

Project Order, Variations and Research Progress

Project Title: [Fire ecology of grassy woodlands](#)

This document contains three sections. Click on the relevant section for more information.

- Section 1: [Research Project Order as approved by the GISERA Research Advisory Committee and GISERA Management Committee before project commencement](#)
- Section 2: [Variations to Project Order](#)
- Section 3: [Progress against project milestones](#)



1 Original Project Order

Project Order

Proforma 2012

1. Short Project Title (less than 15 words)

Project 2 – Fire ecology

Long Project Title	Fire ecology of grassy woodlands
GISERA Project Number	B2 1215
Proposed Start Date	October 2012
Proposed End Date	September 2015
Project Leader	Alan Andersen (CSIRO)

2. GISERA Research Program

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> Biodiversity Research | <input type="checkbox"/> Marine Research | <input type="checkbox"/> Land Research |
| <input type="checkbox"/> Water Research | <input type="checkbox"/> Social & Economic Research | |

3. Research Leader, Title and Organisation

Alan Andersen
Chief Research Scientist
CSIRO Ecosystem Sciences

4. Summary (less than 300 words)

Appropriate fire regimes are critical for the conservation of the fire-prone vegetation that covers most of the Australian continent. Highly fire-prone grassy woodlands dominate the coal seam gas (CSG) development region, and the CSG industry has identified fire as a priority issue for managing CSG impacts. Recent climatic conditions resulting in increased fuel loads are also of concern. This has exposed a gap in fire ecology understanding around this region and knowledge of how to best

manage the biodiversity impacts of altered fire regimes associated with the development is currently unavailable.

CSG development could potentially influence fire regimes in diverse ways. On one hand, increased human activity might lead to increased ignition sources and therefore to increased fire frequency. On the other hand, landscape-scale developments involving long linear structures can restrict the free movement of fire across the landscape, and so reduce fire frequency in isolated patches. The existence of valuable and fire-sensitive infrastructure might also lead to enhanced fire suppression and therefore a managed reduction in the incidence and severity of fires in the landscape. Such changes to the existing fire regime have the potential to lead to important biodiversity impacts, by altering bio-geochemical cycling and other ecological processes, changing vegetation structure, and promoting invasive species. However, the fire ecology of the region is not well understood and it is currently not possible to predict the impacts of either increased or reduced fire severity. More generally, the sensitivity of the regional biota to changed fire regimes, and the thresholds at which changed fire regimes cause substantial ecological impact, are poorly understood. This project will address the knowledge gap issue for the regionally dominant and most fire-prone grassy woodlands.

5. Budget Summary (From Excel Budget Pack worksheet "Project Plan Summary")

Expenditure	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
Labour		134,753	299,716	174,977	44,100	653,547
Operating		59,370	60,000	10,000	6,125	135,495
Total Costs		194,123	359,716	184,977	50,225	789,042
CSIRO		194,123	359,716	184,977	50,225	789,042
Total Expenditure		194,123	359,716	184,977	50,225	789,042

Expenditure per Task	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
Task 1		194,123	359,716	184,977	50,225	789,042
Total Expenditure		194,123	359,716	184,977	50,225	789,042

Cash Funds to Project Partners	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
CSIRO		146,042	97,361	146,042	97,362	486,807
Total Cash to Partners		146,042	97,361	146,042	97,362	486,807

Source of Cash Contributions	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
Australia Pacific LNG		146,043	97,361	146,042	97,362	486,807
Total Cash		146,042	97,361	146,042	97,362	486,807

Contributions						
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In- Kind Contribution from Partners	2011/12 Year 1	2012/13 Year 2	2013/14 Year 3	2014/15 Year 4	2015/16 Year 5	Total
CSIRO		48,080	262,356	38,935	-47,137	302,235
Total In- Kind Contribution from Partners		48,080	262,356	38,935	- 47,137	302,235

	Total funding over all years	Percentage of Total Budget
Australia Pacific LNG Investment	486,807	62%
CSIRO Investment	302,235	38%
Total Other Investment		
TOTAL	789,042	100%

