



#### Contact Details

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## SEQ Fire & Biodiversity Consortium Submission

### Nomination to List: ‘Fire regimes that cause biodiversity decline’ as a Key Threatening Process under the *Environment Protection and Biodiversity Conservation Act 1999*

The South East Queensland Fire and Biodiversity Consortium (SEQFBC), established in 1998 by Griffith University, a number of state agencies and local government authorities, is a network of stakeholders devoted to providing best-practice recommendations for fire management, fire ecology and the conservation of biodiversity in the SEQ region through education, community engagement and practical research. The SEQFBC is now in Phase 4 and is being hosted by SEQ Catchments, the regional natural resource management (NRM) body for the South East Queensland (SEQ) region. This newest phase of the SEQFBC is generously supported by Brisbane, Gold Coast, Ipswich, Lockyer Valley, Logan, Moreton Bay, Redland, Scenic Rim, Sunshine Coast and Toowoomba councils, the National Parks Association of Queensland, Powerlink, Queensland Fire and Rescue Service and SEQ Catchments.

The SEQFBC Steering Committee support the recognition of inappropriate fire regimes that may lead to biodiversity at a national level and as listed as a Key Threatening Process (KTP) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and hope that the information provided in this submission will assist in refining this nomination and developing effective and well resourced Threat Abatement Plans (TAP).

This submission addresses the focus questions and provides feedback on the title of the nomination. The SEQFBC are concerned that the current title is possibly misleading and could imply that all fire regimes may cause biodiversity decline. The SEQFBC suggests that a more accurate title might be “*Inappropriate fire regimes that cause biodiversity decline*”. The SEQFBC believe that this title more accurately reflects the very serious issue that inappropriate fire regimes (including too frequent fire, lack of fire and high intensity fire) may lead to biodiversity declines by disrupting reproduction and thereby the potential survival of certain species and homogenizing ecological communities. This may appear like a minor issue, but given the increased community interest in fire and fire management and the substantial conflicts that exist between managing fire for life/property, conservation and production, the SEQFBC believes it is important that the title of this nomination accurately reflects the scope of the nomination. For example, the NSW Scientific Committee listed “*ecological consequences of high frequency fires*” as a key threatening process under the *Threatened Species Act 1995* (TSC Act). This title and nomination specifically states that high frequency fires that disrupt the life cycle processes of plants and animals can lead to the loss of vegetation structure and composition in some species and communities. This identifies a particular component of fire regimes (i.e. frequency), but does not allow for misinterpretation of the listing. The SEQFBC are concerned the current title may be used by some sectors of the community to discredit best practice fire management guidelines to the detriment of conservation and biodiversity, and asks that Scientific Committee reconsider the title of this nomination.

## Focus Questions

### **(1) In your judgement, is the information provided in the nomination sufficient to either confirm or disqualify this process as a Key Threatening Process under the EPBC Act?**

The information in the nomination provides a basis for inappropriate fire regimes to be listed as a KTP. However, the nomination also highlights the substantial lack of scientific data available on the response of individual species, species at the population scale (Ooi *et. al*, 2006) and ecological communities to fire regimes and planned burns, particularly in South East Queensland (SEQ). Furthermore, as highlighted by the Scientific Committee:

*“an appropriate fire regime for many communities depends on the desired management outcomes”.*

Whilst fire management planning for particular vegetation types will generally refer to best available information on recommended ecological fire regimes in planning management outcomes, in many urban and peri-urban zones with a high proportion of bushland (i.e. SEQ) conservation values may be superseded or complicated by issues of life and property protection (Whelan, 2006; Whelan *et al.*, 2006). Therefore, for some of Australia’s most populated areas with high bushland values (e.g. Brisbane region, greater Sydney), ecologically recommended fire regimes need to be considered in conjunction with other fire management planning recommendations, further complicating fire management planning and potentially increasing the risk of adverse biodiversity impacts. If inappropriate fire regimes are listed as a KTP under the EPBC Act, it would appear appropriate to differentiate between literature/evidence from studies undertaken in areas with urban/peri-urban issues and those based on ecological/conservation recommendations.

