. They are distant family to another original population still hanging on in the *Strzelecki Ranges Bioregion*. Both populations are of significance for their robust genetic diversity. They inhabit comparable country and face similar threats of logging and fire. Since the days of fur trading and shooting for dog meat came to an end, our koala population continue to signal *their* world is declining.

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[1] Koala populations elsewhere in south-eastern Australia are known to have limited genetic diversity (Houlden, 1999; Seymour et al., 2001). The majority of koalas in Victoria originate from four Strzelecki animals 'saved' over a century ago to islands, and since translocated back to the mainland.

[2] Clear-felling of moist, wet sclerophyl forests in southern Australia led to the development of dense stands of regrowth saplings that provided more fuel than if the forest was not clearfelled (Whelan1995; Lindemayer *et al*. 2009)

[3] In 2007, a systematic survey began by using the regularised Grid-based Spot Assessment Technique (RGBSAT). The survey became probably one of the largest undertakings of its kind, involving FNSW, indigenous organizations, educational institutions, community groups and individuals.

- Within this fifteen-year time frame, some previously known locations of koala activity in the *Bega* district have apparently become extinct. I wish to now briefly and simply suggest how perhaps the *Mumbulla* koalas have *hung on.*

Anecdotally, some of the last koalas in the *Bega Valley* decades ago are said to have hung on at *Angledale*, on the edge. An adjacent escarpment leads up to *Biamanga Aboriginal Place* to the north of here, and to the east two kilometres away, are today's remnant *Mumbulla* koalas. The steep and relatively undisturbed escarpment could well have historically provided an important refuge from logging. Looking at a 1967 *Adastra* aerial photo in my possession, there are clearly three distinct zones of logging intensity across the coastal forests. Minimal to no significant logging impacts can be seen on the escarpment, with similar light disturbance over the area where the *Mumbulla* koalas exist today. A zone of medium intensity disturbance extends down to power-lines running east-west, and from here further south to the *Bega* river, it is obvious the forests had been severely devastated by wholesale logging. Furthermore, a 1999 aerial photo (*Brogo Map, Land Information Centre*) shows that the darkest, most undisturbed vegetative cover across the landscape happens to coincide with the area of current koala activity. It is not unreasonable to conclude that our remnant koala population was but one or two logging operations away from termination.[4] It is a furphy to suggest *logging is good for koalas*, as has been claimed.

It is believed the rich alluvial and agricultural lands—settled areas—were the prime habitat of koala, natural parklands and lowlands. Yesterday's perhaps secondary, less preferable habitat has by force of necessity become today's prime habitat—the rangelands. Places like the *Strzelecki Ranges* and *Mumbulla Mountain* foothills, where wet-sclerophyll forests have until relatively recent times remained fairly undisturbed. Tall, wet and intact, these forests will naturally moderate fire frequency and intensity. Rainforest repels and resists fire intrusion. But fragmentation, acts of repeatedly stripping back forest cover to bare soil and incorporating promiscuous fire use, now represents the final straw for the koala. The situation is altogether more precarious for koala on ranges and foothills, where a culture of modern industrial logging practice tends to operate with impunity, despite controls.[5] Unfortunately, the system of oversight and *enforcement of proscriptions is lax*.

- The story now compartmentalises. Various elements and pairings have been isolated in an attempt at a logical succession of ideas. I now try to tell my story of the koala in simple, sometimes poetic terms. This way, I hope to render a more *accessible picture* of koala threats.

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[4] Forests NSW staff acknowledged that logging entire compartments between 1968 and 1976 in the region has undoubtedly reduced koala numbers. (Jurskis and Shields 1996)

[5] Press Release 11/2/11; South East Forest Rescue: "Recent audits have exposed illegal logging of rainforest, habitat of threatened and endangered native animals, old growth, endangered ecological communities, rocky outcrops,'' said spokesperson Lisa Stone. "We have proven systemic, recurring breaches on the South Coast that show a pattern of non-compliance." See also SMH: 14/4/10.

5 The art of wood fire

Weathered from rock long ago, clay is a living, natural material. A furnace fire of white heat will re-mineralise clay back to stone. Repeatedly exposing a jumble of clay surfaces to a week or more of wood-fuelled fire will exercise the imagination—fertile ground in supposing processes of fire in landscapes. The richness or poverty of clay and earth materials treated with fire is a result of *complex*, *cyclical interactions over time*.

6 Landscape fire

Fire thought of in terms of an equilateral triangle—with fire at the top, fuel and air at the bottom—is too simplistic. To think of fire in the landscape—our theatre and laboratory—a star symbol is more appropriate. The points of the star must represent other input factors such as topography, human action, weather systems, Chance and Time. Fire's behaviour is chaotic, displaying individual characteristics from moment to moment. In the landscape, fire is not a singularly knowable, stable entity. Feeding on fear, it can never be grasped. Fire is *released energy* from sunshine.