Task	Milestone Number	Milestone Description	Funded by	Participant Recipient	Start Date (mm- yy)	Delivery Date (mm- yy)	Fiscal Year	Fiscal Quarter	Payment \$
Task 1	1	On sign contract	GISERA	CSIRO	Oct-12	Dec-12	2012/13	Quarter 2	148,988.92
Task 1	2	On completion of experimental plot setup	GISERA	CSIRO	Jan-13	Jun-13	2012/13	Quarter 4	74,494.46
Task 1	3	On completion of manuscript submission from experimental plots	GISERA	CSIRO	Jun-13	Jun-14	2013/14	Quarter 4	148,987.39
Task 1	4	On completion of biodiversity assessments	GISERA	CSIRO	Jun-14	Oct-14	2014/15	Quarter 2	148,987.39
Task 1	5	On completion of data analysis	GISERA	CSIRO	Oct-14	Dec-14	2014/15	Quarter 2	74,494.46
Task 1	6	On acceptance of final report	GISERA	CSIRO	Jan-15	Jun-15	2015/16	Quarter 4	148,988.92

6. Other Researchers (include organisations)

Researcher	Time Commitment (project as a whole)	Principle area of expertise	Years of experience	Organisation
Alan Andersen	0.1	Ant ecology	30	CSIRO
Garry Cook	0.1	Vegetation ecology	25	CSIRO
Dr Teresa Eyre	0.1	Plant and animal ecology	20	Old Govt
Dr Rod Fensham	0.05	Vegetation ecology	25	Old Govt

7. GISERA Objectives Addressed

Research that improves and extends knowledge of environmental impacts and opportunities of CSG-LNG projects, enabling the CSG-LNG industry to better meet the expectations of relevant communities and the broader public.

Informing government, regulators and policy-makers on key issues regarding policy and legislative framework for the CSG-LNG industry.

8. Program Outcomes Achieved

Details are provided in *Section 13. Project Objectives and Outputs*.

9. Program Outputs Achieved

Details are provided in *Section 13. Project Objectives and Outputs*

10. What is the knowledge gap that these research outputs will address?

The major outcomes from this project will be an understanding of the sensitivity of the regional biota to variation in fire regimes, and identification of thresholds where change becomes a conservation concern. This will address a key uncertainty in the region.

11. How will these research outputs and outcomes be used by State Government and other managers?

The research will provide state government, local governments and industry with context for predicting potential future fire regimes.

12. Project Development (1 page max.)

The project was developed in consultation between Australia Pacific LNG and CSIRO staff. The proposed activity was discussed with members from various stakeholder groups and was identified as an important research need.

This work will be undertaken in collaboration with relevant groups and professionals within the regions who work on fire management.

13. Project Objectives and Outputs

The major outcomes from this project will be an understanding of the sensitivity of the regional biota to variation in fire regimes, and identification of thresholds where change becomes a conservation concern. This will address a key uncertainty in the region. There is potential to extend this project to long term monitoring of fire-affected sites. At relatively low cost, but with an ongoing commitment, such work could deliver results after 5-10 years of monitoring activity.

14. Project Plan

The project will comprise two core components: (1) landscape-scale analysis of biota at sites with different fire histories, reviewing and building on existing fire and biodiversity research in the region; and (2) modelling the sensitivity of populations of representative tree species to variation in fire regimes, based on existing information on tree growth and survival in relation to fire.

The landscape-scale analysis will be based on biodiversity assessments of a large number of sites that cover a range of regional fire regimes, representing low, moderate and high fire frequency. Because sites have varying fire histories, the historical and current fire regime can be used to provide context for predicting potential future fire regimes. The assessments will target a range of taxonomic groups, including woody plants, mammals, birds and ants, building on Department of Environment and Heritage Protection’s (DEHP) (formerly Department of Environment and Resource Management) existing database on plant and animal species distributions in the region. This and the tree population modeling work will be undertaken in collaboration with relevant groups and professionals within the region who work on fire management.

The table below shows how project activities align with each of the scientific research aims.