On page 8, fourth paragraph, the last sentence states:

*“The loss of pollinators/seed dispersers due to fire is a further threat to flora species”.*

This sentence does not link with the paragraph and is not supported by any literature or studies in the nomination. As with generally accepted fauna response to fire, many pollinators (e.g. birds, gliders, possums, invertebrates and bats) may be able to escape low and moderate intensity fires by flying, burrowing or hiding. High intensity fires would result in greater loss and some populations of threatened or endangered plants may suffer from a local loss of pollinators, but this requires supporting evidence because most Australian plants are pollinated by a suite of vertebrate and invertebrate pollinators (i.e. insects and native birds) and most pollinators are generalists and will feed on a range of species, therefore limiting the number of flora species at true risk of decreased reproductive output as a result of pollinator loss. There are a range of issues that would influence whether a species would be at risk of decreased reproductive output due to pollinator decline after fire, including (but not limited to): the frequency and extent of fires, pollinator population size, pollinator group (i.e. bird, mammal, invertebrate), plant mating system (i.e. can the species set seed from self pollen and/or self set seed), seed recruitment from neighboring populations, plant response to fire (i.e. does the plant flower in response to fire) and the speed of recolonisation by pollinators after fire (i.e. birds tend to respond quickly to newly flowering plants after fire because of the ready food source). If the Scientific Committee consider this a genuine issue then it would be best if it was supported by relevant literature and evidence. The SEQFBC would be interested in assisting the Scientific Committee in compiling some information on fire and pollination if required.

### **(2) Is the material accurate and complete, so far as you are aware?**

Below is a list of literature: (1) relevant to the SEQ region and (2) recently published that may be of interest or assistance to the Scientific Committee.

### **Literature Relevant to South East Queensland:**

Borsboom, A. C. (2006) Impact of a prescribed burn on a threatened macrozamia in southeast Queensland, *Life In A Fire-Prone Environment: Translating Science Into Practice* Bushfire Conference - Brisbane, Conference Proceedings.

Brownlie, H., Playford, J., Wallace, H. and Shapcott, A. (2009) Population ecology and genetics of the vulnerable *Acacia attenuate* (Mimosaceae) and their significance for its conservation, recovery and translocation. *Australian Journal of Botany* (57) 675 - 687.

Debuze, V. and Lewis, T. (2007) *Using fire in spotted gum – ironbark forests for production and biodiversity outcomes – Guidelines for landholders*. Department of Primary Industry and Fisheries, Gympie, Queensland.

Environmental Protection Agency (2007). *National recovery plan for the Mt Emu she-oak *Allocasuarina emuina**. Report to Australian Government Department of the Environment and Water Resources. Queensland Parks and Wildlife Service, Brisbane.  
<http://www.environment.gov.au/biodiversity/threatened/publications/pubs/a-emuina.pdf>

Kennedy, M. S., Baxter, G. S. and Spencer, R-J. (2006) Towards a more detailed understanding of habitat: the responses of bush rats to manipulation of food and predation after fire. *Life In A Fire-Prone Environment: Translating Science Into Practice* Bushfire Conference - Brisbane, Conference Proceedings.

Leeson, P. (2006) Queensland Parks and Wildlife Service Fire Management System – balancing ecological requirements and hazard reduction in burning practices. *Life In A Fire-Prone Environment: Translating Science Into Practice* Bushfire Conference - Brisbane, Conference Proceedings.

Shapcott, A., Lamont, R. W. and Thomson, A. (2005) How do rare *Boronia* species differ from their widespread congeners? *Australian Journal of Botany* (53) 171 – 183.

Tran, C and Gilroy, J. L. (2006) A new fuel model for eucalyptus forests in southeast Queensland. *Life In A Fire-Prone Environment: Translating Science Into Practice* Bushfire Conference - Brisbane, Conference Proceedings.

Tran, C. T., Gilroy, J. L. and Williams, P. R. (2008) Quantifying the fuel load and fire hazard in a wet sclerophyll community of southeast Queensland, following invasion by the woody weed, *Lantana camara*. Fire, Environment and Society Conference - Adelaide, Conference Proceedings.

Virkki, D. (2009) *Lantana Removal: the influence on retille assemblages and habitat attributes*. Griffith University, Honours Thesis.

Watson, P. (2006) Concepts, characteristics, competition: tools in the search for sustainable fire regimes. *Life In A Fire-Prone Environment: Translating Science Into Practice* Bushfire Conference - Brisbane, Conference Proceedings.

### **Recent publications that may be of interest or use to the Scientific Committee:**

Driscoll, D. A., Lindenmayer, D. B., Bennett, A. F., Bode, M., Bradstock, R. A., Cary, G. J., Clarke, M. F., Dexter, N., Fensham, R., Friend, G., Gill, M., James, S., Kay, G., Keith, D., MacGregor, C., Russell-Smith, J., Salt, D., Watson, J. E. M., Williams, R. J. and York, A. (2010) Fire management

for biodiversity conservation: Key research questions and our capacity to answer them. *Biological Conservation* (143) 1928 – 1939.