7 Sunshine

Penetrating the landscape, the sun's energy conducts itself into bare earth, or strikes forests that mostly absorb and degrade it. Forests dissipate the sun's heat to coolness, while a tiny fraction converts to biomass and some is reflected. A tree is best understood as a giant degrader of energy, a humidifier. Trees are like big water fountains, spewing out water in the form of latent heat. The sun's radiation is mostly swallowed. But simply soaked into soil, sand and rocks, heat will radiate quickly back to air mass, and from deserts can deliver heatwave conditions across distance. Grasslands can also annually threaten a release of energy; swiftly moving fires. The wholesale destruction of forest cover through logging must have a *heating* and *parching* effect—*globally*. Sand and rocks—the bones of the earth—the natural end.

8 Forest fire

Across the landscape, topography broadly determines surface impacts and response to events. If one takes a *Google Earth* trip across the *Strzelecki Ranges* or *Mumbulla Mountain*, one sees a network of green arteries. Each healthy artery carries the potential to snuff creeping fires, and as a living system, has proved resilient to extreme events. These rainforests have historically survived all fires, safe in contoured shelters. Since the natural lifespan of tall eucalypts is measured in centuries—height and diameter reaching such proportions as to filter sun and wind—these noble structures also promise a shield. The wet-sclerophyll rainforests are a hand in glove arrangement of fire protection, of inter-dependence among species of diversity. The koala is at home here in an *inter-tidal zone* of passive fire.

Rainforest species rot down well, logs like water-sodden sponges strewn about in ferny irrigation channels—the earth bare. Exposed dry-sclerophyll is subject to occasional fires, perhaps skipping across ridge-tops, while *other fire* eases gently down through wet-sclerophyll, toward pure rainforest, cleansing.

Extreme events are the greatest shapers. Catastrophic fire had visited itself upon the *Strzelecki Ranges* infrequently, measured at intervals approaching many hundreds of years. Once officially crowned the tallest flowering plant in the world,[6] Mountain Ash (*E. Regnans*) rise up from ash beds into even-aged stands after extreme events. Old stands are archives of triumph against fire. As a prime agent of change across the whole topography under discussion, fire has historically impacted heavily only at intervals of many centuries.[7] At all other times its character and affects have been relatively benign. Deep, tall rainforests and water bring and sustain life. Fire is misunderstood if only considered a rejuvenator of landscapes. Fire stimulates and destroys. *Water* stimulates and brings *life.*

9 Logging fire

Arriving on the back of drought-breaking floods, water bodies expand over landscapes—short-term features—like the compartments of rising and falling forests. The drought-breaking rains re-charge ground-waters and promote extraordinary grassland growth, while the falling and razing of forest brings tinder-dry slash, promotes dense sapling regrowth and a charging, penetrating fire. It's often claimed that logging episodes simply mimic a fire event. The notion may well come from observations of Ash-type forests returning phoenix-like after complete stands are burned out—but time-scales at work here could not be more different. Stand knockout fires are infrequent in natural, mature forest. A regenerating stand of Ash if left in place thins itself and matures into centuries. Industrially kick-starting the regeneration process continuously across logged landscapes is reckless and fraught with danger. Density must again reside safely in girth and height in moist forests, not standing sticks. Logging mimics more closely the effect of fuel-loaded grasslands after phenomenal rain events, by promoting an equally extraordinary growth of thick, fine standing fuel—*a hazardous 'super-grass'*.

Industrial logging practice incorporates fire into a system of management. But brought together, these twin agents of change represent an altogether new mechanism, an unprecedented kind of power with a devastating effect on habitat. Fire and logging share in common the ability to convert biosystems—quickly—in tandem, they desiccate and impoverish with triple the power and double the certainty. The cumulative impact of industrial logging and fire on landscapes is most extreme.[8] The fragmentation of what were once very fire-shy landscapes allows now a more *certain penetration*.

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[6] The world's largest tree was the Ferguson Tree—Mountain Ash (*E. Regnans*)— at over 500 feet (154m) near Healesville, Victoria, as measured by Surveyor Ferguson in 1872.

[7] Fire was previously extremely rare in moist forests where natural fire regimes tend toward low frequency, stand replacing events (Whelan 1995; Odion et al. 2004; Bradshaw *et al.* 2009)

[8] Logging in the moist eucalypt forests of southeastern Australia has shifted the vegetation composition toward one more characteristic of dryer forests that tend to be more fire prone (Mueck & Peacock 1992).

