28.2.2018

To: NSW Department of Planning and Environment

From: Dr Andrew Benwell (ecologist)

[redacted]

Mullumbimby

NSW 2482

[redacted]

Cultural Events Site – State Significant Development Application (SSD – 8169)

Dear Sir/Madam,

I wish to lodge this objection to State Significant Development Application 8169 for the permanent approval and further expansion of a music festival-cultural events site at Yelgun on environmental (ecological) grounds, as detailed below.

I object to SSD 8169 seeking permanent approval of the music festival-cultural events development at Yelgun, as the proposal is incompatible with existing land-use in the Billinudgel Nature Reserve – Marshalls Ridge Wildlife Corridor locality, which has been concern primarily with biodiversity conservation for the last 30 years. There is a high likelihood the development will have a degrading effect on the localities high biodiversity and there is already evidence that this has occurred during the trial period. The ecological monitoring program that claims to have detected no significant adverse impacts on wildlife during the trial is highly contentious for a number of reasons relating to selection of monitoring sites, data analysis methods and interpretation of results, which are discussed in detail below. Basically, the Biodiversity Assessment accompanying the EIS and the annual ecological monitoring reports on which it is based lack credibility and there is more straightforward, as well as strong circumstantial evidence to indicate that biodiversity values overall will be irrevocably damaged by operation of a permanent music festival-cultural events site at Yelgun. Worse still, the EIS proposes to increase the allowable limit of patrons at festival events to 50,000 per day, hold more events per year, build a conference centre, on-site sewage disposal facility and more.

There have been major changes to the wildlife found on the NBP festival event site since the start of the trial in 2013. Common species of marsupial such as Swamp Wallabies and Bandicoots have disappeared or become rare (Fitzgerald 2013-2017). The grassland bird community on the northern side of the site was destroyed in establishing the main event area and camping ground. This included habitat of the endangered Grass Owl, which was not recorded during the trial monitoring until 2017 when it was recorded again at Yelgun Flat on the southern side of Marshalls Ridge. This undeveloped part of the site must be preserved to protect the Grass Owl before it disappears entirely from the Yelgun locality. Influxes of scavenging bird species such as Ibis and Crows have become a common feature of the site's birdlife during festival events (Fitzgerald 2013-2017), and the figures have been used in a cynical fashion to claim an increase in bird numbers and diversity. The ups and downs of waterbirds on an old farm dam is also touted as evidence that everything is ok with birdlife on the property, a massive total of 10 waterbird species being recorded on the dam in the five year trial. Although not the threatened Jacana (Water Lily Bird), not recorded since the development started.

Impacts of the trial on the great mass of bird species remains a mystery as bird monitoring data has never been released or included in reports for public scrutiny, only inscrutable multivariate statistics. The combining of bird counts for impact sites with bird counts for control sites in Billinudgel Nature Reserve more than 2km away (the control sites also outnumbering the impact sites) is used to justify

the claim that bird diversity has stayed the same during the course of the trial. This type of data analysis is spurious as there is no reference to the scale of effects (i.e. were the observed effects close to the site or far away). The control sites should be compared to the impact sites, not combined with them. Two new threatened birds species were recorded during the trial - the Brown Treecreeper in Billinudgel Nature Reserve and the Bush Stone Curlew on the festival site. This ground nesting species seeks out areas that are relatively free of dogs in particular, which prevent it from breeding. What is its tolerance of massed human presence, noise and night lighting is has not been assessed. Many other threatened species known to occur at the Marshalls Ridge Wildlife Corridor have not been recorded since events started as shown in Table 1, p. 11 below.

Anyone with a passing interest in birdlife and nature will know there are some birds that are relatively unaffected by disturbance and human activity (e.g. Magpies, Noisy Minors, Spur-winged Plovers), and there are others that are seldom seen, shy and easily driven away by noise, intrusion of people or the sudden appearance of a predator. The great majority of bird species fall into this latter group, but the monitoring study made little effort to identify the level of impact on uncommon or low frequency birds, preferring to discuss measures of diversity biased by common species (e.g. total numbers of birds and species), a completely illogical approach if the purpose is to detect impacts on birds that could be affected by human activity.

The EIS states that potential impacts on wildlife were managed by avoidance, minimisation, mitigation and potential offset. These are terms environmental managers employ in management plans and the like, but have they any substance? During the trial, the number of events was kept to a minimum, and parts of the site were revegetated. However, other parts were cleared, drained, roaded and filled. Only about 10 ha of cleared land out of a several hundred hectare site was planted with trees. In effect, what has happened at Yelgun in the last five years is that a large property consisting of grazing land and bush, which was used to graze cattle for the last 30 years, was converted to a large scale festival event area with associated camping, car parking, road and infrastructure to service up to 35,000 patrons per day. The facts are there was a net loss of habitat (grassland, sometimes grazed, provided habitat for grassland birds and hunting ground for avian predators) with the added intrusion of a massive increase in human presence during festivals, occurring as a series of pulse disturbances throughout the year (ie. sudden, high-intensity disturbances). One would have expected that such a major change in land-use would be accompanied by changes in biodiversity. Yet the monitoring reports and the EIS tell us that biodiversity is unaffected. From the outset in 2010, the proponent has argued that displacement of wildlife will occur during festivals but then return to pre-event levels soon after events have end and the disturbance has died down. Is this believable or a distortion of the facts? It may be true for common bird species, but what about the total avian fauna including uncommon and rare species, including the threatened species, and other fauna groups? The ecological monitoring program was an opportunity to undertake a frank and fearless assessment of ecological impacts on wildlife during the trial, but has been compromised from the start by a flawed design and making predictions (assumptions?) before objectively evaluating the data. Even the data collected with its various weaknesses, in my opinion, has not been honestly analysed and assessed.

In my opinion the conclusion of the ecological monitoring program, which underpins the EIS currently on exhibition, that there were no significant negative impacts on wildlife during the five year music festival trial has so many flaws that it is essentially invalid and in present form cannot reasonably be used to justify permanent approval of a music-cultural events site. These flaws are detailed in my comments on the Ecological Monitoring Program (2013-2017) and Biodiversity Assessment of EcoLogical (2017) below.

Comments on the Ecological Monitoring Program (2013-2017) and Biodiversity Assessment of EcoLogical (2017)

1 Background

1.1 Trial Approval and the Ecological Monitoring Program

Consent was granted by the NSW Department of Planning for North Byron Parklands (NBP) to operate a large scale music festival site at Yelgun for a trial period of five years between 2013 and 2017. The main reason for approving the festival site proposal as a trial was the site's problematic location, which is in an area well recognised for its high nature conservation value. Previous development applications had been refused for over 30 years because of the high number of threatened species reported from the property, existing habitat protection (7k) zonings and the property's location within a regional wildlife corridor and next to Billinudgel Nature Reserve.

Consent conditions for the trial required the design of an ecological monitoring program to determine whether music festival events and associated operations had any significant adverse effects on wildlife during the trial period. In this submission I wish to point out major flaws in the design, implementation and interpretation of the ecological monitoring program, which I believe completely invalidate the conclusion of this EIS and annual Performance Reports that festival events and development of the festival site in general had no significant adverse impacts on wildlife during the trial period. Comments made are mainly in relation to birdlife but most of the issues raised extend to other fauna groups (ie. mammals, reptiles and amphibians).

1.2 Consent Condition C20 Pertaining to the Ecological Monitoring Program

Condition C20 stated that monitoring locations must be near amplified sound and lite areas, Billinudgel Nature Reserve and Marshall's Ridge wildlife corridor. The specific monitoring program design, including monitoring sites, data collection and data analysis methods was left up to the proponent and their consultant, and subsequently reviewed and approved by the Department of Planning. No expert or peer review process was required during design of the monitoring program.

1.3 Key Performance Indicators for the Ecological Monitoring Program

Key Performance Indicators (KPIs) were required by the Consent Condition (C20c) but never implemented. The project ecologist argued that KPIs were not possible, as pre-2013 fauna data were not collected at the same sites and with the same quantitative methods as monitoring during the EIM (Event Impact Monitoring). However, a considerable amount of pre-2013 wildlife data was available so there seems no reason why KPIs could not have been formulated on that basis.

1.4 Monitoring Period, Music Festivals and Reporting

The trial period ran from 2013 to 2017 (recently extended). Two large music festivals were held each year, Splendour in the Grass (SITG) in winter and the Falls Festival (FF) in summer, plus other smaller cultural events later in the trial period.

Ecological monitoring program related reports considered in preparing this submission included:

- Concept Plan – Appendix E: Ecological Assessment and response to Director-General's Environmental Assessment Requirements (DGRs) Application Number: 09_0028 North Byron Parklands (Fitzgerald June 2010).
- Concept Plan – Appendix F: Fauna and Flora monitoring at Parklands. Parklands-Application Number 09_0028 Prepared for Billinudgel Property Trust (Billinudgel Property Pty Ltd) (Fitzgerald 2010).

- Event Impact Monitoring (EIM) – five reports by Fitzgerald for music festivals between 2013 and 2017 (presented as Appendices in annual NBP Performance Reports – see below)
- Fauna surveys in 2007 and 2009 (Fitzgerald)
- Biennial Fauna Monitoring – conducted in 2007 and 2009 by Fitzgerald. The biennial fauna survey reports are separate from the EIM reports
- Review of 2010 Predictions of Ecological Impacts (Fitzgerald 2015)

Music festivals covered by the first dot point (reports by Fitzgerald) above include:

Performance Report: Ecology Year 1 SITG 2013, FF 2013/2014

Performance Report: Ecology Year 3 SITG 2014

Performance Report: Ecology Year 3 FF 2014/2015, SITG 2015

Performance Report: Ecology Year 4 FF 2015/2016, SITG 2016

Performance Report: Ecology Year 5 FF 2016/2017, SITG 2017

Finally, there is the EIS and accompanying Biodiversity Assessment, Appendix F - Summary of ecological surveys and monitoring at North Byron Parklands 2007 – 2016, prepared by EcoLogical 2017.

2 Comments on the Monitoring Program

In my opinion the conclusion of the ecological monitoring program contained in the reports above, which underpin the EIS currently on exhibition, that there were no significant negative impacts on wildlife during the five year music festival trial has so many flaws that it is essentially invalid and in present form cannot reasonably be used to justify permanent approval of a music-cultural events site.

There are two aspects of the monitoring program that I will comment on below:

- Sampling strategy and data collection
- Data analysis and interpretation

2.1 Sampling Strategy and Data Collection - Summary of Issues

1. Impacts during the pre-event construction period were not monitored or assessed prior to being implemented and subjected wildlife to a substantial initial impact that likely altered biodiversity and conditioned fauna community composition to a higher frequency disturbance regime, before the actual EIM (Event Impact Monitoring) started.
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2. Two of the four impact sites were at low impact locations (IM3A and IM3B) on the southern side of Marshall Ridge well away from the music festival event area (see Appendix 1 below).

3. There were only two true impact monitoring sites (IM2A and IM2B) and eight control or low impact sites, which distorted data interpretation when combining data for each monitoring period.

4. Bird monitoring was limited to Paperbark swamp forest on the floodplain. No EIM was conducted in forest surrounding swamp forest, which is in the main centre of bird diversity. This is the most extensive habitat type on the NBP land and includes the Marshalls Ridge wildlife corridor, where Consent Conditions specifically required monitoring to be carried out.

5. The design of the monitoring program was poorly planned and flawed from the outset, due to biased sampling design, low number of sample sites and high data variance (ie low statistical power) , making data analysis highly susceptible to Type II Error. The monitoring program was not modified to correct these issues despite the proponent being made aware of design problems through their ecological consultant and comments by National Parks and Wildlife Service/OEH and others at RWG meetings.

6. Baseline data as required by Statement of Commitment B6 (part of the Concept Plan approval) and Consent Condition C20 to compare with the results of EIM monitoring was never collected.

2.2 Data Analysis and Interpretation - Summary of Issues

7. Monitoring data was not made available in annual monitoring reports, or the EIS, for independent assessment of results and conclusions. My own requests to the PAC and a RWG representative for access to the monitoring data was not responded to and apparently denied.

8. Data analysis focused on whole bird assemblages and guilds, the dynamics of which were dominated by common and opportunistic species, and seasonal nectivores (ie birds that feed on flower nectar such as lorikeets). Bird counts are dominated by these species. Impacts on uncommon or low frequency bird species, which make up the majority of the avifauna, are in the main unanalysed and unassessed.

9. The lumping approach to data analysis employed in the EIS, where counts of bird number and bird species were derived by combining all Control and Impact sites is spurious, as it prevents a direct comparison (without unnecessarily complex multivariate statistics) of trends specifically at the Impact sites and other sites, the very purpose of the monitoring program.

10. Quantitative evidence of negative impact on birds evident in many of the results was not described in the reports.

The following Sections 2.3 to 2.15 discuss these issues in more detail.

2.3 Early Impacts not Monitored or Assessed

Before the start of EIM (Event Impact Monitoring) the festival site was subject to months of disturbance associated with festival site preparation, including construction of a cut-and-cover tunnel linking the northern and southern parts of the site, land filling, drainage works, fencing etc. This occurred in the months leading up to the first festival event and the start of ‘Impact Monitoring’. It is reasonable assume that after decades of minimal impact except for cattle grazing, these activities would have had a major disturbing effect on wildlife, quite likely altering fauna communities. Because the monitoring program, which was supposed to record the impact of the project on wildlife, had not been put in place, there is no data on this initial impact period. The initial impact is very important, as species assemblages are rapidly modified by a new disturbance regime and a new assemblage (or species configuration) establishes, which is then maintained by the new conditions and seen as ‘normal’. In a complex community of species such as an avian community, changes may be difficult to detect except by a well-designed monitoring program, which includes detailed baseline data.

The Year 1 Performance Report (Ecology) states on p. 178: “The merit and validity of any ecological assessment rely upon an as complete and comprehensive understanding of the proposed activity

under consideration as practically possible. However, logistically driven changes to project design and delivery occur at times, and no opportunity exists to modify the (2010) assessment to examine these changes. The 2010 assessment relied upon a pattern of up to three events annually with substantial interludes of low levels of activity. The pattern which occurred included two events but with sustained moderate to high levels of disturbance from March through August."

"The following elements of the Parklands proposal, including elements of Splendour in the Grass 2013, were not assessed (p. 178):

Table 13: Unassessed and Additional Components of the proposal (extract relevant to birds)

Element	Response
Lengthy disturbance from excavations in pasture for installation of extensive sub- surface drainage infrastructure, aeration of topsoil and associated impacts on internal drains and water quality	A once-only procedure in response to extremely wet conditions in cattle pasture.
Soil stock piling, particularly around trees	Was remedied in timely manner and requirements for appropriate management of any soil stockpile will be included in the formal Environmental Induction for the next and subsequent events at the site.
Temporary deployment of mobile phone towers and radio tower, and emission of electromagnetic energy (EME) radiation from these facilities	Sites for temporary mobile phone towers should be surveyed for the presence of bat roosts, nesting birds, and frog breeding areas before tower locations are determined
Extensive site hardening for parking	Resulted in changes to grassland bird communities. A grassland plan is proposed to provide for reservation of areas of tall grassland where practicable.
Installation of a large water tank requiring native tree removal;	Location for the tank was approved in the construction certificate
Conflict between event landuse and "Managed Parklands" zoning in *e.g.* restaurant alley	If event landuse intensity cannot be practically modified to allow viable plantings, an equivalent area of plantings will be installed elsewhere.
The "Minimum 30m buffer "to SEPP 14 Wetlands and Billinudgel Nature Reserve, depicted as "New Habitat and Constructed Wetlands" has not been implemented.	Planned removal of all cattle from areas east of the southern carpark would allow development of a considerably larger buffer. However cattle were still present at time of writing, planned removal of cattle by April 2014. MM

The impacts listed in the table above appear to be unanticipated impacts during the operation of music festivals in Year 1. However, in the same report the project ecologist makes no mention of major disturbance during pre-event construction, which obviously affects the interpretation of monitoring results and conclusions drawn from the monitoring program.

The proponent was aware of potential impacts on wildlife during the construction period since the Concept Plan planning stage (2008-2010). In replying to the Director-General's Environmental Assessment Requirements (Fitzgerald 2010 Appendix E), the proponent stated (6.2 Impacts on

Fauna) “Proposed activities on the site which will generate impacts for fauna can be summarised into two broad categories, namely: the construction and upgrading of infrastructure, and the conduct of events.” However, no effort was made by the proponent or the Department of Planning (then DPI) to ensure the design of a monitoring program that took into account construction related impacts on wildlife, despite this being the key environmental issue associated with the development.

2.4 Unrepresentative Selection of Monitoring Sites

In designing a monitoring program, it is important that monitoring sites are selected so that potential impacts are able to be detected if they occur and that sites are sufficiently replicated to reduce levels of data variance. For example, if impact monitoring sites are placed at locations where the level of impact is low, or in low bird diversity habitat (e.g. paperbark forest), the monitoring program is unlikely to be capable of discriminating potential adverse impacts on uncommon, resident species. A number of such irregularities are evident in the selection of monitoring sites for the present EIM program:

- Two of the four Impact sites (IM2A and IM2B) are in low impact areas (for the location of these sites see map in Appendix 1 below).
- Only sites in paperbark swamp forest habitat were included in the monitoring program (apart from opportunistic monitoring of plantings). The justification for this was to minimise habitat variability, both main habitat and centre of bird diversity was not monitored – forest on slopes above the floodplain - as required by the Consent Conditions. This could have been addressed by appropriate stratification of the monitoring sites.
- The number and location of the monitoring sites was different in Year 1 (see Appendix 1) Impacts were well underway by the time the monitoring strategy was finalised in Year 2. Such changes add a further layer of variance or data noise unrelated to music festival events.