Penman, T. D. and York, A. (2010) Climate and recent fire history affect fuel loads in *Eucalyptus* forests: Implications for fire management in a changing climate. *Forest Ecology and Management* (260) 1791 - 1797.

Woinarski, J. C. Z., Armstrong, M., Brennan, K., Fisher, A., Griffiths, A. D., Hill, B., Milne, D. J., Palmer, C., Ward, S., Watson, M., Winderlich, S. and Yound, S. (2010) Monitoring indicates rapid and severe decline of native small mammals in Kakadu National Park, northern Australia. *Wildlife Research* (37) 116 – 126.

### **(3) Can you provide additional examples of the impacts of inappropriate fire regimes on particular native species or ecological communities?**

Mt Emu she-oak *Allocasuarina emuina*

The Recovery Plan for the Mt Emu she-oak (*Allocasuarina emuina*) has some relevant information on the fire regimes required for this species and mentions that the changed regimes following urban development around the populations are having impacts. It is also a good example of how an endangered species' requirements for fire (in this case burns every 5-7 years given the reduced seed viability past this point) may be at odds with the general fire regimes identified for the ecological community it occurs in (mainly heath - 8-12 years in ecological guidelines). The Recovery Plan can be found at: <http://www.environment.gov.au/biodiversity/threatened/publications/pubs/a-emuina.pdf>

#### *Back on Track*

The *Back on Track* project was initiated by the Queensland Department of Environment and Resource Management (DERM) and partnered with regional NRM bodies to address the decline of priority species within each NRM region of Queensland. The project does this by identifying priority species, the threats to those species and the actions required to assist in mitigating those threats. The SEQ Back on Track plan identifies inappropriate fire regimes as a major threat to 30 Back on Track priority species due to loss of habitat, loss of individuals, limited capacity to reproduce and habitat degradation.

Of these 30 species, 16 are flora species and 14 are fauna, with a total of nine being listed on the EPBC Act, as indicated by an asterisk. These species are:

#### Flora

- *Acacia attenuata*\*;
- *Acacia baueri* (subsp. *baueri*);
- *Acacia saxicola*;
- *Blandfordia grandiflora*;
- *Boronia keysii*\*;
- *Boronia safrolifera*;
- *Brachychiton* sp;
- *Callitris baileyi* ,
- *Caustis blakei* (subsp. *macrantha*);
- *Corchorus cunninghamii*\*;
- *Macarthuria complanata*;
- *Melaleuca groveana*;
- *Platysace* sp;
- *Sarcochilus hartmannii*\*;
- *Swainsona fraseri*; and
- *Tephrosia* sp.

## Birds

- Black-breasted button quail\*;
- Eastern bristlebird\*;
- Ground parrot; and
- Red goshawk\*.

## Mammals

- Brush-tailed rock wallaby\*;
- Golden-tipped bat; and
- Yellow bellied glider.

## Reptiles

- Collared delma\*;
- Common delma;
- Elf skink;
- Pale-headed snake; and
- Stephens' banded snake;

## Invertebrates

- Bennett's woodland snail; and
- Varied sword-grass brown.

Further discussion on the inclusion of recommendations from this plan in a regional TAP is provided below (Question 6).

### *Border Ranges Rainforest Biodiversity Management Plan*

The Border Ranges Rainforest Biodiversity Management Plan lists seven fauna species and 23 flora species are threatened by inappropriate fire, these species are:

## Flora

- *Acronychia littoralis*;
- *Arthraxon hispidus*;
- *Baloghia marmorata*;
- *Bosistoa transversa*;
- *Clematis fawcettii*;
- *Corchorus cunninghamii*;
- *Cryptocarya foetida*;
- *Endiandra floydii*;
- *Endiandra hayesii*;
- *Floydia praealta*;
- *Fontainea australis*;
- *Macadamia tetraphylla*;
- *Marsdenia longiloba*;
- *Ochrosia moorei*;
- *Owenia cepiodora*;
- *Phebalium distans*;
- *Plectranthus nitidus*;
- *Sarcochilus fitzgeraldii*;
- *Sarcochilus hartmannii*;
- *Symplocos baeuerlenii*;
- *Syzygium moorei*;
- *Tinospora tinosporoides*; and
- *Tylophora woollsii*.

