



Central West Catchment Management Authority

Bioregional Assessment Part 2 Project Progress Report

28 June 2013

Table of contents

- 1.1 Introduction 1
- 1.2 Part Two Project Overview 1
- 1.3 Tasks Completed to Date3
- 1.4 Ongoing work 4
- 1.5 Final Project Tasks6

Table index

- Table 1: Project activities.....3
- Table 2: Final Project Tasks6

Figure index

- Figure 1 Bioregional Assessment Phase Two Overview.....2

1.1 Introduction

This summary identifies the work to date for the Central West Catchment Management Authority (CW CMA) project Bioregional Assessment Part 2: *“The vulnerability of water assets in the Central West to mining operations relative to threatened species and determination of resource condition on a local catchment scale and vulnerability to mining operations”*. The document provides a summary of progress against tasks identified in the project methodology and the final steps for projection completion and acceptance.

1.2 Part Two Project Overview

Bioregional assessments were initiated by the Commonwealth Government (Commonwealth) to provide at the large catchment level an analysis of the potential risks from coal seam gas or large coal mining developments to ecological, hydrological and geological water assets. A range of large catchments, generally coinciding with catchment management authority (CMA) boundaries, have been identified within NSW, Queensland and Victoria for bioregional assessments. The assessments were funded by the Department of Sustainability, Environment, Population, Water and Communities (SEWPaC). One of the catchment areas identified for this assessment is the Castlereagh, Bogan and Macquarie River catchments within the Central West Catchment Management Authority (CW CMA) region.

The following key deliverables from the bioregional assessment process have been identified by the Commonwealth:

- *Bioregional and sub-bioregional profiles that will present an overview of each region and sub regions in report format and interactive web systems that provide access to data, reference material and three dimensional 'conceptual' models.*
- *Surface and groundwater models to provide an integrated 'conceptual' understanding of a particular bioregion and a 'numerical' understanding of how all water related attributes interact to form a water balance.*
- *Risk assessment reports that will articulate the likely impacts of mine development on community and environmental values and may describe the direct and indirect impacts of a particular mining activity or mining activities on a region's values.*

Part One of the CW CMA Bioregional Assessment was completed in early 2013 by SKM with the objective to:

- Provide a baseline identification and characterisation of the water assets within the CW CMA region; and
- Assess the potential effects to water assets in the area as a result of the direct and indirect impacts of coal seam gas development (CSG) or large coal mining development.

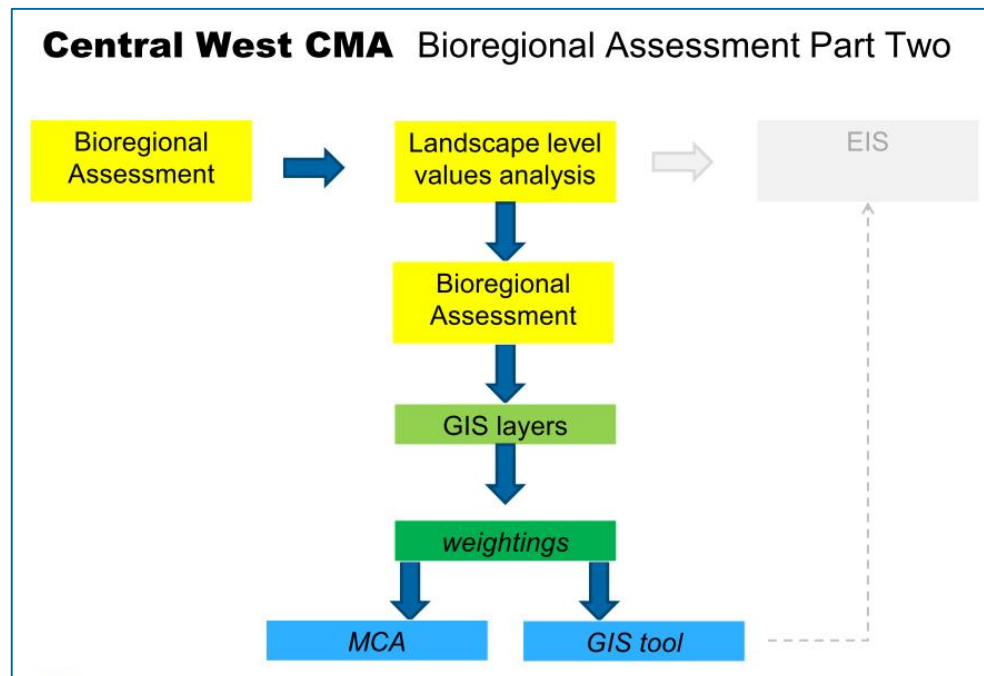
Potential risks from coal seam gas and large coal mining development to water assets within the catchment were captured in the Water Asset Information Tool (WAIT) provided by SEWPaC. Spatial datasets and two final reports were prepared. Open cut coalmining, long-wall coal mining and coal seam gas mining was considered in this assessment with other forms of mining such as gold and

other precious metals, and other forms of gas extraction and quarrying deliberately excluded.