2.5 Absence of Baseline Data

The Performance Reports state that true baseline condition of monitoring sites is available only for the Water Birds Dam and impact site IM3B, a forest block near the centre of the event area. By this they mean data which compatible with the EIM methods. However, there was a large amount of semi-quantitative (e.g. relative abundance) data from pre-event surveys collected between the Concept Plan stage the start of the trial, as well as before the Concept Plan that represents valuable and relevant baseline data. Why was effort not made to formulate this data in some way to define the base line conditions?

In replying to the Director-General’s Environmental Assessment Requirements (Fitzgerald 2010 Appendix E), it was stated (1.3 Fauna Monitoring and Surveys) “A program of monthly fauna monitoring recommended leading up to the first proposed event will add to existing survey data. Collectively this will provide information on the numerical ecology of target fauna groups to determine ‘normal’ or pre-event levels of variation in abundance and community composition. These data will enable the recognition of variations in faunal abundance associated with operation of the site.”

Likewise the fauna monitoring methods (Fitzgerald 2010, Appendix F) stated (1.0.2 Timing and sample sizes—baseline data) “Because potentially high impact activities (noise, lights, large numbers of people) associated with major events typically occur over a ~3 day period, it is proposed to acquire a 3 day sample each month from June 2010 to June 2011, prior to the first event for the site in July 2011….. This will enable multiple samples of target groups across an annual cycle in areas likely to experience impacts. Based on techniques proposed this would provide 72 point surveys of the large northern dam, 180 timed transect samples in five forest blocks for forest birds to add to existing samples (20 at the dam and 46 of forest birds).”

Apparently 4-6 months of data were collected at some of the proposed sampling sites, but this appears to have been carried out during the construction impact period, when fauna was already being impacted. The data in the form stated in the proponents response to the Director Generals Requirements was never collected, in breach of the proponents undertaking. Therefore’, no compatible data was collected to function as a baseline for comparison of results from the EIM.

Baseline data was never included in any data analysis. The conclusion that festivals had no adverse effect on wildlife must be therefore be rejected.

2.6 Misinterpreting Underwood (1994)

Repeated reference to Underwood (1994) as the basis of the monitoring program design misrepresents the author, as the reference clearly states on p. 3 that the methods described are designed for univariate data analysis, whereas the approach taken to analysis of the EIM data, on which conclusions of the EIS are based is essentially multivariate (e.g. ordination and Permanova of whole bird assemblage data). Whether it is possible to draw conclusions about individual species, particularly rare or infrequent species using a multivariate, whole community or feeding guild approach, as employed in the performance reports, is highly questionable. Also, as an experimental design, 'BACI – Before After Control Impact' derives from Green (1979) not Underwood (1994), as Underwood also makes clear in the introduction, nor does it include the important EIM component During.

2.7 Data Recording

For each festival event, three days of monitoring were recorded Before, During and After a music festival event at each of 10 monitoring sites or transects (see Table 1). Each transect was a 20 minute/2 ha bird sample recorded within 2 hours of dawn. The Before and After monitoring events were recorded after the 'bump in' and 'bump out', which varied from around 3 months to 7 months apart.

Table 1: Monitoring program design with four impact and six control sites, indicating sample number raw and number of merged samples (in brackets)

	Impact				**Control**						**Total**
	IM2A	IM2B	IM3A	IM3B	C1A	C1B	C2A	C2B	C3A	C3B	
Before	3 or 1 merged	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	30 (10)
During	3 or 1 merged	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	30 (10)
After	3 or 1 merged	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	30 (10)
Total	9 or 3 merged	9 (3)	9 (3)	9 (3)	9 (3)	9 (3)	9 (3)	9 (3)	9 (3)	9 (3)	N=90 or 30 merged

2.8 Data Analysis - Type II Error

There may be a real difference between two sets of samples, such as Before and After bird data, but if the variance is too high and the sample number is too low, it will not be possible to demonstrate a statistically significant difference, resulting in what is known as a Type II error. A Type II error is 'the failure to reject a false null hypothesis of no significant difference'. Examples of Type II errors would be a blood test failing to detect the disease it was designed to detect; a fire breaking out and the fire alarm does not ring; or a clinical trial of a medical treatment failing to show that the treatment works when really it does (Peck et al. 2011 in Wikipedia).

This limitation is common with ecological data because of high data variability caused by the many factors that influence response variables, including diversity related variables. Common factors affecting bird monitoring data include daily weather conditions, yearly variation in temperature and rainfall, seasonal bird migration associated with flowering and fruiting, spatial variation in resource availability, observer error, breeding behaviour and abiotic factors such as slope, aspect and soil type.

If the level of data variability is high and the sample number is relatively low only a large difference between sample means is likely to be statistically significant, raising the prospect of a Type II error if the finding is no significant difference. In other words, a monitoring program may be flawed from the outset by not having sufficient power to analyse impacts because data variability is to high and sample number too low. I would argue that this situation applies to the present monitoring program. And the problem is made worse if the sampling design is biased and/or non-representative, as described above.

Accepting the validity of a finding of no statistically significant difference without critically evaluating the adequacy of the monitoring program design, particularly when there is considerable body of other evidence to suggest a contrary finding, seems to be naïve and reckless, particularly when the conclusion is used to justify ever increasing intensification of site development, including increasing patronage per festival to 50,000, more festivals per year, conference centre construction, on-site sewage treatment works and more, as proposed in this EIS.

2.9 Assumptions of Permanova Not Met

With non-parametric methods such as Permanova, the similarity between samples (e.g. bird transects) is compared against random draws (permutations) from the sample data to determine the probability of the observed level of similarity. An assumption of Permanova is that variance is relatively uniform across the data set and a data transformation is usually applied to lessen the influence of abundant species. A test of the assumption of uniformity of variance is not presented and does not appear to have been carried out. In a data set strongly influenced by seasonal migrants and year to year variation in food resources, as made abundantly clear by the project ecologist, it is unlikely that variance was relatively uniform across the data set collected in different seasons. If the assumption is violated then the Permanova result is invalid. (Note – this is additional to the problem of Type II error stemming from the monitoring program design.)

2.10 Analysis of Species Assemblages vs. Individual Species

In a bird community or any other complex biotic community there are typically a relatively small number of common or abundant species, a slightly larger group of moderately abundant species and a large group of uncommon and rare species. When plotted this results in a skewed frequency distribution with a narrow hump of abundant species and a long tail of increasingly rare species. This type of distribution applies to the bird monitoring data. For example, Performance Report 3 (Ecology appendix) reported that SITG 2015 EIM data included 2979 records of 83 bird species. The most frequently recorded species were Lewins Honeyeater (421), Scarlet Honeyeater (340), Grey Fantail (230) and Australasian Figbird (193). In other words, 4 species accounted for 35% of the total number of birds. The highly skewed distribution of bird species abundances means that when the data are analysed as a species assemblage, or by lumping all the observations together, the dynamics of the bird community are dominated by the behaviour of the common species. This is not very helpful if the objective is to understand the behaviour of bird species to festival events. The direct way to examine bird species response is to analyse the bird monitoring data species by species. It would then be possible to more directly assess the responses of individual species. as well as quality of the data set (in terms of numbers and variance of each species). That is, the most important data, involving the uncommon and possibly threatened species was lumped together with the data on abundant common species, making it very difficult to detect any impacts on the most important targets: the species that are rare and very possibly threatened.

The Performance Reports are always careful to state that no adverse effects were detected on fauna groups, not on fauna species. Bird counts are presented for common species, dam birds and threatened species, but generally an analysis of the response of birdlife to music festival events at the level of individual species was not carried out. Analysis of bird data was conducted at the collective level of trophic guilds (groups of species with similar feeding habits) or whole species assemblages (transect samples) using complex multivariate statistics. An analysis of how species affect the

ordination of sample sites in abstract ordination space is included on ordination diagrams (Pearson Correlation). Even if these were readable, which they are not, for anybody examining the performance reports (ecology appendices), the dynamics of the great bulk of species (80% or more) is a blank space. The situation is comparable to one in which the interest is in the impacts of a certain activity on poodles, so the activity is done with a group of poodles but is also done with a group of collies, terriers, and several other dogs. If the analysis is done on all the dogs, taken together, and the conclusion is "no impact on dogs", we would be left to wonder: But what was the impact on the poodles? Likewise, we are here left wondering, what was the impact of this festival project on the individual bird species in which we are most interested?

Raw bird transect data (ie. counts made of bird species for each bird transect or site sample) were not provided in reports or made available for independent scrutiny. I requested access to this data through the RWG and the PAC but never received any response. Raw data was presented for noise monitoring, why not ecological monitoring? Furthermore, raw data are never presented for the monitoring sites, so the reader is unable to make a simple comparison of birds recorded Before, During and After events at specific monitoring sites. How many and what bird species were recorded at specific Impact sites and Control sites? Instead, most of the results are couched in complex multivariate statistics, which nobody on the RWG or in the Department of Planning had the expertise to comment on. For the five years, it was apparently assumed that the ecologists who wrote the reports must be right, because the data analysis methods they used were so arcane and complicated, either way it silenced serious debate about wildlife impacts, the primary reason for the trial in the first place.

A 'species assemblage' or data lumping approach to analysis of monitoring data affects how results and trends are perceived. For example, EcoLogical (2017) present a graph of total counts of bird individuals and species (ie. all data combined for each event – Before + During + After transects, Control + Impacts sites) to justify the conclusion of no significant impact on birdlife associated with music festival events. What is the logic of this approach? Surely it would have been realised that in a combined dataset, the weight of data from the control sites would cloud effects occurring closer to the festival site? A simple example illustrates how misleading this approach can be. In Table 2 below, although total species abundance and number of species remains constant across three musical festival events, species A and B have decreased in abundance and species C and D have increased in abundance. Trends at the collective level can conceal changes at the individual species level

Table 2: Possible scenario of changing species abundance where total abundance and number of species remain constant.

	Event 1	**Event 2**	**Event 3**
Species A	2	1	1
Species B	5	1	1
Species C	5	4	6
Species D	3	8	7
Total abundance	15	15	15
No. of species	4	4	4

Likewise, Performance Report No. 5 states that the second highest number of birds were recorded (total counts), but the lowest number of species for the trial period (70). Species data were not made available, but it is a safe bet that common species continued to maintain high numbers and the fall in number of species represents species that were uncommon during the monitoring program.

2.11 Data Lumping – Impact and Control Sites

Also, it is hardly valid when reporting counts and number of species, to lump impact and control sites together, particularly when there are more control sites (6) than impact sites (4). As sites IM2A and IM2B are low impact sites and more akin to controls, there were actually only two impact sites and

eight control or low impact sites. Counts of birds or number of species and averages presented in the EIS therefore reflect avifauna patterns at the control sites (as there are more of them), or essentially avifauna dynamics inside Billinudgel Nature Reserve. What about the festival site?

Counts of birds, number of species and averages for each monitoring site (control and impact) are not presented in the reports. There is little site-specific data to examine and make an assessment of trends.

This lumping approach is both illogical and misleading when the whole purpose of monitoring and data was to analysis impacts of festival events "near amplified sound and lite areas, Billinudgel Nature Reserve and Marshall's Ridge wildlife corridor", as stipulated in Consent Condition C20.

2.12 Stress and Breeding Success

The fauna monitoring program provides no information on potential impacts on stress levels and breeding behaviour in birds or other fauna groups associated with music festival events, although indirect evidence such as the disappearance of marsupials such as Swamp Wallabies and bandicoots, and birds such as the Jacana and other threatened species suggest that such impacts were at work during the trial period. No systematic data on bird nesting was presented although tables note that nests with abandoned fledglings were "not observed". Whether there was any systematic attempt to record nesting behaviour is not reported.

A large body of research on the effects of increased human presence, noise and night lighting on avifauna and other fauna groups has documented increased stress and changes in behaviour including nesting (see Benwell and Scotts 2010). Common sense and general observation would suggest the same ye such impacts are dismissed by the EIS as being insignificant.

2.13 Impacts on Nocturnal Insect Life

Insect life would normally be of little concern or relevance, but as the primary land use on and surrounding the trial music festival property is still biodiversity conservation, and insects make up the greater part of biodiversity the area is (or was) intended to preserve, this neglected fauna group assumes at least some importance.

There is a large volume of research literature which describes in detail the severe impacts that night lighting has on nocturnal insect life (see Benwell and Scotts 2010).

Low impact sodium vapour lights, as used by NSW Roads and Maritime Services where highway lighting is necessary next to conservation areas (e.g. Brunswick Heads Nature Reserve), was not implemented by NBP. (Sodium vapour lights give off a less intense yellowish light whereas standard mercury lights have a bright, white light. Generally, the more intense the light source the greater the impact).

The annual monitoring reports offer half a line about impacts on nocturnal insect life – "No impacts observed". Whether there was any systematic checking of festival lighting for insect impact is not reported. It is possible that the initial impact of intensified disturbance involving bright light sources occurred during pre-festival construction, or the bump-in period. Starting from baseline conditions, the initial impact is by far the largest and most significant. There is not an inexhaustible supply of insects to feed insect attracting lights and numbers are quickly depleted. At the first Blues Festival at Tyagarah near Byron Bay, I had the opportunity of observing the initial impact on nocturnal insect life of night lighting. I observed large numbers of insects of many different species swarming around the portable lighting units in the car parking area, and many dead on the ground. However, in all subsequent years, very few insects were observed around the lighting units. Likewise, at the RMS site office for the T2E project at Bangalow, massive numbers of beetles were attracted to bright outside lights left on at night and dead ones covered the ground, but after this initial impact, which occurred in the space of a few weeks at the most, no further evidence of kills was seen during succeeding years.

The same process may occur at other sites near natural habitat where a major new night lighting source is introduced. Biodiversity may have been substantially reduced without anyone being aware it had happened.

2.14 Threatened Species

Over five years only four of the 20 threatened birds species recorded for the monitored area, including the festival site property and Billinudgel Nature Reserve, were recorded. Other notable absences amongst the mammals included the Common Planigale and Common Blossum Bat. Amphibians were not monitored despite a large area of floodplain habitat being converted to event area, parking, camping etc.

The impact of the trial on these species is therefore essentially unknown, but prospects for these species are unlikely to be improved by approval and expansion of a permanent festival site at Yelgun. Without any clearing of habitat being involved, music festival tourism in picturesque rural settings involving mass congregations of people and associated noise and night lighting (plus site construction etc) is likely to produce a major disruptive and limiting effect on local biodiversity, including the cumulative decline of uncommon, rare and threatened species (Benwell and Scotts 2010).

Table 1 : Threatened fauna species from Billinudgel Nature Reserve and immediate surroundings. Species recorded during ecological monitoring 2013-2017 in yellow highlite.

Species	Conservation status	Locality and reference source
Amphibians		
Wallum froglet (*Crinia tinnula*)	Vulnerable [a]	Billinudgel NR [4]
Wallum tree frog (*Litoria olongburensis*)	Vulnerable [a, b]	Billinudgel NR [2,4]
Mammals		
Common planigale (*Planigale maculata*)	Vulnerable [a]	Billinudgel NR [1,4]
Koala (*Phascolarctos cinereus*)	Vulnerable [a]	Billinudgel NR [1,4]
Long-nosed potoroo (*Potorous tridactylus)*	Vulnerable [a, b]	Billinudgel NR [1,2,4]
Common blossom bat (*Syconycteris australis*)	Vulnerable [a]	Billinudgel NR [2,4]
Grey-headed flying fox (*Pteropus poliocephalus*)	Vulnerable; Endangered population [a]	See section 3.0
Little bent-wing bat (*Miniopterus australis*)	Vulnerable [a]	Billinudgel NR [2,4]
Common bent-wing bat (*Miniopterus schreibersii*)	Vulnerable [a]	Ocean Shores [4]
Eastern long-eared bat (*Nyctophilus bifax*)	Vulnerable [a]	Billinudgel NR [1,2,4]
Birds		
Magpie goose (*Anseranas semipalmata*)	Vulnerable [a]	Ocean Shores [4]
Black bittern (*Ixobrychus flavicollis*)	Vulnerable [a]	Billinudgel NR [2] Marshall's Creek [4]
Australasian bittern (*Botaurus poiciloptilus*)	Vulnerable [a]	Billinudgel NR [2,4]
Black-necked stork (*Ephippiorhynchus asiaticus*)	Vulnerable [a]	Marshall's Creek [4]
Osprey (*Pandion haliaetus*)	Vulnerable [a]	Billinudgel NR [1,4]
Square-tailed kite (*Lophoictinia isura*)	Vulnerable [a]	Billinudgel NR [1,4]
Red goshawk (*Erythriotriorchis radiates*)	Endangered [a]	Billinudgel NR [1,4]
Brolga (*Grus rubicundus*)	Vulnerable [a]	Billinudgel NR [2,3,4]
Bush hen (*Amaurornis olivaceus*)	Vulnerable [a]	Billinudgel NR [2,3,4]
Comb-crested jacana (*Irediparra gallinacea*)	Vulnerable [a]	Billinudgel NR [2,3]
Bush thick-knee (*Burhinus grallarius*)	Endangered [a]	Billinudgel NR [3] Brunswick Heads[4]
Wompoo fruit-dove (*Ptilinopus magnificus*)	Vulnerable [a]	Billinudgel NR [2,3,4]
Rose-crowned fruit-dove (*Ptilinopus regina*)	Vulnerable [a]	Billinudgel NR [1,2,3,4]
Glossy black-cockatoo (*Calyptorhynchus lathami*)	Vulnerable [a]	Billinudgel NR [1,2,4]

Swift parrot (*Lathamus discolor*)	Vulnerable [a]	Ocean Shores [2,4]
Eastern grass owl (*Tyto capensis*)	Vulnerable [a]	Billinudgel NR [2,4]
Masked owl (*Tyto novaehollandiae*)	Vulnerable [a]	Billinudgel NR [1,2,4]
Regent honeyeater (*Xanthomyza phrygia*)	Endangered [a]	Billinudgel NR [1,2,4]
White-eared monarch (*Monarcha leucotis*)	Vulnerable [a]	Billinudgel NR [1,2,3,4]
Barred cuckoo-shrike (*Coracina lineata*)	Vulnerable [a]	Billinudgel NR [1,2,3,4]

Conservation status: a = *Threatened Species Conservation Act* 1995; b = *Environment Protection and Biodiversity Conservation Act* 1999.