Research aim	Research methods	Outcomes
Year 2012- 2013		
<ul style="list-style-type: none"> Assessments fire regimes of survey sites for landscape-scale analysis, and commencement of new data collection. 	<ul style="list-style-type: none"> Field sampling, GIS analysis Population modelling using FLAMES. 	<ul style="list-style-type: none"> Identified study sites representing the full range of regional fire regimes. Preliminary understanding of sensitivity of tree species to variation in fire regimes
Year 2013- 2014		
<ul style="list-style-type: none"> Continuation of biodiversity sampling, processing and identification 	<ul style="list-style-type: none"> Field sampling and laboratory processing Simulation modeling 	Understanding of the sensitivity of the regional biota to variation in fire regimes.

<ul style="list-style-type: none"> • Completion of tree population modeling. 		
Year 2014- 2015		
Continuation of biodiversity sampling, processing and identification. Analysis and write-up	Field sampling, laboratory processing and data analysis, synthesis of findings, writing publications.	High quality peer-reviewed scientific papers outlining thresholds where changes in fire regimes become a conservation concern. Guidance for managing fire in the region.

14.1 Project Schedule

ID	Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
1	Sign contract	Andersen	Oct 12	Dec 12	
2	Set up experimental plots	Andersen	Jan 13	Jun 13	1
3	Submit manuscript from experimental plots	Andersen	Jun 13	Jun 14	2
4	Complete biodiversity assessments	Andersen	Jun 14	Oct 14	3
5	Complete data analysis	Andersen	Oct 14	Dec 14	4
6	Produce final report	Andersen	Jan 15	Sep 15	5

Task 1.

TASK NAME: Sign contract.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – Dec 2012

BACKGROUND: Contract needs to be signed to allow project to proceed.

TASK OBJECTIVE: To sign the contract.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Signed contract.

Task 2.

TASK NAME: Set up experimental plots.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Jan 2013 – Jun 2013

BACKGROUND: The experimental work will be conducted on Glen Innes station near Alpha, where DEHP has established experimental fire plots. As well as assessments of experimental plots at Glen Innes, there will be selection of study sites for landscape-scale analysis (see full project plan).

TASK OBJECTIVE: To establish the field and landscape plots.

TASK OUTPUTS & SPECIFIC DELIVERABLES: On-ground setup of plots, with established fire histories. Identified study sites representing the full range of regional fire regimes.

Task 3.

TASK NAME: Submit manuscript from experimental plots.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Jun 2013 – Jun 2014

BACKGROUND: Results from experimental work will be written up for publication in scientific journals.

OBJECTIVE: To produce a scientific manuscript detailing the results of the experimental work.

TASK OUTPUTS & SPECIFIC DELIVERABLES: One scientific manuscript.

Task 4.

TASK NAME: Complete biodiversity assessments.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – Dec 2012

BACKGROUND: Field sampling of experimental and landscape plots to establish biodiversity responses to alternative fire regimes.

TASK OBJECTIVE: To assess biodiversity responses in the field.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Data on biodiversity responses.

Task 5.

TASK NAME: Complete data analysis.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – Dec 2012

BACKGROUND: Following field data collection, a full analysis will be conducted.

TASK OBJECTIVE: To understand the signals from the data.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Analysed data.

Task 6.

TASK NAME: Produce final report

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – Dec 2012

BACKGROUND: Project reporting is a key deliverable.

TASK OBJECTIVE: To produce a final report.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Final report.

15. Budget Justification

The budget for this project has been approved by GISERA's Research Advisory Committee and Management Committee.

16. Project Governance

Project management tasks and dissemination activities are specified in *Section 14 Project Plan*.

17. Communications Plan

General communication will be managed by GISERA.

18. Risks

At this stage no unmanageable risks particular to this project are foreseen.

Capacity to deliver: All project staff have sufficient experience to lead and supervise the various activities and ascertain the research outcomes. Therefore the impact of unplanned key staff departure is low and can be mitigated.

19. Intellectual Property and Confidentiality

Background IP (clause 10.1, 10.2)	Party	Description of Background IP	Restrictions on use (if any)	Value
				\$
				\$
Ownership of Non-Derivative IP (clause 11.3)	CSIRO			
Confidentiality of Project Results (clause 15.6)	Project results are not confidential.			
Additional Commercialisation requirements (clause 12.1)	Not Applicable			
Distribution of Commercialisation Income (clause 1.1)	Not applicable			
Commercialisation Interest (clause 1.1)	Party		Commercialisation Interest	
	Australia Pacific LNG			
	CSIRO			

20. Approval from Project Parties

In signing this Document you are committing your organisation to provide the specified funds, personnel and the required in-kind contributions.