Part Two of the Bioregional Assessment seeks to build on the Part One outputs, and 'operationalise' the findings from the initial report, including the WAIT vulnerability and sensitivity assessments, and additional data and information, into an easily accessible tool that can be used by the CW CMA. The CW CMA engaged GHD under a competitive tender process to complete Part Two.

To deliver these project objectives, GHD identified an approach to develop a GIS-based Multiple Criteria Analysis (MCA) mapping methodology to provide a user-friendly assessment tool, capable of combining a large array of factors into an easily understood risk-based vulnerability mask layer. This will be accompanied by a GIS tool in which the user can query weighted GIS layers to identify for a specific location those factors that may be driving risk. An overview of this process is shown in the figure below.

Figure 1 Bioregional Assessment Phase Two Overview



These products, which will need to be used by staff with some GIS understanding, provide the basis to assess the vulnerability of the water assets, threatened species and local catchment functions within the CW CMA to coal mining (open cut, long wall and coal seam gas) operations. The use of this tool will provide natural resource planners within the CMA with an analysis of where in the landscape mining may compromise agriculture, water assets, biodiversity and catchment functions. At the landscape level it will flag which factors are driving the risk from a particular mining proposal in a specific area, and therefore the factors that will require detailed consideration in an environmental assessment. The tool is dynamic and customisable, may be updated to incorporate new data and information and will be able to be applied to a range of other catchment based NRM issues.

1.3 Tasks Completed to Date

A summary of the tasks completed and those remaining are identified in the table below with details provided against each activity.

Table 1: Project activities

Activity	Output	Completed
Project inception	<ul style="list-style-type: none"> Agreed basis for undertaking the project, transfer of all relevant information from CW CMA 	Yes
Data Collection	<ul style="list-style-type: none"> Collection and analysis of Stage One data including WAIT database and GIS layers. Consultation and clarification with CW CMA regarding the utility and validity of available datasets Collection and review of additional spatial datasets important to the project 	Yes
MCA and GIS query tool development	<ul style="list-style-type: none"> Review of spatial data layers and preparation of base weightings source datasheet. Initial review of spreadsheet by specialists and assignment of weightings Initial model design and development Internal technical liaison between specialists CW CMA workshop with CW CMA internal and external stakeholders Identification of additional datasets for inclusion and liaison with specialists to assess their validity and utility Ongoing testing and quality assurance of the MCA GIS tool until final datasets are confirmed 	Yes
Catchment/species vulnerability report and finalisation of MCA GIS tool	<ul style="list-style-type: none"> Draft report detailing (at risk) species and assets Final report 	Commenced
Capacity building	<ul style="list-style-type: none"> Training in MCA including additional uses Integration of MCA model and outputs 	Still to be completed

1.4 Ongoing work

To date CW CMA and GHD have assembled base datasets and those created from Part One (SEWPaC have advised that no new datasets are to be created as in Part 2) and continued with the development of the MCA model (including the initial application of sensitivity ratings and weightings). Standard rating techniques such as 'ordinal' or 'interval' were used as well as standard weighting techniques such as 'additive' or 'pair wise' methods were used. GIS software was used to produce a 'model' to apply the various criteria and their relative ratings and weightings for each of the datasets and combine them to produce a single constraints map for the CMA showing areas of relatively high and low vulnerability to mining and CSG activities.

A bioregional assessments agency workshop was jointly delivered by CW CMA and GHD on 5 June 2013 to provide an overview of project background and summarise progress to date to agency specialists. It was also used by GHD and CW CMA to review and confirm with the participants the assumptions in the risk model, risk approach and sensitivity ratings for each of the GIS layers that will be used. Participants also completed the pairwise rankings for each of the mining types within the MCA tool.

The workshop participants also identified that there should be:

- Follow up consultation with government agency groundwater specialists that were unable to attend the meeting, recognising the considerable local knowledge held within Government agencies and the need for these government specialists to provide their input and offer additional advice.
- Provision of additional datasets important for an analysis of mining impacts on catchment values, such as high quality soils layers.

Once these additional steps are confirmed the model will be updated to allow for the additional datasets.

Since the workshop all data identified as relevant to the MCA has now included in a specifically formatted geo-database. The data has all been attributed with the constraint levels and constraint scores developed at the workshop. The geo-database also includes the toolbox developed and a table that includes the outcomes from the pairwise comparisons.