## Fauna

- Black-breasted button-quail;
- Brush-tailed rock-wallaby;
- Eastern bristlebird;
- Hastings River mouse;
- Long-nosed potoroo;
- Spotted-tailed quoll (southern subspecies); and
- Three-toed snake-tooth skink;

### *Ecological Communities Listed under the EPBC Act*

Four ecological communities in SEQ are listed as either endangered or critically endangered under the EPBC Act, these are:

- Brigalow (*Acacia harpophyll* dominant or co-dominant) - RE 12.8.23, 12.9/10.6;
- Swamp Tea Tree (*Melaleuca irbyana*) Forest - RE 12.9-10.11, 12.3.3c;
- Littoral Rainforest and Coast Vine Thickets - RE 12.2.2; and
- Box Gum Grassy Woodland, listed as White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland - Box Gum Grassy Woodland is a component of RE 12.8.16.

These communities are all recognised as being threatened by a number of processes, including inappropriate fire regimes.

### **(4) Can you comment on the impact on biodiversity of contemporary fire regimes in a particular region of Australia?**

#### *Regional Ecosystems and Recommended Fire Management Guidelines*

Vegetation communities in Queensland are described as “*Regional Ecosystems*” (RE) and DERM have identified 151 REs in the SEQ bioregion. These 151 REs have been grouped into 18 broad vegetation groups for the purposes of assigning recommended fire management guidelines (i.e. fire season, intensity, interval, strategy and issues). These guidelines were developed by Cuong Tran (former Coordinator for the SEQFBC) and Geoff Smith (Queensland Herbarium) and made publically available as part of the Regional Ecosystem Description Database in 2009. DERM is currently undergoing a review of its planned burn guidelines (“*Climate Q – Improved Fire Management in National Parks*”) and this will include a review of recommended fire regimes. The SEQ region has already undergone a trial review and the Wet Tropics region is expected to be at draft stage by December. The SEQ region will then undergo its formal review in early 2011. At this stage, it would seem appropriate to wait for the outcomes of this review and refer to these with reference to fire regimes in SEQ (and the Wet Tropics). However, the vegetation groups identified as being in most need of further information to better inform recommended fire management and regime guidelines are:

- Melaleuca forest/woodland (RE 12.2.7, 12.3.12, 12.9-10.10, 12.9-10.11, 12.11.21, 12.3.4, 12.3.5, 12.3.6);
- Wet sclerophyll (REs 12.2.4, 12.3.2, 12.5.6a, 12.8.8, 12.8.9, 12.11.2, 12.12.15a, b);
- Montane Heath (REs 12.8.19, 12.12.10); and
- Dry sclerophyll with shrubby understorey (REs 12.2.5, 12.2.11, 12.5.3, 12.5.5, 12.5.6 (b, c), 12.5.12, 12.7.1, 12.7.2, 12.8.20, 12.9-10.5, 12.9-10.9 (shrubby or grassy), 12.9-10.20, 12.12.6, 12.12.14).

The person to contact in DERM for a copy of the SEQ trial review or for more information is:

- **David Shevill** (Project Manager) - ClimateQ “Improved Fire Management in National Parks”  
Ph: (07) 3330 5199; Mob: 0457 536 318  
E-mail: [david.shevill@derm.qld.gov.au](mailto:david.shevill@derm.qld.gov.au)

**(5) In cases where contemporary fire regimes are impacting on biodiversity, is this caused by inappropriate policies governing those regimes, lack of implementation of existing policies, or both? Alternatively, are there other reasons?**

In the SEQ region, the key reasons that inappropriate fire regimes may be impacting on biodiversity are:

- the occurrence of arson and wildfire that disrupt planned burning regimes and often occur at greater intensity and geographic ranges than hazard reduction burns or ecological burns would have been implemented;
- a general lack of information on plant, animal and ecosystem response to fire in the SEQ region for many vegetation groupings;
- local disagreement between land managers and other stakeholders over recommended fire regimes;
- lack of experience or leadership within some land management organisations in implementing recommended fire management guidelines;
- other environmental issues such as weed presence, vegetation removal and habitat fragmentation;
- competing priorities with life and property protection and agricultural landuse, in particular grazing;
- in some circumstances uninformed opinion and under resourcing prevents the thorough implementation of management plans;
- fragmentation of land ownership/responsibility across the landscape often complicates fire management planning and onground activities; and
- in some circumstances biodiversity suffers because of poor fire management planning/policy and/or insufficient habitat conservation (i.e. the geographic size and/or quality of habitat).