10 Promiscuous fire

Stags—hollow long-dead remnant giants, ancient standing skeletons of the forest and full of life, are lost to promiscuous fire. The idea sometimes heard, that as soon as the bush is *dry* enough to burn, it should be *made* to burn, is an argument driven by fear and misunderstanding. Fire dispersed annually across a landscape forces conversion to simple grasslands—at best with eucalypts. Under certain conditions, the release of a measured quantity of fire is expected to behave in a particular fashion—hazard reduction prescriptions. Offering little stimulation, repeated cool burns are destructive of ecosystems. When fuel reduction and fire prevention fails, we plan our attack against fire with more fire. We draw the line and recruit a brand of fire to operate for us in our theatre of war. In the campaign for control, our enemy is understood to be lurking out there—potentially everywhere. *Our ally can switch sides any time*.

Like a long, drawn out explosion, fire in the landscape is a fierce, malleable phenomenon of nature. Bombs wrought with certainty are sparingly employed, limited weight given to water. Our arsenal means to cast friendly fire,[9] we fall back to new lines, new strategies and incendiary bombing. Fire and fear is magnified.[10] Just as warm waters feed cyclonic energy, energy and water released in the heat of combustion develops a phenomenon of pyrocumulo-nimbus thunderstorm. Nature so stimulated and having had her fill, throws spears and quenches the fire. Heads roll, and we continue to sustain our assault on the landscape—*before*, *during* and *after* fire.

11 Wild fire meets anthropomorphic fire

Ancient wild fire had long laid down discernable patterning—*pristine caresses over millennia*. In the Dreamtime, anthropomorphic fire was aware, listening to the land. The story was there, written in sodden land; contrast in wild fire.[11]

Native fire was intelligent fire, informed by long, unbroken lore. Seasoned and barefoot, this cool fire followed a living, human pattern inside the landscape. This fire had bounds, keeping to traditionally frequented and cleansed sites. It was a fire of coastal headlands, river plains and harbour, a fire of pathways and ridge-tops. It sang the song-lines. Tall, moist forests escaped treatment; unvisited places left. Rainforest was not burned. While landscape features of significance and culture informed and shaped native fire use, climate and topography continued to shape the more powerful wild fire. Extended periods

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[9] The Age 12/2/2009: Sam the Koala was rescued after preventative CFA back-burning operations, conducted during the week leading up to Australia's deadliest bushfires. D. Tree was reunited with Sam after she'd been taken to the Mountain Ash Wildlife Shelter for bandaging. "We got off scot-free in our home town," said Tree.

[10] The "Black Saturday" fires that occurred in Victoria (February, 2009) significantly reduced the available Koala habitat in the Strzelecki Ranges; together, the Boolarra and Churchill fires affected approximately 7500 ha of forest in the area. The frequency and intensity of such fire events is predicted to increase under the influence of climate change (Hennessey *et al.* 2006) says Lindenmayer.

[11] Geology (2011) T. J. Cohen: Continental aridification and the vanishing of Australia's mega-lakes. "Certainly this suggests that Australia had quite a lot of moisture on it after humans arrived, but much less than it had many thousands of years beforehand," says co-author Professor Gerald Nanson.

of high precipitation led to mega-lakes, vast inland waters, all joined-up. Natural, patterned scapes continued to *evolve* as *water reigned*, and then fire.

12 Mega-lakes to mega-fires

The most recent appearance of lakes *Mega-Frome* and *Mega-Eyre* occurred around 800 to 1000 years ago. Significant flooding rains filled and held these mega-lakes to levels many, many times higher than the waist-deep waters generated in early 1974. Come early spring, the cured grasslands burned for months across the whole country—a third of the top-end. While the country had burned fiercely after a piddle, the mega-lakes had tanked for decades.

With the arrival of Europeans, fire activity in the landscape was substantially increased.[12] For the early settlers, a baptism of water was followed by a judgement of fire. Author Patrick White, in *The Tree of Man*, inflicts on his settlement flood and then fire. “Fact was—the fighters had become not only exhausted but fascinated by the fire. There were very few who did not succumb to the spell of the fire. They were swayed by it, instead of *it* by *them*… Because they had looked *into* the fire, and seen what *you* do see,”

The failed wood *chip* industry—still flogging *quality* native forest—is already disastrous on a grand scale, on borrowed time.[13] But Australian wildfire in an *already* changed climate—heat records tumbling all over the globe—ups the ante. The Mega-fire is undoubtedly here. A ‘big wet’ won’t save us quickly. We’re in *more* trouble, *more* regularly already. Intense dry-land growth, plus existing ‘super-grass’ stands across a logged and altered, dryer more fire-prone landscape, is bad news.[14] But wet periods will assist, and may indeed provide the panacea for a *task of amelioration*.