The toolbox now contains a number of tools that the CMA can use. The tools include:

1. A tool to add standard fields to record the constraint levels and scores in any dataset (a standard domain, ie dropdown selection list, is also checked for and created as necessary, to ensure the population of these fields with the standard terms – Neutral, Low constraint, Moderately constrained, Highly constrained, Highly unsuitable and No go);
2. A tool to apply the appropriate constraint score into the relevant fields in a dataset once the constraint levels have been populated in the layer. (It is up to the user to populate the constraint levels into the layer prior to running this tool). This tool would be used to score the constraints for new/replacement layers being added into the MCA.
3. A tool that creates a standard format table to record the results of a pairwise comparison. (The user has to populate the actual table). This tool would be run as part of the setup for a completely new MCA.

4. A tool to run the MCA and produce the combined weighted constraint surfaces and store them in the geo-database. This tool would be run to update the existing MCA outputs, or as part of a completely new MCA.
5. A tool to allow an impact assessment of a specific area (this is the tool already demonstrated). This tool has been updated to use km and ha as the base units, rationalised the number of decimals in the outputs, and now also includes a percentage impact area for polygon features.

These first four tools have been used and tested as part of the geo-database build process to ensure they work.

Tasks to be completed

The following activities have been identified following on from the workshop, that it is hoped will significantly enhance project outputs.

Task One: Confirmation of the additional soils layers to be added to the MCA | GIS tool

The high and moderately high soils fertility layer has been identified as important for the analysis as an indicator of high productivity soils. "Risky/low value" soils are also identified as important (as they are flagged in CAP priorities) because they require special management if a mining proposal was to be considered.

There is uncertainty about which soil fertility classes in the range of Moderate to High should be adopted as the 'higher value' soils. To resolve this, GHD has been requested to provide draft project outputs with two sets of soil data: one which includes fertility data from moderate to high as 'high value' soils and one which includes moderately high to high as 'high value' soils. CW CMA will make a decision on which model will be used in the final report.

Once the above has been confirmed GHD will finalise the soils layer and prepare some advanced MCA combined constraint layers.

Task Two: Seeking Other Outstanding Layers

Currently all layers identified at the workshop have been brought into the database and the constraints as confirmed at the workshop. These layers have been attributed with the constraint rankings. However the following layers discussed at the workshop are yet to be obtained:

1. State Forest flora reserves and plantation forests. To be excluded from the current project – CW CMA can include at a later stage.
2. Voluntary type conservation areas. To be excluded from the current project – CW CMA can include at a later stage.
3. EPBC Act species sighting locations. To be excluded from the current project – CW CMA can include at a later stage.
4. AHIMS data – Note: In discussions with OEH the predictive Aboriginal Cultural Heritage modelling is not universally viewed very highly and is recognised as fairly coarse (ie not particularly useful at the level sought for this project). GHD is yet to confirm the CW CMA's preference about incorporating cultural heritage layers.
5. Better groundwater constraint data (such as utilising the HGL data) – GHD is currently pursuing Rob Muller in OEH to further clarify this data. This

groundwater data is critical and is currently a major gap, and our specialists are seeking to get in touch with Rob to make sure we interpret the data correctly.

In the meantime GHD will continue to test the model for the draft report including testing the fertility data to see how using different levels influences “heat maps.

1.5 Final Project Tasks

Once the issues with water data (especially the HGL layer) and the cultural heritage data are clarified GHD will be able to confirm the timing of the final project deliverables. The overall objective remains a very solid, robust and workable product that must include groundwater and/or HGL in the assessment.

It is anticipated that if the above can be confirmed by the end of June, the draft project deliverables can be completed in the next three to four weeks. These outstanding elements have delayed project delivery but are very important project value-adds that should be pursued to greatly enhance project outputs.

Table 2: Final Project Tasks

Task	GHD resources	Anticipated timing
Resolution of outstanding issues and additional layer to be included	Dominic Adshead, Genevieve Foley (Principal Hydrogeologist – GHD), Tim Ferraro	28 June 2013
MCA Model & GIS Tool Finalisation	Glenn McDiarmid Dominic Adshead & GHD technical specialists	19 July 2013
Draft project summary report	Dominic Adshead and Tim Ferraro	19 July 2013
Consolidated comments from CW CMA (two week review)	CW CMA	2 August 2013
Final report and project outputs	Tim Ferraro and Glenn McDiarmid	9 August 2013
Training in MCA including additional uses	Glenn McDiarmid and Tim Ferraro	By end August 2013 (at timing suitable to CW CMA)
Integration of MCA model and outputs		

GHD

Cnr Macquarie and Bultje Streets Dubbo NSW 2830

-

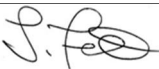
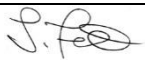
T: 2 6841 4600 F: 2 6841 4601 E: dbomail@ghd.com.au

© GHD 2013

This document is and shall remain the property of GHD. The document may only be used for the purpose of assessing our offer of services and for inclusion in documentation for the engagement of GHD. Unauthorised use of this document in any form whatsoever is prohibited.

N:\AU\Sydney\Projects\21\22385\WP\ProgressReport.docx

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	D.Adshead	T.Ferraro		T. Ferraro		24/6/13

www.ghd.com