Record sources: 1 = NSW NPWS Wildlife Atlas; 2 = CONOS, 1995; 3 = Opit 1997;

4 = BSC 1999.

2.15 Evidence of adverse impact on birdlife in Performance Reports

Evidence of adverse impacts on birdlife can be found in the monitoring reports, which is not discussed or is ignored in favour of the statistically non-significant results of complex and to the average person completely unintelligible, multivariate analysis of grouped data. Examples of adverse impact on birdlife drawn from the Performance Reports are given below (this is just a selection).

Performance Report – Ecology No. 1 (2013-2014)

The first monitoring report provides a table of recorded impacts on p. 173, as follows:

"Comparison of the environmental impacts and performance of the project against environmental impacts and performance of the project predicted in the Environmental Assessment (Fitzgerald 2010).

Table 11. Impact predictions and performance (extract)

Predicted Impact	Performance
Road construction, upgrading and use will produce barrier effects and roadkill risks for particular terrestrial fauna,	Road kill reported on internal roads included: Eastern Brown Snake (n=1) Yellow-faced Whipsnake (n=1) Bandy-bandy (n=1)
Disruption of flying-fox foraging patterns	Flying-fox attendance at blossom crops (e.g. Forest Red Gum) and fruiting trees (Camphor Laurel) was investigated before and during the SITG 2013 event, but no flying-foxes were observed within event areas on 2 event nights. Observations during the Falls Festival confirmed the validity of this prediction.
	Inappropriate illumination of food trees occurred and revealed a similar pattern of alienation of the illuminated forage resource (blossoms of Pink Bloodwood) to that observed in studies of the New Brighton Sportsfield lights (Fitzgerald 2010 & 2012). Flying-foxes avoided brightly illuminated blossom but exploited this resource soon after lights were switched off, and in the interior of less brightly illuminated trees at variable distances from light towers.
High levels of human presence on the site with associated lighting and noise are likely to disturb shy fauna species.	Undetermined, but likely to have operated at some scale Bandicoots do not occur in the hair funnel sample after June and reoccurred sparsely (1 record) in later sampling, but it is unclear whether event processes were involved.
Artificial lighting has the capacity to trap and kill invertebrate fauna	Not observed. Areas around light towers were inspected, but no insect kill was recorded

Scavenging bird species may increase in abundance through exploitation of food scraps,	Large numbers of Straw-necked Ibis foraged in disturbed soil in the parking and event areas following SITG 13. ***(How did this affect bird counts?)*** Similar behaviour was not observed after Falls Festival but substrate was very much drier.: See Appendix A.
Time between events (up to several months) will allow time both for recovery and for 'normal' ecological functions to occur at the Parklands site	Inaccurate prediction for this reporting period. Disturbance from construction of extensive sub-surface drainage,aeration of topsoil, roading, and importation of fill produced a near-continuous diurnal disturbance regime from ~ March to August 2013.
Mobile species such as Swamp Wallabies will leave the vicinity	Sustained disturbance from operation of machinery over months before and during events is likely to have affected fauna, but observations of Swamp Wallabies or evidence of their presence (e.*g.* scats, pads) have been scarce throughout EIM.
Masked Plovers, White-faced and Pacific Herons, Ibis and Egrets of the pasture habitats will likely leave the car parking, event and camping areas in response to increasing human presence	Largely correct However White-necked (previously Pacific) Herons were observed regularly, attending excavators operating in the northern pasture, to feed on invertebrates disturbed by soil excavation. All bird species mentioned were noted to be absent from event areas during the event, but returned soon after. Large numbers of Straw-necked Ibis (~200+) attended by a group of Whistling Kites (8) foraged over the disturbed soil of the camping areas for several days after the SITG 13 event.
Alienation of habitats may operate for frugivorous and nectivorous birds, wherever human presence, vehicle movements or amplified music produce disturbance effects'	Lower than average numbers of birds in two transects close to disturbance processes were observed in each event monitoring period. However, numbers of nectivorous birds were highest at the transect nearest to stages (IM1B) during the SITG 13 sampling. See discussion of EIM results in Appendix A.

<u>Performance Report – Ecology No. 1 (2013-2014) continued</u>

p. 165 . "Analysis of trophic guilds indicated that bird numbers appeared to track resource abundance at both Control and Impact sites. For example the abundance of fruiting Camphor Laurels in 3 of 4 Impact sites was likely to have been responsible for increased frugivore numbers recorded at these sites during the July SITG 13 event monitoring." ***Comment: Common species dominate most trophic guilds as well as whole bird assemblages. The analysis does not address uncommon or low frequency species that make up the great bulk of the avian fauna.***

p. 172. Dam birds "Lowest counts were associated with 2 observations during SITG 13 when people were observed swimming in the dam; the low counts were probably caused by this disturbance."

p. 182. “Overall, the data provided a clear signal of both seasonal variation and resource availability shaping the use and occupation of the site by fauna species during the study periods. In fact, the signals from resource pulses associated with flowering events, and increase in insect activity with warm weather, were overwhelmingly the strongest influences detected. It could be argued that the alignment of these natural pulse ‘events’ with the Festivals masked some of the potential to detect impacts. However, closer scrutiny of the data available, for example partitioning species into trophic guilds to explore patterns of avian activity, showed no discernible trends related to measurable impacts.” ***Comment: Trophic guilds represent grouped species data. Generally there are abundant and rare species. Grouped data conceal what is happening to infrequent species because of the much greater abundance of common species.***

Performance Report – Ecology No. 2 (2014)

- SITG 2014 ordination diagram (p. 16) shows Before, During and After monitoring sites are generally grouped in a separate space. ***Comment – this infers that music festival events are influencing the composition of bird communities.***
- Relative abundance of most frequently recorded species in Table 2, p. 12. ***Comment – Indicates dominance of bird communities by common generalist species.***

Performance Report – Ecology No. 3 (2014-2015)

- Table 1, p.9 shows granivores and insectivores greatly reduced after Falls 2014-2015; frugivores slightly reduced; carnivores slightly increased **(*Comment – reductions consistent with adverse event impact; increased carnivores picking off disoriented individuals?)***
- Ordination diagram Fig 2, p. 11 shows that high Impact Sites 3A and 3B are separated from low impact sites 2A and 2B, and that 2A and 2B are nested closer to the control sites. ***Comment – consistent with an event impact and the low impact position of IM2A and IM2B on the southern side of Jones Road ridge away from the event area (see map in Appendix below). Why weren’t these sites supposedly to monitor impacts in Billinudgel Nature Reserved placed along Jones Road in the Marshalls Ridge Wildlife Corridor next to the festival site?***
- Dam birds – counts: 59 Before, 28 During, 18 After (Table 6, p. 15). ***Comment – consistent with an adverse event impact***
- Outlier – C2B-tb (‘tb’ = total before) higher than average; Outlier – IM2A-tb (‘tb’ = total before) lower than average. ***Comment – consistent with an adverse event impact***
- Table 1 and Table 7 bird guild counts. Numbers lower after events than before events. ***Comment – consistent with an adverse event impact.***
- p.17 “Lower than average species counts at transect IM3B…..transect most exposed to event influences and bird counts may reflect adverse influences of noise and close human presence during events….A 50% lower than average count of insectivorous birds. ***Comment – consistent with an adverse event impact. The ecologist states that the 50% lower than average insectivorous birds <u>accounts</u> for the lower than average bird counts – doesn’t he mean reflects?***

Performance Report – Ecology No. 4 (2015-2016)

- Table 9 – Birds counts fell substantially between Before and After. Bird ‘Count Range’ and ‘Total Birds’ also fell. ***Comment – consistent with an adverse event impact.***
- Figure 4 Ordination Diagram – results for the Before, During and After monitoring events (represented by the symbols) are separated in the ordination diagram. ***Comment – consistent with an adverse event impact.***

Performance Report – Ecology No. 5 (2016-2017)

- Figure 4 & 5, p. 18. After sites are separate from Before and During sites. ***Comment – consistent with an adverse event impact. Report no. 5 was the first one where data were transformed before being analysed even though this is standard practice with highly skewed community data. What does the ordination of untransformed data (as in previous annual monitoring reports) look like?***
- Table 12, p.27. Decline in bird counts occurs across Before-During-After data. ***Comment – consistent with an adverse event impact. As in other reports, this is pooled data so indicates an adverse impact more than 2km from the event site.***
- Figures 8 & 9, p. 29. The ordination diagrams clearly show After sites separate from During and Before; also evident in the merged data Fig 11. ***Comment – consistent with an adverse event impact and extending out to more than 2km****.*
- ***Note – statistical significance test meaningless because of high likelihood of Type II error. This comment applies to all the monitoring reports.***
- Only an average of 10 species recorded at Impact Site IM3B (p. 33) ***Comment: One of only two true impact sites, indicating the inherently low species richness habitat it provides. Most of these species are probably common, opportunistic and disturbance tolerant species (raw data not provided)****.*

3 Summary

Here is a summary of the issues:

1. No peer or expert review of the ecological monitoring program was required or sought during the design phase. A number of weaknesses entered into the program that could have been avoided with expert assistance.

2. Key Performance Indicators were required by the original Consent Condition C20(c) but were never implemented.

3. Pre-construction impacts were not assessed as required by Statement of Commitment B6, which formed part of the Concept Approval. That period of time was critical for the monitoring program because initial impact on species is especially important to identify. It is highly likely that the construction had adverse impacts on the biodiversity in the area and that it conditioned fauna to higher levels of disturbance, which would have then affected later observations.

4. Left unassessed were these noted changes to the site: excavations in pastures, soil stock piling, deployment of mobile phone towers, extensive soil hardening in parking areas, removal of trees to install a water tank, landuse conflicts affecting plantings, and delay in protecting the SEPP14 Wetlands. All would have had predictable impacts on the site's biodiversity.

5. Two of the four designated impact sites were at low-impact locations, well away from the event area itself, so essentially there were only 2 impact sites and 8 control (low-impact) sites. This distorted the data, leading to no-adverse-impact conclusions that cannot be justified.

6. The number and location of monitoring sites was changed after Year 1, undermining the consistency needed for meaningful assessment of impacts.

6. Bird monitoring was not done in forested, hill slope areas, including the Wildlife Corridor, which are the main areas of bird diversity on the site and among the areas specifically targeted for monitoring by the consent conditions.

7. The design of the program was flawed. Biased sampling, a low number of impact sites, and high variance all made data analysis susceptible to Type II error: a false conclusion that no adverse impacts had occurred.

8. Baseline data were never collected, as had been required by Statement of Commitment B6, which formed part of the Concept Plan approval, and Consent Condition C20.

9. Raw data from the montoring were not made available for independent assessment of results and conclusions, despite requests for the data to be shared, which is common among scientists.

10. Data analysis focused on birds as a whole, which resulted in common and opportunistic species dominating the counts. The uncommon, possibly threatened species, got lost in the shuffle.

11. Data from Control and Impact sites were lumped together instead of being compared directly against one another, which undermined the very purpose of the monitoring program.

12. Quantitative evidence of negative impacts on birds that was clearly evident in the reported results was not discussed in the reports.

13. The program did not use the right statistical analysis for the type of data that had been collected.

14. The design of the Event Impact Monitoring was Before-After Control-Impact (BACI) does not include a During component, which was especially important for this monitoring situation.

15. The Before and After monitoring times varied from about 3 months to 7 months, introducing inconsistency.

16. In this monitoring program, the data had a high amount of variability, and the number of sampling sites was small. That combination often leads to Type II errors (ie. concluding no significant difference when a difference actually exists). In this case, the same conclusion was drawn repeatedly: "no adverse impacts", and in each case, the conclusion had a high risk of being false.

17. The statistical tests used on the data, in each data analysis, did not report tests of the assumptions on which the tests are based. When the assumptions are violated, the results must be considered invalid.

18. The data of most importance here involved uncommon species, yet those species were lumped together with common species for data analysis. That made it impossible, to assess impacts on the overall avifauna. In fact, the Performance Reports always state that no adverse effects were detected on fauna *groups*, not fauna *species* even though it is the species, especially threatened species, that are of most interest.

19. The monitoring program provides no information about potential impacts on stress levels and breeding behaviour in birds or other fauna although indirect evidence suggests that such impacts were at work.

20. The reports claim that no impacts on insects were observed although it is not clear if any concerted attempt at monitoring for such impacts was made, especially during the initial introduction of bright lights, which other research shows has by far the most significant impact.

21. Over five years, only 4 of 20 threatened bird species known to be in the area were recorded on the festival site and in Billinudgel Nature Reserve, so the impacts of festivals on the rest of the species are simply unknown.

22. Evidence of adverse impacts on fauna can be found in the reports, but that evidence is not discussed or is ignored in favour of no-adverse-impacts conclusions based highly equivocal statistical analysis.

Appendix 1

Performance Report Report No. 1 (Ecology Appendix)

Table 2. Event Impact Monitoring Methodology.

Fauna Group	Sampling methodology
Forest Birds	Monthly samples over three consecutive days of ten X 20minute/200m transects undertaken by three experienced observers from March 2013 to September 2013 and from December 2013 to February 2014. Sampling for the Falls Festival involved 2 transects (IM3A & 3B) not sampled for SITG 13 because of the concentration of event activity and infrastructure close to northwestern forest areas. A previously unsampled transect (IM3A) was established in Brush Box Forest north of the large dam. Transect IM3B was located in a small swamp sclerophyll forest block, not monitored for SITG 13, but for which earlier (2007-2009) bird survey data was available. Impact transects IM1A and IM1B were not sampled for the Falls Festival. Two transects at each of 3 'Control' & 2 'Impact' locations were surveyed for each event

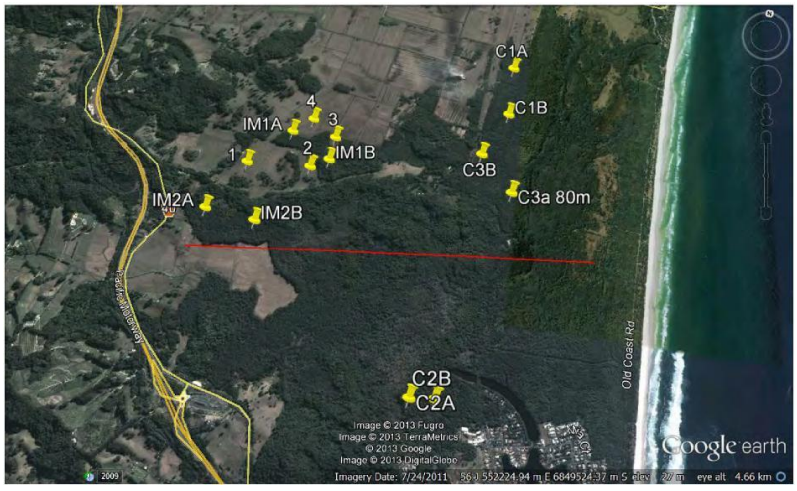


Illustration a: Event Impact Monitoring locations and stages (numbered 1-4) for SITG 13. Anabat detectors were rotated through all sites except C3. Hair Funnel sampling at C1B, C2B, C3A, IM1B and IM2A. Source GoogleEarth Scale: ~ 1: 3 500. Red Line = 3km. (p. 232 of Performance Report)

Performance Report Report No. 3 (Ecology Appendix)

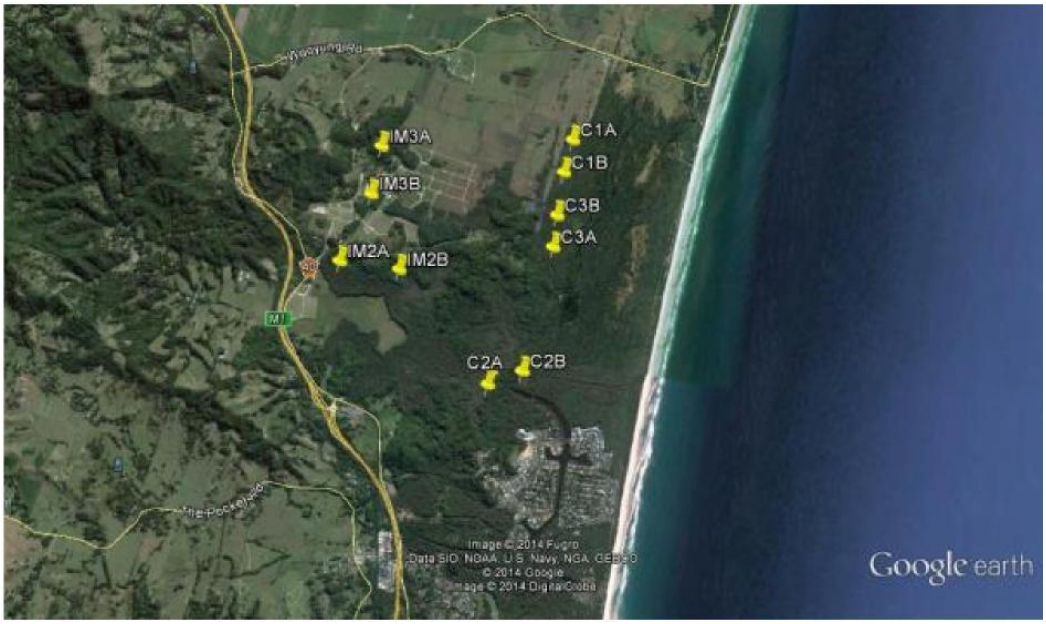
Table 1. Implementation of measures from the flora and fauna management plan

Recommended Measure	Performance
A program of monthly fauna monitoring	Event Impact Monitoring (EIM) took place in a Before-During-After pattern for each event. Monitoring samples for Falls were undertaken in December, early and late January. Due to flash flooding and other logistics only 20 during sitesamples were acquired for birds (*vs.* usual *n* = 30). Monitoring samples for SITG 2015 were undertaken in June, July and August 2015.