13 Consuming fire

The plant and animal kingdoms of our terrestrial ecosystems are represented conventionally as a pyramid, with the weight of biomass production at the bottom—the forests. At the top sits the consumer of biomass, the lion. But the ultimate consumer of terrestrial biomass is fire—*fire* rules. Fire stalks both

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[12] University of NSW (website news) 6/12/10; First Australians did not boost fire activity: A new study indicates that Australia’s earliest settlers arriving around 50,000 years ago did not significantly increase the fire activity on the continent, although the arrival of Europeans after 1788 resulted in a substantial increase in fire activity, according to palaeoecologist Dr Scott Mooney.

[13] There may be a strong case to exclude logging from those areas where past human disturbances (like timber harvesting) have been limited (Cochrane & Barber 2009). This is because logging induced alterations in landscape cover patterns can take prolonged periods to reverse and hence associated changes in fire susceptibility also may be long lived (Perry 1998; Lindemayer *et al*. 2009)

[14] It has been argued by some, “industrial logging was a source of almost unprecedented holocausts…” (Pyne 1992, p.182) in the past. (Contrary to the beliefs of industrial lobby groups) logging is likely to make some kinds of forests (moist & rainforest) more, not less prone to an increased probability of ignition (Krawchuk & Cumming 2009) and increased fire severity and/or fire frequency (Uhl & Kaufman 1990; Thompson *et al.* 2007; Bradshaw *et al*. 2009; Mahli *et al*. 2009; Lindemayer *et al*. 2009)

kingdoms with a potency of supreme power. *Biomass contracts simply,* mineral products and water vapour.

14 Remedial fire

Restoring the healthy green arteries of forests—our lungs, the carbon sinks, *reticulation plants and fire moderators* of habitat—is priority. Remedial fire means holding fire, actively allowing the regeneration of moist forests across the *greater* landscape. The wet gullies and creeks must be given over to generations of regeneration to form natural mitigators once more—soak-hoses snaking throughout the land. Existing plant communities must dictate the use of fire or not at a micro-scale, and they must be recognised. Burns must always occur only on dry-sclerophyll, never wet-sclerophyll and never in tree-fern gullies. Wild fire comes soon enough. Pioneer rainforest plants over decades without disturbance will re-emerge from retreats and re-modify a proneness to burn.[15] Cast widely the seeds of Brush kurrajong (*Commersonia Fraseri)* and *Pittosporum Undulatum*, the sweet pioneers of moist, wet-sclerophyll forests, long misunderstood. Blackfellows hemp, synonymous with the Brush kurrajong is *most* valuable. As for the towering, long-lived wattles of rainforests, let them age with grace. Tall Maiden's wattle (*Acacia Maidenii*), and Blackwood (*Acacia Melanoxylon*)—still taller—are important under-story of twenty metres plus. A dry burning reign of wood *chip* logging in wet-sclerophyll forest must cede to a *rain of transpiration*.

15 End of story

I have endeavoured to explain the impact of elemental fire as it had previously occurred—rather benignly, mostly—and as it manifests itself in habitat today. Serious investigation of industrial logging practice and its dire effects are long overdue.[16] Through an unbiased and clear lens, forensic evidence of the true situation can simply be seen, written all over and through the forests—the whole of landscape.

Fire cannot really be taught through textbooks—words simply symbolic. There is no *true* 'rule book' on fighting fire—not possible to master campaigns. If there was ever a fire discipline understood, it was that understood by the indigenous people and the land itself. Fire *can* be read—can *speak* from land in warm voice—but two feet must always remain planted firmly in the ground. Fire can be grasped—in degrees. And like a tree—the total *war on landscape* must be dropped.[17] A moral imperative insists that a new *Eden* be restored.

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[15] Forests and their susceptibility to fire are characterised by a continuum of precipitation and humidity ranging from relatively moist to relatively dry (Lindenmayer *et al.* 2009).

[16] To the best of our collective knowledge, there has been to date no detailed published review of how industrial logging policies and practices can alter fire regimes (Lindenmayer *et al*. 2009).

[17] Encounter, ABC Radio National (30/1/11): Something Happened To Darwin, (theologian Paul Collins in conversation with Tim Flannery). 'Be fruitful and multiply and fill the earth and subdue it and have dominion over every living thing that moves upon the earth.' Yes, I've in fact heard executives of Australian mining companies quote that very text to justify a kind of bulldozer—it's a kind of a bulldozer theology…

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