**(6) If ‘Fire regimes that cause biodiversity decline’ is listed as a Key Threatening Process, then do you consider that the development and implementation of a National Threat Abatement Plan is a feasible, effective and efficient way to abate the threat?**

A national TAP would provide essential recommendations and be the lead document to direct mitigation of the threat of inappropriate fire regimes and biodiversity decline. However, the development of a TAP alone will not abate this threat. For a TAP to “effectively and efficiently” abate this threat, the TAP would need to include a realistic budget and include significant funding for implementation of the plan. Without this, the TAP is a guide, with no additional resources available for implementation, beyond what regional land managers and state agencies already have at their disposal. It would not appear realistic to presume that these organisations could effectively implement such a significant plan without some level of funding. One option might be to include specific recognition of inappropriate fire regimes and biodiversity loss in the next Caring for our Country Business Plan to allow for the funding of relevant projects. However, SEQFBC are also mindful that much of this funding has already been allocated in previous years and funding specific to the proposed TAP would be the best solution.

The submission also recognises the need for regional TAPs, which SEQFBC supports as a necessary way of addressing regional ecological and social complexities. Although, it is not clear who would develop these regional plans (i.e. would these plans be developed as part of a national TAP, or would funding be provided at a regional level for plans to be developed by regional NRM bodies or another organisation), or what level of community consultation and input they would have. The submission also states that:

*“A TAP could target and coordinate management for EPBC Act listed threatened species and ecological communities that have inappropriate fire regimes identified as a threat, at the scale of each NRM regional body”.*

No information is provided on how a TAP could “*coordinate*” management and without the provision of funding, it would appear that a TAP would guide management rather than “*coordinate*” management.

Overall, the SEQFBC strongly support the development of a national TAP and subsequent regional TAPs, but also highlights the need for supporting funds to implement regional plans.

**(7) If a National Threat Abatement Plan is developed, what activities should be included in the plan, specifically for the region(s) with which you are familiar?**

In a recent paper published in *Biological Conservation*, Driscoll *et al.* (2010) discuss “*key research questions and our capacity to answer them*” with respect to fire management and biodiversity. They highlight three broad knowledge gaps that “*currently limit our ability to plan fire regimes that will conserve biodiversity*”, each being highly relevant from a national and SEQ region perspective.

They are:

1. “*A mechanistic understanding of the response of a range of plants and animals to fire regimes;*”
2. *Knowledge of how species are influenced by the spatial arrangement and temporal sequence of fires; and*
3. *Knowledge of how factors such as herbivory, predation, fragmentation, invasive species and weather interact with fire to alter species’ responses to fire directly, or via changes to the fire regimes”.*

Specifically in SEQ, the most urgent research and information priorities that would need to be included in a regional TAP include:

- the development of a database providing information on the response of flora and fauna species and ecological communities to fire;
- dedicated research on the impact of fire regimes and small mammals, reptiles and invertebrates;
- the development of an SEQ specific fuel hazard assessment and fuel load guide for onground practitioners;
- information on the long-term response of vegetation communities to fire and changes in fire regimes;
- the effects and impacts of climate change on fire behaviour and fuel load in the sub-tropics; and
- the response of exotic grasses to fire in order to better manage the rate and spread of exotic grasses.

Obviously, even if funding was to be made available, it would not be possible to fund all the work needed in each region. Therefore, it may be appropriate to overlay fire threat with biodiversity values in order to identify the areas with the highest biodiversity values and greatest risk of inappropriate fire. This would then need to be linked with regional and local resources, stakeholders and community capacity.

Any SEQ regional TAP would also need to refer to the section of the SEQ Back on Track plan on “*inappropriate fire regimes*”, which identifies:

- current actions;
- plans and strategies;
- on-ground works;
- community capacity potential; and
- research and monitoring needs with reference to mitigating inappropriate fire regimes.



**(8) Can you provide any additional data or information relevant to this assessment?**

NA

**(9) Can you suggest any other relevant person or organisation that should be approached to comment on this nomination?**

Queensland Conservation Council

AgForce

Powerlink

Queensland Department of Main Roads

Queensland Department of Environment and Resource Management

Queensland Farmers Federation

Queensland Fire and Rescue Service

Queensland Local Government Association

SEQ Catchments

Wildlife Preservation Society of Queensland

WWF Australia

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