Table 2. Event Impact Monitoring Methodology

Fauna Group	Sampling methodology
Forest Birds	Monthly samples over three consecutive days of ten X 20minute/200m transects usually undertaken by three experienced observers from November 2014 to August 2015. Due to logistic problems, sampling for the Falls Festival involved 2 observers for the 'during' phase and the 'during' sample, which was also disrupted by flash flooding.
Forest Birds	Birds are being monitored at two sites in established *(~8* year old) native plantings in the Marshall's Ridges area.

Figure 1: EIM bird and Hair Funnel transects **-** IM are Impact transects; C are Control transe



Appendix 2:

I also wish to include the objections myself and Dave Scotts raised to the proposed approval of the cultural events site at the PAC in Byron Bay in 2012 that address issues additional to those discussed above and which are pertinent to the current proposal. I request that the DPE consider this information (herein Appendix 2) in deciding the current proposal.

31/1/2012

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Submission to the Planning and Assessment Commission (PAC) at Byron Bay on the proposed Yelgun Cultural Events Site

Personnel Background

My name is Andrew Benwell, I have PhD is ecology from the University of New England. I operate an ecological consultancy business and I have done several surveys and reports on the Yelgun area for the National Parks and Wildlife Service and other clients over the last 20 years.

Points of Objection to the DPI's recommendation to approve the Yelgun 'Cultural Events' Site **(DPI November 2011)**

(DPI 2011 - Major Projects Assessment: Cultural Events Site at Tweed Valley Way and Jones Road, Yelgun. Environmental Assessment Report Section 75I of the EP&A Act 1979)

Objections:

1 DPI has not given proper consideration to the high conservation value of the Yelgun/Marshall's Ridge area.

The proposed festival site and adjoining land supports more than 20 threatened fauna species, 7 threatened flora species, 4 Endangered Ecological Communities and a regional wildlife corridor.

The high conservation value of the land is clearly demonstrated by the LEP zoning, current land-use, conservation planning policies and numerous flora and fauna studies. For example:-

- The majority of the Yelgun/Marshalls Ridge area is occupied by Billinudgel Nature Reserve and the proposed festival site land has approximately 3km of common boundary with the nature reserve;
- A substantial part of the proposed festival site is zoned 7(k) habitat protection and most of the remainder has cross-hatched or hatched 'buffer' zoning under the Byron Shire LEP. This was put in place after the Cleland inquiry (1997) to provide buffer protection to the nature reserve and places restrictions on development activity and land-use - see the LEP;
- The festival site adjoins SEPP 14 wetland and the SEPP 14 wetland boundary extends within the festival site boundary in places at Yelgun Flat;

- The Yelgun/Marshalls Ridge area is located within the "Billinudgel Range Regional Conservation Priority Area" (OEH 2010), a long-term planning initiative of the National Parks and Wildlife Service (EPA) endorsed by the DPI.

- The Yelgun/Marshalls Ridge area is part of a regional wildlife corridor, which is documented in OEH, BSC and CMA conservation planning strategies and policies;

- The Byron Shire Conservation Strategy (BSC 1999) identifies all blocks of forest on the proposed festival site as having High Conservation Value.

- The festival site is subject to the CMA Northern Rivers Catchment Action Plan - Biodiversity Management Targets (see Reply to Submissions, Section 7).

The DPI has failed to weigh up the environmental impact of the mega music festival site proposal in the context of the Yelgun localities' high conservation value and current land-use which is directed primarily at nature conservation. The DPI would sacrifice these values for economic development in the form of festival tourism, which may quite well be short-lived (see Sydney Morning Herald 31/7/2011 and 23/12/2011).

2 Music festival tourism is not an ecologically benign activity

There is a large body of research on the behavioural and ecological effects on wildlife of mass human presence, noise and artificial night lighting. In a review of this field of research, David Scotts and myself discussed more than 70 studies from peer reviewed journals indicating the adverse impacts of increased human presence, loud noise and artificial night lighting on wildlife (Benwell and Scotts 2009).

The project Ecological Assessment (Appendix E) and the proponents Reply to Submissions Report made little effort to consult the scientific literature on wildlife response to human disturbance and overseas research on this topic was dismissed as irrelevant, as it was not carried out in Australia. It is reasonable to assume that wildlife will exhibit similar ranges and patterns of response to human presence and associated disturbance in Australia as in other continents, and this is borne out by research conducted in Australia so far.

Appendix E (Ecological Assessment) states that the impact of music festival events on wildlife cannot be predicted, as there is a lack of information and few precedents for this type of activity (within a high conservation value area). At the same time, the ecologist states that it is likely wildlife will be frightened away, desert territory and may abandon their nests (see Section 6.2.3 p. 648/41 to 652/45). The ecologist appears to be saying in 7-part test assessments in the EA that there will be negative impacts on threatened species, but we don't know how bad they will be and since no definitive adverse impact is established, the activity cannot be rejected as ecologically damaging. The ecologist prefers to think that fauna will be temporarily displaced and then return to the festival site after a brief sojourn in the Billinudgel Nature Reserve. This is inconsistent with the fact that most Australian birds are territorial and defend their territories vigorously from individuals of the same species

The DPI recommends monitoring to study response of fauna to festival events, which amounts to recommending that the festival site be used for a large-scale ecological experiment. If the purpose of an area is for protection of biodiversity and threatened species, is it appropriate to allow these species to be exposed to a variety of different stresses to see if they persist or not? Is it ethically acceptable to use a high conservation value area to study the effects of human disturbance on wildlife?

The Ecological Assessment (Appendix E) generally concludes that the impacts of the festival site on biodiversity and threatened fauna species cannot be predicted. This is hardly a basis for the DPI to conclude that the area would be ecologically sustainable if large scale permanent festival tourism was allowed. In fact there is much evidence to indicate that a permanent music festival site will significantly disrupt and degrade local fauna biodiversity.

3 Approval of a large scale festival tourism site at Yelgun is inconsistent with previous planning inquiries, current land-use zonings and conservation planning policies.

Approval of the Yelgun cultural events site would over-turn all these measures put in place to over the last 20 years that promote nature conservation and compatible land-use at this locality.

The music festival site proposal is a large scale development that is fundamentally incompatible with existing land-use in the Yelgun/Marshalls Ridge area, which is concerned primarily with nature conservation - ie Billinudgel NR, regional wildlife corridor, 7k habitat zones, SEPP 14 wetland and Billinudgel Range Regional Conservation Priority Area (OEH 2010).

The proponent is intending to develop a mega festival site within a regional wildlife corridor, adjoining a Nature Reserve along much of its boundary, next to SEPP 14 wetland and in an area rich in threatened fauna species.

The Byron Biodiversity Conservation Strategy (BSC 1999), the Cleland Inquiry (1997) and numerous conservation planning policies were put in place in the last 15 years, clearly identify the major conservation values of the subject locality to preserve the areas conservation value. For example:-

- Northern Rivers Biodiversity Management Plan (OEH 2010)
- Draft North Coast Regional Conservation Plan (OEH & DPI 2009)
- Climate Change Corridors (OEH 2009)
- Byron Shire Biodiversity Conservation Strategy (BSC 2004)
- NPWS Key Habitat and Wildlife Corridors (OEH 2003)
- Australian Heritage Commission Registrar of National Estate 'Natural and Cultural Heritage Place - Indicative listing)

The Northern Rivers Catchment Management Authority found that the Yelgun festival site proposal is inconsistent with the Northern Rivers Catchment Action Plan.

"The Northern Rivers Catchment Management Authority (NRCMA) considers that the location of the events site between and adjacent to the Billinudgel Nature Reserve and the regionally significant Marshalls Ridge Wildlife Corridor is inappropriate and would degrade the existing corridor. We feel that the regular impact of noise and people within the corridor and adjacent to the reserve would be detrimental to the animals that the Nature Reserve has been set up to protect and that it will negatively affect the use of the corridor by much of the native wildlife..... due to the nature of the events proposed for the site in terms of music volume, frequency of events and numbers of people attending the events, the buffer zones to SEPP wetlands, Nature Reserve and corridors of significance should be a lot greater than listed (p92) but this should not be to the detriment of the wildlife corridor" (proponents Reply to Submissions and Preferred Project Report, p. 91)

4 The monitoring program supposed to detect risks to wildlife has fundamental flaws

One of the key mitigation measures proposed by DPI to lessen the risk to the areas conservation and biodiversity values is monitoring and management response through the Regulatory Working Group. This mitigation measure lacks rigour to the point where it is little more than window dressing.

Appendix F of Appendix E (the Ecological Assessment) states:

"The operation of the North Byron Parklands as a cultural events site introduces unprecedented activities and a novel episodic disturbance regime to a pastoral and forested landscape adjoining Billinudgel NR. Predictions of the ecological impact are unavoidably speculative. Evidence from monitoring is considered essential to produce appropriate management of ecological impacts" (p. 823). On this basis, the DPI Draft Conditions of Approval H17 proposes to turn the festival site into a large-scale ecological experiment to study the effects of human disturbance (human congregation, noise, lighting etc) on wildlife. Apart from the issue of whether management response would actually be effective in addressing detected impacts, is it ethical or sound planning to expose an identified high conservation value area (i.e. the Billinudgel Nature Reserve and the festival site itself) to such development pressures, especially when it contradicts existing zoning protection and the area is known to be of high conservation value?

Draft Conditions of Approval H17 regarding fauna monitoring and the design of the fauna monitoring program outlined in Appendix F have many flaws and weaknesses. For example:

a) The DPIs draft Condition of Consent regarding fauna monitoring (H17) provides only general guidelines for the design of the ecological monitoring program. The details of the monitoring program are left up to the proponent, to be prepared in consultation with the Regulatory Working Group and approved by DPI.

However, the Regulatory Working Group appears to have no relevant expertise to oversee design of the ecological monitoring program.

b) The proponent's monitoring proposal makes it clear that natural variability in fauna numbers and limited baseline data will make it difficult for monitoring to establish the actual effects of festival events on species (see Appendix F of Appendix E, Sections 1.2 & 1.3). The writer has conducted extensive monitoring of threatened species for many years (mainly plant species) and has an in depth appreciation of this research limitation. Without a very large monitoring and data collection effort, the only species that will reveal statistically significant data trends will be the common species like Noisy Minors and Magpies. These species are undoubtedly of interest, but the species we are really concerned about are threatened species and they will be recorded at too low frequency to allow for detection of important effects and trends, because it is impossible to get statistically significant results with low frequency data (ie small positive samples). The currently low numbers of many species suggest not only that proper analysis will be impossible but also that introducing massive disturbances and then "monitoring" and "analysing" the results is indefensibly reckless. The tactic should be protect and restore, not disturb and monitor.

c) Appendix F of Appendix E clearly describes the problem of natural variability in fauna abundance as follows:-"The number of fauna species and individuals present and the seasonal availability of important ecological resources (*e.g.* rainfall, blossoms and fruit) have been observed to vary considerably during the previous four years at the Parklands site. Threatened fauna species recorded from the Parklands site also exhibit substantial variation in patterns of presence, absence and abundance" (p. 9). Prior to the start of events, the draft Condition of Approval H17 requires that monitoring only be undertaken a minimum of once, 1-2 months before the event, while Appendix F proposes to collect a 3 day sample each month for a year before the first event (see p. 824).

d) The monitoring program does not take into account pre-event disturbance, including the upgrade of Jones Road, construction of the cut-and-cover tunnel through Marshall Ridge and excavating and filling of Yelgun Flat. Pre-event disturbance would invalidate any assumption that pre-event monitoring records the normal pre-disturbance abundance of fauna (Appendix F, p. 824). Valid baseline data on fauna abundances would require data collection before the start of site infrastructure construction, as well as before festival events (i.e. for at least two years).

e) The DPIs draft Conditions of Approval require targeted monitoring of only one threatened fauna species - the Eastern Grass Owl. This is despite the high conservation value of the area, the high number of threatened species and the potential impact on Billinudgel Nature Reserve. What of impacts on the many other threatened species know to occur in the cultural events site? Appendix F also does not propose specific monitoring of threatened fauna species; the great majority of the data collected will be for common birds and bats

f) No monitoring is required of frogs, reptiles, insects and terrestrial mammals, in other works there will be no monitoring information on most of the local biodiversity.

g) No monitoring of disturbance impacts on wildlife is proposed in adjoining parts of Billinudgel Nature Reserve, which shares 3 kms of common boundary with the festival site. This is inconsistent with the DPIs assessment report which acknowledges the potential impacts of human congregation, noise and lighting on the Nature Reserve.

h) How will management respond if a significant negative impacts is detected? Appendix F suggests the response will be more monitoring, to clarify cause and effect, particular disturbance type, timing and location of impact (see Section 1.5.5). The DPIs draft Conditions of Approval make no provision for decreasing the intensity of festival events, only increasing their intensity.

In summary The DPI summary report and draft CoA H17 proposed to use a high conservation value area to conduct a large-scale experiment on the ecological impact of human disturbance on wildlife, despite its protective zoning under the LEP and the large body of existing research on effects of human disturbance on wildlife indicating that the proposed development has the potential to significantly modify and degrade the biodiversity of the locality.

Ensuring independent and rigorous scientific evaluation of the ecological impact of each event will be complex and difficult, not to mention expensive. The subject site is too important to allow it to be used as an experimental monitoring area like 'scientific whaling', to determine the tolerances of threatened fauna species to levels of human activity and disturbance.

5 Other Inadequate Mitigation Measures

As well as the fauna monitoring proposal, these measures also provide effective mitigation for ecological impacts of the mega festival site:-

Maximising inter-event period

DPI has recommended 3 major events per year in the first year with provision to increase the frequency and size of events. The proponents Reply to Submissions Report states "In the first 5 years of operation at Parklands non event time or 'down time' will overwhelmingly predominate at the site (>80% of any year, including consideration of bump-in and bump-out periods). This should enable event areas to be re-occupied if shy fauna avoid them during periods of high human presence." (Comment 2.5). This does not appear to be correct, as from the information provided there would be 94 activity days in the first year (10 event days + 21 x 3 bump-in + 7 x 3 bump-out). The 80% figure also greatly under-estimates the period of no human activity in the first year, as there will be major construction activity for much of the year - cut and cover tunnel through Marshalls Ridge, building, fencing and large scale excavation and filling of carparks.

Land swaps with NPWS

The National Parks and Wildlife Service has apparently committed to undertaking land swaps with the proponent NBSP. However, the primary purpose of land swaps for the proponent is to secure parcels of land owned by NPWS at Yelgun Flat that are important for operation of the festival site, because they provide essential access points. Is this a mitigation measure?

Tree planting in the wildlife corridor

The planting 6 hectares of trees in the wildlife corridor is hardly going to compensate for the ecological impact on the Yelgun/Marshalls area of invasions of 30,000, 25,000 and 20,000 people in the first year, building up to 50,000 per event in year 4 (plus unlimited small events).

Wetland construction next to Billinudgel NR

The "constructed wetlands" referred to by DPI is an addition to the festival proposal apparently made after submissions closed and refers to land on Yelgun Flat to be excavated as a source of fill to construct the festival site's southern carpark. The implications for the Nature Reserve and SEPP 14 wetland don't appear to have been considered and excavation would be within the 50m buffer normally required for SEPP 14 wetland.

The southern carpark is to built next to the constructed wetland (using the excavated material) and SEPP 14 wetland at Yelgun Flat. The proponent has not demonstrated how sediment/pollutants will be prevented from entering the wetlands. What happens when it rains and cars and people churn up the poorly drained heavy clay soil?

Use of sodium vapour night lighting

Appendix L under "Lighting principles" p. 1039, states that "low pressure sodium vapour lights will be used which do not attract insects and bats". This is untrue. Eisenbeis (2006) in Longcore and Rich (2006, p. 290) states that sodium vapour lights result in a reduced kill rate. For example, in one study quoted in the latter book, use of sodium vapour lights reduced 44,000 insects caught in white mercury light traps to 22,000. Therefore, de-population of the nocturnal insect fauna continues to its ultimate end point, but at a slower rate. They also noted that some moth families and genera were more attracted to sodium vapour lights than white mercury lights.

Measures such as locating lighting in the open away from trees and pointing floodlights downward will still attract insects, as light sources will be visible laterally, forest surrounds the festival event area on three sides a short distance away (only 10 meters buffer required by DPI, although OEH recommended 75 meters) , the forest understorey will be illuminated and the southern carpark area will also most likely have large generator operated lighting units.