Australia Pacific LNG

SIGNED for and on behalf of Australia Pacific LNG, exercising authority delegated by the GISERA Management Committee

by
in the presence of

Dean Sullivan
.....

Shiner
.....
Signature of witness

SALVATRICE RANIERI
.....
Name of witness

~~14-2-12~~ *14-2-13*
.....
Date

CSIRO

W. M. Marshall

SIGNED for and on behalf of CSIRO, exercising authority delegated by the GISERA Management Committee

by
in the presence of

DR MARK LOWSDALE
.....

Shiner
.....
Signature of witness

LINDA LEVITT
.....
Name of witness

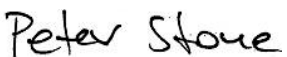

31/1/2013
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Date

2 Variations to Project Order

Changes to research Project Orders are approved by the GISERA Director, acting with authority provided by the GISERA National Research Management Committee, in accordance with the [National GISERA Alliance Agreement](#).

The table below details variations to research Project Order.

Register of changes to Research Project Order

Date	Issue	Action	Authorisation
19/04/13	Research project start date delayed; milestone dates require rescheduling	All milestone dates rescheduled to reflect later project start date; timing of milestones relative to start date not altered.	
09/12/14	Due to the desire to incorporate into the manuscript new research about the impacts of fire management on carbon sequestration in savannas and the interactions with climate change, it is preferred to wait until these new findings are being published.	Milestones 3, 5 and 6 will be pushed back by 4 months	

3 Progress against project milestones

Progress against milestones are approved by the GISERA Director, acting with authority provided by the GISERA National Research Management Committee, in accordance with the [National GISERA Alliance Agreement](#).

Progress against project milestones/tasks is indicated by two methods: Traffic Light Reports and descriptive Project Schedule Reports.

1. Traffic light reports in the Project Schedule Table below show progress using a simple colour code:
 - **Green:**
 - Milestone fully met according to schedule.
 - Project is expected to continue to deliver according to plan.
 - Milestone payment is approved.
 - **Amber:**
 - Milestone largely met according to schedule.
 - Project has experienced delays or difficulties that will be overcome by next milestone, enabling project to return to delivery according to plan by next milestone.
 - Milestone payment approved for one amber light.
 - Milestone payment withheld for second of two successive amber lights; project review initiated and undertaken by GISERA Director.
 - **Red:**
 - Milestone not met according to schedule.
 - Problems in meeting milestone are likely to impact subsequent project delivery, such that revisions to project timing, scope or budget must be considered.
 - Milestone payment is withheld.
 - Project review initiated and undertaken by GISERA Research Advisory Committee.
2. Progress Schedule Reports outline task objectives and outputs and describe, in the 'progress report' section, the means and extent to which progress towards tasks has been made.

Project Schedule Table

ID	Task Title	Task Leader	Scheduled Start	Scheduled Finish	Predecessor
1	Sign contract	Andersen	Oct-12	May-13	
2	Set up experimental plots	Andersen	Jun-13	Nov-13	1
3	Submit manuscript from experimental plots	Andersen	Nov-13	Mar-15	2
4	Complete biodiversity assessments	Andersen	Nov-14	Mar-15	3
5	Complete data analysis	Andersen	Mar-15	Dec-15	4
6	Produce final report	Andersen	Jun-15	Mar-16	5

Project Schedule Report

Task 1.

TASK NAME: Sign contract.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – May 2013

BACKGROUND: Contract needs to be signed to allow project to proceed.

TASK OBJECTIVE: To sign the contract.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Signed contract.

PROGRESS REPORT:

The contract was signed in February 2013.

Task 2.

TASK NAME: Set up experimental plots.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Jan 2013 – Jun 2013

BACKGROUND: The experimental work will be conducted on Glen Innes station near Alpha, where DEHP has established experimental fire plots. As well as assessments of experimental plots at Glen Innes, there will be selection of study sites for landscape-scale analysis (see full project plan).