Several other measures relating to mitigation of the effects of artificial night lighting are proposed as "Standard parameters" (EA p. 19/626) as listed in the Environmental Health and Safety Management (EH&SM) Manual. They are also referred to as "Key Performance Indicators" by the DPI, although the words "Key Performance Indicators" do not appear in the EH&SM Manual. These measures appear to be more like simple mitigation measures than Standard Parameters or Key Performance Indicators. Whatever the case may be, they are likely to have little effect on mass killing of nocturnal insects. The writer observed the effect of artificial night lighting over two nights at the inaugural Blues Festival at Tyagarah next to Tyagarah Nature Reserve and vast numbers of insects were observed trapped at lights and dying on the ground, many at lights directed downwards or shaded. The devastating effect of artificial night lighting on nocturnal insect biota is one of the worst potential impacts of mega music festivals, which is why they should not be held next to nature reserves and on high conservation value lands.

Directing noise away from bushland area

How much can noise be directed away from bushland areas? At Yelgun, the festival area north of Jones Road is surrounded by low forested hills on three sides. Noise is pervasive, it cannot be directed like water in a hose. From my own experience of music festivals there is little capacity to reduce noise levels by directing sound away from bushland, especially when there are multiple stages operating.

The proponent states that the site is ideally situated from a noise abatement perspective as the ridge to the south (Marshalls Ridge/Jones Road) will cut off noise from urban areas to the south and the Nature Reserve. The Nature Reserve is apparently to function as a noise barrier. However, the noise study should have made it clear that a source of noise located in a basin surrounded by hills will be amplified in the surrounding hills (ie. the Nature Reserve). Anyone who has stood on a hill above a busy highway will know how incredibly noisy it can be, even at a considerable distance from the source of noise. The noise study makes little or no reference to possible noise impacts on wildlife in and adjoining festival site.

6 Impact on Threatened Fauna Species

DPI states that 11 threatened fauna species have been recorded on the festival site and another 21 species are potentially present on the site (see Section 5.4.1, p. 53). Most if not all of the 21 species have been recorded within a kilometer of the site and almost certainly utilise habitats on the site from time to time. Several of these species have actually been recorded on the site by other naturalists and ecologists, but were not considered as on-site species (e.g. Glossy Black Cockatoo, Bush Hen and Black Bittern, B. Oehlman pers. comm.). This is important as the assessment gives the impression that threatened fauna diversity is significantly lower than it actually is. In fact thirty-two (32) threatened species of threatened fauna are known or can reasonably be expected to occur on the site, not 11.

The EA states that no surveys were conducted in the southern (Yelgun Flat) part of the site, which is justified on the grounds that the festival activities are to be held in the north of the site. This is despite the fact that a very large car parking area is to be established in the south of the site with associated excavation and filling. The ecologist notes that the Square-tailed Kite was recorded in the south of the site at Yelgun Flat in 2003 during other survey work, but this species was not included in the list of species recorded on-site. The two threatened wallum frog species recorded in Yelgun/Marshall Ridge area are likely to occur in the southern part of the site

The EA also gives the impression that pasture areas adjoining forested habitat are largely devoid of threatened species and have low biodiversity value. This is untrue as many of the threatened species recorded from the site utilise open pasture adjoining forested habitat, for example, Masked Owl, Barking Owl, Grass Owl, Bush Hen, White-eared Monarch, Planigale, Koala and micropteran bat species. Pasture with occasional trees provides an open woodland habitat which adds to the habitat diversity of the locality, providing important buffer habitat to core

habitat in the Billinudgel Nature Reserve, and this habitat is directly utilised as foraging habitat by threatened species such as those listed above.

Out of all the threatened species known or likely to occur on the festival site, the DPI in its draft Conditions of Approval has proposed specific Conditions of Approval be applied to only one species - the Eastern Grass Owl. This highly selective approach also has the effect of playing down the conservation significance of Yelgun/Marshalls Ridge area.

7 Jones Road Upgrade omitted from Ecological Assessment (Appendix E)

DPI have not assessed the removal of vegetation and hill flattening required for proposed upgrading of the first 350 meters of Jones Road. DPI only assessed the removal of vegetation required for construction of the underpass. “The underpass will require the removal of 75 existing trees, of which 34 of these are Camphor Laurels, an introduced noxious weed. A small area of lowland rainforest EEC vegetation is also required to be removed to facilitate construction of the underpass. The proponents ecological assessment notes that the removal of vegetation in this area is likely to temporarily disrupt foraging and movement patterns for a number of local fauna species such as the swamp wallaby and carpet python; involves the loss of fruit for several bird and bat species.” (p. 54).

The DPI and the Ecological Assessment only assessed the underpass and not the 350m upgrade of Jones Road, which includes many more trees, feeding trees for Glossy Black Cockatoos (B. Oehlman pers.comm.), Koala food trees and a stand of the Endangered Ecological Community 'Coastal Cypress Pine Forest' at the corner of Jones Road and Tweed Valley Way that would be impacted (removed?) by hill flattening.

8 Ecological Impact on Central Forest Blocks

The DPI states “OEH recommended a buffer distance of 75m to central forest blocks however this was not supported by the proponent and it was noted in the PPR that events could not be carried out at all should a buffer of this distance be enforced. The proponent instead proposes fauna friendly fencing around the forest blocks” (Section 5.4.3, p. 60). “the department has recommended a condition of approval requiring temporary exclusion fencing a minimum distance of 10m to the designated forest blocks”. So the Department has seen fit to reduce OEH’s recommended buffer of 75m to 10m, increasing the ecological impact of festival activities.

“OEH’s recommendation to direct speaker systems away from forested areas is also reflected in the recommended conditions of approval with a requirement to position event stages and sound equipment away from any forested where possible.” (p. 61).

This indicates the OEH considers that noise levels, artificial night lighting and human intrusion will constitute a serious disturbance to the adjoining forest.

9 The DPI has not given proper consideration to the aboriginal cultural heritage values of the proposed festival site locality.

The Yelgun-Wooyung area contains the only remaining example of a largely undeveloped, pre-European landscape with numerous secular and sacred Aboriginal sites in the coastal region between Brisbane and Ballina.

The DPI has endorsed the proposals 'Aboriginal and European Heritage Assessment' (Appendix H of the Environmental Assessment) despite obvious deficiencies in the assessment methodology. For example, reference to Appendix H, Figure 4, p. 1418 shows:

- the archaeologist did no survey work on Yelgun Flat, including the area to be excavated for fill;
- there was no archaeological survey work along the 350m section of Jones Road proposed for upgrading to bitumen two land road except at the narrow point where it is intersected by the cut-and-cover tunnel (the Spine Road);
- no archaeological work was conducted in the main festival site area in the north east of the site.

More than 40 archaeological sites are registered or to be assessed in the locality indicating that additional archaeological sites will be present in these areas.

The only archaeological excavation was a small section of the Spine Road in a disturbed and heavily used area at the rear of the old Gidday Roadhouse. Appendix H notes " The widespread incidence of European materials (plastic, metal, glass, china and ceramic shards throughout the topsoil is indicative of considerable disturbance." A significant number of small aboriginal artefacts were found, but any large artefacts would probably have been removed a long time ago. Why wasn't a less disturbed section selected?

Appendix H notes "The study area is set within a wider environment that contains an inter-related complex of traditional ceremonial, mythological and other important sacred/spiritual sites/places, camping places (shell middens and stone artefact occurrences) and resource-use places. Together, these form a cultural landscape of high and enduring socio-cultural significance. This significance extends to and includes the existing forests, which provide a tangible link with the traditional past. The known site complex is unique in the local and regional archaeological record, and is thus of high scientific/archaeological significance."(p. 1429/31).

Despite this uniqueness and the high scientific and archaeological significance, the DPI considers it appropriate that the area be excavated, filled, effectively quarried at the cut-and-cover tunnel and subjected to human disturbances that would severely impact on the natural values of the land. This assessment is highly compromised by a wish to see the land developed by establishing a large-scale festival tourism site. This assessment is seriously flawed when there are numerous other locations in the far north coast area suitable for a cultural events site but with less environmental sensitivity.

10 Key Environmental Conditions

The DPI states "It is acknowledged that the cumulative impact of events being carried out at the site in perpetuity is difficult to predict, and that continual reporting of the site's environmental performance is therefore necessary to monitor the level of impact. The department has recommended approval for one event of 30,000 patrons per calendar year in perpetuity and considers the site is able to sustain an annual event of this size without irreversible impacts upon existing threatened flora and fauna species and EECs." (p. 55).

The DPI has recommended a series of key environmental conditions (see pages 55-56) which in the writer's experience are almost exactly the same as the types of condition imposed by DPI for highway developments. The DPI appears to consider that the Yelgun festival site proposal is in the same class of development as a highway development and impacts can mitigated in much the same way, with the notable exception of any requirement for compensatory habitat or offsets. This demonstrates a failure of the DPI to recognise the level of environmental impact and the types of pressure associated with the proposed activity, when this is clearly apparent to other agencies such as OEH and the CMA. Economic development through festival tourism is their primary consideration.

Also, the above quote from the DPI assessment report gives the impression that one event of 30,000 patrons would be allowed per year, with no increase until KPIs are complied with. In fact DPI has recommended 3 major events in the first year. The KPIs are window dressing and will do little to mitigate the environmental impact of the development, as the source of impact/disturbance, ie festival events, will be allowed to operate, permanently.

11 Ecologically Sustainable Development

Allowing a development to proceed in a high conservation value area with such obvious potential to degrade those values is an abandonment of the DPIs own ecologically sustainable development (ESD) principles defined under the EP&A Act, particularly the Precautionary Principle and the Biodiversity Principle.

Wildlife Matters

David Scotts
Wildlife Ecologist

21January 2012

Submission to the NSW Planning and Assessment Commission concerning the proposed cultural events site at Yelgun

Dear Sir / Madam,

Summary: I urge you to reject the proposed cultural events site at Yelgun. I believe that the proposal contravenes the outcomes of a raft of preceding planning and assessment forums that have highlighted the need for conservation and restoration of this important location. In my opinion, and as recognised by the Department of Planning and Infrastructure's Major Project Assessment, the ecological impacts of the proposal cannot be foreseen or quantified. I believe those impacts may well be severe. I also believe that the proposed ecological monitoring regime, inte

nded to assess impacts in association with a staged ramping up of festival intensity, will be unlikely to discern the insidious, complex and cumulative impacts that are likely to be associated with the imposition of intense intermittent human disturbance pressures at this location. The conservation values of the Yelgun – Wooyung locality are too important to be compromised by a development that will provide undoubted wider economic and social benefits but could and should be sited elsewhere.

In formulating my submission I have read the following documents pertaining to this proposal:

- Department of Planning and infrastructure 2011. Major Project Assessment: Cultural Events Site at Tweed Valley Way and Jones Road, Yelgun;
- Statement of Commitments from North Byron Shire Parklands
- Draft Instrument of Approval for the Concept Plan
- Draft Instrument of Approval for the Project Application

In my opinion the proposal and the Department of Planning's assessment and approval documents fail to account for three major points of ecological concern:

1. Contradiction of previous planning and assessment recommendations

The Yelgun - Wooyung locality has been identified, through numerous planning forums, inquiries and ecological assessments, as an area of high conservation value. I believe that the approval of a cultural events site at this locality is completely at odds with previous recommendations and approaches to manage, restore and conserve these high conservation values.

The conservation values of the locality have been well documented and acknowledged with importance at local and landscape scales. Highlights

include the known occurrence of a number of threatened species and ecological continuity with Billinudgel Nature Reserve, a renowned coastal biodiversity icon. The site is also an integral component of a broader landscape unit including one of the few remaining habitat corridors in far north-east NSW extending from the coast to the hinterland and providing critical landscape connectivity at local and regional scales. The importance of these conservation values cannot be denied and should be fostered by targeted conservation efforts not compromised by an inappropriate development which should be sited in a less environmentally sensitive and ecologically important area.

2. Ecological Impacts of the proposal

I believe that the ecological impacts of intense and intermittent human disturbance of the scale proposed at Yelgun will be severe and significant. As stated in the Department of Planning and Infrastructure's assessment report, "the complex and variable disturbance regime experienced by the carrying out of events is likely to affect fauna in different ways and to varying extents of severity." I believe that the implications of these impacts cannot be foreseen and have not and cannot be adequately assessed. Further, I do not believe that the ecological mitigation procedures outlined in the Statement of Commitments from North Byron Shire Parklands and in the draft Instrument of Approval (Conditions of Approval) – stages 1 and 2 Project Application will ameliorate what are likely to be insidious, complex and cumulative impacts.

Given the difficulty in assessing and quantifying the consideration of impacts on threatened species associated with periodic intense human activity and noise it comes down to personal opinion as to whether or not these will constitute a significant impact. My personal opinion, formulated while conducting a detailed review of the effects of human intrusion and disturbance on wildlife (previously supplied to the Department of Planning and Infrastructure as part of the public consultation process (Benwell and Scotts 2010)), is that the ecological impacts will be severe and significant. The vast majority of research and monitoring carried out to investigate the impacts of human-induced noise and disturbance on biodiversity, particularly fauna, indicates detrimental outcomes, sometimes leading to local population loss and potentially leading to flow-on effects extending well beyond the actual site of consideration. These largely unknown, and possibly unknowable, impacts are unacceptable within a locality of recognised high conservation importance.

In my opinion the insidious, complex and probably cumulative ecological impacts of intense human activity of the type proposed at Yelgun (see Benwell and Scotts 2010) cannot be mitigated. Cultural festivals, especially music festivals, are loud, bright, spasmodic and intense. Their 'bump in' and 'bump out' activities are also necessarily loud and obtrusive. They should be sited in less environmentally sensitive and ecologically important areas.

3. Reliance upon a monitoring program with little chance of detecting insidious, complex and cumulative ecological impacts

As outlined above, I believe that the real ecological impacts of the proposal will be insidious, complex and most likely cumulative. Ecological monitoring is a very complicated procedure at the best of times but when the likely impacts

are of such a character real monitoring to reveal real impacts becomes next to impossible in my view. I believe that the proposed ecological monitoring regime, intended to assess impacts and provide a basis and justification for a staged ramping up of festival intensity, will be unlikely to provide adequate ecological information.

The fact that this proposal has progressed to the PAC stage leaves one to wonder how the Department of Planning and Infrastructure has applied the precautionary principle as it claims to have done. I believe that the ecological impacts of this proposal remain largely unknown, that proposed mitigation cannot hope to account for ecological impacts that have not and probably cannot be quantified and that the proposed monitoring regime will be inadequate to assess and investigate the real ecological impacts of the proposal.

I urge you to reject the proposed cultural events site at Yelgun.

Yours sincerely

David Scotts

Appendix 3:

I also wish to include this nomination to the Commonwealth Department of Environment for registration of the Wooyung National Heritage Place (National Heritage Place) under the EPBC Act (1999), which includes the North Byron Parklands property, as a place of national aboriginal heritage significance (still pending).

Australian Government
Department of Sustainability, Environment, Water, Population and Communities

National Heritage List

NOMINATION FORM

The National Heritage List is a record of places in the Australian jurisdiction that have outstanding natural, Indigenous or historic heritage values for the nation. These places they are protected by federal law under the *Environment Protection and Biodiversity Conservation Act 1999*. Nominating a place for the National Heritage List means identifying its national heritage values on this form and providing supporting evidence. If you need help in filling out this form, contact (02) 6274 2149.

Form checklist

1. **read** the *Nomination Notes* for advice and tips on answering questions in this form.
2. **add** attachments and extra papers where indicated (Note: this material will not be returned).
3. **provide** your details, sign and date the form.

Nominated place details

Q1. What is the name of the place?
Yelgun - Wooyung National Heritage Place

Q2

Give the street address, or, if remote, describe where it is in relation to the nearest town. Include its area and boundaries. Attach a map with the location and boundaries of the place clearly marked. See the Nomination Notes *for map requirements.*

Q2a. Where is the place? Address/location: The area is bounded by the Pacific Ocean to the east, the Pacific Highway to the west, Wooyung Road to the north and urban area of Ocean Shores to the south (see Figures 1-3 below).

(Note - It may be appropriate to extend the northern boundary to include the historical Wooyung Caravan Park and Wooyung Nature Reserve, which are both located directly north of Wooyung Road. The owners of the caravan park have indicated they would be very supportive of the proposal.)

Q2b. Boundary: see attached map

Q2c. Type of map you have supplied: 1:25,000 topographic map extract overlaid with boundary on the nominated National Heritage Place.

Q3.

For information on where to obtain details of who owns a place, contact your local government. See the Nomination Notes *for ideas.*

Q3a. Who owns it? Owner's name (If more than one owner, attach a list):

Office of Environment and Heritage (NPWS), 4/135 Main Street, Murwillumbah, NSW, 2484, 02 66708600

North Byron Parklands/Billinudgel Property Pty Ltd, PO Box 517, Bangalow, NSW, 2479, 02 9475 5046

Wooyung Properties, Wooyung Road, Wooyung, NSW, 2483

Greenfields Mountain Pty Ltd, 1 Jacaranda Close, Fitzgibbon Queensland 4304

Klepp-Curry, Jones Road, Yelgun, NSW, 2483, 02 6680 5211

Scanlon, Jones Road. Yelgun, NSW, 2483, 02 6680 1276

Opit-Daoud, Jones Road. Yelgun, NSW, 2483, 02 6680 5466

Artup, Jones Road, Yelgun, NSW, 2483, 02 6680 4183

Possible owners

Richards Landscaping, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1307

Boerman, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1??

Foyster, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1236

Cole, 21 Tweed Valley Way, Crabbes Creek, NSW, 2483, 02 6677 1617

(Note - This list may not exhaustive; I have checked the proposed boundary but may have overlooked one or two properties.)

State: Postcode:

Telephone: Fax: Email:

Q3b. Is the owner(s) aware of the nomination?

NO ☐ YES ☐ SOME ARE Yes ☐ (Please list):

Q4. Who has an interest in the place? This could include the property's manager, local environment or historical groups, local council, Indigenous people and developers or industry groups. Please provide names and contact details.

Byron Shire Council, PO Box 219, Mullumbimby NSW 2482, 02 6626 7000

Tweed Shire Council, PO Box 816, Murwillumbah NSW 2484, 02 6670 2400

Office of Environment and Heritage (NPWS), 4/135 Main Street, Murwillumbah, NSW, 2484, 02 66708600

Tweed-Byron Local Aboriginal Lands Council, P.O. BOX 6967, Tweed Heads South, NSW, 2486, 07 5536 1763

Bundjalung Elders Aboriginal Corporation, 2/2 Little Street, Casino NSW 2470

Arakwal Aboriginal Corporation, Yvonne Stewart, PO Box 127, Byron Bay NSW 2481

Bundjalung Nation Aboriginal Cultural Heritage Natural Resource Environment Management Committee Aboriginal Corporation, 16 Gumtree Drive, Goonellabah NSW 2480

Byron Environment Centre, PO Box 782, Byron Bay, NSW, 2481 6684 2272

North Byron Parklands, PO Box 517, Bangalow, NSW, 2479, 02 9475 5046

Wooyung Properties, Wooyung Road, Wooyung, NSW, 2483

Greenfields Mountain Pty Ltd, 1 Jacaranda Close, Fitzgibbon Queensland 4304

Conservation of North Ocean Shores Inc., PO Box 828, Billinudgel. NSW, 2483, 02 6680 1276

BEACON, Byron Bay, NSW, 2481 02 668

Klepp-Curry, Jones Road, Yelgun, NSW, 2483, 02 6680 5211

Scanlon, Jones Road. Yelgun, NSW, 2483, 02 6680 1276

Opit-Daoud, Jones Road. Yelgun, NSW, 2483, 02 6680 5466

Artup, Jones Road, Yelgun, NSW, 2483, 02 6680 4183

Wooyung Caravan Park, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1300

Northern Rivers Catchment Management Authority, PO Box 678, Murwillumbah NSW 2484, 02 6676 7390

<u>Possibly interested</u>

Richards Landscaping, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1307

Boerman, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1??

Foyster, Wooyung Road, Wooyung, NSW, 2483, 02 6677 1236

Cole, 21 Tweed Valley Way, Crabbes Creek, NSW, 2483, 02 6677 1617

(Note - This may not be an exhaustive list)

About the importance of the place

Q5. What is its significance? How would you tell people that this place has great importance to Australia? For example, why does this place, unlike other similar places, best highlight an outstanding aspect of Australia's heritage?

This place contains the only surviving example of a largely undeveloped, pre-European landscape with numerous secular and sacred Aboriginal archaeological sites, underpinned by high productivity ecosystems, in the coastal region of central-eastern Australia between Brisbane (Qld) and Ballina (NSW), a region of rapid population growth and development. The nominated place is of great importance to Australia as a landscape with nested natural and Aboriginal cultural heritage values (McIntyre-Tamwoy 2008) still existing in a largely intact state. The natural environment of the nominated place is an extensive area of productive, lowland ecosystems, which elsewhere in this region have been converted to agriculture, or become highly fragmented or urbanised. The high density and diversity of Aboriginal archaeological sites recorded in the nominated place indicates it formed a prime living space for traditional Aboriginal culture, unlike landscapes preserved in other large coastal conservation parks and reserves in this region of Australia which represent unproductive sand-heath ecosystems that were more sparsely utilised by the aborigines.

This is the last place in the region of central-eastern Australia (defined above) where one can experience important in situ Aboriginal cultural sites stretching from the beach inland to the Pacific Highway, including the last surviving double Bora Rings or Aboriginal initiation sacred site, in an original intact coastal environment. The Bora Rings represent a ceremonial culture unique to the Aboriginal people of the central-eastern Australian region (Bowdler 1999; McIntyre-Tamwoy 2008). Of the many such rings that originally occurred in this region great importance stems from the fact that they still exist within the nominated place in their natural, relatively undisturbed surroundings of beach, dunes, wallum, forest and wetlands from which these humans obtained their requirements.

The place is of central importance to the Bundjalung/Githabul, the indigenous peoples on whose land the nominated place is located, particularly in regard to the Wooyung Bora Ground. The "Three Brothers Legend" recounts how long ago Birrung with his two bothers Mamoon and Yarbirri came to the this land with their wives and children in a great canoe from an island across the sea. The three brothers made the first bora ring at Wooyung 10km North of Brunswick Heads and held the first Wandaral ceremony. The oldest brother Yarbirri, then made the laws. The brothers separated to populate the earth. Yarbirri went north, Mamoon went west and Birrung travelled south (Bundjalung Elders Council Aboriginal Corporation, undated).

The nominated place contains a rich diversity of flora and fauna including approximately 450 native plant species, 10 nationally threatened plant species (EPBC Act), an additional 5 nationally rare plant species (ROTAP - Briggs and Leigh 1995), as well as 6 nationally threatened fauna species and 2 endangered ecological communities (EPBC Act), as listed in Appendix 1. More than 50 species of flora and fauna are listed under NSW environmental legislation as threatened species (NPWS, Wildlife Atlas database).

In a wider, regional conservation context, the nominated place forms a core section of "Regional Conservation Priority Area No. 4 - Billinudgel Range", including the most easterly wildlife corridor in Australia which extends between Billinudgel NR and Mt Jerusalem NP (DECCW 2010). This corridor forms a continuous area of habitat between the hinterland ranges of the Mt Warning caldera with their World Heritage Rainforests and remaining areas of lowland coastal habitat, which are utilised by seasonal, altitudinal migrants (Gilmore *et al*. 1986; NPWS 1995). "The Billinudgel Range corridor provides significant Aboriginal cultural heritage linkages that are part of the natural landscape. These connections include movement routes, opportunities for recreation and ceremonial, spiritual and natural heritage values." (DECCW 2010, p. 59). ...As emphasised by Tony Burke MP in his address to the National Press Club on 24/8/2011: "Connections between landscapes are really important. You only get your environmental resilience by having your connections. That's what the corridors are about and the work we are doing in the corridors."

In summary, the nominated place is of major significance for its combination of natural and Aboriginal cultural heritage values, which are unique in their diversity and intactness within the coastal central-eastern Australian region between Brisbane Qld and Ballina NSW, one of the fastest growing regions of Australia.

* The Aboriginal meaning of Yelgun is "'the sun" and Wooyung is "the grass" (i.e. a grassy area, or a grassy area surrounded by rainforest) (Ryan 1963).

Q6. *See the* Nomination Notes *for examples on how criteria might be interpreted.*

Q6. Which criteria does it meet? Please try and identify each criterion from the list below applies to the place and explain why it meets that criterion (attach evidence in relation to each criterion claimed to have been met).

The National Heritage criteria for a place are any or all of the following:

☐ **a** – the place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history **Yes**

☐ **b** – the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history **Yes**

☐ **c** – the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history **Yes**

☐ **d** – the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:

i. a class of Australia's natural or cultural places or
ii. a class of Australia's natural or cultural environments **Yes**

☐ **e** – the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group **Yes**

☐ **f** – the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period **NA**

☐ **g** – the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons **Yes**

☐ **h** – the place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history **NA**

☐ **i** – the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition **Yes**

Q7a.

In describing the place, think about its physical aspects and surrounds, its uses by people, aesthetic qualities and any spiritual or cultural associations. You should include photographs and a site map or sketch plan if appropriate. See the Nomination Notes *for details.*

Q7a. How would you describe the place?

Location and Land-use

The nominated place is located on the Far North Coast of NSW in Byron and Tweed Shires and it covers approximately 1000 hectares. The place incorporates a natural landscape complex including the beach and coastal dune system, a 1-2km wide coastal plain and coastal foothills where they merge with the coastal plain. The place is centred on the Lower Yelgun Valley and extends south to Marshall's Creek and north to Crabbes Creek and Billinudgel Creek in the vicinity of Wooyung (see the Pottsville 1:25,000 topographic map, No. 9641-3-S).

Approximately two-thirds of the nominated place is covered by Billinudgel Nature Reserve and Marshall's Creek Nature Reserve, which occupy the central and southern sections of the place. The remaining third, at the northern end of the nominated place comprises private property and includes a mixture of native vegetation, regenerating natural vegetation and cleared, undeveloped land. A small area of sugar cane cultivation occurs within the place along its north-western boundary at Crabbes Swamp. There are approximately 10 residences within the nominated place, located on rural allotments.

As noted in Q5, the nominated place forms a core section of "Regional Conservation Priority Area No. 4 - Billinudgel Range" (DECCW 2010). The land also falls within the broad area of the proposed Border Ranges Biosphere Reserve. "The exact size and boundaries of the Biosphere Reserve are yet to be determined and may alter with time. The bioregion suggested is all the elevated and eroded land formed by the volcanic uplifting and out pouring from the Mt Warning/Wollumbin volcano and includes the adjacent coastal plains, beaches and marine areas." (UNESCO, undated)

Aboriginal cultural heritage

The nominated area contains a high density of Aboriginal cultural heritage sites, which illustrate diverse aspects of the Aboriginal way of life in a largely intact, pre-European, undeveloped environment. There are 40 sites within the nominated place currently registered on the AHIMS database (NPWS 2011),as shown on Figure 2. Some sections of the nominated area have no archaeological survey data, such as Marshalls Creek Nature Reserve (NPWS 2011), although they have a high potential for additional Aboriginal cultural sites (Navin 1990). To demonstrate this point, a recent survey for Aboriginal scared trees detected 14 unregistered scared trees in Billinudgel NR on a single day's traverse (A. Benwell unpub. data). These are currently in the process of being incorporated on the AHIMS register.

The following information is drawn from archaeological surveys undertaken to date in parts of the nominated place, including Navin (1990), Piper (2002) and Collins (2010) to show the Aboriginal cultural significance of the place:-

An early inspection conducted by Navin (1990) resulted in the detection of 22 Aboriginal sites - 10 small foredune middens; five middens (one associated with the Wooyung Bora ground) on old beach and inner dune deposits; one scarred blackbutt tree on the valley flats; and one midden and five scatters of between three and 54 stone artefacts on the ridges and spurs. Navin (1990) identified the spine of Marshalls Ridge, and elevated and well-drained areas adjacent to wetlands, especially spurs that provide level ground, as being of high archaeological sensitivity.

Collins (2010) reported: "The study area is set within a wider environment that contains an inter-related complex of traditional ceremonial, mythological and other important sacred/spiritual sites/places, camping places (shell middens and stone artefact occurrences) and resource-use places. Together, these form a cultural landscape of high and enduring socio-cultural significance. This significance extends to and includes the existing forests, which provide a tangible link with the traditional past. The known site complex is unique in the local and regional archaeological record, and is thus of high scientific/archaeological significance." (p.31). "The Aboriginal stakeholders hold Marshalls Ridge to represent a traditional pathway used to access ceremonial sites on the coastal plain at Wooyung." (p. 1)

Of the known archaeological sites, Yelgun flat 1 (Figure 2 #22-1-114/115) is of especially high socio-cultural and scientific/archaeological significance in that it represents a likely permanent or regularly-used traditional campsite, with evidence of a range of on-site activities, as well as the southern-most recorded extent of bevelled pounders, not previously found south of Morton Bay (Piper 2002). These were used to process Bungwahl fern roots, a carbohydrate rich staple food of the local Minjungbal people and would have been abundant within the nominated place at Yelgun Flat and Crabbes Swamp (Navin 1990).

Q7b. What condition is it in? Describe whether the place is intact or if there has there been any damage or disturbance.

The great majority of the nominated place supports natural vegetation in good to excellent condition – ie. high native species diversity, low levels of exotic species and intact structure. The age-class of vegetation varies from old-growth to various stages of post-clearing regrowth, the latter generally in good condition. Old-growth examples of a wide range of forest types are found in the nominated place (NPWS 1995).

Sections of Marshall's Ridge and the coastal plain were cleared in the past (NPWS 1995), however, patches of original forest were left and declining agricultural land-use since the Second World War saw widespread regeneration of the original vegetation communities. Aerial photography and historical data demonstrate the resilience of natural vegetation communities and the rapid regeneration to forest that occurs when agricultural activity declines.

Parts of the nominated place still contain cleared land with patches of natural vegetation. These areas were included in the nominated place to complete landscape or catchment units, including coastal plain and adjacent foothills, encompassing the range of natural ecosystems that supported the associated Aboriginal cultural heritage sites.

Q8. What is its history?

The first European sighting of Aboriginal people on the far North Coast of NSW was recorded by Captain Cook in the vicinity of Wooyung Beach, where he observed "about twenty of the natives who each had a large bundle upon his back which we conjectured to be palm leaves for the covering of their houses" (Cousins 1933).

Past economic land use that occurred in the nominated place after European settlement included timber extraction, dairy farming and sand mining. Logging of the original forest is still evidenced by numerous large standing stumps with notches cut by axeman to insert planks on which they stood to fell the trees. The dairy industry reached its peak in the 1930s after which time the industry consolidated into large co-operatives and small farms became uneconomic. The present vegetation structure indicates that much of Marshalls Ridge and its fringing spurs were cleared down to the edge of the paperbark wetlands, probably for the purposes of dairy cattle grazing. A core of intact swamp forest, wet sclerophyll forest, rainforest and Coastal Cypress Pine forest remained and other small patches of the original vegetation were scattered across cleared areas. With the collapse of the export dairy industry in the 1960s and decline of agricultural activity, regeneration back to natural vegetation accelerated.

In the 1970's most of the nominated place formed the northern section of the Oceans Shores development. Due to difficult swampy terrain and changes in the economic fortunes of different developers, the lower Yelgun valley area of North of Ocean Shores was never developed. An Interim Protection Order was placed over the land in the 1980s because of its outstanding conservation values and finally much of the land was bought by the State Government to create Billinudgel Nature Reserve in 1995. Other crown land and private land was later dedicated as Marshalls Creek Nature Reserve.

The nominated place contains a significant amount of European heritage including many large stumps from the original forest with felling notches cut by axemen; the remains of several abandoned dairy farms and a dam created by sand mining (rutile extraction) at the base of Marshalls Ridge. Also of historical interest is the history of numerous failed attempts at Gold Coast style development of the subject land, including Pat Boon and CIA connections in the 1960s and Alan Bond in the 1980s.

The regenerated parts of the nominated place demonstrate the resilience of nature and the relatively short time-scales required to re-establish biologically rich and diverse natural ecosystems solely by processes of natural colonisation and regrowth.

Q9. *We'd like to know about other places that have similar characteristics to the place that you are nominating. For example, these other places might have similar species or rock formations; they might be similar buildings or places with similar histories, traditions or beliefs attached to them. We want to know what makes the place you've nominated a better example than these other places, in short, why is it outstanding? See the* Nomination Notes *for more tips.*

Q9. What other places have similar characteristics? How do these places compare with the place you are nominating?

There are other places within the coastal region of central-eastern Australia with Aboriginal cultural heritage sites still existing in natural vegetation similar to the original environment at the time European settlement. However, these other places are very small in area and do not have a high density and diversity of Aboriginal cultural heritage sites, and survive in much more disturbed and developed landscapes. Only the nominated place contains an example of a pre-1750 landscape with diverse types of natural ecosystem rich in flora and fauna, combined with a great variety of Aboriginal cultural heritage sites, which illustrate the full spectrum of religious-mythological and daily economic aspects of the Aboriginal way of life at the time of European settlement within this region. Several other bora grounds are documented in the region, but all are disturbed to varying degrees (generally by loss of one bora ring) or have been destroyed, as listed below.

Other Bora Grounds (Bowdler 1999; A. Benwell pers. observ.):-
South Tweed Heads - one ring surviving in a small forest reserve in an urbanised landscape.
Tucki Tucki - one ring surviving within the precinct of a modern cemetery, in a largely cleared landscape
Pumpinbil 1 - one or two rings (?) surviving in cleared grazing land.
Pumpinbil 2 - destroyed in 1960.
Lennox Head - single ring in public park within development area.
Tyagarah - destroyed; stone arrangement was moved to Heritage Park Mullumbimby then removed from display.
Hastings Point – destroyed.
Burleigh Heads - single ring in fenced enclosure in a small public park in an urban area

Q10. What other information is available on the place? List any articles, books, reports or heritage studies that may provide evidence supporting your nomination. You may also have information from Traditional Owners and Custodians, scientists or heritage specialists. If they have agreed to share their knowledge, please include their contact details.

This list of information sources includes the references given above with the other nomination questions.

Benwell, A. S (1995). *Vegetation Map of Billinudgel Nature* Reserve. Prepared for the National Parks and Wildlife Service.

Bowdler, S. (1999). *A study of Indigenous ceremonial ("Bora") sites in eastern Aust*ralia. Paper delivered at "Heritage Landscapes: Understanding Place &Communities" conference, Southern Cross University, Lismore.

Briggs, J.D. and Leigh, J.H. (1995). *Rare or Threatened Australian Plants* (revised edition). CSIRO Publishing, Collingwood, Victoria.