TASK OBJECTIVE: To establish the field and landscape plots.

TASK OUTPUTS & SPECIFIC DELIVERABLES: On-ground setup of plots, with established fire histories. Identified study sites representing the full range of regional fire regimes.

PROGRESS REPORT:

This milestone has been fully met. A total of 59 study sites have been selected at Claravale, Currawarra, Myrtleville and Glendonnell Stations, representing a broad range of fire histories. Ants have been sampled at all these sites, and vascular plants and vertebrates at a subset of them. A presentation on the project was given at the GISERA workshop in Brisbane in October.

Task 3.

TASK NAME: Submit manuscript from experimental plots.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Jun 2013 – Jun 2014

BACKGROUND: Results from experimental work will be written up for publication in scientific journals.

OBJECTIVE: To produce a scientific manuscript detailing the results of the experimental work.

TASK OUTPUTS & SPECIFIC DELIVERABLES: One scientific manuscript.

PROGRESS REPORT:

The manuscript "Tree stand dynamics in central Queensland: Is fire irrelevant?" was submitted to publish on 9 April 2015. The paper found that the imposition of fires of low or very low intensity did not cause any discernible change in the probability of survival of trees, and concluded that water limitations rather than fire is a driver of tree dynamics.

Task 4.

TASK NAME: Complete biodiversity assessments.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – Dec 2012

BACKGROUND: Field sampling of experimental and landscape plots to establish biodiversity responses to alternative fire regimes.

TASK OBJECTIVE: To assess biodiversity responses in the field.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Data on biodiversity responses.

PROGRESS REPORT:

The project has three data sets:

- Tree responses to fire. These data are described in the manuscript delivered for milestone 3, with Garry Cook (Garry.Cook@csiro.au) the data holder. Manuscript title 'Tree stand dynamics in central Queensland: Is fire irrelevant?'
- Vertebrate responses to fire. These data are described in the attached manuscript, with Teresa Eyre from the Qld Herbarium (teresa.eyre@dsiti.qld.gov.au) the data holder. Manuscript title 'Relative effects of fire on fauna assemblages in fragmented grazing landscapes'.
- Ant responses to fire. The fieldwork for this was successfully completed in May 2014, but the processing of samples (59 sites x 20 traps x 2 occasions) has been substantially delayed by the redundancy of a technical officer assigned to the project and the extended sick leave of another. The completion of the processing of these samples is a likely 3 months away.

Task 5.

TASK NAME: Complete data analysis.

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 – Dec 2012

BACKGROUND: Following field data collection, a full analysis will be conducted.

TASK OBJECTIVE: To understand the signals from the data.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Analysed data.

PROGRESS REPORT:

Data analysis has been completed. Key results are:

- Trees. Eucalypts are highly resilient in relation to fire, and their population dynamics are driven primarily by water availability. In contrast, the density of fire-sensitive *Callitris* increases markedly in the absence of fire, and *Callitris* can dominate long-unburnt sites.
- Vertebrates
 - Reptiles. High fire frequency significantly reduced reptile species richness in poplar box fragments.
 - Birds. Frequent fire reduces the density and diversity of small woodland-dependent species, by simplifying the shrub layer and facilitating domination by aggressive miners and predatory species.
 - Mean small mammal species richness was significantly higher in burnt than unburnt poplar box fragments.
- Ants
 - More than 300 ant species were recorded during the study
 - Ant richness and composition was influenced by fire frequency, but not time since the last fire.
 - Long-unburnt sites dominated by *Callitris* had relatively low ant diversity, but supported a compositionally distinct fauna
 - High ant diversity was maintained even under very high fire frequencies (every 2-3 yrs.)

Task 6.

TASK NAME: Produce final report

TASK LEADER: Alan Andersen

OVERALL TIMEFRAME: Oct 2012 - Mar 2016

BACKGROUND: Project reporting is a key deliverable.

TASK OBJECTIVE: To produce a final report.

TASK OUTPUTS & SPECIFIC DELIVERABLES: Final report.

PROGRESS REPORT:

The final report has been completed and is available on the GISERA website, [Biodiversity responses to variation in fire regimes in the coal-seam gas region of south-eastern Queensland](#).