Broadbent, J.A. and Stewart, R. (1986). *North Ocean Shores Regional Environmental Study*. JTCW Planning for the Bond Corporation.

Bundjalung Elders Council Aboriginal Corporation (undated). *Spirits in the rocks, trees and mountains of Bundjalung Country. Aboriginal Stories from North-Eastern New South Wales as told to European settlers in the period 1840-1940 by Aboriginal men of the Bundjalung nation.* Printed with the permission of the Bundjalung Elders Council Aboriginal Corporation.

Collins, J. (2010). *Aboriginal & European Heritage Assessment Technical Paper H.* Proposed Cultural Events Site, Tweed Valley Way and Jones Road, Yelgun, NSW Far North Coast. Prepared for North Byron Parklands.

Cousins, A. (1933). *The Northern Rivers of NSW*. Shakespeare Head Press, Sydney.

Commission of Inquiry (W. Simpson) (1990). *Draft Local Environment Plans Amendments Nos.13 and 14 - Shire of Byron*

Commission of Inquiry (K. Cleland) (1998). *Proposal to Rezone Land at North Ocean Shores - Byron Shire*.

DECCW (2010). Far North Coast Regional Conservation Plan. NSW Dept of Environment, Climate Change and Water.

Donnelly, T. (1991). *North Ocean Shores/Wooyung Bora Ground*. Northern Rivers Aboriginal Land Council, Grafton.

Gilmore, A.M, Milledge, D.R. and Mackay, D. (1986). *Vertebrate Fauna of the Undeveloped Land, North Ocean Shores*. Unpubl. report. A.M. Gilmore and Associates, Federal.

Keats, N. C. (1988). Wollumbin: The Creation and Early Habitation of the Richmond and Brunswick Rivers of NSW. N.C. Keats (Point Clare, N.S.W.)

Livingstone, H. (1892). *A short grammar and vocabulary of the dialect spoken by the Minyung people*. In Threkeld, An Australian Language, Appendix 3-27. Aust Govt Printers.

McBryde, I. (1978). *Records of Times Past, Ethnohistorical essays and the culture and ecology of the New England tribes*. A.I.A.S. Canberra.

Navin, K. (1990). *An Archeaological Survey of North Ocean Shore's Development Area, NSW*. A Report to Bondcorp.

Nayutah, J. and Finlay, G. (1988). *Minjungbal - The Aborigines and Islanders of the Tweed Valley*. North Coast Institute for Aboriginal Community Education.

NPWS (1990). *Billinudgel Nature Reserve Proposal - Botanical Survey*. Unpublished Report.

NPWS (1993). *Vegetation of the Proposed Billinudgel Swamp Nature and Marshalls Creek Additions - Botanical Survey*. Unpublished Report.

NPWS (1995). *Natural, Cultural and Scientific Significance of the North Ocean Shores Interim Protection Area*. Unpublished Report.

NPWS (2000). *Billinudgel Nature Reserve - Plan of Management*. **NSW National Parks and Wildlife Service**.

NPWS (2011). *Marshall's Creek Nature Reserve - Plan of Management*. **NSW National Parks and Wildlife Service**.

McIntyre-Tamwoy, S. (2008). *Archaeological sites & Indigenous values: the Gondawana Rainforests of Australia World Heritage Area*. Archaeological Heritage Vol 1, No.1. pp 42-49.

Ryan, J. S. (1963). Some Aboriginal Place-names in the Richmond-Tweed Area. *Oceania*, 34(1).

Satterthwait, L. and A. Heather (1987). *Determinants of earth circle site location in the Moreton region, Southeast Queensland.* Queensland Archaeological Research 4: 5-53

Sullivan, S. (1978). *Aboriginal Diet and Food Gathering Methods in the Richmond and Tweed River Valleys, as seen in the Early Settler Records.* Chapter 7 in McBryde, I. (ed). 'Records of Times Past' A.I.A.S. Canberra.

Steele, J. G. (1983). *Aboriginal Pathways in Southeast Queensland and the Richmond River*. University of Queensland Press.

UNESCO (undated). *Border* Ranges Biosphere Reserve. United Nations Educational Scientific and Cultural Organisation.

Considerations

Q11. Are there sensitive issues associated with the place? These may be issues that need to be kept out of the public eye such as matters relating to sacred or religious sites, or the location of rare fossils, plants or fragile places.

NO ☐ No YES ☐

If you answer yes, we will contact you to discuss the issues.

Q12a.

An explanation of themes is available in the Nomination Notes. *For information on current themes for National Heritage List nominations, visit www.environment.gov.au/heritage or call (02) 6274 2149.*

Q12a. Do the values reflect a National Heritage Theme announced by the Minister?

NO ☐ No YES ☐

Q12b. If you answered yes, please state which theme:

Your details

Your details are needed in case we require more information on the nominated place. Your identity is protected under the Federal Privacy Act 1988 *and will not be divulged without your consent or as allowed for under that Act.*

Title: Dr First name: Andrew Family name: Benwell

Are you nominating a place on behalf of an organisation? NO ☐ No YES ☐

If you answered no, please complete the address details below, if yes, please name the organisation and your position in it and then complete the address details for the organisation below:

Organisation: Position:

Address: 3 Short St, New Brighton

State: NSW Postcode: 2483

Telephone: 0266804817 Fax: Email: ecos@nrg.com.au

FINAL CHECKLIST

Before signing and dating your nomination form, please make sure that you have:

☐ completed name, location, boundary, significance and criteria questions

☐ attached and labelled the location/boundary map and/or site plan

☐ attached and labelled any photographs and supporting evidence or extra information.

Signature of nominator

Date
14/11/2011

Send your completed nomination form and attachments:

By mail to:
The Nominations Manager Heritage Division Department of Sustainability, Environment, Water, Population and Communities GPO Box 787 CANBERRA ACT 2601

If the person making this nomination is, or is representing, a *small business* (a business having fewer than 20 employees), please provide an estimate of the time taken to complete this form. 80 **hours** **minutes**

Please Include
The time spent reading the instructions, working on the questions and obtaining the information; and
The time spent by all employees in collecting and providing this information.

see Q7a continued

"A Bora ground (Figure 2 - #4-2-012) with an associated stone arrangement (#4-2-095) still survives on the coastal plain at Wooyung..... Owing to its direct geographical connection with the inland ranges, Marshalls Ridge has long been considered "a likely access corridor for the various social groups involved" in ceremonial activities at Wooyung (Navin 1990:11). This proposition was explored by Fox (2003), who concluded on the basis of Aboriginal consultation (primarily with Ngaraakwal/Githabul Elder Harry Boyd) and other oral history research, literature review and field surveys, that Marshalls Ridge did form part of a traditional pathway between Wooyung and sacred/significant sites and places in the Mount

The Wooyung Bora Ground, also referred to as the Wollumbin bora ground by local Aboriginal people, is the only surviving double bora in the region. Bora grounds originally had paired ceremonial rings, but only one ring survives at other sites such as Tweed Heads South and Tucki Tucki (Lismore), which are also in much more disturbed and developed landscapes.

"Ethno-historical accounts describe groups of up to 1,000 people assembled in the vicinity of Bora grounds for periods of between two days and three weeks (Sullivan 1977). Due to the exhaustion of localised resources that these gatherings caused, several Bora grounds are thought to have been used on a rotational system (Satterthwait and Heather 1987:48)." (Collins 2010). A second bora ring site from near New Brighton in the area formerly known as 'Capricorn' was registered by Isabel McBryde in 1964 (#4-2-001), which may have since been destroyed although there are anecdotal reports of its location as within the nominated place in Marshalls Creek Nature Reserve.

As described under Q5 above, the place is of central importance to the Bundjalung/Githabul, the indigenous peoples on whose land the nominated place is located, particularly in regard to the Wooyung Bora Ground. The "Three Brothers Legend" recounts how long ago Birrung with his two bothers Mamoon and Yarbirri came to the this land with their wives and children in a great canoe from an island across the sea. The three brothers made the first bora ring at Wooyung 10km North of Brunswick Heads and held the first Wandaral ceremony. The oldest brother Yarbirri, then made the laws. The brothers separated to populate the earth. Yarbirri went north, Mamoon went west and Birrung travelled south (Bundjalung Elders Council Aboriginal Corporation, undated).

Natural environment (flora and fauna)

The nominated place contains a wide range of ecosystems, including coastal dunes, wetlands, rainforest, dry and wet sclerophyll forest, mangroves and swamp forests (Gilmore et al. 1986; NPWS 1995). It includes the largest remaining Coastal Cypress Pine (*Callitris columellaris*) forest, recently listed as an Endangered Ecological Community in NSW (OEH website). As noted above, the nominated place contains a rich diversity of flora and fauna including 10 nationally threatened plant species (EPBC Act), 6 nationally threatened fauna species (EPBC Act) and 2 endangered ecological communities (EPBC Act) and 5 additional nationally rare plant species (Briggs and Leigh 1995) (see Appendix 1). More than 50 species of flora and fauna are listed under NSW environmental legislation as threatened species.

The following description referring to the nominated place and indicating the diversity of fauna was provided by NPWS (1995):

"The Significance of the IPO Area as an Ecological Unit

The IPO area's large size and diversity of faunal habitats, particularly those associated with the swamp sclerophyll forest and woodland and other wetland communities, give it a major refuge function for an assemblage of species which have suffered substantial habitat losses and are currently poorly conserved in the existing regional and state reserve system. These are predominantly specialised wetland species such as the endangered (State) Wallum Tree Frog *Litoria olongburensis,* Wallum Froglet *Crinia tinnula*, Black Bittern

Ixobrychus flavicollis, Australasian Bittern *Botaurus poiciloptilus*, Brolga *Grus rubicunda*, Bush Hen *Amaurornis olivaceus*, Comb-crested Jacana *Irediparra gallinacea*, the regionally significant Laughing Tree Frog *Litora tyleri*, Sandy Gungan *Uperoleia fusca*, Great Egret *Ardea alba*, Royal Spoonbill *Platalea regia*, Spotless Crake *Porzana tabuensis* and other species closely associated with wetland communities such as the endangered (State) Grass Owl *Tyto capensis* and regionally significant Brahminy Kite *Haliastur indus*, Little Bronze-cuckoo *Chrysococcyx minutillus*, Forest Kingfisher *Todiramphus macleayii* and Grassland Melomys *Melomys burtonii*.

The rainforest or mesic vegetation elements associated with the Paperbark *Melaleuca quinquenervia* - Swamp Mahogany *Eucalyptus robusta* - Swamp Turpentine *Lophostemon suaveolens* tall open forests are characteristic of these forests on the New South Wales far north coast (Broadbent and Stewart 1986) and are especially important for rainforest associated fauna and they give the IPO area an additionally significant function as a coastal rainforest refuge. Fauna species dependent on these habitats include the endangered (State) Woompoo Fruit-dove *Ptilinopus magnificus*, Rose-crowned Fruit Dove *Ptilinopus regina*, White-*eared Monarch Monarcha leucotis, Black Flying Fox Pteropus alecto, Queensland Blossum-bat Syconycteris* australis and Northern Long-eared Bat *Nyctophilus bifax* and the regionally significant Murray's Skink *Eulampris murrayi*, Yellow-bellied Skink *E. tenuis*, Carpet Python *Morelia spilota*, Rough-scaled Snake *Tropidechis carinatus*, Pacific Baza *Aviceda subcristata*, Little Shrike Thrush *Colluricincla megarhyncha*, Spectacled Monarch *Monarcha trivirgatus*, Varied Triller *Lalage leucomela* and Regent Bower Bird *Sericulus chrysocephalus*.

The importance of the IPO area's Wallum plant communities in providing over-wintering habitat for a suite of nomadic and migratory nectivorous, frugivorous and insectivorous birds and nectivorous and frugivorous fruit bats has been well established (Gilmore et al. 1986; Milledge 1991). These species include altitudinal migrants such as the endangered (State) Woompoo and Rose-crowned Fruit-doves and White-eared Monarch and the regionally significant Little Shrike Thrush, latitudinal migrants such as the regionally significant Little Bronze-cuckoo, Forest Kingfisher, Spectacled Monarch and Spangled Drongo *Dicrurus bracteatus* and the nomadic, endangered Regent Honeyeater *Xanthomyza phrygia*.

The old-growth forest elements throughout a number of stands are of high value to many specialised species, particularly hollow dependent species, in providing food, den and nest site resources and are a scarce resource on the far north coast as a result of widespread clearing and disturbance. Species dependent on these resources include the endangered Osprey *Pandion haliaetus*, Square-tailed Kite *Lophoictinia isura*, Woompoo Fruit Dove, Glossy Black-cockatoo *Calyptorhynchus lathami*, Masked Owl *Tyto novaehollandiae*, *Regent Honeyeater,* Koala *Phascolarctos cinereus,* Queensland Blossum-bat, *Little Bentwing Bat Miniopterus* australis, and Northern Long-eared Bat and regionally signficant Pacific Baza, Brahminy Kite, White-bellied Sea Eagle *Haliaeetus leucogaster*, Forest Kingfisher and Little Shrike-thrush." (NPWS 1995, p. 11-12).

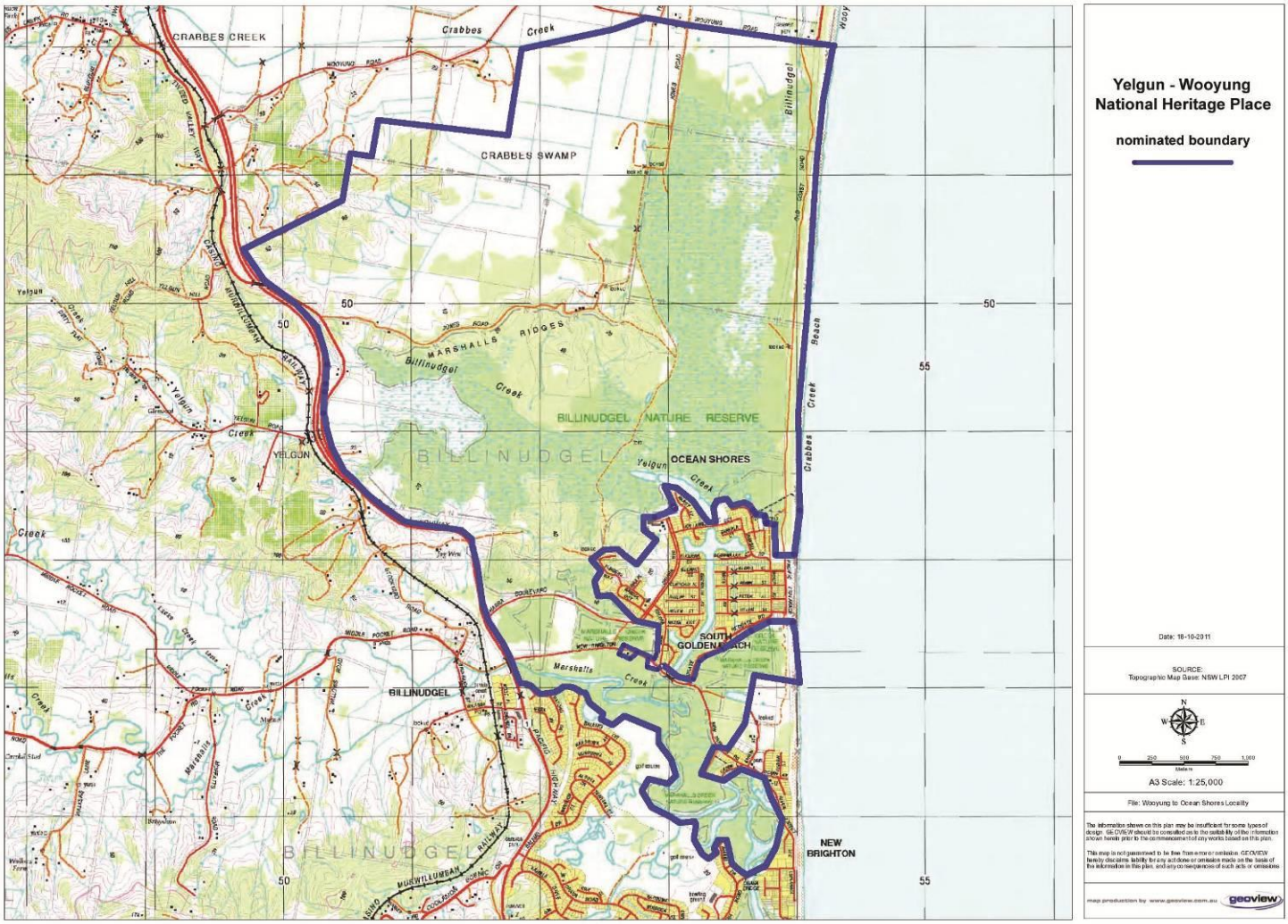
CRABBES CREEK
Crabbes Creek
CRABBES SWAMP
MARSHALLS RIDGES
Billinudgel Creek
BILLINUDGEL NATURE RESERVE
BILLINUDGEL
YELGUN
OCEAN SHORES
Yelgun Creek
Crabbes Creek
Billinudgel Beach
SOUTH GOLDEN BEACH
Marshalls Creek
BILLINUDGEL
NEW BRIGHTON
Yelgun - Wooyung
National Heritage Place
nominated boundary
Date: 18-10-2011
SOURCE:
Topographic Map Base: NSW LPI 2007
N
W
E
S
0 250 500 750 1,000
Metres
A3 Scale: 1:25,000
File: Wooyung to Ocean Shores Locality
The information shown on this plan may be insufficient for some types of design. GEOVIEW should be consulted as to the suitability of the information shown hereon prior to the commencement of any works based on this plan.
This map is not presumed to be free from error or omission. GEOVIEW hereby disclaims liability for any act done or omission made on the basis of the information in this plan, and any consequences of such acts or omissions.
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Figure 1: Proposed boundary of the Yelgun - Wooyung National Heritage Place

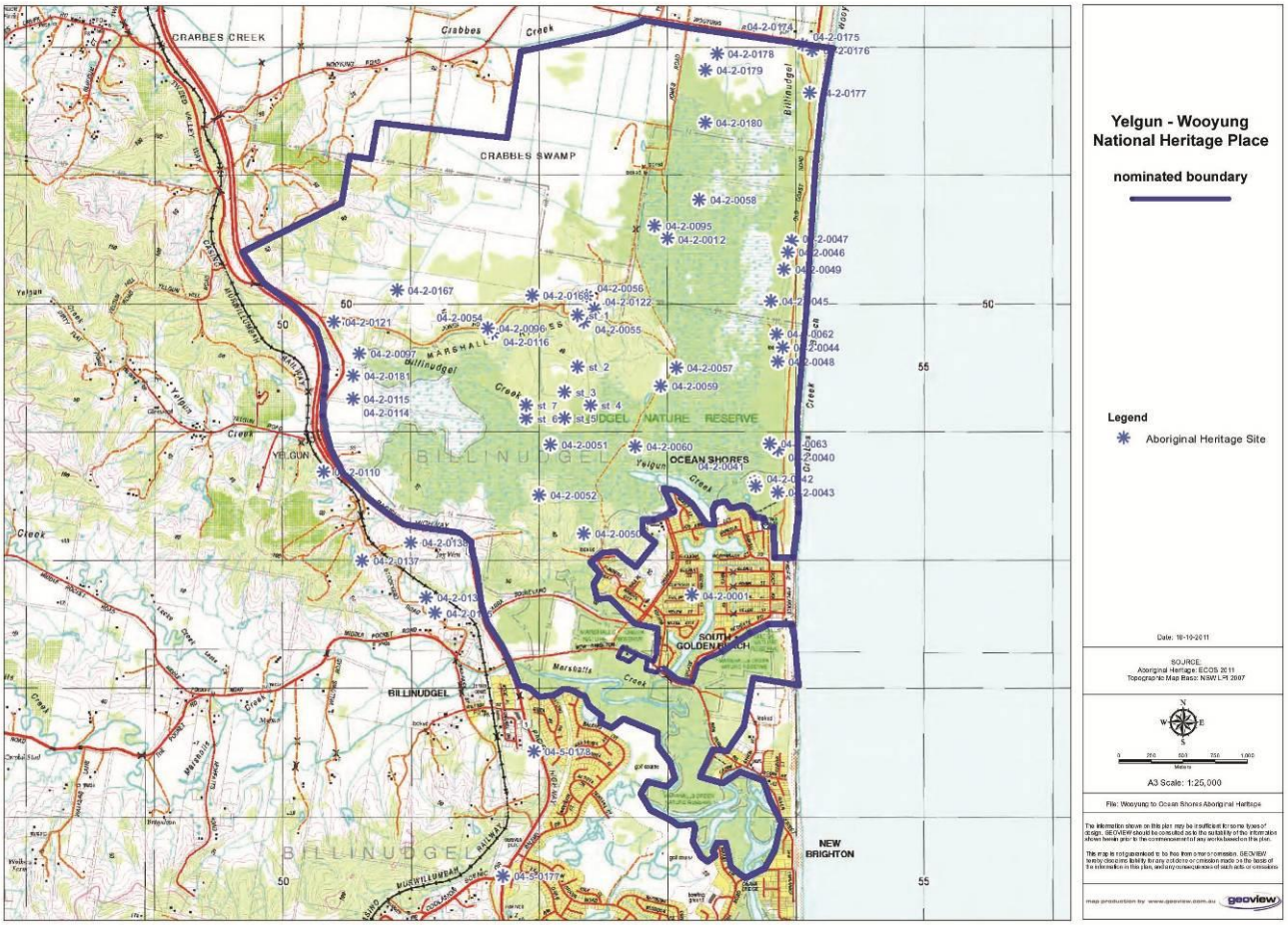
CRABBES CREEK
Crabbes Creek
CRABBES SWAMP
BILLINUDGEL NATURE RESERVE
OCEAN SHORES
SOUTH GOLDEN BEACH
BILLINUDGEL
NEW BRIGHTON
Yelgun - Wooyung
National Heritage Place
nominated boundary
Legend
Aboriginal Heritage Site
Date: 18-10-2011
SOURCE
Aboriginal Heritage: ECOS 2011
Topographic Map Base: NSW LPI 2007
A3 Scale: 1:25,000
File: Wooyung to Ocean Shores Aboriginal Heritage

Figure 2: Registered Aboriginal archaeological sites within the nominated Yelgun - Wooyung National Heritage Place (AHIMS database). Sites ST -1 to 7 are in process of being registered.

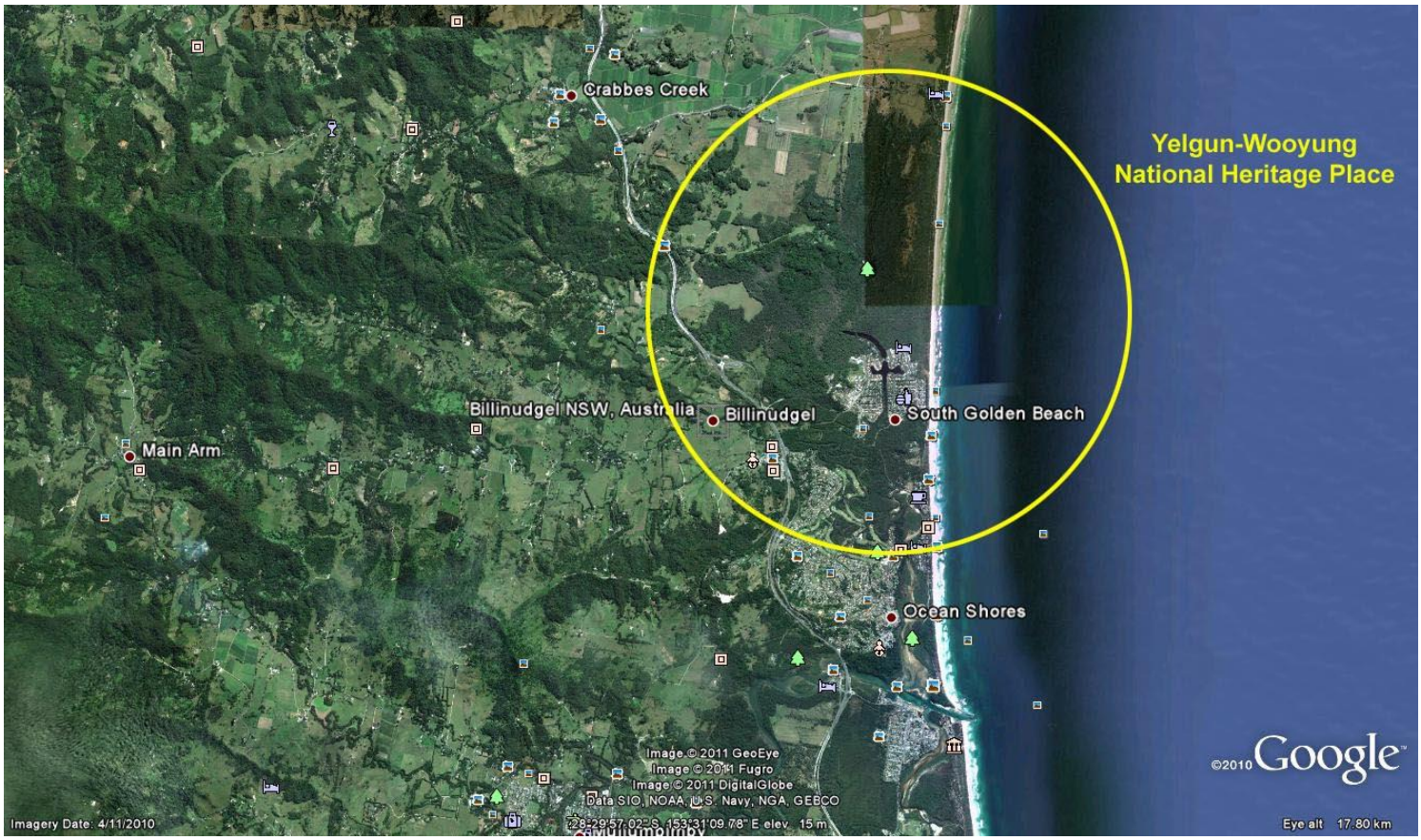

Figure 3: Aerial photograph of the nominated Yelgun - Wooyung National Heritage Place and the surrounding district. (Note - east-west habitat corridor extending west from the nominated place.)

APPENDIX 1: Biota of national conservation significance (listed under the Commonwealth EPBC Act) recorded within the nominated place.

(sources: EPBC Protected Matters Search Tool; NSW NPWS Wildlife Atlas; NPWS 1995; A. Benwell unpub. data)

Threatened Plant Species (EPBC Act)	
Coolamon Tree	*Syzygium moorei*
Scented Acronychia	*Aconychia littoralis*
Spiny Gardenia	*Randia moorei*
Rusty Green-leaved Rose Walnut	*Endiandra muelleri ssp. bracteata*
Davidson's Plum	*Davidsonia jerseyana*
Stinking Cryptocarya	*Cryptoarya foetida*
Crystal Creek Walnut	*Endiandra floydii*
Hairy Walnut	*Endiandra haysii*
White Silky Oak	*Grevillea hilliana*
Corokia	*Corokia whiteana*
Nationally Rare Plant Species (Briggs and Leigh 1995)	
Black Walnut	*Endiandra globosa*
Veiny Laceflower	*Archidendron muellerianum*
Silverleaf	*Argophyllum nullumense*
Long-leaved Tuckeroo	*Cupaniopsis newmanii*
Smooth-leaved Rhodamnia	*Rhodamnia maideniana*
Threatened Fauna Species (EPBC Act)	
Wallum Sedge Frog	*Litoria olongburensis*
Loggerhead Turtle	*Caretta caretta*
Red Goshawk	*Erythrotriorchis radiatus*

Regent Honeyeater	*Xanthomyza phrygia*
Long-nosed Potoroo	*Potorous tridactylus*
Grey-headed Flying Fox	*Pteropus poliocephalus*
Endangered Ecological Communities (EPBC Act)	
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	
Lowland Rainforest of Subtropical Australia (nominated)	

APPENDIX 2: Aboriginal sites from the nominated place recorded on the AHIMS (Aboriginal Heritage Information Management System) database maintained by the NSW Office of Environment and Heritage (October 2011).

Note - coordinates for site 04-2-0001 were adjusted as the AHIMS data plotted this site too far south.

SiteID	SiteName	Contact	Datum	Zone	Easting	Northing	Context	Recorders	SiteFeatures
04-2-0001	Yelgun;New Brighton;		AGD	56	553200	6847700	Open site	Isabel McBryde	Ceremonial Ring (Stone or Earth) : -
04-2-0097	N.O.S 24		AGD	56	550600	6849600	Open site	Ms.Rebecca Edwards-Booth	Artefact : -
04-2-0012	Restriction applied. Please contact ahims@environment.nsw.gov.au.	Mr.Ron Heron					Open site	Mr.R McKinney,Mr.Ian Fox	Ceremonial Ring (Stone or Earth) : -
04-2-0040	N.O.S 1		AGD	56	553860	6848850	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0041	N.O.S 2		AGD	56	553680	6848600	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0042	N.O.S. 3		AGD	56	553690	6848570	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -

04-2-0043	N.O.S. 4		AGD	56	553860	6848520	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0045	N.O.S. 6		AGD	56	553810	6850010	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0047	N.O.S. 8		AGD	56	553970	6850480	Open site	Kerry Navin,Mr.Kelvin Officer	Shell : -, Artefact : -, Earth Mound : -
04-2-0048	N.O.S. 9 (Northern Ocean Shore)		AGD	56	553860	6849540	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0049	N.O.S. 9		AGD	56	553910	6850260	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0050	N.O.S. 11;North Ocean Shores		AGD	56	552350	6848200	Open site	Kerry Navin,Mr.Kelvin Officer	Modified Tree (Carved or Scarred) : -
04-2-0054	N.O.S. 15		AGD	56	551640	6849760	Open site	Kerry Navin,Mr.Kelvin Officer	Artefact : -
04-2-0055	N.O.S.16;North Ocean Shores		AGD	56	552350	6849850	Open site	Kerry Navin,Mr.Kelvin Officer	Artefact : -
04-2-0056	N.O.S.17;North Ocean Shores		AGD	56	552370	6850050	Open site	Kerry Navin,Mr.Kelvin Officer	Artefact : -

04-2-0057	N.O.S. 18		AGD	56	553070	6849490	Open site	Kerry Navin,Mr.Kelvin Officer,Deidre Murphy	Earth Mound : -, Shell : -, Artefact : -
04-2-0058	N.O.S. 22;North Ocean Shore		AGD	56	553250	6850800	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0059	N.O.S. 19		AGD	56	552950	6849350	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0060	N.O.S. 20		AGD	56	552750	6848880	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0062	CRABBES CREEK 1		AGD	56	553850	6849750	Open site	S Davies,Davies Heritage Consultants Pty Ltd	Earth Mound : -, Shell : -, Artefact : -
04-2-0063	CRABBES CREEK 2		AGD	56	553800	6848900	Open site	S Davies,Davies Heritage Consultants Pty Ltd	Earth Mound : -, Shell : -, Artefact : -
04-2-0110	Yelgun 02		AGD	56	550320	6848680	Open site	Claude McDermott	Artefact : -
04-2-0114	Yelgun Flat 1		AGD	56	550550	6849250	Open site	Allan Goodwin	Artefact : 1
04-2-0115	Yelgun Flat		AGD	56	550550	6849250	Open site	Allan Goodwin,Mr.Adrian Piper	Artefact : 1, Potential Archaeological Deposit (PAD) : -

04-2-0116	Artefact Scatter		AGD	56	551640	6849760	Open site	R Oehlman	Artefact : -
04-2-0121	GMY1		AGD	56	550400	6849850	Open site	Mr.Adrian Piper	Artefact : 3
04-2-0122	GMY2		AGD	56	552430	6849950	Open site	Mr.Adrian Piper	Artefact : 1
04-2-0044	N.O.S. 5		AGD	56	553900	6849650	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0096	N.O.S 23		AGD	56	551600	6849800	Open site	Ms.Rebecca Edwards-Booth	Artefact : -
04-5-0177	SB-OS-1 (PAD's 1, 2 & 3)	T Russell	AGD	56	551720	6845530	Open site	Robynne Mills	Artefact : -, Potential Archaeological Deposit (PAD) : -
04-2-0135	JW-OS-1 (PAD 4)	T Russell	AGD	56	551190	6847580	Open site	Robynne Mills	Artefact : -, Potential Archaeological Deposit (PAD) : -
04-2-0136	JW-OS-2 (PAD 5)	T Russell	AGD	56	551120	6847700	Open site	Robynne Mills	Artefact : -, Potential Archaeological Deposit (PAD) : -
04-2-0137	JW-OS-3 (PAD 6)	T Russell	AGD	56	550620	6847990	Open site	Robynne Mills	Artefact : -, Potential Archaeological Deposit (PAD) : -
04-5-0178	B-OS-1, Brunswick Heads	T Russell	AGD	56	551960	6846500	Open site	Robynne Mills	Artefact : 2
04-2-0138	JW-OS-4	T Russell	AGD	56	551000	6848130	Open site	Robynne Mills	Potential Archaeological Deposit (PAD) : 1
04-2-0167	Yelgun 3	Searle	AGD	56	550893	6850095	Open site	Ms.Jacqueline Collins	Artefact : 1

04-2-0168	Yelgun 4	Searle	AGD	56	551946	6850057	Open site	Ms.Jacqueline Collins	Artefact : 3
04-2-0046	N.O.S. 7 (Northern Ocean Shore)		AGD	56	553940	6850390	Open site	Kerry Navin,Mr.Kelvin Officer	Earth Mound : -, Shell : -, Artefact : -
04-2-0174	Wooyung 1	Tweed Byron LALC	GDA	56	554063	6852028	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-0175	Wooyung 2	Tweed Byron LALC	GDA	56	554053	6852009	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-0176	Wooyung 3	Tweed Byron LALC	GDA	56	554131	6851964	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-0177	Wooyung 4	Tweed Byron LALC	GDA	56	554110	6851634	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-0178	Wooyung 5	Tweed Byron LALC	GDA	56	553387	6851937	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-0179	Wooyung 6	Tweed Byron LALC	GDA	56	553298	6851811	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-0180	Wooyung 7		GDA	56	553296	6851400	Open site	Everick Heritage Consultants Pty Ltd	Shell : 1
04-2-	N.O.S. 12		AGD	56	552090	6848890	Open	Kerry Navin,Mr.Kelvin	Earth Mound : -, Shell : -, Artefact

0051							site	Officer	: -
04-2-0052	N.O.S.13;North Ocean Shores		AGD	56	552000	6848500	Open site	Kerry Navin,Mr.Kelvin Officer	Artefact : -
04-2-0095	Stone Arrangement;Wooyung-North Ocean Shores		AGD	56	552900	6850600	Open site	S Scanlon	Stone Arrangement : -
04-2-0181	Yelgun Flat 1 extension		GDA	56	550550	6849430	Open site	ADISE Pty Ltd,Ms.Jacqueline Collins	Artefact : 24